AUSTRALIS
Tree Management

Arboricultural Impact Assessment

Lot 2051 DP812614
1a Little Alfred Street, North Sydney

Commissioned by: **Ethos Urban**
173 Sussex Street
SYDNEY NSW 2000

Date: **16th November 2017**
File Reference: 20181384.1

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Summary

Australis Tree Management has been commissioned by Ethos Urban to complete an arboricultural impact assessment. This report aims to identify the health and condition of the selected trees, potential impacts from proposed works and to provide recommendations regarding tree retention and protection.

On the 10th November 2017, I attended the site, Little Alfred Tennis Centre at 1a Little Alfred Street, North Sydney and inspected twenty four (24) trees, which are located on site and within 5m of the boundaries of the site on adjoining properties.

I completed a modified Tree Survey Form (Matheny & Clark, 1994), applied '*TreeAZ*' ratings (Barrell, 2016) as well as taking supporting photographs of the trees.

The development proposed is for the demolition of the existing clubhouses and tennis courts for the construction of a high density development.

- Three (3) trees on adjoining northern properties are selected for retention.
- Twenty one (21) trees are located on the southern adjoining property being a public park area, theses are also proposed for retention though varying amounts of pruning is required for some trees overhanging the boundary

Trees proposed for retention will require tree protection measures throughout the development works to ensure their long term survival.

The tree defects and symptoms that were encountered have been discussed in section 5 and a detailed tree schedule is included in appendix a.

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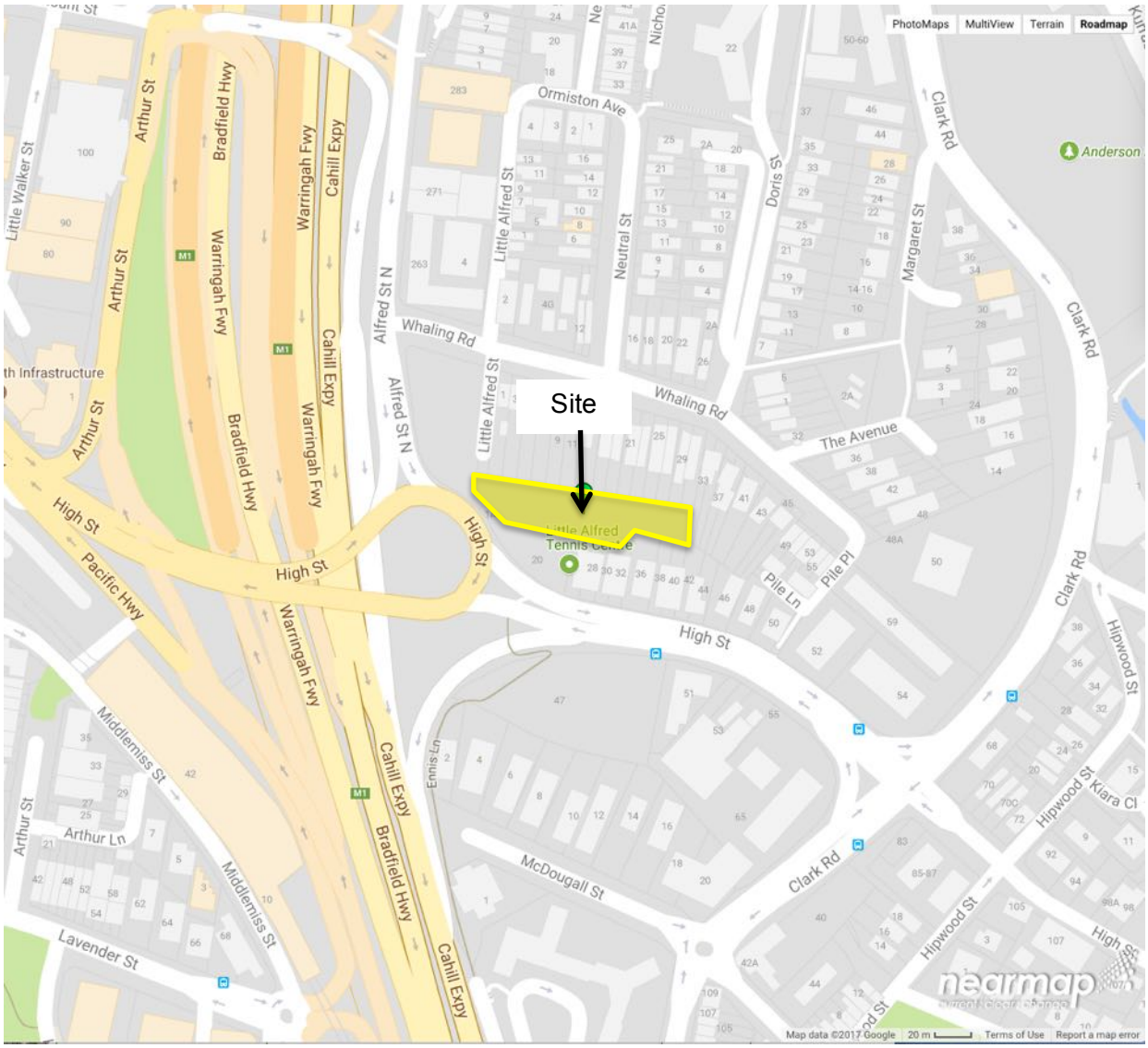
Abbreviations

LGA…….Local Government Authority
SRZ…….Structural Root Zone
TPO…….Tree Preservation Order
TPZ…….Tree Protection Zone

Location Map

1a Little Alfred Street, North Sydneyx

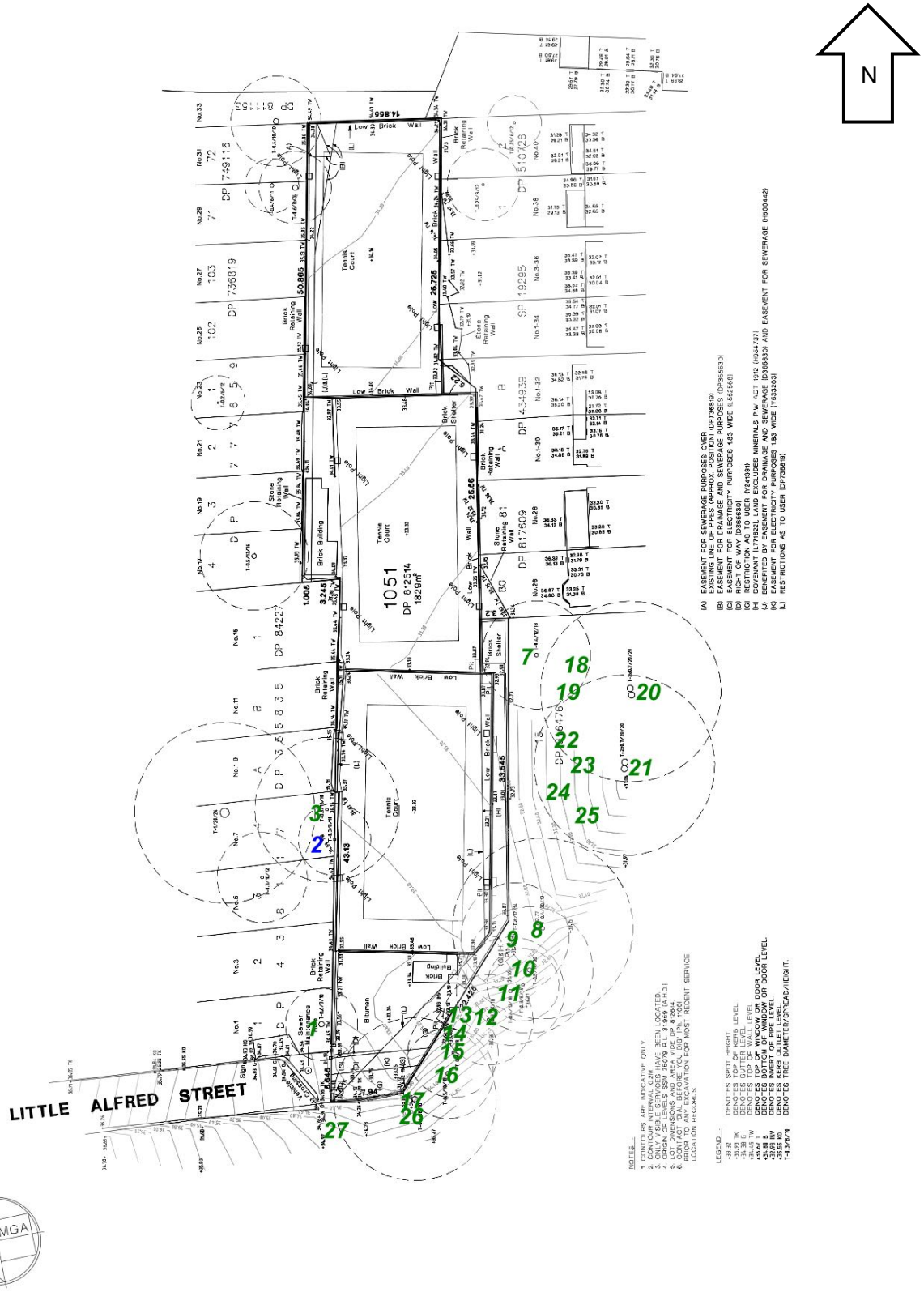


Source –Near Maps 16/11/17

Figure 1. Location Map

Site Map

1a Little Alfred Street, North Sydney



Source – Ethos Urban

Figure 2. Site Map

1 Introduction

1.1 Brief

Ethos Urban has given instruction to inspect and assess the health and condition of the selected trees at 1a Little Alfred Street, North Sydney, including any tree within the vicinity of the proposed works including trees on adjoining properties. To prepare an Arboricultural Impact Assessment on the proposed impacts of the development works on the subject trees. The report will provide recommendations regarding tree protection during the development process. Tree numbering is consistent with previously written documents.

1.2 Aims

- Undertake field surveys for tree health and condition.
- Conduct a literature review on the tree defects and symptoms.
- Search databases for relevant tree species information including Tree Preservation Orders.

1.3 Qualifications and Experience

This report has been based upon site observations and the assessment of the subject trees. Conclusions have been reached from experience and follow up research. Qualification details are included in the appendix.

1.4 Documents Provided

The following information was supplied for review and use.

- Ethos Urban
  - Survey 1A Little Alfred.pdf
  - LS01_B_171017.pdf
  - LS02_A_171017.pdf

1.5 Scope

This report is only concerned with the health and condition of the subject trees and the potential impacts from the proposed development. Root mapping, invasive structural strength of the trees or soils assessments or aerial inspections were not performed. This report has been prepared in accordance with North Sydney Council. It includes a detailed assessment based on the site visit and the documents provided. Recommendations may be provided regarding alterations to the proposed design or construction methods to minimize detrimental impacts on the subject trees.

