AUSTRALIS
Tree Management

Arboricultural Impact Assessment

Lot 12-14 DP 9748
70-74 O'Neill Street, Guildford

Commissioned By:	**Richmond PRA** **C/- Ardesign** **Suite 3 - Greenway Plaza** **1183 The Horsley Drive,** **Wetherill Park**
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Summary

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

On the 6th June 2014, I attended the site at 70-74 O'Neill Street, Guildford and inspected forty-one (41) trees, which are located on site or outside the boundaries within 5m. An additional six (6) trees were marked on the survey (2003) but were no long present.

I completed a modified Tree Survey Form (Matheny & Clark, 1994), applied 'Priority Matrix of the IACA Significance of a Tree, Assessment Rating System (STARS)© (IACA, 2010) as well as taking supporting photographs of the trees.

Two (2) trees on site are selected for retention, thirty-one (31) onsite trees are selected for removal and six (6) trees are located outside the boundaries and will require protection. One (1) tree on the adjoining property is proposed for removal with the owners consent.

The development proposed is for the demolition of the existing structures for the construction of in-fill affordable housing (multi unit) development.

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

Individual tree protection measures are listed in section 6 with general guidelines in section 7.

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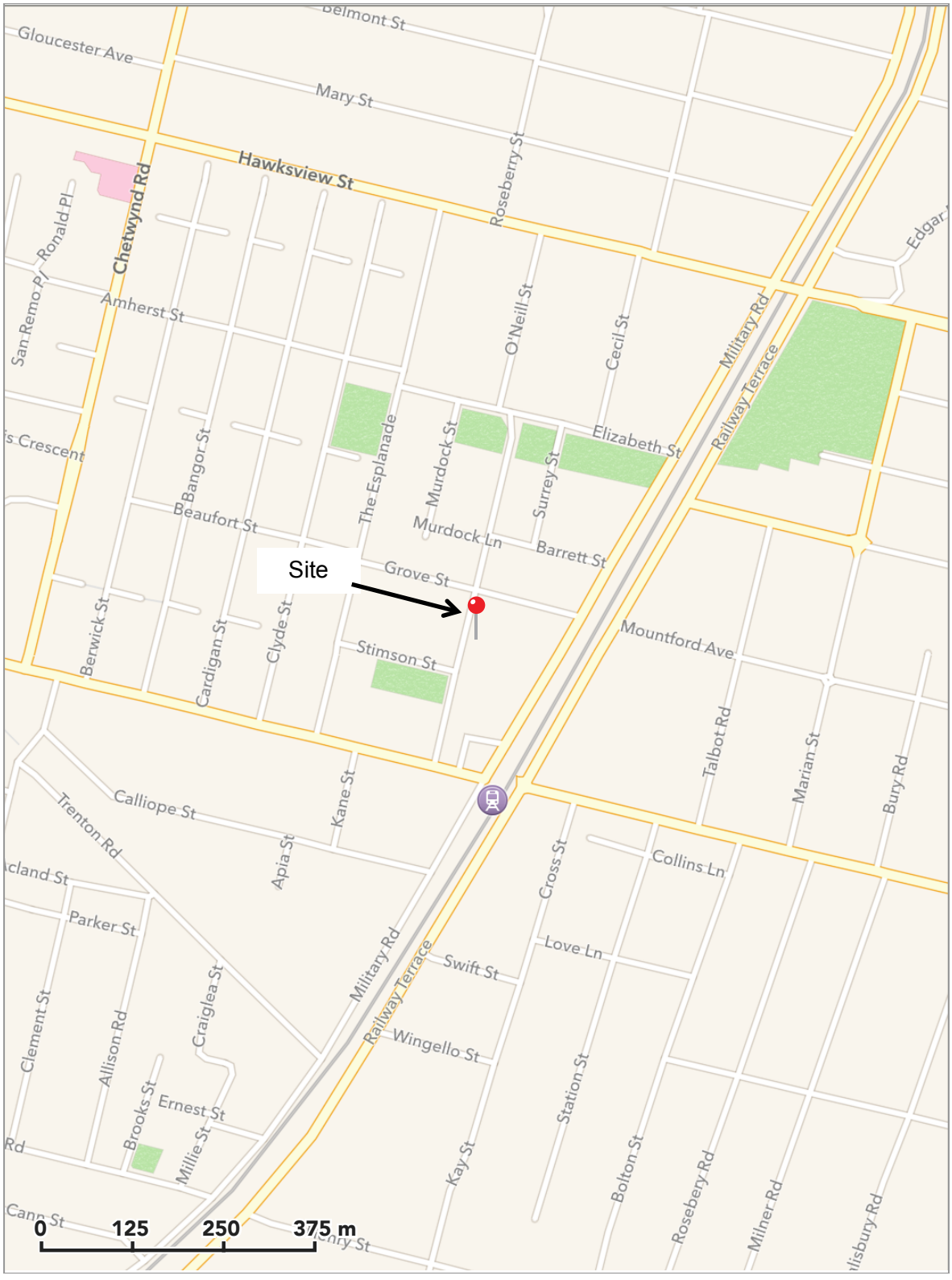
Location Map

70-74 O'Neill Street, Guildford



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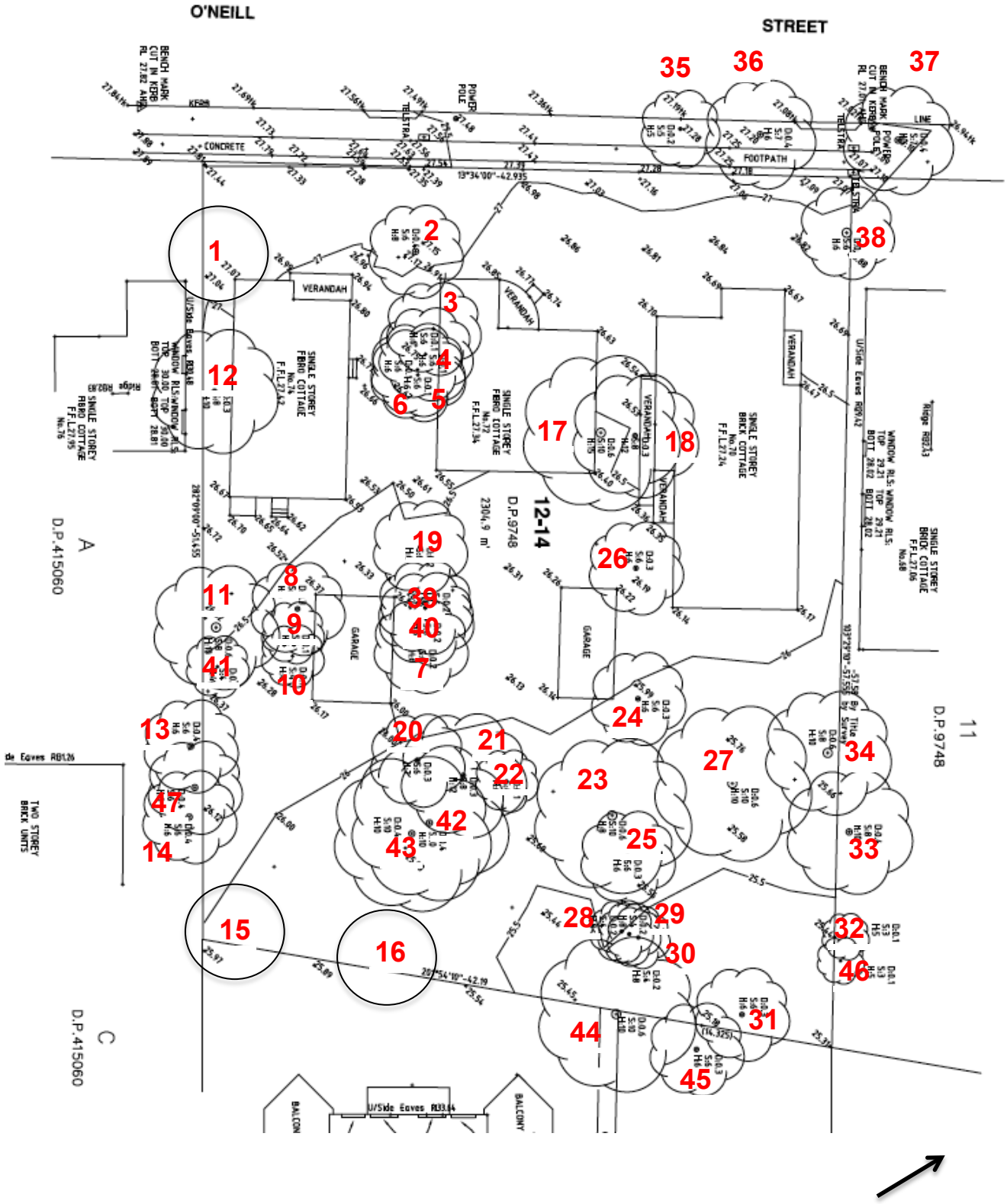
Source – Apple Maps

Figure 1 Location Map

Site Map

70-74 O'Neill Street, Guildford



Source – Richmond PRA

Figure 2 Site Map

1 Introduction

1.1 Brief

Richmond PRA has given instruction to inspect the selected trees at 70-74 O'Neill Street, Guildford and preparation of an arboricultural impact assessment on the health and condition of the subject trees. The report will provide recommendations regarding its protection during the development process.

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 and 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 by Ardesign.

- 838_development submision.pdf
- 838_development submision.dwg
- northern side.tif
- rear elevation.tif
- southern side.tif
- front.bmp
- guildford1.png
- aerial.JPG
- oneil survey.pdf (dated 2003)

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. It takes no account of root mapping or invasive structural strength of the trees. This report has been prepared in accordance with Holroyd Council requirements. 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 methods were used to compile information for consideration of the proposed works. Details are located in the appendices.

- Visual Tree Assessment (Mattheck & Breloer, 1994)
- AS 4373 - 2007. Pruning Of Amenity Trees.
- Tree Survey Form (Matheny & Clark, 1994) modified, which includes species identification, age, condition etc.
- Priority Matrix of the IACA Significance of a Tree, Assessment Rating System (STARS)© (IACA, 2010).

2.2 Information Collected

- Tree Species (botanical and common names)
- Trunk diameter measured at 1.4m, basal diameter, height, canopy
- Age, crown class & crown condition
- Canopy health and vigour (density, deadwood etc.)
- Tree condition (wounds etc.)
- Landscape significance
- Signs of wildlife (scratches, nests, hollows etc.)
- Tree Significance (STARS)
- Tree Protection Zone
- Tree Protection Zone Encroachments

2.3 AS 4970 - 2009 Protection of Trees on Development Sites

- 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.*
  - *Less than 10% encroachment is acceptable.*
  - *Structural Root Zone*
  - *The SRZ is the area required for tree stability. A larger area is required to maintain a viable.*
  - *No encroachment permissible.*

2.4 Species Identification

- Fairley & Moore (1989) Native Plants of the Sydney District.
- Phillips, R. (1978) Trees In Britain, Europe and North America.
- Rowell, R.J. (1991) Ornamental Flowering Trees In Australia.