2 Methodology

2.1 Methods

The following relevant information was compiled for consideration of the proposed works. Details are located in the appendices.

- AS 4970- 2009 Protection of trees on development sites
- AS 4373 - 2007 Pruning of amenity trees
- *Tree Survey Form* (Matheny & Clark, 1994)
- *Visual Tree Assessment* (Mattheck & Breloer, 1994)

2.2 *TreeAZ* (Barrell, 2016)

- ***TreeAZ* 'A'** - Moderate and high quality trees suitable for retention for more than 10 years, and worthy of being a material constraint
- ***TreeAZ* 'Z'** - Low quality trees not worthy of being material constraint

2.3 Information Collected

Information collected includes tree species, dimensions, tree health and condition, tree assessment ratings and tree protection zones etc. Trees located on adjoining properties will be inspected from the ground on the subject site or public land only. All relevant information is included in the Tree Schedule (Appendix A). The inspection was of a preliminary nature and did not involve any climbing or detailed investigation beyond what was visible from accessible points at ground level.

2.4 Species Identification

Tree identification was determined by visible features only and compared with text listed in "References' only. Every effort was made to correctly identify the assessed trees where time permitted.

2.5 Tree Measurements

In accordance with AS 4970-2009 tree trunk diameters were measured with a diameter tape at 1.4m high (unless stated). Measurements of tree heights and canopy spreads are estimated accordingly.

2.6 Photography

A Nikon D5200 SLR camera or an Iphone were used. In low light levels photographs maybe altered to improve visual quality, this involves adjustments to exposure, contrast, reduction of shadows and increased sharpness. No adjustments to vibrancy that alter any colours were applied.

2.7 State Environment Planning Policy (2017) *Vegetation in Non-Rural Areas* [NSW]

The State Environmental Planning Policy (Vegetation in Non-Rural Areas) 2017 includes provisions requiring the preservation of trees and bushland within North Sydney Shire.

3 Aims of Policy

The aims of this Policy are:

(a) to protect biodiversity values of trees and vegetation in non-rural areas of the

State, and

(b) to preserve the amenity of non-rural areas of the State through the preservation of trees and other vegetation.

2.8 Tree and Vegetation Management (2013)

The State Environmental Planning Policy (Vegetation in Non-Rural Areas) 2017 includes provisions requiring the preservation of trees and bushland within North Sydney LGA. This report relies on the information contained within North Sydney Council's Tree and Vegetation Management (2013). This report may include trees on adjoining properties that are likely to be impacted by the proposed development regardless of the definition contained in the Tree and Vegetation Management (2013).

Trees on Public Land

The North Sydney Council Development Control Plan 2013 (Section16) protects trees in North Sydney. A permit is required prior to any pruning or removal of trees protected by the DCP2013 and breaches of the DCP2013 may result in fines of up to $1.1 million dollars. The DCP2013 protects:

- *any tree on public land regardless of size*
- *any vegetation more than 5 metres tall on the site of a heritage item (as indicated in the North Sydney Council Local Environment Plan 2013)*
- *any other tree having a height of 10 metres, a crown width of 10 metres or a trunk circumference of 1.5 metres measured 1 metre above ground level*

Trees on Private Land

Development Consent or a Tree Management Permit is required for the removal or pruning of the following trees/vegetation:

- *Any tree or vegetation on public land, regardless of size.*
- *Any vegetation more than 5m tall on the site of a heritage item.*
- *Any other tree with: a height of 10m, or a crown width of 10m, or a trunk circumference of 1.5m measured at 1m above ground level (existing)*

2.9 Vegetation

Vegetation types have been determined using a variety of methods depending on the location and LGA. Depending on the sources results can vary and should be used as a guide only.

2.10 Wildlife

Interactions between the tree and possible fauna were examined to the best of my ability through the following text. An expert opinion may be required confirm or deny any fauna activities.

3 Site Visit and Observations

3.1 Field Visit

The unaccompanied site visit was conducted on 10th November 2017 taking approximately 2 hours. All observations were from ground level without detailed investigations. The weather at the time of the inspection was clear, still and dry with average visibility.

3.2 NSW Property Details

The following relevant information was gathered from NSW Planning Portal on 16th November 2017.

- Terrestrial Biodiversity – No
- Environmental Protection – No
- Native Vegetation Protection – No
- Riparian Lands and Watercourses – No

3.3 Brief Site Description

Little Alfred Street is located in a residential area of North Sydney. Number 1a is on the eastern side of the road surrounded by residential developments and a public park located at 1a Whaling Road. The property consists of three (3) tennis courts and small clubhouses.

3.4 Location of the Trees

The trees in question are located on adjoining properties surrounding the site. The trees have been located on the supplied site plan and numbered accordingly. These plans are illustrative purposes only and should not be used directly for scaling measurements. Trees no. 13, 14, 15 18, 19, 22, 23, 24, 25, 26 & 27 were not located on the supplied survey plan. The trees have been approximately located therefore inaccuracies may occur.

3.5 Onsite Vegetation

The surrounding areas around the site contain indigenous, planted native and exotic tree species. They are of varying ages and stages of maturity. There is no remnant vegetation on site or nearby.

3.6 Vegetation in Non-Rural Areas (2017)

The subject site is does not contain *High Biodiversity Value*.

3.7 Threatened Species

The subject tree species are not listed in the NSW Threatened Species Conservation Act 1995.

3.8 Noxious Weeds and Undesirable Species

The subject tree species are not listed in the NW Act 1993 or in councils' list of undesirable species.

4 Results

The following tables do not include dead trees or trees unprotected under councils Tree and Vegetation Management (2013). A complete tree schedule is located in appendix a.

- ***TreeAZ* 'A'** - Moderate and high quality trees suitable for retention for more than 10 years, and worthy of being a material constraint
- ***TreeAZ* 'Z'** - Low quality trees not worthy of being material constraint

4.1 Adjoining Property Trees

Tree no.	Species	Life Expectancy
1	*Phoenix canariensis* (Canary Island Date Palm)	40+yrs
2	*Jacaranda mimosifolia* (Jacaranda)	15-40yrs
3	*Jacaranda mimosifolia* (Jacaranda)	15-40yrs
7	*Eucalyptus saligna* (Sydney Blue Gum)	15-40yrs
8	*Ficus microcarpa var. hillii* (Hills Weeping Fig)	40+yrs
9	*Eucalyptus microcorys* (Tallowwood)	40+yrs
10	*Eucalyptus saligna* (Sydney Blue Gum)	40+yrs
11	*Eucalyptus saligna* (Sydney Blue Gum)	40+yrs
12	*Eucalyptus pilularis* (Blackbutt)	40+yrs
13	*Eucalyptus saligna* (Sydney Blue Gum)	40+yrs
14	*Ficus rubiginosa(Port Jackson Fig)*	40+yrs
15	*Eucalyptus saligna* (Sydney Blue Gum)	40+yrs
16	*Eucalyptus saligna* (Sydney Blue Gum)	40+yrs
17	*Ficus rubiginosa* (Port Jackson Fig)	40+yrs
18	*Casuarina cunninghamiana* (River Oak)	15-40yrs
19	*Casuarina cunninghamiana* (River Oak)	15-40yrs
20	*Ficus microcarpa* var. *hillii* (Hills Weeping Fig)	40+yrs
21	*Ficus microcarpa* var. *hillii* (Hills Weeping Fig)	40+yrs
22	*Casuarina cunninghamiana* (River Oak)	15-40yrs
23	*Casuarina cunninghamiana* (River Oak)	15-40yrs
24	*Casuarina cunninghamiana* (River Oak)	15-40yrs
25	*Casuarina cunninghamiana* (River Oak)	15-40yrs
26	*Eucalyptus saligna* (Sydney Blue Gum)	15-40yrs
27	*Eucalyptus saligna* (Sydney Blue Gum)	40+yrs

Table 1. Adjoining Property Trees

4.2 Trees Proposed for Retention

Tree no.	Species	TPZ
1	*Phoenix canariensis* (Canary Island Date Palm)	4m
2	*Jacaranda mimosifolia* (Jacaranda)	3.6m
3	*Jacaranda mimosifolia* (Jacaranda)	6m
7	*Eucalyptus saligna* (Sydney Blue Gum)	4.8m
8	*Ficus microcarpa var. hillii* (Hills Weeping Fig)	7.8m
9	*Eucalyptus microcorys* (Tallowwood)	7.8m
10	*Eucalyptus saligna* (Sydney Blue Gum)	6m
11	*Eucalyptus saligna* (Sydney Blue Gum)	3.6m
12	*Eucalyptus pilularis* (Blackbutt)	5.4m
13	*Eucalyptus saligna* (Sydney Blue Gum)	3.6m
14	*Ficus rubiginosa(Port Jackson Fig)*	4.8m
15	*Eucalyptus saligna* (Sydney Blue Gum)	4.8m
16	*Eucalyptus saligna* (Sydney Blue Gum)	6m
17	*Ficus rubiginosa* (Port Jackson Fig)	7.2m
18	*Casuarina cunninghamiana* (River Oak)	3.6m
19	*Casuarina cunninghamiana* (River Oak)	3m
20	*Ficus microcarpa* var. *hillii* (Hills Weeping Fig)	15m
21	*Ficus microcarpa* var. *hillii* (Hills Weeping Fig)	10m
22	*Casuarina cunninghamiana* (River Oak)	3m
23	*Casuarina cunninghamiana* (River Oak)	2.4m
24	*Casuarina cunninghamiana* (River Oak)	2.4m
25	*Casuarina cunninghamiana* (River Oak)	2.4m
26	*Eucalyptus saligna* (Sydney Blue Gum)	3m
27	*Eucalyptus saligna* (Sydney Blue Gum)	2m

Table 2. Trees Proposed for Retention

5 Discussion

5.1 Adjoining Property Trees Proposed for Retention

5.1.1 Tree no. 1 *Phoenix canariensis* (Canary Island Date Palm)

This exotic palm is located in the northern adjoining property being 1 Whaling Road. It is mature in age and in good health and condition with a *'TreeAZ'* rating of 'A'. This tree has a life expectancy of 40+yrs.

The palm is located within 1m to the existing brick retaining wall, which will remain. Therefore there will be no proposed impacts to the palms root system.

The canopy may require tying back to the boundary to prevent damage to the fronds.

Figure 3. Tree no. 1 *Phoenix canariensis* (Canary Island Date Palm)

5.1.2 Tree no. 2 *Jacaranda mimosifolia* (Jacaranda)

5.1.2.1 This exotic tree is located in 7 Whaling Road. It is young in age and in poor to adequate health and condition with a '*TreeAZ*' rating of 'Z4'. The tree has suffered from numerous pruning events with poor cuts, which have resulted in watersprout growth and decline in health. This tree has a life expectancy of 15-40 years.

5.1.2.2 Once again this tree is located within 1m to the existing brick retaining wall, which will remain, therefore there will be no proposed impacts to its root system.

5.1.3 Tree no. 3 *Jacaranda mimosifolia* (Jacaranda)

5.1.3.1 This exotic tree is also located in 7 Whaling Road. It is young in age and once again in poor to adequate health and condition with a '*TreeAZ*' rating of 'A'. This tree has also suffered from numerous

pruning events with poor cuts, with watersprout growth, though this tree does not appear to be showing signs of decline. This tree has a life expectancy of 15-40 years.

5.1.3.2 Once again this tree is located within 1m to the existing brick retaining wall, which will remain, therefore there will be no proposed impacts to its root system.

5.1.4 Tree no. 7 *Eucalyptus saligna* (Sydney Blue Gum)

5.1.4.1 This native tree is located in the adjoining park being 1a Whaling Road. It is young in age and in adequate health and condition with a '*TreeAZ*' rating of 'A'. There are no significant defects or issues visible. This tree has a life expectancy of 15-40 years.

5.1.4.2 The trunk is located approximately 3.3m from the edge of the low brick wall followed by a foot path and brick club house then tennis court extending away from the trunk. Given the grassed area to the south and the sealed surfaces to the north that inhibit moisture and air from penetration the root zone the likelihood of roots under these areas are slim. Therefore the impact to its root system is likely to be minimal.

5.1.4.3 During the demolition of the courts and structures care must be given to remove the brick and paving by hand then the area should be inspected for roots and protected accordingly.

5.1.4.4 A 2nd order limb extends over the tennis court fence and clubhouse by approximately 3m at approximately 3.5-4m high. Pruning of the canopy is required for the construction of level 1 with associated scaffolding. This will require in the removal of the highlighted limb resulting in a canopy loss of approximately 30-40%.

Figure 4. Tree no. 7

Figure 5. Tree no. 7 Pruning

5.1.5 Tree no. 8 *Ficus microcarpa var. hillii* (Hills Weeping Fig)

5.1.5.1 This native tree is located in the adjoining park being 1a Whaling Road. It is semi mature in age and in adequate health and condition with a '*TreeAZ*' rating of 'A'. There are no significant defects or issues visible and it has a life expectancy of 40+ years.

5.1.5.2 The trunk is located approximately 3.7m from the edge of the low brick wall followed by a footpath and then tennis court. There are open areas to the south, east and west allowing for root system occupation. Given the size and characteristics of this species the presence of roots under these surfaces may be possible. Therefore during demolition of the structure care must be given during removal of the sealed surfaces for root system inspection.

5.1.5.3 The canopy extends towards the tennis court fence. Pruning of the canopy is required for the construction of level 1 with scaffolding. This is likely to require in the removal of numerous 5th-6th order branches resulting in a canopy loss of approximately less than 10%.

Figure 6. Tree no. 8 Pruning

5.1.6 Tree no. 9 *Eucalyptus microcorys* (Tallowwood)

5.1.6.1 This native tree is also located in the adjoining park being 1a Whaling Road. It is mature in age and in adequate health and condition with a '*TreeAZ*' rating of 'A'. There are no significant defects or issues visible though there is a self corrected bend in the trunk at approximately 1m high. This tree has a life expectancy of 40+ years.

5.1.6.2 The trunk is located approximately 1.5m from the edge of the low brick wall followed by a footpath and then tennis court. There are open areas to the south, east and west allowing for root system occupation. Once again given the size of this species the presence of roots under these surfaces is possible. Therefore during demolition of the structure care must be given during removal of the sealed surfaces for root system inspection.

5.1.6.3 The canopy for this tree also extends over the tennis court fence, which is likely to require pruning for the 1st and 2nd floor construction. Inspection of specific branches for pruning was difficult. Therefore it is estimated that the tree will require the pruning of 3rd order branches resulting in a canopy loss of approximately 25%.

Figure 7. Tree no. 9 Pruning

5.1.7 Tree no. 10 *Eucalyptus saligna* (Sydney Blue Gum)

5.1.7.1 This native tree is also located in the adjoining park being 1a Whaling Road. It is semi mature in age and in adequate health and condition with a '*TreeAZ*' rating of 'A'. There are no significant defects or issues visible and it has a life expectancy of 40+ years.

5.1.7.2 The trunk is located approximately 4.7m from the edge of the low brick wall followed by a footpath and then tennis court. There are open areas to the south, east and west once again, allowing for root system occupation. The likelihood of significant roots under the sealed surface at this distance is unlikely.

5.1.7.3 The canopy extends towards the tennis court fence. Pruning of the canopy is required for the construction of level 1 with associated scaffolding. Once again the inspection of specific branches to prune was not possible. Therefore it is estimated that the tree will require in the removal of numerous 4th-5th order branches resulting in a canopy loss of approximately less than 10%.

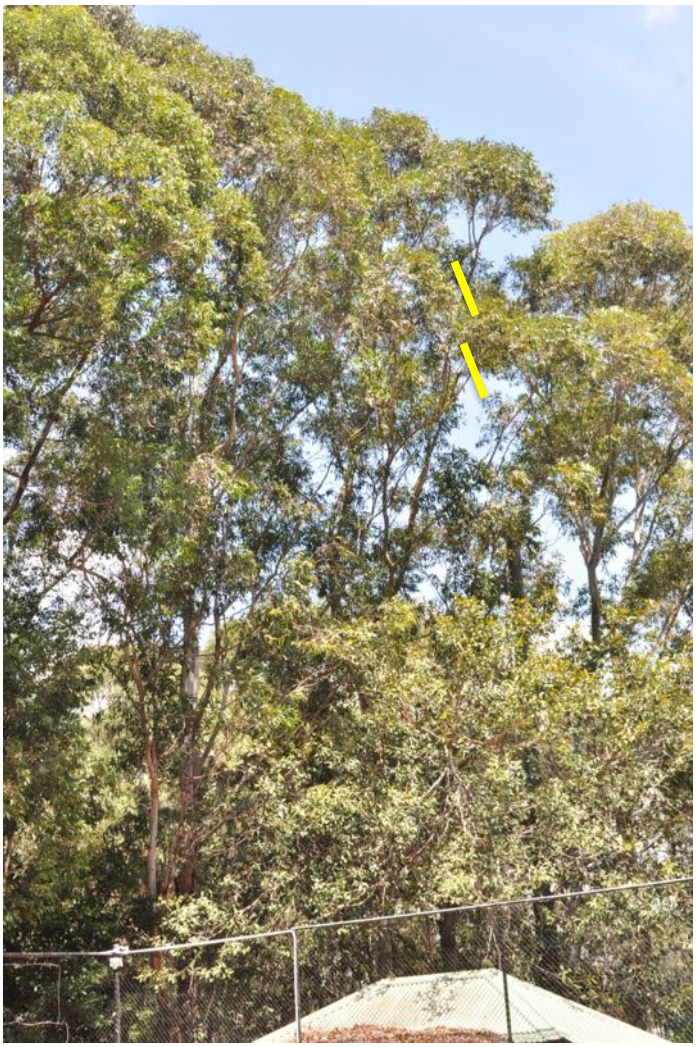


Figure 8. Tree no. 10 Pruning

5.1.8 Tree no. 11 *Eucalyptus saligna* (Sydney Blue Gum)

5.1.8.1 This native tree is also located in the adjoining park being 1a Whaling Road. It is semi mature in age and in adequate health and condition with a '*TreeAZ*' rating of 'A'. Again there are no significant defects or issues visible and the tree has a life expectancy of 40+ years.

5.1.8.2 The trunk is located approximately 4.2m from boundary with the existing and proposed structures being outside the 3.6m TPZ.

5.1.8.3 The canopy extends towards the tennis court fence but pruning for the proposed works is unlikely.

5.1.9 Tree no. 12 *Eucalyptus pilularis* (Blackbutt)

5.1.9.1 This native tree once again is located in the adjoining park being 1a Whaling Road. It is semi mature in age and in adequate health and condition with a '*TreeAZ*' rating of 'A'. There are some minor deadwood branches in the canopy and included bark within the scaffold branch union. At this time there are no signs of separation at this time. This tree has a life expectancy of 40+ years.

5.1.9.2 The trunk is located approximately 3.5m from the edge of the low brick wall followed by the sealed car parking area. There are open areas to the south, east and west once again, allowing for root system occupation. The likelihood of significant roots under the sealed surface at this distance is unlikely.

5.1.9.3 The canopy extends towards the boundary fence. Pruning of the canopy is required for the construction of level 1 and scaffolding. Again the inspection of specific branches to prune was not possible. Therefore it is estimated that the removal of numerous 4th-5th order branches is required resulting in a canopy loss of approximately less than 10%.

5.1.10 Tree no. 13 *Eucalyptus saligna* (Sydney Blue Gum)

5.1.10.1 This is another native tree and once again is located in the adjoining park being 1a Whaling Road. It is semi mature in age and in adequate health and condition with a '*TreeAZ*' rating of 'A'. There are no significant defects there is some minor deadwood branches in the canopy. This tree has a life expectancy of 40+ years.

5.1.10.2 The trunk is located approximately 2m from the edge of the low brick wall followed by the sealed car parking area. There are open areas to the south, east and west, once again, allowing for root system occupation. Given the distance the likelihood of significant roots under the sealed surface is unlikely.

5.1.10.3 The canopy also extends towards the boundary fence. Pruning of the canopy is required for the construction of level 1 and construction scaffolding. This will require in the removal of the numerous 4th-5th

order branches resulting in a canopy loss of approximately less than 10%.

5.1.11 Tree no. 14 *Ficus rubiginosa* (Port Jackson Fig)

5.1.11.1 This native tree is located in the adjoining park being 1a Whaling Road. It is semi mature in age and in adequate health and condition with a '*TreeAZ*' rating of 'A'. Once again there are no significant defects or issues visible other than pruning events and this tree has a life expectancy of 40+ years.

5.1.11.2 The trunk is located approximately 1m from the edge of the low brick wall followed by the car parking area. There are open areas to the south, east and west allowing for root system occupation. Given the size and characteristics of this species the presence of roots under these surfaces may be possible. Therefore, as with tree no. 8, during demolition of the structure care must be given during removal of the sealed surfaces for root system inspection.

5.1.11.3 The canopy extends over the boundary fence. Pruning of the canopy will be required for the construction of the ground level for the proposed development. This will require in the removal of the numerous 3rd and higher order branches resulting in a canopy loss of approximately 30%.