2.5 Tree Measurements

In accordance with AS 4970-2009 tree trunk diameters were measured with a diameter tape at 1.4m high to formulate Tree Protection Zones (TPZ) and at the base of the tree to formulate Structural Root Zones (SRZ) where applicable. Tree heights are measured with a clinometer and canopy spreads estimated accordingly.

2.6 Photography

A Nikon D5000 SLR camera was 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 colour were performed.

2.7 Tree Management Order (TMO)

The subject trees are protected under Holroyd City Council (2003) *Tree Management Order*.

- *For the purposes of this Order a tree is any woody and soft wooded perennial plant with a height of 3.6m or greater. The height of 3.6m (approximately 12ft) is intended to represent the maximum allowable height of the gutters on a single storey residential dwelling.*

2.8 Holroyd Development Control Plan 2013

General Controls page 48

Development Works including existing trees and landscaping

C1. All proposals and development works shall comply with Australian Standard 4970-2009 – Protection of Trees on Development Sites.

C3. Development proposals must consider existing trees situated on Adjacent properties with adequate setbacks to any works and protection measures stipulated in accordance with AS4970-2009 to ensure their long term survival.

2.9 Vegetation

Vegetation types have been determined by the following text:

- Tozer and others (2010) N*ative Vegetation Of Southeast NSW: a revised classification and map for the coast and eastern tablelands.*

2.10 Legislation

The following were searched.

- Environment Protection and Biodiversity Conservation Act (1999)
- National Parks & Wildlife Act (1975)
- Noxious Weeds Act (1993)
- Threatened Species Conservation Act (1995)

3 Site Visit and Observations

3.1 Field Visit

The unaccompanied site visit was conducted on 6th June 2014 taking approximately 2 hours. All observations were from ground level without detailed investigations. The weather at the time of the inspection was cloudy, still and damp with average visibility.

3.2 Threatened Species

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

3.3 Undesirable Species

The subject tree species are listed in the NW Act 1993 or in councils' list of undesirable species.

- Trees no 23 and 25 *Erythrina crista-galli* (Cock's Comb Coral Tree)
- Trees no 4, 5, 6, 11, 19, 22, 24, 39 & 40 *Ligustrum lucidium* (Large Leaf Privet)
- Tree no 32 *Ficus elastica* (Indian Rubber Tree)

3.4 Onsite Vegetation

The site currently contains planted and self-seeded indigenous, native and exotic tree species. They are of varying ages and stages of maturity. There is no remnant vegetation is on site or nearby The vegetation community has been mapped as 'Built-up Area' (Tozer & others, 2009). This area has been highly modified with the removal of all native under storey and ground cover plants and shrubs.

3.5 Brief Site Description

O'Neill Street is located in the residential of Guildford. Numbers 70 to 74 are on the eastern side of the road surrounded by similar residential developments. The properties consist of houses that are set to the front of each block with garden sheds etc situated in the middle of the sites. The site slopes slightly downwards from the front to the rear and is exposed to the east.

3.6 Location of the Trees

The trees in question are located throughout the entire the sites. 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.

3.7 Collection of Data

From inspecting the trees information was collected on species, maturity, life expectancy, Priority Matrix of the IACA Significance of a Tree, Assessment Rating System (STARS)© (IACA, 2010) as well as significant defects and other relevant facts, which are recorded 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.

4 Results

A complete tree schedule is located in appendix a.

4.1 Tree Significance & Retention Value

Determined by using the Tree Significance - Assessment Criteria of the *IACA Significance of a Tree, Assessment Rating System* (STARS)© (IACA, 2010).

Tree no	Species	Tree Significance	Retention Value
1	*Pittosporum undulatum* (Sweet Pittosporum)	Medium	Low
2	*Liquidambar styraciflua* (Liquidamber)	Medium	Medium
3	*Liquidambar styraciflua* (Liquidamber)	Medium	Low
4	*Ligustrum lucidium* (Large Leaf Privet)	Low	Removal
5	*Ligustrum lucidium* (Large Leaf Privet)	Low	Removal
6	*Ligustrum lucidium* (Large Leaf Privet)	Low	Removal
7	*Grevillea robusta* (Silky Oak)	High	Medium
8	*Syzygium australe* (Brush Cherry)	Medium	Low
9	*Camellia japonica* (Japonica Camellia)	Low	Low
10	*Camellia japonica* (Japonica Camellia)	Low	Low
11	*Ligustrum lucidium* (Large Leaf Privet)	Low	Removal
12	*Cinnamomum camphora* (Camphor Laurel)	Medium	Medium
13	*Callistemon viminalis* (Weeping Bottlebrush)	Medium	High
14	*Callistemon viminalis* (Weeping Bottlebrush)	Medium	High
15	*Jacaranda mimosifolia* (Jacaranda)	Low	Low
16	*Grevillea robusta* (Silky Oak)	Low	Low
17	*Grevillea robusta* (Silky Oak)	Medium	Medium
18	*Cinnamomum camphora* (Camphor Laurel)	Medium	Removal
19	*Ligustrum lucidium* (Large Leaf Privet)	Low	Removal
20	*Grevillea robusta* (Silky Oak)	Medium	Medium
21	*Grevillea robusta* (Silky Oak)	Medium	Medium
22	*Ligustrum lucidium* (Large Leaf Privet)	Low	Removal
23	*Erythrina crista-galli* (Cock's Comb Coral Tree)	Low	Medium
24	*Ligustrum lucidium* (Large Leaf Privet)	Low	Removal
25	*Erythrina crista-galli* (Cock's Comb Coral Tree)	Low	Low
26	*Lagerstroemia indica* (Crepe Myrtle)	Low	Low
27	*Ulmus glabra* (Scotch Elm)	Medium	Removal
28	*Grevillea robusta* (Silky Oak)	Medium	Medium
29	*Cinnamomum camphora* (Camphor Laurel)	Medium	Medium
30	*Grevillea robusta* (Silky Oak)	Medium	Medium
31	*Callistemon viminalis* (Weeping Bottlebrush)	Low	Low
32	*Ficus elastica* (Indian Rubber Tree)	Low	Medium
33	*Grevillea robusta* (Silky Oak)	High	High
34	*Jacaranda mimosifolia* (Jacaranda)	Medium	Medium
35	*Jacaranda mimosifolia* (Jacaranda)	Low	Low
36	*Jacaranda mimosifolia* (Jacaranda)	Medium	Medium
37	*Jacaranda mimosifolia* (Jacaranda)	Medium	Medium

Tree Significance & Retention Value cont.

Tree no	Species	Tree Significance	Retention Value
38	*Dead Tree*	Low	Removal
39	*Ligustrum lucidium* (Large Leaf Privet)	Low	Removal
40	*Ligustrum lucidium* (Large Leaf Privet)	Low	Removal
41	*Shrub*	Low	Removal

Table 1 Tree Significance & Retention Value

4.2 Non existent Trees

Tree no	Location
42	On Site
43	On Site
44	Rear Property
45	Rear Property
46	68 O'Neill Street
47	76 O'Neill Street

Table 2 Non Existent Trees

4.3 Trees Proposed For Retention

Tree no	Species	TPZ	Location
16	*Grevillea robusta* (Silky Oak)	4.8m	Onsite
31	*Callistemon viminalis* (Weeping Bottlebrush)	4.1m	Onsite

Table 3 Trees Proposed For Retention

4.4 Trees Proposed For Removal

These trees are located within the proposed development envelope or closely adjacent to the proposed works and unlikely to tolerate the proposed impacts.

Tree no	Species	TPZ
1	*Pittosporum undulatum* (Sweet Pittosporum)	2.4m
2	*Liquidambar styraciflua* (Liquidamber)	6.6m
3	*Liquidambar styraciflua* (Liquidamber)	4.8m
4	*Ligustrum lucidium* (Large Leaf Privet)	N/A
5	*Ligustrum lucidium* (Large Leaf Privet)	N/A
6	*Ligustrum lucidium* (Large Leaf Privet)	N/A
7	*Grevillea robusta* (Silky Oak)	7.2m
8	*Syzygium australe* (Brush Cherry)	5.5m
9	*Camellia japonica* (Japonica Camellia)	1.2m
10	*Camellia japonica* (Japonica Camellia)	1.2m
11	*Ligustrum lucidium* (Large Leaf Privet)	N/A
12	*Cinnamomum camphora* (Camphor Laurel)	6.6m
15	*Jacaranda mimosifolia* (Jacaranda)	1.2m
17	*Grevillea robusta* (Silky Oak)	8.4m
18	*Cinnamomum camphora* (Camphor Laurel)	8.4m

Trees Proposed For Removal cont.

Tree no	Species	TPZ
19	*Ligustrum lucidium* (Large Leaf Privet)	N/A
20	*Grevillea robusta* (Silky Oak)	5.4m
21	*Grevillea robusta* (Silky Oak)	4.8m
22	*Ligustrum lucidium* (Large Leaf Privet)	N/A
23	*Erythrina crista-galli* (Cock's Comb Coral Tree)	9.4m
24	*Ligustrum lucidium* (Large Leaf Privet)	N/A
25	*Erythrina crista-galli* (Cock's Comb Coral Tree)	4.8m
26	*Lagerstroemia indica* (Crepe Myrtle)	4.1m
27	*Ulmus glabra* (Scotch Elm)	7.7m
28	*Grevillea robusta* (Silky Oak)	3.6m
29	*Cinnamomum camphora* (Camphor Laurel)	3.6m
30	*Grevillea robusta* (Silky Oak)	4.8m
34	*Jacaranda mimosifolia* (Jacaranda)	9.4m
38	*Dead Tree*	N/A
39	*Ligustrum lucidium* (Large Leaf Privet)	N/A
40	*Ligustrum lucidium* (Large Leaf Privet)	N/A

Table 4 Trees Proposed For Removal

4.5 Trees Located Outside Site Boundaries

Tree no	Species	TPZ	Location
13	*Callistemon viminalis* (Weeping Bottlebrush)	5.4m	Adjoining
14	*Callistemon viminalis* (Weeping Bottlebrush)	10.3m	Adjoining
32	*Ficus elastica* (Indian Rubber Tree)	2.6m	Adjoining
33	*Grevillea robusta* (Silky Oak)	7.2m	Adjoining
35	*Jacaranda mimosifolia* (Jacaranda)	2m	Nature Strip
36	*Jacaranda mimosifolia* (Jacaranda)	6.6m	Nature Strip
37	*Jacaranda mimosifolia* (Jacaranda)	4.8m	Nature Strip

Table 5 Trees Proposed For Retention

4.6 Tree Protection Zone Encroachments

Trees with proposed tree protection zone encroachments (AS 4970 – 2009).