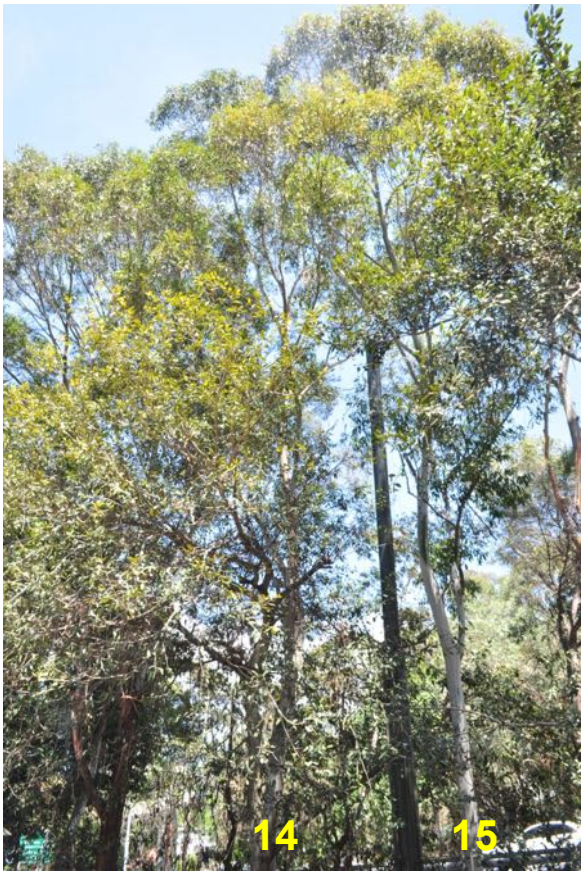


Figure 9. Tree no. 14 *Ficus rubiginosa* (Port Jackson Fig) and tree no. 16 *Eucalyptus saligna* (Sydney Blue Gum)

5.1.12 Tree no. 15 *Eucalyptus saligna* (Sydney Blue Gum)

5.1.12.1 This is another native tree and once again is located in the adjoining park being 1a Whaling Road. It is semi mature in age and in adequate health and condition with a '*TreeAZ*' rating of 'A' with no significant defects or issues. This tree has a life expectancy of 40+ years.

5.1.12.2 The trunk is located approximately 2.6m from the edge of the low brick wall followed by the sealed car parking area. There are open areas to the south, east and west allowing for root system occupation. The likelihood of roots under the sealed surface is may be possible. Therefore, as with trees no. 8 & 14, during demolition of the structure care must be given during removal of the sealed surfaces for root system inspection.

5.1.12.3 The canopy is generally vertical though some branches extend towards the boundary fence. Pruning of the canopy is may be required for the construction of level 1 and construction scaffolding. It is estimated that this will require in the removal of the numerous 4th-5th order branches resulting in a canopy loss of approximately less than 10%.

Figure 10. Tree no. 14

5.1.13 Tree no. 16 *Eucalyptus saligna* (Sydney Blue Gum)

5.1.13.1 This is another native tree and once again is located in the adjoining park being 1a Whaling Road. It is semi mature in age and in adequate health and condition with a '*TreeAZ*' rating of 'A' with no significant defects. The lower trunk has some canker formation, which is localised disruption of the cambial layer. This tree has a life expectancy of 40+ years.

5.1.13.2 The trunk is located approximately 3m from the edge of the low brick wall followed by the sealed car parking area. There are open areas to the south, east and west allowing for root system occupation. The likelihood of roots under the sealed surface is may be possible. Therefore, as with other trees located close to the boundary fence, during demolition of the structure care must be given during removal of the sealed surfaces for root system inspection.

5.1.13.3 Once again this canopy is generally vertical though some branches extend towards the boundary fence. Pruning of the canopy is may be required for the construction of level 1 and construction scaffolding. This will require in the removal of the numerous 4^{th}-5^{th} order branches resulting in a canopy loss of approximately less than 10%.

5.1.14 Tree no. 17 *Ficus rubiginosa* (Port Jackson Fig)

5.1.14.1 This native tree is located in the adjoining park being 1a Whaling Road. It is semi mature in age and in adequate health and condition with a '*TreeAZ*' rating of 'A' with no significant defects or issues visible other than pruning events. This tree has a life expectancy of 40+ years.

5.1.14.2 The trunk is located within 1m to the edge of the low brick wall followed by the car parking area. There are open areas to the south, east and west allowing for root system occupation. Once again given the size and characteristics of this species the presence of roots under these surfaces may be possible. Therefore, as with other trees located close to the boundary fence, during demolition of the structure care must be given during removal of the sealed surfaces for root system inspection.

5.1.14.3 This canopy also extends over the boundary fence. Pruning of the canopy will be required for the construction of the ground level for the proposed development. This will require in the removal of at least two (2) 2^{nd} order branches resulting in a canopy loss of approximately 30%.

Figure 11. Tree no. 17

5.1.15 Trees no. 18, 19, 22, 23, 24 & 25 *Casuarina cunninghamiana* (River Oak)

5.1.15.1 These native trees are located in the adjoining park being 1a Whaling Road. They are mature in age and in adequate health and condition with a '*TreeAZ*' rating of 'A'. There were no significant defects or issues visible other though most of the trees are leaning north to available light levels away from trees 20 & 21. Both trees have life expectancies of 40+ years.

5.1.15.2 The trunks are located between 4m and 7m to the edge of the low brick wall followed by the tennis courts outside of their TPZ's. Their canopies will require protection from development activities, though no pruning is likely.

5.1.16 Trees no. 20 & 21 *Ficus microcarpa* var. *hillii* (Hills Weeping Fig)

5.1.16.1 These native trees are located in the adjoining park being 1a Whaling Road. They are mature in age and in good health and condition with a '*TreeAZ*' ratings of 'A' with no significant defects or issues visible other though minor bark inclusions were sighted. These trees have life expectancies of 40+ years.

5.1.16.2 The trunks are located between 12m and 13m to the edge of the low brick wall on the boundary. Surface roots canopies can be seen near the low wall. Therefore during demolition of the structure care must be given during removal of the sealed surfaces for root system inspection.

5.1.17 Tree no. 26 *Eucalyptus saligna* (Sydney Blue Gum)

5.1.17.1 This is another native tree and once again is located in the adjoining park being 1a Whaling Road. It is young in age and in adequate health and condition with a '*TreeAZ*' rating of 'A' with no significant defects. Its canopy is partially supressed as it is growing through the canopy of tree no. 17. This tree has a life expectancy of 15-40 years.

5.1.17.2 The trunk is located approximately 3m from the edge of the low brick wall followed by the sealed car parking area at the edge of its TPZ with the proposed development unlikely to be detrimental. No canopy pruning will be required for the proposed development.

5.1.18 Tree no. 27 *Eucalyptus saligna* (Sydney Blue Gum)

5.1.18.1 This is another native tree and once again is located in the adjoining park being 1a Whaling Road. It is young in age and in adequate health and condition with a '*TreeAZ*' rating of 'A' with no significant defects. This tree has a life expectancy of 40+ years.

5.1.18.2 Once again the trunk is located approximately 3m from the edge of the low brick wall followed by the sealed car parking area at the edge of its TPZ with the proposed development unlikely to be detrimental. No canopy pruning will be required for the proposed development.

6 Conclusion & Recommendations

6.1 Trees Proposed for Retention - *TreeAZ* 'Z'

6.1.1 Tree no. 2 *Jacaranda mimosifolia* (Jacaranda) is a young tree located n 7 Whaling Road. It is in poor to adequate health with a 'Z4' rating and a 15-40yrs life expectancy. There will be no proposed impacts as the palm is located within 1m to the existing brick retaining wall, which will remain.

- Recommendations
  - Canopy protection (tied back clear of boundary)
  - Apply tree protection methods (sect.7)
  - No pruning is required

6.2 Trees Proposed for Retention - *TreeAZ* 'A'

6.2.1 Tree no. 1 *Phoenix canariensis* (Canary Island Date Palm) is a mature palm tree located in the adjoining property being 1 Whaling Road. It is in good with an 'A' rating and a 40+yrs life expectancy. There will be no proposed impacts as the palm is located within 1m to the existing brick retaining wall, which will remain.

- Recommendations
  - Canopy protection (tied back clear of boundary)
  - Apply tree protection methods (sect.7)
  - No pruning is required

6.2.2 Tree no. 3 *Jacaranda mimosifolia* (Jacaranda) is a young tree located also located in 7 Whaling Road. The tree is in poor to adequate health with an 'A' rating and a 15-40yrs life expectancy. There will be no proposed impacts as the palm is located within 1m to the existing brick retaining wall, which will remain.

- Recommendations
  - Canopy protection (tied back clear of boundary)
  - No pruning is required
  - Apply tree protection methods (sect.7)

6.2.3 Tree no. 7 *Eucalyptus saligna* (Sydney Blue Gum) is a young tree located in the adjoining park being 1a Whaling Road. It is in adequate health with an 'A' rating and a 15-40yrs life expectancy. The proposed works are located within the existing development at a 3.3m distance from the trunk. The impact to the root system is likely to be minimal.

- Recommendations
  - Remove existing concrete slabs and structures and inspect for location of roots
  - Prune a 2nd order limb that extends over the boundary fence by approximately 3m at approximately 3.5-4m high resulting in the removal of approximately 30-40% of the canopy

- All pruning must be in accordance with AS4373-2007 *Pruning amenity trees* to achieve construction clearance
- Apply tree protection methods (sect.7)

6.2.4 Tree no. 8 *Ficus microcarpa var. hillii* (Hills Weeping Fig) is a semi mature tree located in 1a Whaling Road. The tree is in adequate health with an 'A' rating and a 40+yrs life expectancy. The proposed works are located within the existing development at a 3.7m distance from the trunk. The impact to the root system is possible.

- Recommendations
  - Remove existing concrete slabs and structures and inspect for location of roots
  - Prune 5th-6th order limbs that extend over the boundary fence by approximately 1m resulting in the removal of approximately 10% of the canopy
  - All pruning must be in accordance with AS4373-2007 *Pruning amenity trees* to achieve construction clearance
  - Apply tree protection methods (sect.7)

6.2.5 Tree no. 9 *Eucalyptus microcorys* (Tallowwood) is a mature tree located in 1a Whaling Road. It is in adequate health with an 'A' rating and a 40+yrs life expectancy. The proposed works are located within the existing development at a 1.4m distance from the trunk. The impact to the root system is possible.