Tree no	Species	Proposed Encroachment	
13	*Callistemon viminalis* (Weeping Bottlebrush)	34m^2	26%
14	*Callistemon viminalis* (Weeping Bottlebrush)	55m^2	22%
16	*Grevillea robusta* (Silky Oak)	13m^2	18%
31	*Callistemon viminalis* (Weeping Bottlebrush)	20m^2	38%
33	*Grevillea robusta* (Silky Oak)	47m^2	29%

Table 5 Tree Protection Zone Encroachments

5 Discussion

5.1 Trees Proposed For Retention

5.1.1 Tree no 16 *Grevillea robusta* (Silky Oak)

5.1.1.1 The tree is young in age and located near the northern boundary fence. It is in adequate health and condition with no obvious defects sighted.

5.1.1.2 The proposed works encroach the TPZ by 18%, which is considered a 'major' encroachment in accordance with AS4970-2009. The proposed excavations for storm water pipe and above ground retention will result in some root loss and may cause stress to the tree. *There are two considerations in evaluating root disturbance: removal of absorbing roots and removal of support or anchoring roots. Removing shallow absorbing roots can cause immediate water stress. The ability of the tree to survive that impact is linked to its tolerance of water stress and ability to form new roots rapid* (Matheny & Clark, 1998).

5.1.2 Tree no 31 *Callistemon viminalis* (Weeping Bottlebrush)

5.1.2.1 This small stature tree is located in the rear yard of no 70 next to the northern boundary fence and in adequate health and condition.

5.1.2.2 The proposed storm water detention works encroach the TPZ by 38%, which is considered a 'major' encroachment in accordance with AS4970-2009 and is within the structural root zone. The proposed excavations for storm water pipe and above ground retention will also result in root loss and may cause stress to the tree.

5.2 Trees Proposed For Removal

5.2.1 Tree no 1 *Pittosporum undulatum* (Sweet Pittosporum)

5.2.1.1 This tree is situated near the southern boundary of no 74 O'Neill Street. It is mature in age and in adequate health and condition.

5.2.1.2 The proposed ramp on the southern side of the proposed development is located approximately 1m from the tree. This will result in significant root loss that will stress the tree and reduce its stability.

5.2.2 Tree no 2 *Liquidambar styraciflua* (Liquidamber)

5.2.2.1 The tree is semi mature in age and in adequate health. It is severely lifting the nearby concrete driveway and has a longitudinal crack on the eastern side of the trunk. *Longitudinal ribs develop almost exclusively due to the presence of longitudinal radial cracks. The origin of the crack is immaterial; it could have extended outwards from internal decay following the xylem rays, from the included bark of an old occluded wound, or from a partly healed frost crack* (Mattheck 1998).

5.2.2.2 It is located within the proposed development envelope therefore proposed for removal.

5.2.3 Tree no 3 *Liquidambar styraciflua* (Liquidamber)

5.2.3.1 This is also a semi mature tree in adequate health. This tree is situated near tree no 2. It is growing against the dwelling roof (no 72), which is deforming the trunk.

5.2.3.2 This tree is also located within the proposed development envelope therefore proposed for removal.

5.2.4 Tree no 7 *Grevillea robusta* (Silky Oak)

5.2.4.1 This is a mature tree located near the boundary between no's 72 and 74 O'Neill Street. The tree is in good health and condition with no obvious defects.

5.2.4.2 It is located within the proposed development envelope and proposed for removal.

5.2.5 Tree no 8 *Syzygium australe* (Brush Cherry)

5.2.5.1 This is a small stature tree located in the rear of no 74 O'Neill Street. The tree is in adequate health and condition though it has been lopped in the past.

5.2.5.2 This small tree is also located within the proposed development works.

5.2.6 Trees no 9 & 10 *Camellia japonica* (Japonica Camellia)

5.2.6.1 These two trees are also small and insignificant. They are in adequate health and condition and located within the proposed envelope.

5.2.7 Tree no 12 *Cinnamomum camphora* (Camphor Laurel)

5.2.7.1 This semi mature tree is located within 2m to the dwelling at no 74. It is in good health though will not tolerate the proposed excavation works.

5.2.8 Tree no 15 *Jacaranda mimosifolia* (Jacaranda)

5.2.8.1 This is a young insignificant tree located near the near northern boundary fence.

5.2.8.2 This tree is not located within the vicinity of the proposed works and due to the included bark within the co-dominant scaffold branch union it is not worthy of long term retention. *Longitudinal ribs develop almost exclusively due to the presence of longitudinal radial cracks. The origin of the crack is immaterial; it could have extended outwards from internal decay following the xylem rays, from the included bark of an old occluded wound, or from a partly healed frost crack* (Mattheck 1998).

5.2.9 Tree no 17 *Grevillea robusta* (Silky Oak)

5.2.9.1 This tree is a mature tree located immediately next to the no 72 O'Neill Street dwelling. The base of the tree has grown and damaged the fibro wall covering.

5.2.9.2 The tree appears to be in adequate health though a pruning wound approximately 50cm in diameter has been removed.

5.2.9.3 It is located within the proposed development envelope and proposed for removal.

5.2.10 Tree no 18 *Cinnamomum camphora* (Camphor Laurel)

5.2.10.1 This tree is located close to the no 70 dwelling. It is semi mature is age with a thin canopy.

5.2.10.2 The tree has included bark within the scaffold limb union and not recommended for long term retention.

5.2.10.3 It is also located within the proposed development works.

5.2.11 Trees no 20 & 21 *Grevillea robusta* (Silky Oak)

5.2.11.1 These are young trees in adequate health and condition. They are located within the rear yard at no 72 O'Neill Street. They are also proposed for removal as they are located within the proposed works.

5.2.12 Tree no 23 *Erythrina crista-galli* (Cock's Comb Coral Tree)

5.2.12.1 This is a mature tree with multiple trunks. It appears to be in adequate health though it has the typical amount of previously failed limbs.

5.2.12.2 It is also located within the proposed development works.

5.2.12.3 This is an exempt species under Holroyd Council's Tree Management Order (2003).

5.2.13 Tree no 25 *Erythrina crista-galli* (Cock's Comb Coral Tree)

5.2.13.1 This is a semi mature tree in adequate heath and condition

5.2.13.2 It is located within the proposed development envelope and an exempt species under Holroyd Council's Tree Management Order (2003).

5.2.14 Tree no 26 *Lagerstroemia indica* (Crepe Myrtle)

5.2.14.1 This is a mature tree located in the rear of no 70 O'Neill Street. It is a small stature tree in adequate health and condition.

5.2.14.2 This tree is also located within the proposed development envelope therefore proposed for removal.

5.2.15 Tree no 27 *Ulmus glabra* (Scotch Elm)

5.2.15.1 This is a mature tree in very poor health and condition. It has a thin and open canopy with many decaying wounds on the trunk and scaffold branches. There is excessive deadwood and many previously failed branches.

5.2.15.2 It is also located within the proposed development works.

5.2.16 Tree no 28 & 30 *Grevillea robusta* (Silky Oak)

5.2.16.1 These trees are young in age and located within the rear yard at no 70 O'Neill Street.

5.2.16.2 They are in adequate health and condition with no major defects sighted.

5.2.16.3 These trees are located with 2m to the proposed development envelope and will not tolerate the root system disturbances required for the proposed works.

5.2.17 Tree no 29 *Cinnamomum camphora* (Camphor Laurel)

5.2.17.1 This tree is located between trees 28 & 30. It is adequate health though overcrowded by the neighbouring Grevillea's.

5.2.17.2 This tree is also unlikely to safely tolerate the proposed disturbances.

5.2.18 Tree no 34 *Jacaranda mimosifolia* (Jacaranda)

5.2.18.1 This tree is mature in age and located near the western boundary fence. It is in adequate health, though it has suffered from pruning resulting in mature watersprout growth. *Watersprouts are often forced into growth just below large pruning wounds, particularly when branches have been cut to stubs. Watersprouts are seldom firmly attached to the trunk or branch from which they arise* (Harris, Clark & Matheny, 1999).

5.2.19 Trees no 4, 5, 6, 11, 19, 22, 24, 39 & 40 *Ligustrum lucidium* (Large Leaf Privet)

5.2.19.1 This is a class 4 Noxious Weed with the following control measures. *The growth of the plant must be managed in a manner that continuously inhibits the ability of the plant to spread* (NW Act 1993).

5.2.20 Tree no 41 *Shrub*

5.2.20.1 The subject shrub is not protected under Holroyd City Council *Tree Management Order* (2003) as it is less than 3.6m in height,

5.2.21 Trees no 42 & 43

5.2.21.1 These trees appeared on the supplied survey map but were no longer in existence at the time of the inspection.

5.3 Trees Located On Adjoining Properties

5.3.1 Tree no 13 *Callistemon viminalis* (Weeping Bottlebrush)

5.3.1.1 This tree is located in the adjoining property being 76 O'Neill Street. The tree is in adequate health and condition, though the canopy has been lifted and a 300mm diameter co-dominant trunk has been removed near the base of the tree.

5.3.1.2 The proposed storm water detention works encroach the TPZ by 26%, which is considered a 'major' encroachment in accordance with AS4970-2009. The proposed excavations for storm water pipe and above ground retention will also result in root loss and may cause stress to the tree.

5.3.2 Tree no 14 *Callistemon viminalis* (Weeping Bottlebrush)

5.3.2.1 This tree is also located the adjoining property being 76 O'Neill Street. It too is in adequate health with multiple trunks and a lifted canopy.

5.3.2.2 This tree requires a TPZ of 8.8m with the proposed development encroaching by 23%, which is also considered a 'major' in accordance with AS4970-2009. Once more the proposed excavations for storm water pipe and above ground retention will also result in root loss and may cause stress to the tree.

5.3.3 Tree no 32 *Ficus elastica* (Indian Rubber Tree)

5.3.3.1 This tree is located in the adjoining property being 68 O'Neill Street. It is too in adequate health with multiple trunks and a lifted canopy.

5.3.3.2 The proposed works is outside the TPZ.

5.3.3.3 This is an exempt species under Holroyd Council's Tree Management Order (2003).

5.3.4 Tree no 33 *Grevillea robusta* (Silky Oak)

5.3.4.1 This mature tree is located within the western adjoining property being no 68 O'Neill Street, very close to the joint boundary fence. The tree is in adequate health and condition.