- Recommendations
  - Remove existing concrete slabs and structures and inspect for location of roots
  - Prune 3rd order limbs that extend over the boundary fence by approximately 1m resulting in the removal of approximately 25% of the canopy
  - All pruning must be in accordance with AS4373-2007 *Pruning amenity trees* to achieve construction clearance
  - Apply tree protection methods (sect.7)

6.2.6 Tree no. 10 *Eucalyptus saligna* (Sydney Blue Gum) is a semi mature tree located 1a Whaling Road. It is in adequate health with an 'A' rating and a 40+yrs life expectancy. The proposed works are located within the existing development at a 4.7m distance from the trunk. The impact to the root system is likely to be minimal.

- Recommendations
  - Remove existing concrete slabs and structures and inspect for location of roots
  - Prune numerous 4th-5th order limbs that extend over the boundary fence by approximately 1m resulting in the removal of approximately 10% of the canopy

- All pruning must be in accordance with AS4373-2007 *Pruning amenity trees* to achieve construction clearance
- Apply tree protection methods (sect.7)

6.2.7 Tree no. 11 *Eucalyptus saligna* (Sydney Blue Gum) is a semi mature tree located 1a Whaling Road. It is in adequate health with an 'A' rating and a 40+yrs life expectancy. There are no proposed works within the 3.6m TPZ for this tree.

- Recommendations
  - No pruning is required
  - Apply tree protection methods (sect.7)

6.2.8 Tree no. 12 *Eucalyptus pilularis* (Blackbutt) is a semi mature tree located 1a Whaling Road. It is in adequate health with an 'A' rating and a 40+yrs life expectancy. The proposed works are located within the existing development at a 5.4m distance from the trunk. The impact to the root system is likely to be minimal.

- Recommendations
  - Remove existing concrete slabs and structures and inspect for location of roots
  - Prune numerous 4th-5th order limbs that extend over the boundary fence by approximately 1m resulting in the removal of approximately 10% of the canopy
  - All pruning must be in accordance with AS4373-2007 *Pruning amenity trees* to achieve construction clearance
  - Apply tree protection methods (sect.7)

6.2.9 Tree no. 13 *Eucalyptus saligna* (Sydney Blue Gum) is a semi mature tree located in 1a Whaling Road. It is in adequate health with an 'A' rating and a 40+yrs life expectancy. The proposed works are located within the existing development at a 2m distance from the trunk. The impact to the root system is possible.

- Recommendations
  - Remove existing concrete slabs and structures and inspect for location of roots
  - Prune numerous 4th-5th order limbs that extend over the boundary fence by approximately 2m resulting in the removal of approximately 10% of the canopy
  - All pruning must be in accordance with AS4373-2007 *Pruning amenity trees* to achieve construction clearance
  - Apply tree protection methods (sect.7)

6.2.10 Tree no. 14 *Ficus rubiginosa* (Port Jackson Fig) is a semi mature tree located in 1a Whaling Road. It is in adequate health with an 'A' rating and a 40+yrs life expectancy. The proposed works are located within the existing development at a 1m distance from the trunk. The impact to the root system is possible.

- Recommendations
  - Remove existing concrete slabs and structures and inspect for location of roots
  - Prune numerous 3rd and higher order limbs that extend over the boundary fence by approximately 2m resulting in the removal of approximately 30% of the canopy
  - All pruning must be in accordance with AS4373-2007 *Pruning amenity trees* to achieve construction clearance
  - Apply tree protection methods (sect.7)

6.2.11 Tree no. 15 *Eucalyptus saligna* (Sydney Blue Gum) is a semi mature tree located in 1a Whaling Road. It is in adequate health with an 'A' rating and a 40+yrs life expectancy. The proposed works are located within the existing development at a 2.6m distance from the trunk. The impact to the root system is possible.

- Recommendations
  - Remove existing concrete slabs and structures and inspect for location of roots
  - Prune numerous 4th-5th order limbs that extend over the boundary fence by approximately 1m resulting in the removal of approximately 10% of the canopy
  - All pruning must be in accordance with AS4373-2007 *Pruning amenity trees* to achieve construction clearance
  - Apply tree protection methods (sect.7)

6.2.12 Tree no. 16 *Eucalyptus saligna* (Sydney Blue Gum) is a mature tree located in 1a Whaling Road. It is in adequate health with an 'A' rating and a 40+yrs life expectancy. The proposed works are located within the existing development at a 3m distance from the trunk. The impact to the root system is possible.

- Recommendations
  - Remove existing concrete slabs and structures and inspect for location of roots
  - Prune numerous 4th-5th order limbs that extend over the boundary fence by approximately 1m resulting in the removal of approximately 10% of the canopy
  - All pruning must be in accordance with AS4373-2007 *Pruning amenity trees* to achieve construction clearance
  - Apply tree protection methods (sect.7)

6.2.13 Tree no. 17 *Ficus rubiginosa* (Port Jackson Fig) is a mature tree located in 1a Whaling Road. It is in adequate health with an 'A' rating and a 40+yrs life expectancy. The proposed works are located within the existing development at a 3m distance from the trunk. The impact to the root system is possible.

- Recommendations
  - Remove existing concrete slabs and structures and inspect for location of roots

- Prune at least two (2) 2nd order limbs that extend over the boundary fence by approximately 4m resulting in the removal of approximately 30% of the canopy
- All pruning must be in accordance with AS4373-2007 *Pruning amenity trees* to achieve construction clearance
- Apply tree protection methods (sect.7)

6.2.14 Trees no. 18, 19, 22, 23, 24 & 25 *Casuarina cunninghamiana* (River Oak) are semi mature trees located in 1a Whaling Road. They are in adequate health with 'A' ratings and 15-40yrs life expectancies. There are no proposed works within the TPZ's for these trees.

- Recommendations
  - No pruning is required
  - Apply tree protection methods (sect.7)

6.2.15 Trees no. 20 & 21 *Ficus microcarpa* var. *hillii* (Hills Weeping Fig) are mature trees located in 1a Whaling Road. They are in good health with 'A' ratings and 40+yrs life expectancies. These trees have extensive root systems near the boundary line.

- Recommendations
  - Remove existing concrete slabs and structures and inspect for location of roots
  - No pruning is required
  - Apply tree protection methods (sect.7)

6.2.16 Tree no. 26 *Eucalyptus saligna* (Sydney Blue Gum) is a young tree located 1a Whaling Road. It is in adequate health with an 'A' rating and a 15-40yr life expectancy. The proposed works are located within the existing development at a 2m distance from the trunk. The impact to the root system is likely to be minimal.

- Recommendations
  - Remove existing concrete slabs and structures and inspect for location of roots
  - No pruning is required
  - Apply tree protection methods (sect.7)

6.2.17 Tree no. 27 *Eucalyptus saligna* (Sydney Blue Gum) is a young tree located 1a Whaling Road. It is in adequate health with an 'A' rating and a 15-40yr life expectancy. The proposed works are located within the existing development at a 2.5m distance from the trunk. The impact to the root system is likely to be minimal.

- Recommendations
  - Remove existing concrete slabs and structures and inspect for location of roots
  - No pruning is required
  - Apply tree protection methods (sect.7)

7 Tree Protection Measures

These specifications are for the trees identified and selected for retention including any tree located on adjoining properties.

7.1 Tree Protection

7.1.1 All tree parts must be protected. This includes roots, trunks and branches.

7.1.2 If working within TPZ, trunk protection shall consist of two metre lengths of timber (100 x 50mm) spaced at 100-150mm centres secured together with 2mm galvanised wire. These shall be strapped around the trunk and not fixed to the tree in any way to avoid mechanical injury or damage.

7.1.3 Fencing - A 1.8m chain wire fence with concrete footings placed in accordance to tree protection zones and AS 4687. The TPZ distances are located within the tree schedule.

7.1.4 Signage - “Tree Protection Zone, No Entry”. With project arborist contact details. To be attached to the protective fencing.

7.1.5 AS4970-2009 - Activities generally excluded from the TPZ include but are not limited to;

- machine excavation including trenching;
- excavation for silt fencing;
- cultivation;
- storage;
- preparation of chemicals, including preparation of cement products;
- parking of vehicles and plant;
- 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, and
- physical damage to the tree.

7.1.6 All construction scaffolding must be erected around all branches not approved for pruning/removal.

7.1.7 Any pruning required must be in accordance with AS 4373-2007 *Pruning of Amenity Trees*, Standards Australia and completed by level 3 qualified arborist or higher. Climbing spikes **MUST NOT** be used.

7.1.8 Irrigation - All trees must be thoroughly watered regularly throughout the development process. This is dependent on weather conditions where more water applied during hot and or winding weather.

7.1.9 Mulch - With the TPZ fencing 75mm of **COMPOSTED** organic mulch must be applied to help retain moisture levels, suppress weed growth and reduce tree stress. Mulch must be in accordance with AS4454-2012 *Composts, soil conditioners and mulches*.

7.1.10 Tree Damage - If any tree is damaged the project arborist should be notified, engaged to inspect and provide advice as well as written documentation to be supplied to the certifying authority.

7.1.11 Tree Monitoring Schedule

- During site occupation all TPZ's and trees must be monitored, assessed and recorded by a suitably qualified arborist according to council's determinations.
- Any work that must occur within a TPZ must be witnessed and directed by a suitably qualified arborist.
- In the event that any tree is declining in health the project arborist shall be engaged to supply written remedial applications that must be applied immediately.

7.2 Excavation Within Tree Protection Zones

7.2.1 Monitoring

- Any excavation work within any Tree Protection Zone must be monitored by the site arborist.

7.2.2 Root Pruning

- Roots measuring over 30mm in diameter must not be pruned within the Structural Root Zone.
- Roots measuring over 30mm in diameter within the Tree Protection Zone and outside the Structural Root Zone may be pruned at the discretion of the site arborist.
- Root exposure must be applied with hand tools or Air Spade to prevent damage to the root system.
- Root pruning can be performed by a level 3 arborist or higher.
- All pruning equipment must be sharp and clean. Secateurs, loppers or pruning saws can be cleaned with methylated spirits to prevent disease and pathogen spread.

7.2.3 Root Care

- Any roots exposed must be wrapped or covered with hessian or cloth and kept moist to prevent drying out and sunburn until backfilling occurs.
- Backfill must be watered in and mulched with composted leaf mulch.