5.3.4.2 The proposed works and storm water services encroach the TPZ by 29%, which once again is considered a 'major' encroachment in accordance with AS4970-2009. The proposed excavation and root loss will result in potentially killing the tree as well as causing destabilization.

5.3.5 Trees no 35, 36 & 37 *Jacaranda mimosifolia* (Jacaranda)

5.3.5.1 These are all located on the nature strip outside no's 68 and 70 O'Neill Street. They are in adequate health and condition though they appear to be slightly stunted. They are not located near the proposed works though protection from passing machinery will still be required.

5.3.6 Trees no 44, 45, 46 & 47

5.3.6.1 These trees appeared on the supplied survey map but were no longer in existence at the time of the inspection. Trees 44 and 45 were on the rear property and tree 46 was in 68 O'Neill Street and tree no 47 was in 76 O'Neill Street.

6 Recommendations

After inspecting the selected trees at 70-74 O'Neill Street, Guildford and follow up research I came to the following conclusions.

6.1 Trees Proposed For Retention

6.1.1 Tree no 16 *Grevillea robusta* (Silky Oak) is a young tree in adequate health located near the northern boundary. The proposed excavations encroach the TPZ by 18%.

- Recommendations
  - *No excavation within SRZ*
  - *Hand excavation within TPZ*
  - *Do not cut roots over 40mm in diameter*
  - *Properly prune roots under 40mm sharply*
  - *Apply tree protection methods (section 7)*
  - *Apply a 'Tree Management Plan' to monitor and minimise stress*

6.1.2 Tree no 31 *Callistemon viminalis* (Weeping Bottlebrush) is a mature tree in adequate health also located near the northern boundary. The proposed excavations encroach the TPZ by 38%.

- Recommendations
  - *Gradual excavation within TPZ*
  - *Hand excavation within TPZ*
  - *Do not cut roots over 40mm in diameter*
  - *Properly prune roots under 40mm sharply*
  - *Apply tree protection methods (section 7)*
  - *Apply a 'Tree Management Plan' to monitor and minimise stress*

6.2 Trees Proposed For Removal

6.2.1 Tree no 1 *Pittosporum undulatum* (Sweet Pittosporum)

- Recommendation
  - *Remove the tree*

6.2.2 Tree no 2 *Liquidambar styraciflua* (Liquidamber)

- Recommendation
  - *Remove the tree*

6.2.3 Tree no 3 *Liquidambar styraciflua* (Liquidamber)

- Recommendation
  - *Remove the tree*

6.2.4 Tree no 7 *Grevillea robusta* (Silky Oak)

- Recommendation
  - *Remove the tree*

6.2.5 Tree no 8 *Syzygium australe* (Brush Cherry)

- Recommendation
  - *Remove the tree*

6.2.6 Trees no 9 & 10 *Camellia japonica* (Japonica Camellia)

- Recommendation
  - *Remove the tree*

6.2.7 Tree no 12 *Cinnamomum camphora* (Camphor Laurel)

- Recommendation
  - *Remove the tree*

6.2.8 Tree no 15 *Jacaranda mimosifolia* (Jacaranda)

- Recommendation
  - *Remove the tree*

6.2.9 Tree no 17 *Grevillea robusta* (Silky Oak)

- Recommendation
  - *Remove the tree*

6.2.10 Tree no 18 *Cinnamomum camphora* (Camphor Laurel)

- Recommendation
  - *Remove the tree*

6.2.11 Trees no 20 & 21 *Grevillea robusta* (Silky Oak)

- Recommendation
  - *Remove the tree*

6.2.12 Tree no 23 *Erythrina crista-galli* (Cock's Comb Coral Tree) this is an exempt species under Holroyd Council's Tree Management Order (2003).

- Recommendation
  - *Remove the tree*

6.2.13 Tree no 25 *Erythrina crista-galli* (Cock's Comb Coral Tree) this is an exempt species under Holroyd Council's Tree Management Order (2003).

- Recommendation
  - *Remove the tree*

6.2.14 Tree no 26 *Lagerstroemia indica* (Crepe Myrtle)

- Recommendation
  - *Remove the tree*

6.2.15 Tree no 27 *Ulmus glabra* (Scotch Elm)

- Recommendation
  - *Remove the tree*

6.2.16 Tree no 28 & 30 *Grevillea robusta* (Silky Oak)

- Recommendation
  - *Remove the tree*

6.2.17 Tree no 29 *Cinnamomum camphora* (Camphor Laurel)

- Recommendation
  - *Remove the tree*

6.2.18 Tree no 34 *Jacaranda mimosifolia* (Jacaranda)

- Recommendation
  - *Remove the tree*

6.2.19 Trees no 4, 5, 6, 11, 19, 22, 24, 39 & 40 *Ligustrum lucidium* (Large Leaf Privet)

- Recommendation
  - *Remove the trees*

6.3 Trees Located On Adjoining Properties

6.3.1 Tree no 13 *Callistemon viminalis* (Weeping Bottlebrush) is adequate health and condition. The proposed storm water detention works encroach the TPZ by 26%

- Recommendations
  - *No excavation within SRZ*
  - *Gradual excavation within TPZ*
  - *Do not cut roots over 40mm in diameter*
  - *Properly prune roots under 40mm sharply*
  - *Apply tree protection methods (section 7)*
  - *Apply a 'Tree Management Plan' to monitor and minimise stress*

6.3.2 Tree no 14 *Callistemon viminalis* (Weeping Bottlebrush) is adequate health and condition. The proposed storm water detention works encroach the TPZ by 23%

- Recommendations
  - *No excavation within SRZ*
  - *Gradual excavation within TPZ*
  - *Do not cut roots over 40mm in diameter*
  - *Properly prune roots under 40mm sharply*
  - *Apply tree protection methods (section 7)*
  - *Apply a 'Tree Management Plan' to monitor and minimise stress*

6.3.3 Tree no 32 *Ficus elastica* (Indian Rubber Tree) this is an exempt species under Holroyd Council's Tree Management Order (2003).

- Recommendations
  - *No excavation within SRZ*
  - *Hand excavation within TPZ*
  - *Do not cut roots over 40mm in diameter*
  - *Properly prune roots under 40mm sharply*
  - *Apply tree protection methods (section 7)*

6.3.4 Tree no 33 *Grevillea robusta* (Silky Oak)

- Recommendation
  - *Remove the tree with the owners consent*

6.3.5 Trees no 35, 36 & 37 *Jacaranda mimosifolia* (Jacaranda)

- Recommendations
  - *No excavation within SRZ*
  - *Hand excavation within TPZ*
  - *Do not cut roots over 40mm in diameter*
  - *Properly prune roots under 40mm sharply*
  - *Apply tree protection methods (section 7)*

6.4 Arborist Involvement During Construction Activities

- Fencing Compliance
- Any excavation works
- Monthly Inspections
- Final Inspection

Signed

Meredith Gibbs. Dip. Hort. (Arb.) M.A.A, M.I.S.A., M.A.I.H. & M.Q.T.R.A.
Australis Tree Management

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. Additional protection maybe required.

7.1.2 The trunk protection shall consist of two metre lengths of hardwood timbers (100 x 50mm) spaced at 100-150mm centres secured together with 2mm galvanised wire. These shall be strapped around the trunk (not fixed in any way) to avoid mechanical injury or damage.

7.1.3 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 (AS4970-2009).

7.1.4 The SRZ is the area required for tree stability. A larger area is required to maintain a viable tree. The SRZ only needs to be calculated when major encroachment into a TPZ is proposed. There are many factors that affect the size of the SRZ (e.g. tree height, crown area, soil type, soil moisture). The SRZ may also be influenced by natural or built structures, such as rocks and footings (AS4970-2009).

7.1.5 Stress reduction from construction impacts may include mulching and irrigating the TPZ's. This along with other relevant protection measures will help ensure the viability of trees post construction works.

7.2 Fencing

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

7.3 Signage

7.3.1 "Tree Protection Zone, No Entry. Australis Tree Management Ph 0407 103 895". Must be attached to the protective fencing.

7.3.2 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.*

7.4 Pruning

7.4.1 Any pruning required must be in accordance with AS 4373-2007. Pruning of Amenity Trees, Standards Australia, Standards Association of Australia, NSW, Australia and completed by level 3 qualified arborist.

7.5 Irrigation

7.5.1 All trees must be thoroughly water once a week and mulched with composted leaf mulch no thicker than 70mm.

7.6 Mulch

7.6.1 With the tpz fencing 75mm of organic mulch must be applied to help retain moisture levels, suppress weed growth and reduce tree stress.

7.7 Tree Damage

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

7.8 Tree Monitoring Schedule

7.8.1 During site occupation all TPZ's and trees must be monitored, assessed and recorded by a suitably qualified arborist according to council's requirements.

7.8.2 Any work that must occur within a tree protection zone must be witnessed and directed by a suitably qualified arborist.

7.8.3 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.

Appendix A - Tree Schedule

Tree No.	1	2	3	4	5
Species	Pittosporum undulatum (Sweet Pittosporum)	Liquidambar styraciflua (Liquidamber)	Liquidambar styraciflua (Liquidamber)	Ligustrum lucidium (Large Leaf Privet)	Ligustrum lucidium (Large Leaf Privet)
Location	On Site	On Site	On Site	On Site	On Site
DBH	20cm	55cm	40cm		
DGL	20cm	65cm	45cm		
Height	6m	14m	13m		
Spread	4m	12m	8m		
Age	Mature	Semi Mature	Semi Mature		
Life Expectancy	15-40 yrs	40+ yrs	40+ yrs		
Crown Class	Dominant	Dominant	Co-dominant		
Crown Condition	4 - Good	4 - Good	4 - Good		
Root Zone	Garden	Paved	Compacted		
Structures	Fence	Fence	Dwelling		
Type	Self Seeded Indigenous	Exotic	Exotic	NW-4	NW-4
Ecological Value	Food	None	None	None	None
Landscape Significance	Medium	Medium	Medium	Low	Low
Retention Priority	Low - Consider for Retention	Med - Consider for Retention	Low - Consider for Retention	Priority for Removal	Priority for Removal
Health & Condition		BI DW TW SR	PF		
TPO Protected	Yes	Yes	Yes	Noxious	Noxious
Proposed Status	Remove	Remove	Remove	Remove	Remove
Tree Protection Zone	2.4m	6.6m	4.8m		
Structural Root Zone	1.7m	2.8m	2.4m		
Distance To Proposed Development	1m	Within	Within		
Total TPZ Area	18.1m^2	136.8m^2	72.3m^2		
Proposed TPZ Encroachment	-	-	-		
Proposed TPZ Encroachment	0%	0%	0%		
Comments			deformed from roof		

Tree No.	6	7	8	9	10
Species	Ligustrum lucidium (Large Leaf Privet)	Grevillea robusta (Silky Oak)	Syzygium australe (Brush Cherry)	Camellia japonica (Japonica Camellia)	Camellia japonica (Japonica Camellia)
Location	On Site	On Site	On Site	On Site	On Site
DBH		60cm	46cm	10cm	10cm
DGL		70cm	40cm	20cm	20cm
Height		16m	8m	6m	6m
Spread		12m	8m	3m	3m
Age		Mature	Mature	Mature	Mature
Life Expectancy		15-40 yrs	40+ yrs	15-40 yrs	15-40 yrs
Crown Class		Dominant	Dominant	Co-dominant	Co-dominant
Crown Condition		4 - Good	3 - Average / Low Vigour	4 - Good	4 - Good
Root Zone		Garden	Garden	Garden	Garden
Structures		Fence	Garage	Garage	Garage
Type	NW-4	Self Seeded Native	Native	Exotic	Exotic
Ecological Value	None	Food	Food	None	None
Landscape Significance	Low	High	Medium	Low	Low
Retention Priority	Priority for Removal	Med - Consider for Retention	Low - Consider for Retention	Low - Consider for Retention	Low - Consider for Retention
Health & Condition			LP		
TPO Protected	Noxious	Yes	Yes	Yes	Yes
Proposed Status	Remove	Remove	Remove	Remove	Remove
Tree Protection Zone		7.2m	5.5m	1.2m	1.2m
Structural Root Zone		2.8m	2.3m	1.7m	1.7m
Distance To Proposed Development		Within	Within	Within	Within
Total TPZ Area		162.8m^2	95.7m^2	4.5m^2	4.5m^2
Proposed TPZ Encroachment		-	-	-	-
Proposed TPZ Encroachment		0%	0%	0%	0%
Comments					

Tree No.	11	12	13	14	15
Species	Ligustrum lucidium (Large Leaf Privet)	Cinnamomum camphora (Camphor Laurel)	Callistemon viminalis (Weeping Bottlebrush)	Callistemon viminalis (Weeping Bottlebrush)	Jacaranda mimosifolia (Jacaranda)
Location	On Site	On Site	Adjoining	Adjoining	On Site
DBH		55cm	54cm	73cm	10cm
DGL		65cm	60cm	80cm	20cm
Height		12m	6m	6m	7m
Spread		14m	8m	8m	3m
Age		Semi Mature	Mature	Mature	Young
Life Expectancy		40+ yrs	15-40 yrs	15-40 yrs	40+ yrs
Crown Class		Dominant	Dominant	Dominant	Dominant
Crown Condition		4 - Good	4 - Good	4 - Good	4 - Good
Root Zone		Garden	Grass	Grass	Grass
Structures		Dwelling	Fence	Fence	Fence
Type	NW-4	Self Seeded Exotic	Native	Native	Exotic
Ecological Value	None	None	Food	Food	None
Landscape Significance	Low	Medium	Medium	Medium	Low
Retention Priority	Priority for Removal	Med - Consider for Retention	High - Priority for Retention	High - Priority for Retention	Low - Consider for Retention
Health & Condition			PE	SI BI	SI
TPO Protected	Noxious	Yes	Yes	Yes	Yes
Proposed Status	Remove	Remove	Retain	Retain	Remove
Tree Protection Zone		6.6m	6.5m	8.8m	1.2m
Structural Root Zone		2.8m	2.7m	3.0m	1.7m
Distance To Proposed Development		1m	7m	7m	7m
Total TPZ Area		136.8m^2	131.8m^2	241.0m^2	4.5m^2
Proposed TPZ Encroachment		Within	34.0m^2	55.0m^2	0.0m^2
Proposed TPZ Encroachment		0%	26%	23%	0%
Comments			Codominant removed 300mm diam		

Tree No.	16	17	18	19	20
Species	Grevillea robusta (Silky Oak)	Grevillea robusta (Silky Oak)	Cinnamomum camphora (Camphor Laurel)	Ligustrum lucidium (Large Leaf Privet)	Grevillea robusta (Silky Oak)
Location	On Site	On Site	On Site	On Site	On Site
DBH	40cm	70cm	70cm		45cm
DGL	50cm	100cm	90cm		50cm
Height	12m	24m	17m		15m
Spread	7m	18m	12m		12m
Age	Young	Mature	Semi Mature		Semi Mature
Life Expectancy	15-40 yrs	15-40 yrs	40+ yrs		15-40 yrs
Crown Class	Co-dominant	Dominant	Dominant		Co-dominant
Crown Condition	3 - Average / Low Vigour	4 - Good	3 - Average / Low Vigour		3 - Average / Low Vigour
Root Zone	Garden	Compacted	Compacted		Grass
Structures	Fence	Dwelling	Dwelling		
Type	Self Seeded Native	Self Seeded Native	Self Seeded Exotic	NW-4	Self Seeded Native
Ecological Value	Food	Food	None	None	Food
Landscape Significance	Low	Medium	Medium	Low	Medium
Retention Priority	Low - Consider for Retention	Priority for Removal	Priority for Removal	Priority for Removal	Med - Consider for Retention
Health & Condition		SI BD	SI		
TPO Protected	Yes	Yes	Yes	Noxious	Yes
Proposed Status	Retain	Remove	Remove	Remove	Remove
Tree Protection Zone	4.8m	8.4m	8.4m		5.4m
Structural Root Zone	2.5m	3.3m	3.2m		2.5m
Distance To Proposed Development	3m	Within	Within		Within
Total TPZ Area	72.3m	221.6m	221.6m		91.6m
Proposed TPZ Encroachment	13.0m^2	-	-		-
Proposed TPZ Encroachment	18%	0%	0%		0%
Comments		Scaffold removed 500 basal decay			

Tree No.	21	22	23	24	25
Species	Grevillea robusta (Silky Oak)	Ligustrum lucidium (Large Leaf Privet)	Erythrina crista-galli (Cock's Comb Coral Tree)	Ligustrum lucidium (Large Leaf Privet)	Erythrina crista-galli (Cock's Comb Coral Tree)
Location	On Site	On Site	On Site	On Site	On Site
DBH	40cm		78cm		40cm
DGL	45cm		100cm		40cm
Height	13m		8m		7m
Spread	10m		16m		5m
Age	Semi Mature		Mature		Semi Mature
Life Expectancy	15-40 yrs		15-40 yrs		40+ yrs
Crown Class	Co-dominant		Co-dominant		Co-dominant
Crown Condition	3 - Average / Low Vigour		3 - Average / Low Vigour		4 - Good
Root Zone	Grass		Mulch		Grass
Structures			Garage		Garage
Type	Self Seeded Native	NW-4	Exotic	NW-4	Exotic
Ecological Value	Food	None	None	None	None
Landscape Significance	Medium	Low	Low	Low	Low
Retention Priority	Med - Consider for Retention	Priority for Removal	Med - Consider for Retention	Priority for Removal	Low - Consider for Retention
Health & Condition			DW PF		
TPO Protected	Yes	Noxious	Exempt	Noxious	Exempt
Proposed Status	Remove	Remove	Remove	Remove	Remove
Tree Protection Zone	4.8m		9.4m		4.8m
Structural Root Zone	2.4m		3.3m		2.3m
Distance To Proposed Development	0		0		0
Total TPZ Area	72.3m^2		275.1m^2		72.3m^2
Proposed TPZ Encroachment					
Proposed TPZ Encroachment	0%		0%		0%
Comments					

Tree No.	26	27	28	29	30
Species	Lagerstroemia indica (Crepe Myrtle)	Ulmus glabra (Scotch Elm)	Grevillea robusta (Silky Oak)	Cinnamomum camphora (Camphor Laurel)	Grevillea robusta (Silky Oak)
Location	On Site	On Site	On Site	On Site	On Site
DBH	34cm	64cm	30cm	30cm	40cm
DGL	60cm	90cm	30cm	35cm	45cm
Height	6m	8m	14m	9m	15m
Spread	10m	12m	6m	7m	8m
Age	Mature	Mature	Young	Young	Young
Life Expectancy	15-40 yrs	<5 yrs	15-40 yrs	15-40 yrs	15-40 yrs
Crown Class	Dominant	Dominant	Intermediate	Intermediate	Intermediate
Crown Condition	4 - Good	1 - Severe Decline	3 - Average / Low Vigour	3 - Average / Low Vigour	3 - Average / Low Vigour
Root Zone	Grass	Grass	Grass	Grass	Grass
Structures	Garage		Fence	Fence	Fence
Type	Exotic	Exotic	Self Seeded Native	Self Seeded Exotic	Self Seeded Native
Ecological Value	None	None	Food	None	Food
Landscape Significance	Low	Medium	Medium	Medium	Medium
Retention Priority	Low - Consider for Retention	Priority for Removal	Med - Consider for Retention	Med - Consider for Retention	Med - Consider for Retention
Health & Condition		BD PF DW BW CK F			
TPO Protected	Yes	Yes	Yes	Yes	Yes
Proposed Status	Remove	Remove	Remove	Remove	Remove
Tree Protection Zone	4.1m	7.7m	3.6m	3.6m	4.8m
Structural Root Zone	2.7m	3.2m	2.0m	2.1m	2.4m
Distance To Proposed Development	Within	Within	Within	Within	Within
Total TPZ Area	52.3m^2	185.2m^2	40.7m^2	40.7m^2	72.3m^2
Proposed TPZ Encroachment					
Proposed TPZ Encroachment	0%	0%	0%	0%	0%
Comments					

Tree No.	31	32	33	34	35
Species	Callistemon viminalis (Weeping Bottlebrush)	Ficus elastica (Indian Rubber Tree)	Grevillea robusta (Silky Oak)	Jacaranda mimosifolia (Jacaranda)	Jacaranda mimosifolia (Jacaranda)
Location	On Site	Adjoining	Adjoining	On Site	Nature Strip
DBH	34cm	22cm	60cm	78cm	17cm
DGL	40m	40cm	80cm	80cm	30cm
Height	8m	6m	24m	14m	3m
Spread	8m	8m	18m	20m	6m
Age	Mature	Semi Mature	Mature	Mature	Young
Life Expectancy	15-40 yrs	40+ yrs	15-40 yrs	40+ yrs	40+ yrs
Crown Class	Dominant	Dominant	Dominant	Dominant	Dominant
Crown Condition	4 - Good	3 - Average / Low Vigour	3 - Average / Low Vigour	4 - Good	3 - Average / Low Vigour
Root Zone	Grass	Grass	Grass	Grass	Grass
Structures	Fence	Fence	Fence	Fence	Footpath / Road
Type	Native	Exotic	Self Seeded Native	Exotic	Exotic
Ecological Value	Food	None	Food	None	None
Landscape Significance	Low	Low	High	Medium	Low
Retention Priority	Low - Consider for Retention	Med - Consider for Retention	High - Priority for Retention	Med - Consider for Retention	Low - Consider for Retention
Health & Condition					Stunted
TPO Protected	Yes	Exempt	Yes	Yes	Yes
Proposed Status	Retain	Retain	Remove	Remove	Retain
Tree Protection Zone	4.1m	2.6m	7.2m	9.4m	2.0m
Structural Root Zone	2.3m	2.3m	3.0m	3.0m	2.0m
Distance To Proposed Development	0.5m	4m	3m	Within	Outside
Total TPZ Area	52.3m^2	21.9m^2	162.8m^2	275.1m^2	13.1m^2
Proposed TPZ Encroachment	20.0m^2	0.0m^2	47.0m^2		
Proposed TPZ Encroachment	38%	0%	29%	0%	0%
Comments			Owners Consent Required		