7.3 Arborist's Involvement

Hold Point	Task	Timing	Certification
1	Appoint project arborist to ensure protection of trees	Prior to demolition of structures	
2	Tree Protection Plan be onsite prior to works (Sect 5, AS4970-2009)		
3	Inspect Tree Protection Fencing with signage. (App C, AS4970-2009)	Prior to demolition of structures	Project Arborist
4	Supervise all work within any TPZ's	As required prior to works proceeding	
5	Install Trunk Protection where applicable (Sect 7.2.4.)		
6	Tree Inspection	Bi-monthly during all construction works	
7	Final Tree Inspection	Post construction	

Table 3. Arborist's Involvement During Construction Activities

Appendix A - Tree Schedule

Tree no.	1	2	3	7	8
Species	Phoenix canariensis (Canary Island Date Palm)	Jacaranda mimosifolia (Jacaranda)	Jacaranda mimosifolia (Jacaranda)	Eucalyptus saligna (Sydney Blue Gum)	Ficus microcarpa var. hillii (Hills Weeping Fig)
Location	Adjoining	Adjoining	Adjoining	Adjoining - Council	Adjoining - Council
DBH	50cm	30cm	50cm	40cm	65cm
DGL	N/A	40cm	60cm	45cm	60cm
Height	6m	8m	7m	10m	10m
Canopy	6m	5m	8m	8m	818m
TPO Protected	Yes	No	No	Yes	Yes
Age	Semi Mature	Young	Young	Young	Semi Mature
Life Expectancy	40+yrs	15-40yrs	15-40yrs	15-40yrs	40+yrs
Crown Class	Dominant	Dominant	Dominant	Codominant	Codominant
Crown Condition	4 Good	2-3 Low	2-3 Low	3 Ave/Low	3 Ave/Low
Type	Exotic	Exotic	Exotic	Native	Native
Health & Condition		Poor pruning wounds / Watersprouts	Poor pruning wounds / Watersprouts		
TreeAZ	A	Z4	A	A	A
Proposed Works Comments	Protected by a brick retaining wall	Protected by a brick retaining wall	Protected by a brick retaining wall	Existing structures within proposed works envelope.	Existing structures within proposed works envelope.
Distance to prop works	1.0m	0.3m	0.5m	3.3m	3.7m
TPZ	4.0m	3.6m	6.0m	4.8m	7.8m
SRZ	N/A	2.3m	2.7m	2.4m	2.7m
Total TPZ Area	50.2msq	40.7msq	113.0msq	72.3msq	191.0msq
Existing TPZ Encroachment				8.7msq	28.0msq
		0.0%	0.0%	12.0%	14.7%
Proposed TPZ Encroachment		0.0msq	0.0msq	0.0msq	0.0msq
		0.0%	0.0%	0.0%	0.0%
Proposed Status		Retain	Retain	Retain	Retain
dbh1			30cm		
dbh2			40cm		
dbh3					
multi dbh			50cm		
Pruning					X 5+
				150mm	50mm
				3m	1m
				2nd	5th
Pruning Class				Crown Maintenance - Selective Pruning	Crown Maintenance - Selective Pruning
Pruning Canopy Percentage				30-40%	5-10%

Tree no.	9	10	11	12	13
Species	Eucalyptus microcorys (Tallowwood)	Eucalyptus saligna (Sydney Blue Gum)	Eucalyptus saligna (Sydney Blue Gum)	Eucalyptus pilularis (Blackbutt)	Eucalyptus saligna (Sydney Blue Gum)
Location	Adjoining - Council	Adjoining - Council	Adjoining - Council	Adjoining - Council	Adjoining - Council
DBH	65cm	50cm	30cm	45cm	30cm
DGL	60cm	60cm	35cm	45cm	35cm
Height	10m	15m	13m	14m	14m
Canopy	818m	12m	10m	8m	8m
TPO Protected	Yes	Yes	Yes	Yes	Yes
Age	Semi Mature	Semi Mature	Young	Semi Mature	Semi Mature
Life Expectancy	40+yrs	40+yrs	40+yrs	40+yrs	40+yrs
Crown Class	Codominant	Codominant	Codominant	Codominant	Codominant
Crown Condition	3 Ave/Low	3 Ave/Low	3 Ave/Low	3 Ave/Low	3 Ave/Low
Type	Native	Native	Native	Native	Native
Health & Condition	Slight bend in trunk at 1m			Scaffold bark inclusion / Minor deadwood	Minor deadwood
TreeAZ	A	A	A	A	A
Proposed Works Comments	Existing structures within proposed works envelope.	Existing structures within proposed works envelope.	No works within TPZ	Existing structures within proposed works envelope.	Existing structures within proposed works envelope.
Distance to prop works	1.4m	4.7m	4.2m	3.5m	2.0m
TPZ	7.8m	6.0m	3.6m	5.4m	3.6m
SRZ	2.7m	2.7m	2.1m	2.4m	2.1m
Total TPZ Area	191.0msq	113.0msq	40.7msq	91.6msq	40.7msq
Existing TPZ Encroachment	62.0msq	6.0msq	0.0msq	5.0msq	9.9msq
	32.5%	5.3%	0.0%	5.5%	24.3%
Proposed TPZ Encroachment	0.0msq	0.0msq	0.0msq	0.0msq	0.0msq
	0.0%	0.0%	0.0%	0.0%	0.0%
Proposed Status	Retain	Retain	Retain	Retain	Retain
Pruning	X 5+	X 5+		X 5+	X 5+
	20mm	10mm		10mm	10mm
	4m	1m		1m	1m
	3rd	4th		4th	4th
Pruning Class	Crown Maintenance - Selective Pruning	Crown Maintenance - Selective Pruning	Crown Maintenance - Selective Pruning	Crown Maintenance - Selective Pruning	Crown Maintenance - Selective Pruning
Pruning Canopy Percentage	25%	10%		10%	10%

Tree no.	14	15	16	17	18
Species	Ficus rubiginosa (Port Jackson Fig)	Eucalyptus saligna (Sydney Blue Gum)	Eucalyptus saligna (Sydney Blue Gum)	Ficus rubiginosa (Port Jackson Fig)	Casuarina cunninghamiana (River Oak)
Location	Adjoining - Council	Adjoining - Council	Adjoining - Council	Adjoining - Council	Adjoining - Council
DBH	40cm	40cm	50cm	60cm	30cm
DGL	40cm	45cm	65cm	70cm	40cm
Height	8m	10m	11m	8m	8m
Canopy	12m	8m	9m	14m	5m
TPO Protected	Yes	Yes	Yes	Yes	Yes
Age	Semi Mature	Semi Mature	Mature	Semi Mature	Mature
Life Expectancy	40+yrs	40+yrs	40+yrs	40+yrs	15-40yrs
Crown Class	Codominant	Codominant	Codominant	Codominant	Codominant
Crown Condition	3 Ave/Low	3 Ave/Low	3 Ave/Low	3 Ave/Low	3 Ave/Low
Type	Native	Native	Native	Native	Native
Health & Condition	Pruning events		Lower trunk cankers		Lean towards light
TreeAZ	A	A	A	A	A
Proposed Works Comments	Existing structures within proposed works envelope.	Existing structures within proposed works envelope.	Existing structures within proposed works envelope.	Existing structures within proposed works envelope.	
Distance to prop works	1.0m	2.6m	3.0m	1.0m	7.0m
TPZ	4.8m	4.8m	6.0m	7.2m	3.6m
SRZ	2.3m	2.4m	2.8m	2.8m	2.3m
Total TPZ Area	72.3msq	72.3msq	113.0msq	162.8msq	40.7msq
Existing TPZ Encroachment	26.7msq	12.5msq			
	36.9%	17.3%	0.0%	0.0%	0.0%
Proposed TPZ Encroachment	0.0msq	0.0msq			
	0.0%	0.0%	0.0%	0.0%	0.0%
Proposed Status	Retain	Retain	Retain	Retain	Retain
Pruning	X 5+	X 5+	X 5+		
	15mm	10mm	10mm	15mm	
	3m	1m	1m	4m	
	4th	4th	4th	2nd	
	10mm	10mm	10mm	15mm	
	3m	1m	1m	4m	
	4th	4th	4th	2nd	
Pruning Class	Crown Maintenance - Selective Pruning	Crown Maintenance - Selective Pruning	Crown Maintenance - Selective Pruning	Crown Maintenance - Selective Pruning	
Pruning Canopy Percentage	30%	10%	10%	30%	

Tree no.	19	20	21	22	23
Species	Casuarina cunninghamiana (River Oak)	Ficus microcarpa var. hillii (Hills Weeping Fig)	Ficus microcarpa var. hillii (Hills Weeping Fig)	Casuarina cunninghamiana (River Oak)	Casuarina cunninghamiana (River Oak)
Location	Adjoining - Council	Adjoining - Council	Adjoining - Council	Adjoining - Council	Adjoining - Council
DBH	25cm	133cm	88cm	25cm	20cm
DGL	40cm	110cm	100cm	30cm	25cm
Height	8m	12m	12m	8m	8m
Canopy	5m	25m	20m	5m	5m
TPO Protected	Yes	Yes	Yes	Yes	Yes
Age	Mature	Mature	Mature	Mature	Mature
Life Expectancy	15-40yrs	40+yrs	40+yrs	15-40yrs	15-40yrs
Crown Class	Codominant	Codominant	Codominant	Codominant	Codominant
Crown Condition	3 Ave/Low	4 Good	4 Good	3 Ave/Low	3 Ave/Low
Type	Native	Native	Native	Native	Native
Health & Condition	Lean towards light	Lean towards light	Lean towards light	Lean towards light	Lean towards light
TreeAZ	A	A	A	A	A
Proposed Works Comments					
Distance to prop works	6.0m	13.0m	12.0m	5.0m	6.0m
TPZ	3.0m	16.0m	10.6m	3.0m	2.4m
SRZ	2.3m	3.4m	3.3m	2.0m	1.8m
Total TPZ Area	28.3msq	799.8msq	350.2msq	28.3msq	18.1msq
Existing TPZ Encroachment					
	0.0%	0.0%	0.0%	0.0%	0.0%
Proposed TPZ Encroachment					
	0.0%	0.0%	0.0%	0.0%	0.0%
Proposed Status	Retain	Retain	Retain	Retain	Retain
dbh1		80cm	60cm		
dbh2		80cm	65cm		
dbh3		70cm			
multi dbh		133cm	88cm		

Tree no.	24	25	26	27
Species	Casuarina cunninghamiana (River Oak)	Casuarina cunninghamiana (River Oak)	Eucalyptus saligna (Sydney Blue Gum)	Eucalyptus saligna (Sydney Blue Gum)
Location	Adjoining - Council	Adjoining - Council	Adjoining - Council	Adjoining - Council
DBH	20cm	20cm	25cm	17cm
DGL	25cm	25cm	25cm	20cm
Height	8m	8m	8m	4m
Canopy	5m	5m	6m	4m
TPO Protected	Yes	Yes	Yes	Yes
Age	Mature	Mature	Young	Young
Life Expectancy	15-40yrs	15-40yrs	15-40yrs	40+yrs
Crown Class	Codominant	Codominant	Intermediate	Dominant
Crown Condition	3 Ave/Low	3 Ave/Low	3 Ave/Low	3 Ave/Low
Type	Native	Native	Native	Native
Health & Condition	Lean towards light	Lean towards light		
TreeAZ	A	A	A	A
Proposed Works Comments			Existing structures within proposed works envelope.	Existing structures within proposed works envelope.
Distance to prop works	5.0m	6.0m	2.0m	2.5m
TPZ	2.4m	2.4m	3.0m	2.0m
SRZ	1.8m	1.8m	1.8m	1.7m
Total TPZ Area	18.1msq	18.1msq	28.3msq	13.1msq
Existing TPZ Encroachment				
	0.0%	0.0%	0.0%	0.0%
Proposed TPZ Encroachment				
	0.0%	0.0%	0.0%	0.0%
Proposed Status	Retain	Retain	Retain	Retain