Tree No.	36	37	38	39	40
Species	Jacaranda mimosifolia (Jacaranda)	Jacaranda mimosifolia (Jacaranda)	Dead Tree	Ligustrum lucidium (Large Leaf Privet)	Ligustrum lucidium (Large Leaf Privet)
Location	Nature Strip	Nature Strip	On Site	On Site	On Site
DBH	55cm	40cm			
DGL	50cm	60cm			
Height	6m	7m			
Spread	12m	10m			
Age	Semi Mature	Semi Mature			
Life Expectancy	40+ yrs	40+ yrs			
Crown Class	Dominant	Dominant			
Crown Condition	4 - Good	4 - Good			
Root Zone	Grass	Grass			
Structures	Footpath / Road	Footpath / Road			
Type	Exotic	Exotic		NW-4	NW-4
Ecological Value	None	None	None	None	None
Landscape Significance	Medium	Medium	Low	Low	Low
Retention Priority	Med - Consider for Retention	Med - Consider for Retention	Priority for Removal	Priority for Removal	Priority for Removal
Health & Condition	Stunted	WS EP BI			
TPO Protected	Yes	Yes		Noxious	Noxious
Proposed Status	Retain	Retain	Remove	Remove	Remove
Tree Protection Zone	6.6m	4.8m			
Structural Root Zone	2.5m	2.7m			
Distance To Proposed Development	0	0			
Total TPZ Area	136.8m^2	72.3m^2			
Proposed TPZ Encroachment	Outside	Outside			
Proposed TPZ Encroachment	0%	0%			
Comments		Stunted basal decay			

Tree No.	41	42	43	44	45	46	47
Species	Shrub	No Tree	No Tree	No Tree	No Tree	No Tree	No Tree
Location	On Site	On Site	On Site	Adjoining	Adjoining	Adjoining	Adjoining
DBH							
DGL							
Height	1m						
Spread	2m						
Age							
Life Expectancy							
Crown Class							
Crown Condition							
Root Zone							
Structures							
Type							
Ecological Value	None						
Landscape Significance							
Retention Priority							
Health & Condition							
TPO Protected	No						
Proposed Status	Remove						
Tree Protection Zone							
Structural Root Zone							
Distance To Proposed Development							
Total TPZ Area							
Proposed TPZ Encroachment							
Proposed TPZ Encroachment							
Comments							

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	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 Kerb Mulch	Damaged roots Girdled roots Lifting Pavement Paving etc		Exposed roots Grass Lowered soil level Raised Soil level
Structures	Driveway Fence Garage	Footpath Verandah		Dwelling Seat
Health and Condition	Bark Subsidence Basal Inclusion Basal Wound Borers Branch Inclusions Branch Wounds Cambial Dieback Cankers Canopy Lifted Climber Codom Trunk Inclusion Decay Decline Deadwood Dead stubs Epicormic Growth Fungal Bodies Galls Hardware Inclusions Kino	**BS** **BI** **BaW** **BO** **BI** **BrW** **CD** **CK** **CL** **CR** **CI** **DY** **DC** **DW** **DS** **EP** **FB** **GA** **HW** **IN** **KI**	Lean Lifting Paving Lopped Longitudinal Rib Multiple Attach's Multi Trunks Poor Growth Form Previous Failures Pruning Events Sap Scaffold Inclusion Splits / Cracks Surface Roots Suckering growth Termites Thaumasticorid Trunk Drilling Trunk Wounds Twig Dieback Watersprouts	**LN** **LP** **LO** **LR** **MA** **MT** **PG** **PF** **PE** **SA** **SI** **SP** **SR** **SU** **TE** **TH** **TDr** **TW** **TDi** **WS**

Appendix C - Photographs

Figure 3 House no 70

Figure 4 House no 72

Figure 5 House no 74

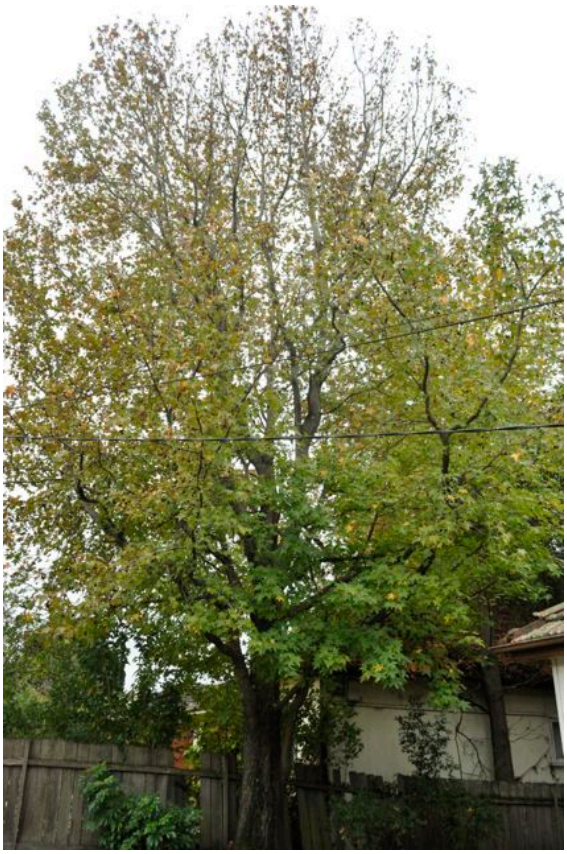


Figure 6 Tree no 2

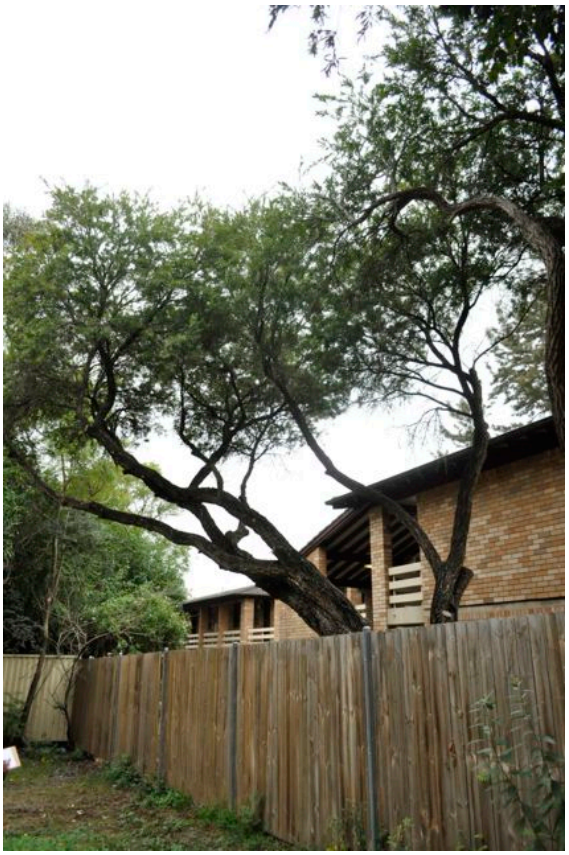


Figure 7 Tree no 14

Figure 8 Rear yard of number 74

Figure 9 Tree no 28

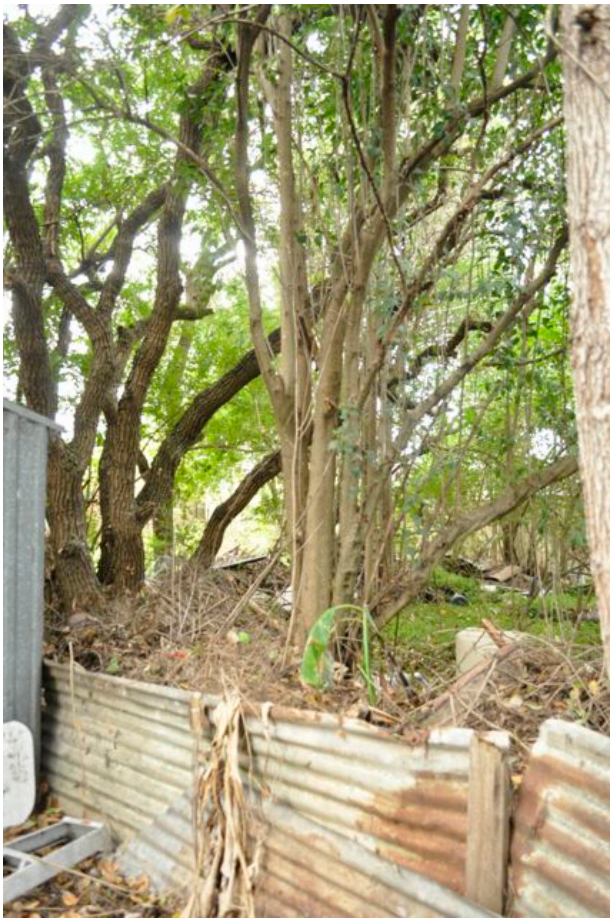


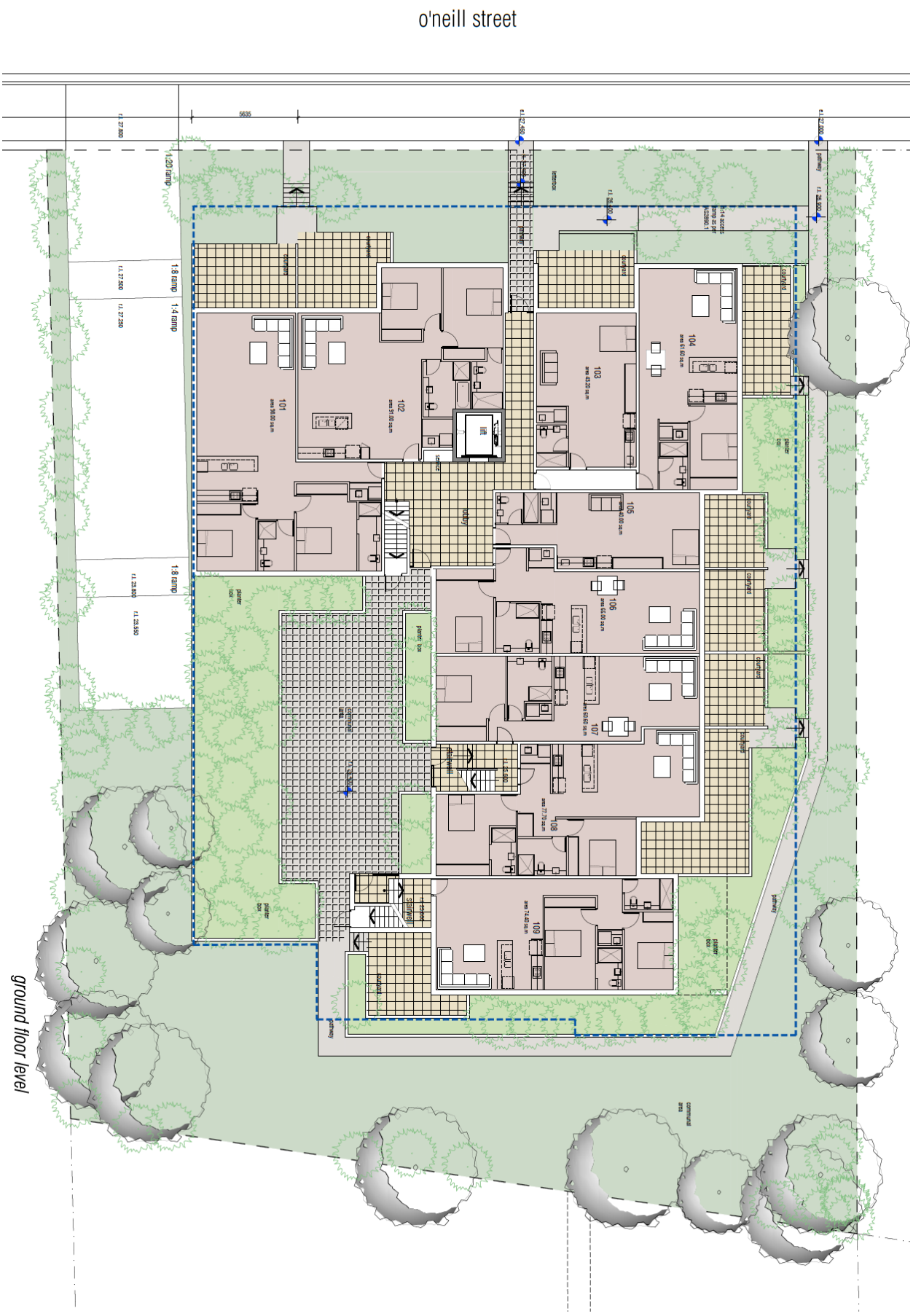
Figure 10 Trees no 24 & 25

Figure 11 Tree no 27

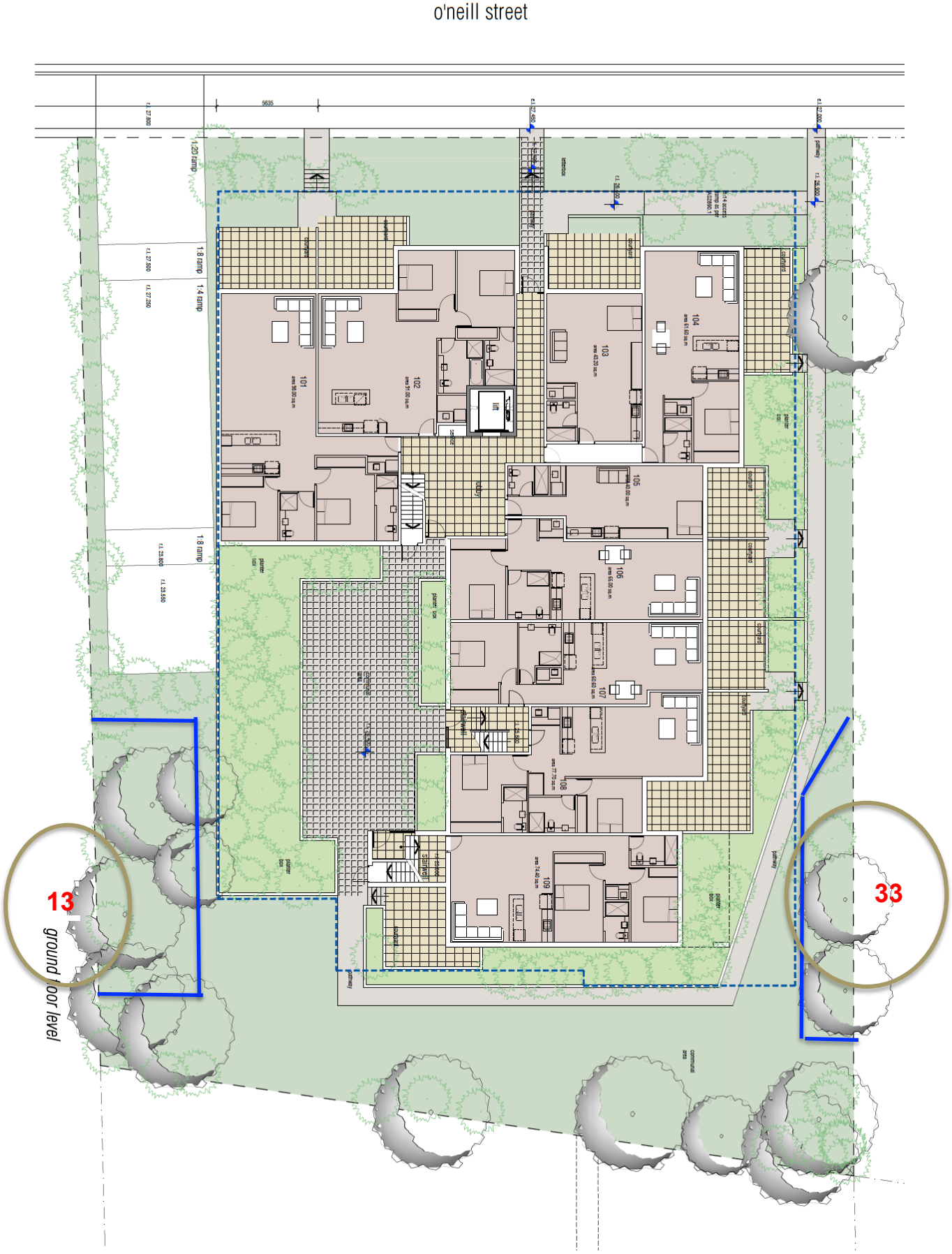
Figure 12 Trees no 28, 29 & 30

Figure 13 Tree no 34

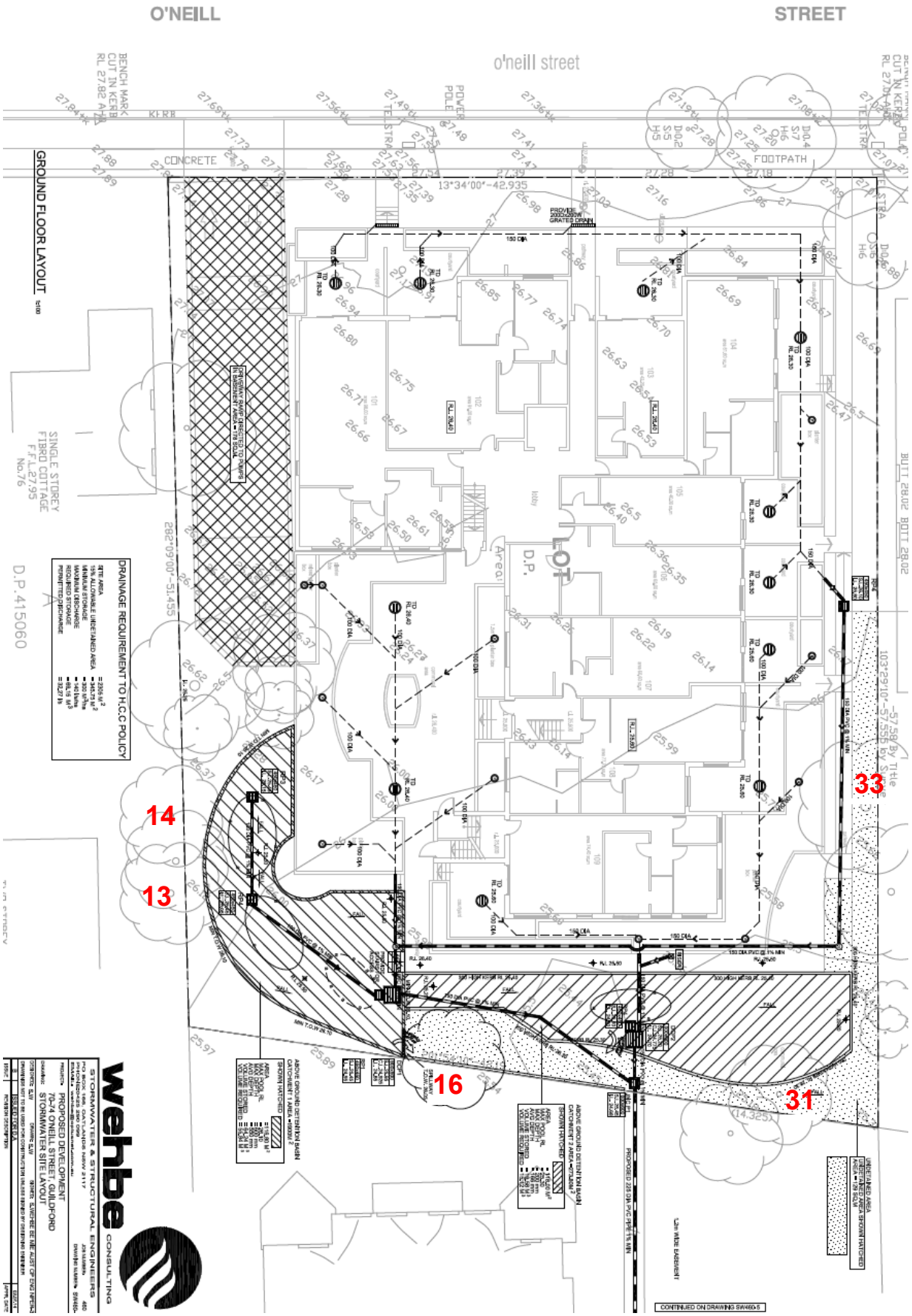
Appendix D - Proposed Site Plan



Appendix E – Tree Protection Plan



Appendix F – Storm Water Plan



Appendix G - 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 co-dominant 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 H - Significance of a Tree, Assessment Rating System

(STARS) IACA, Australia

1. High Significance in landscape

- The tree is in good condition and good vigour;
- The tree has a form typical for the species;
- The tree is a remnant or is a planted locally indigenous specimen and/or is rare or uncommon in the local area or of botanical interest or of substantial age;
- The tree is listed as a Heritage Item, Threatened Species or part of an Endangered ecological community or listed on Councils significant Tree Register;
- The tree is visually prominent and visible from a considerable distance when viewed from most directions within the landscape due to its size and scale and makes a positive contribution to the local amenity;
- The tree supports social and cultural sentiments or spiritual associations, reflected by the broader population or community group or has commemorative values;
- The tree's growth is unrestricted by above and below ground influences, supporting its ability to reach dimensions typical for the taxa in situ - tree is appropriate to the site conditions.