Appendix B - Tree Schedule Definitions

Dimensions	Diameter at breast height (1.4m) (mm) DBH Diameter at ground level (mm) DGL Approximate height x canopy spread (m) H x C			
Age Class	Sapling Mature	Young Over mature	Semi mature Senescent	
Life Expectancy	>5 years	5-15 years	15-40 years	40+ years
Crown Class	Dominant Co-dominant Intermediate Suppressed Dead	Crown extends above general canopy; not restricted by other trees. Crown forms the bulk of the general canopy but crowded by other trees. Crown extends into dominant/ co dominant canopy but quite crowded on all sides. Crown development restricted from overgrowing trees. Dead Tree		
Crown Condition / Vitality	1 Severe decline 2 Declining 3 Average / low vigour 4 Good 5 Excellent	<20% canopy density; major dead wood 20-60% canopy density; twig and branch dieback 60-90% canopy density; twig dieback 90-100% canopy density; little or no dieback or other problems 100% canopy density; no deadwood or other problems		
Location	Adjoining - Nature Strip	On Site	Adjoining Property	
Tree Type	Endemic	Species that occur naturally, and are restricted to a given area.		
	Exotic	An introduced plant from outside Australia.		
	Indigenous	Species that occur naturally to a given area, but may not be restricted to only that area.		
	Native	A general term referring to any plant indigenous to Australia including cultivars.		
	Noxious weed	Weeds are plants that are unwanted in a particular situation as they may threaten agricultural productivity, have detrimental effects on the natural environment or impact on human health.		
	Remnant	It is defined as vegetation where the dominant canopy has greater than 70% of the height and greater than 50% of the cover relative to the undisturbed height and cover of that stratum and dominated by species characteristic of the vegetation's undisturbed canopy.		
Ecological Value	Branch Hollow Nest / Drey Wildlife Sighted	Food Source Scats Endangered Ecological Community	Markings Trunk Hollow	
Root Zone	Compaction Garden Grass	Kerb Lifting Pavement Mulched	Paving etc Soil level lowered Soil level raised	
Structures	Fence Garage	Footpath Verandah	Dwelling Road	Driveway Seat

Appendix C - Thumbnail Photographs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Appendix D - Additional Images

East to West

Appendix E - Proposed Site Plan & Tree Protection Plan


MAXIMUM RL
53356
LEVEL 04 FFL
47420
LEVEL 03 FFL
44220
LEVEL 02 FFL
41020
LEVEL 01 FFL
37820
GROUND FFL
33320
5936
3200
3200
3200
4500

Appendix F - Glossary

Shigo, A.L. (1986) A New Tree Biology Dictionary.
*Docktor, D (2001) City of Palo Alto, Tree Technical Manual.

Bark*	All tissue outside the vascular cambium. Bark is usually divided into inner bark active phloem and aging and dead crushed phloem.
Basal	Lower trunk area of the tree.
Branch*	Organ which supports leaves, flowers and fruit.
Branch collar*	Trunk tissue that forms around the base of a branch between the main stem and the branch wood and trunk wood to meet. Formed by compaction or expansion as the girth of the branch and trunk increase.
Canopy	The part of the crown composed of the leaves and small twigs.
Cavity	An open wound, characterized by the presence of decay and resulting in a hollow (Matheny & Clarke, 1994).
Co dominant stems*	Stems or trunks of about the same size originating from the same position from the main stem.
Compaction	Compaction of soils causes roots to die due to lack of oxygen and water.
Compartmentalization*	Dynamic tree defense process involving protection features that resist the spread of pathogens.
Crown*	Portion of the tree consisting of branches and leaves and any part of the trunk from which branches arise.
Decay*	Degeneration and delignification of plant tissue, including wood, by pathogens or micro organisms.
Decline	Degeneration and delignification of plant tissue, including wood, by pathogens or micro organisms.
Dieback	Dieback is the reduction in the dynamic mass of a tree as twigs and branches die and are walled off by protection boundaries.
Epicormic shoots*	Shoots produced by dormant buds within the bark or stems of a tree as a result of stress, lopping or increase light. Epicormic shoots usually have a weaker form of branch attachment.
Hollows	Hollows from when wood-digesting micro-organisms digest wood within the boundaries set by the reaction zone or the barrier zone.
Included bark*	Inwardly formed bark at the junction of branches or codominant stems.
Kino	A dark red to brown resin-like substance produced by the trees in the genera Eucalyptus and other related genera. Kino forms when living cells are injured and infected.
Lopping*	Random cutting of branches or stems between branch union or at internodes on young trees.
Mycorrhiza	A symbiotic, non pathogenic, or weakly pathogenic association of fungi and non woody, absorbing roots of plants. The common belief is that the mycorrhiza help the tree with mineral absorption, especially phosphorus.
Microorganisms	An organism of microscopic size. Bacteria, the tree pathogens, may be as small as 3 microns wide by 5 microns long.
Pathogen	Any agent that causes disease.
Photosynthesis	A process where chlorophyll in plants traps the energy of the sun in a molecule of carbon dioxide and water that is called sugar.
Roots	An organ of a tree that serves to maintain mechanical support, to provide water and essential elements from the soil through absorption, and to store energy reserves.
Stem*	Organ which supports branches, leaves flowers and fruit.
Tree*	Long lived woody perennial plant greater than (or potentially greater than) 3m in height with one or relatively few stems.
Trunk*	The main stem.
Wound*	An opening that is created when the bark is cut, removed or injured.

Appendix G - TreeAZ (Barrell 2016)

TreeAZ field sheet

Heritage: Each tree is assessed by a visual check. If it is a designated heritage tree, then it is automatically categorized as AA, and is not subjected to any of the category ZZ, Z or A considerations.
Category ZZ (unsuitable for retention): Any remaining trees that are severely compromised and unsuitable for retention, even short term, are categorized as ZZ, i.e. Dead; irreversibly declining health; irremediable structural conditions; or, causing severe inconvenience to people or structural damage.
Category Z (low quality): Any remaining trees are systematically reviewed to decide if they fit into any of the four Z subcategory groups listed in the table below.
Category A (moderate quality): Any remaining trees are automatically category A, with the possibility of being promoted to category AA.
Category AA (high quality): If a category A tree is already Large, or has the potential to become so with limited intervention, it can be promoted to category AA, at the discretion of the assessor.

Category Z: Low quality trees not worthy of being material constraint

Z	**Local policy exemptions:** Trees that are unsuitable for legal protection for local policy reasons including size, proximity and species	
	1	**Size:** Young or insignificant small trees, e.g. below the local size threshold for legal protection, etc
	2	**Proximity, hedge or species:** Exempt from legal protection because of proximity to structures, a maintained hedge or unsuitable species, e.g. scheduled noxious weed, out of character in a setting of acknowledged importance, etc
	Deteriorating health/condition: Trees that are likely to be removed within 10 years because of deteriorating health and/or structural condition	
	3	**Health:** Deteriorating health with little realistic prospect of recovery
	4	**Crown instability:** Deteriorating structural conditions where an increasing risk of failure can be temporarily addressed by reasonable intervention, e.g. storm damage, cavities, decay, included bark, wounds, excessive imbalance, etc
	5	**Root instability:** Deteriorating whole tree stability through poor anchorage, increased exposure to weather, etc
	Ongoing nuisance: Trees that are likely to be removed within 10 years because of unsuitable impact on people	
	6	**Inconvenience:** Ongoing and increasing inconvenience to residents to the extent that a locally recognised court or tribunal would be likely to authorise removal, e.g. dominance, debris, interference, etc
	7	**Damage:** Ongoing and increasing structural damage to property to the extent that a locally recognised court or tribunal would be likely to authorise removal, e.g. worsening damage to surfacing and structures, etc
	Good management: Trees that are likely to be removed within 10 years through responsible management of the tree population	
	8	**No future potential:** Poor condition or location with no realistic potential for recovery or improvement, e.g. dominated by adjacent trees or buildings, poor architectural framework, etc
	9	**Benefit nearby trees:** Removal would benefit better adjacent trees, e.g. relieve physical interference, suppression, etc
	10	**Maintenance costs:** Unacceptably high maintenance costs, e.g. structural conditions requiring high levels of regular pruning, etc

NOTE: Although Z trees are not worthy of influencing new designs, urgent removal is not essential and they could be retained in the short term, if appropriate

Categories A and AA: Moderate and high quality trees suitable for retention for more than 10 years, and worthy of being a material constraint

A		All trees that are not categories ZZ or Z that can be retained with limited intervention

NOTE: Category A trees that are already large, or have the potential to become so, with limited intervention, can be promoted to category AA(1), at the discretion of the assessor. Designated heritage trees are automatically category AA(2). Although all category AA and A trees are sufficiently important to be material constraints, category AA trees are at the top of the categorization hierarchy and should be given the most weight in any selection process.

AA	**1**	Single category A trees or small groups which, at the discretion of assessor, can be promoted to category AA because they are already large, or have the potential to become large
	2	Designated heritage tree

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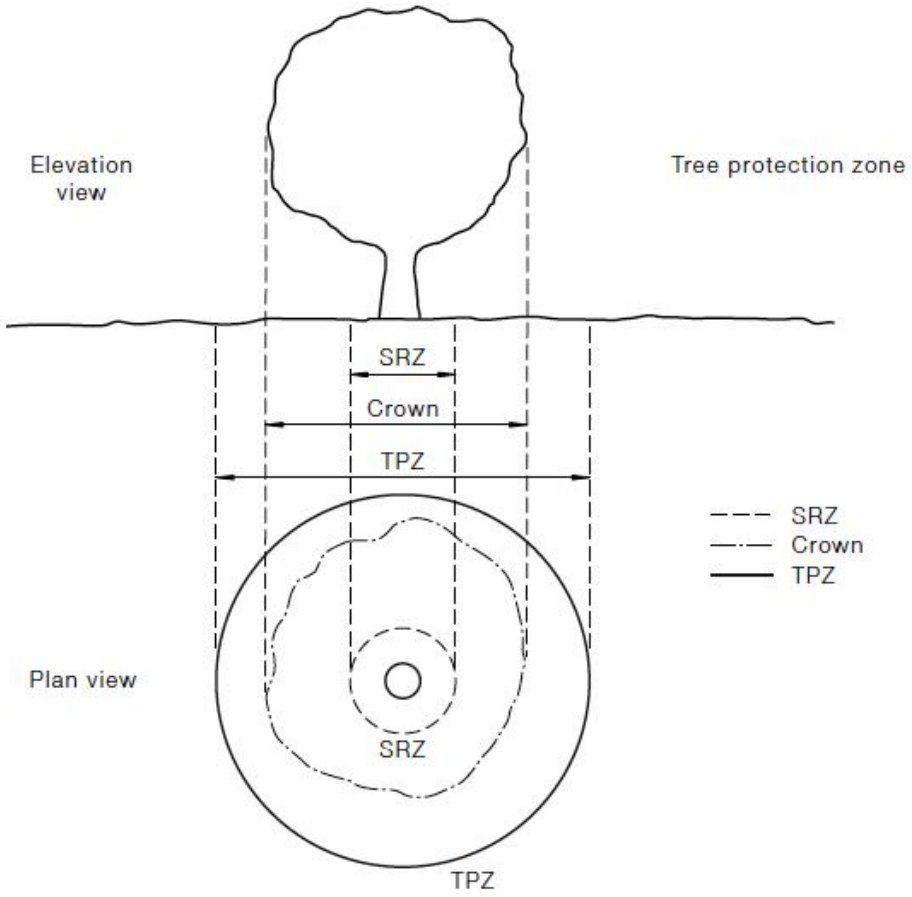
Appendix H - Tree Protection Zones AS4970-2009

Tree Protection Zone

The tree protection zone (TPZ) is the principal means of protecting trees on development sites. The TPZ is a combination of the root area and crown area requiring protection. It is an area isolated from construction disturbance, so that the tree remains viable.



Determining the TPZ

The **radius** of the TPZ is calculated for each tree by multiplying its DBH × 12.
TPZ = DBH×12
Where DBH = trunk diameter measured at 1.4 m above ground

Radius is measured from the centre of the stem at ground level.

A TPZ should not be less than 2m nor greater than 15m (except where crown protection is required). Clause 3.3 covers variations to the TPZ.

The TPZ of palms, other monocots, cycads and tree ferns should not be less than 1 m outside the crown projection.

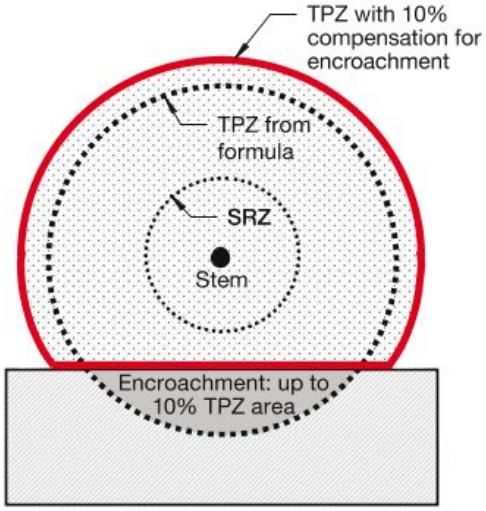
Appendix I - Tree Protection Zone Encroachments AS4970-2009

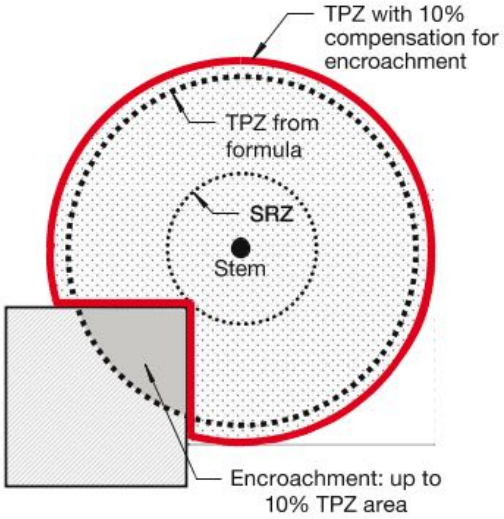
Minor Encroachments

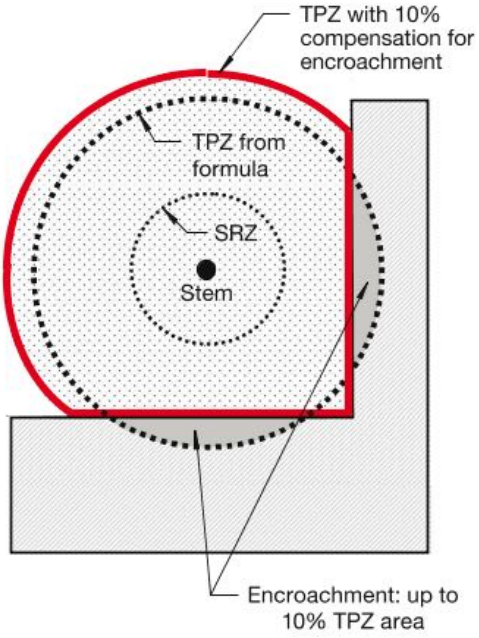
The proposed encroachment is less than 10% of the area of the TPZ and is outside the SRZ. The area lost to this encroachment should be compensated for elsewhere and contiguous with the TPZ.

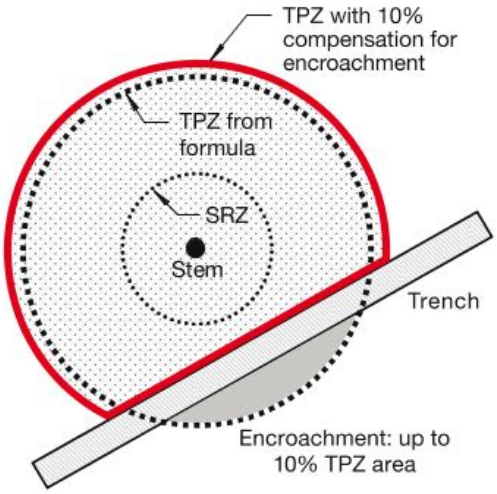
Major Encroachments

The proposed encroachment is greater than 10% of the TPZ or inside the SRZ, the project arborist must demonstrate that the tree(s) would remain viable. The area lost to this encroachment should be compensated for elsewhere and contiguous with the TPZ. This may require root investigation by non-destructive methods.









Appendix J - Qualifications & Experience

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Practical experience:	Australis Tree Management, Consulting Arborist (Owner/Operator) Jan 2000 Silver Springs Nursery (Owner/Operator) Feb 1997 Neil Clayton Lawns & Gardens (Horticulturist) Mar 1998 – Apr 2001 Davidson's Nurseries Pty Ltd (Horticulturist) Feb 1996 – Mar 1998
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Insurance	Professional Indemnity Insurance Liberty International Underwriters $5,000,000.00 Policy No. HC-ME-SPC-01-104260 Public Liability Insurance Liberty International Underwriters $20,000,000.00 Policy No. 463763
Pro Bono Work	Middle Dural Public School
Continuing professional development:	NAAA Conference, Mature Trees, 2001. Claus Mattheck Seminar 2001. ISAAC Conferences - Parramatta 2004, Brisbane 2008, Newcastle 2009, Adelaide 2010 AILA Tree Management Forum 2005. Jeremy Barrell Tree AZ & Report Writing Workshop 2006 A Practitioner's Guide to Visual Tree Assessment – Mike Ellison 2007 Quantified Tree Risk Assessment Workshop – Mike Ellison 2007 ISAAC Conference Workshop Dr. David Lonsdale 2008 ISAAC Conference Workshop Dr. Phillip Gibbons 2008 ISA International Conference Parramatta 2011 ISA International Conference Workshop Dr. Ken James 2011 Arboriculture Australia Annual Conference - Sunshine Coast 2014, Adelaide 2015, Canberra 2017 Jeremy Barrell Arboriculture Australia 2 day Workshop 2017

Appendix K - References

Apple (2012-2014) *Maps* Version 2.0 (1844.0.15)

AS 4970 (2009). *Protection of Trees on Development Sites*, Standards Australia, Standards Association of Australia, NSW, Australia.

Barrell, J. & Wadey, M. (2006) *Workshop Manual, Trees on Construction Sites*. Barrell Treecare Ltd, UK.

Barrell, J (2016) *TreeAZ Assessment Raiting.* Barrell Treecare Ltd, UK.

Brooker, I. & Kleinig, D. (1999), *Field Guide to Eucalyptus, Volume 1, South-Eastern Australia.* Blooming Books. Sydney, Australia.

DII (2010) *Department of Industry and Investment* website. http://www.dpi.nsw.gov.au/agriculture/pests-weeds/weeds/noxweed.

Docktor, D. (2001) *City of Palo Alto, Tree Technical Manual*, The City of Palo Alto Department of Planning and Community Environment. Palo Alto, California, USA.

Environmental Protection and Biodiversity Conservation Act (1999)

Fairley, A. & Moore, P. (1989) *Native Plants of the Sydney District.* Kangaroo Press, Kenthurst NSW Australia.

Harris, R.W., Clark, J.R., Matheny, N.P. (1999). *Arboriculture Integrated Management of Landscape Trees, Shrubs and Vines.* Third Edition. Prentice Hall, Upper Saddle River, New Jersey, USA.

Jones, D.L. (1996) *Palms in Australia, Over 450 Native and Exotic Species.* Third Edition. New Holland Publishers, Australia.

Matheny, N & Clark, J.R (1994) *A Photographic Guide to The Evaluation of Hazard Trees In Urban Areas.* International Society of Arboriculture. USA.

Matheny, N & Clark, J.R (1998) *Trees and Development. A Technical Guide to Preservation of Trees During Land Development*. International Society Of Arboriculture. Exponet Publishers, Inc. Hagerstown In. USA.

Mattheck, C. & Breloer, H. (1994) *The Body Language of Trees.* Research For Amenity Trees No.4 The Stationary Office, London.

Near Maps (2017) www.nearmaps.com.au

North Sydney Council (2013) *Tree and Vegetation Management*

NSW Land and Property Information (2013) *Spatial Information Exchange*. https://six.nsw.gov.au

NSW National Parks & Wildlife Service (1993) *Noxious Weeds Act*, NSW NPWS, Hurstville, NSW, Australia.

NSW National Parks & Wildlife Service (1995) *Threatened Species Conservation Act.* NSW NPWS, Hurstville, NSW, Australia.

NSW Planning Portal (2017) https://www.planningportal.nsw.gov.au. Sited on 16th November 2017

State Environment Planning Policy (2017) *Vegetation in Non-Rural Areas* [NSW]. Published LW 25 August 2017 (2017 No 454)

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