2. Medium Significance in landscape

- The tree is in fair-good condition and good or low vigour;
- The tree has form typical or atypical of the species;
- The tree is a planted locally indigenous or a common species with its taxa commonly planted in the local area
- The tree is visible from surrounding properties, although not visually prominent as partially obstructed by other vegetation or buildings when viewed from the street,
- The tree provides a fair contribution to the visual character and amenity of the local area,
- The tree's growth is moderately restricted by above or below ground influences, reducing its ability to reach dimensions typical for the taxa in situ.

3. Low Significance in landscape

- The tree is in fair-poor condition and good or low vigour;
- The tree has form atypical of the species;
- The tree is not visible or is partly visible from surrounding properties as obstructed by other vegetation or buildings,
- The tree provides a minor contribution or has a negative impact on the visual character and amenity of the local area,
- The tree is a young specimen which may or may not have reached dimension to be protected by local Tree Preservation orders or similar protection mechanisms and can easily be replaced with a suitable specimen,
- The tree's growth is severely restricted by above or below ground influences, unlikely to reach dimensions typical for the taxa in situ - tree is inappropriate to the site conditions,
- The tree is listed as exempt under the provisions of the local Council Tree Preservation Order or similar protection mechanisms,
- The tree has a wound or defect that has potential to become structurally unsound.
- Environmental Pest / Noxious Weed Species
- The tree is an Environmental Pest Species due to its invasiveness or poisonous/ allergenic properties,
- The tree is a declared noxious weed by legislation.
- Hazardous/Irreversible Decline
- The tree is structurally unsound and/or unstable and is considered potentially dangerous,
- The tree is dead, or is in irreversible decline, or has the potential to fail or collapse in full or part in the immediate to short term.

The tree is to have a minimum of three (3) criteria in a category to be classified in that group.

Note: The assessment criteria are for individual trees only, however, can be applied to a monocultural stand in its entirety e.g.

Significance of a Tree, Assessment Rating System cont.

Landscape Significance

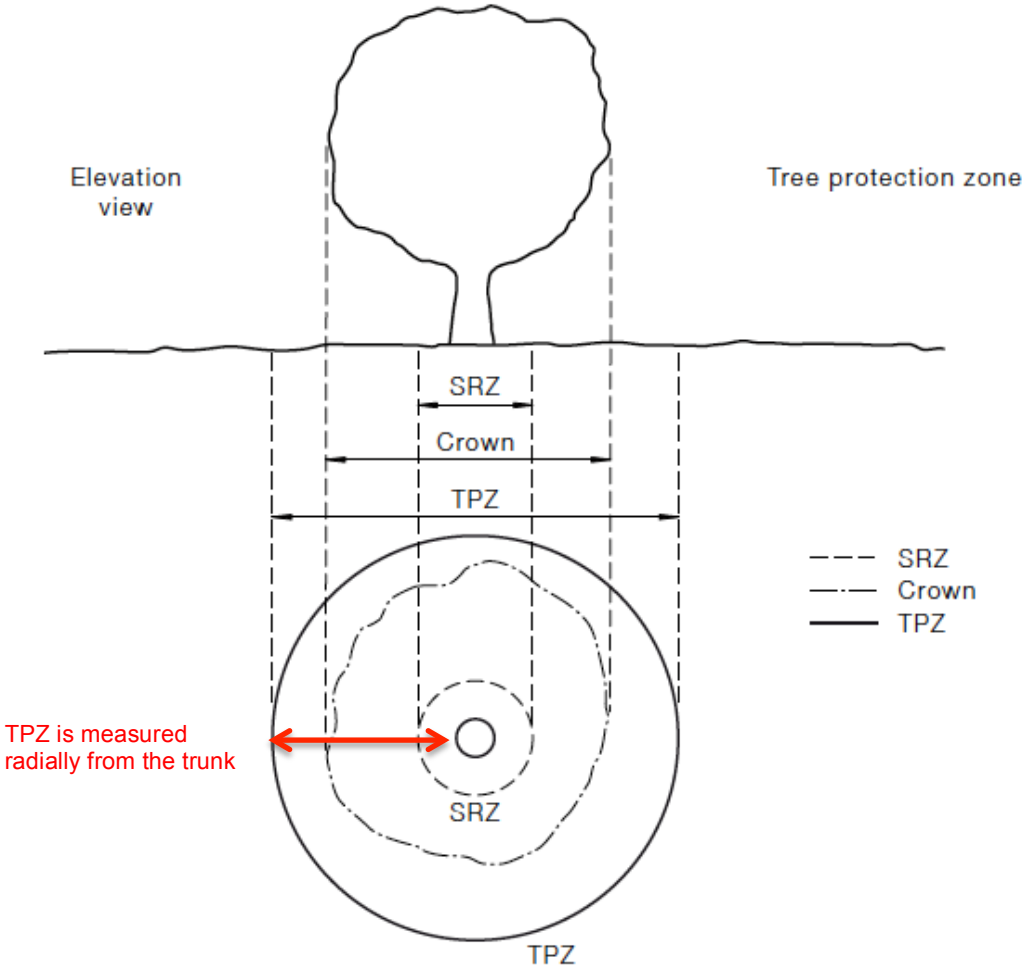
		1. High	2. Medium	3. Low		
		Significance in landscape			Environmental Pest / Noxious Weed Species	Hazardous / Irreversible Decline
Estimated Life Expectancy	1. Long >40 years					
	2. Medium 15-40 years					
	3. Short <1-15 years					
	Dead					

Legend For Matrix Assessment

	Priority for Retention (High) – These trees are considered important for retention and should be retained and protected. Design modification or re-location of building/s should be considered to accommodate the setbacks as prescribed by the Australian Standard AS4980 Protection of trees on development sites. Tree sensitive construction measures must be implemented e.g. pier and beam etc if works are to proceed within the Tree Protection Zone.
	Consider for Retention (Medium) – These trees may be retained and protected. These are considered less critical; however their retention should remain priority with removal considered only if adversely affecting the proposed building/works and all other alternatives have been considered and exhausted.
	Consider for Removal (Low) – These trees are not considered important for retention, nor require special works or design modification to be implemented for their retention.
	Priority for Removal – These trees are considered hazardous, or in irreversible decline, or weeds and should be removed irrespective of development.

Appendix I - Tree Protection Zones AS4970-2009

Protection of Trees On Development Sites



TREE PROTECTION ZONE (TPZ)

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.

The TPZ incorporates the structural root zone (SRZ) (refer to Clause 3.3.5).

DETERMINING THE TPZ
The **radius** of the TPZ is calculated for each tree by multiplying its DBH × 12.

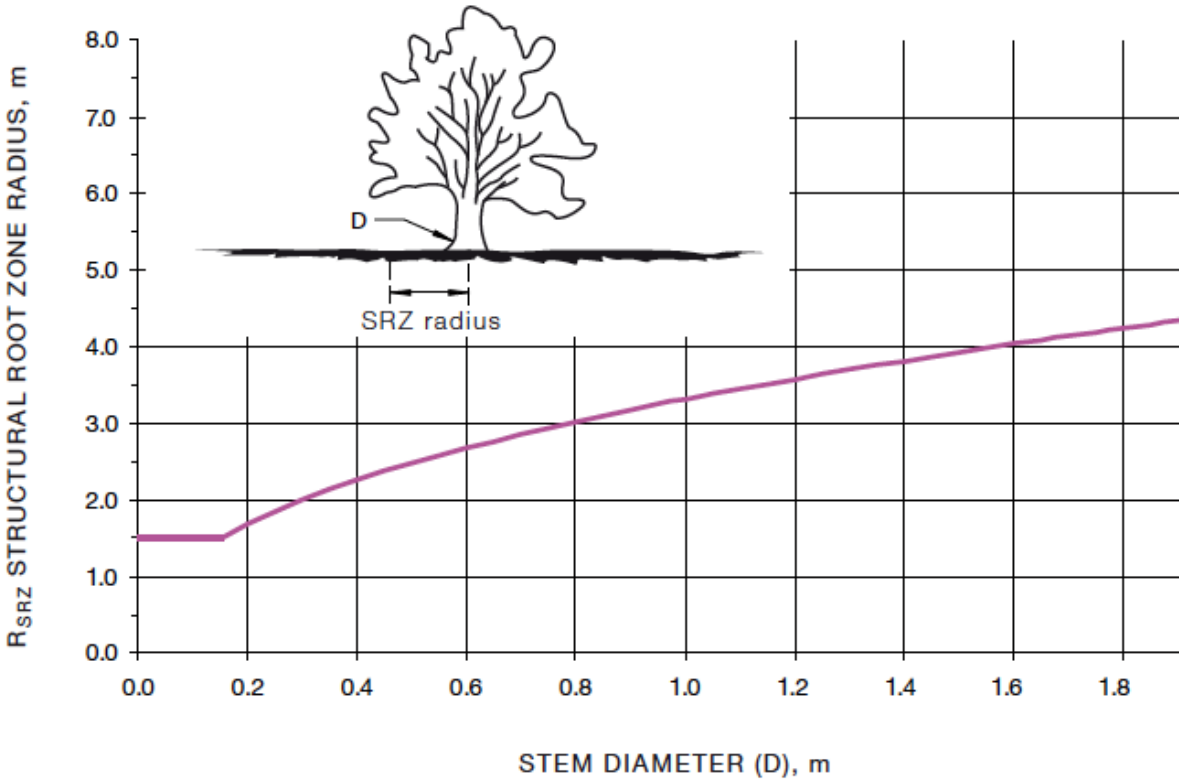
TPZ = DBH×12
where
DBH = trunk diameter measured at 1.4 m above ground

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

A TPZ should not be less than 2 m nor greater than 15 m (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 J - Structural Root Zones AS4970-2009 (amdt 2010)



The curve can be expressed by the following formula:

$R_{SRZ} = (D \times 50)^{0.42} \times 0.64$

NOTES:

1 R_{SRZ} is the calculated structural root zone radius (SRZ radius).

2 D is the stem diameter measured immediately above root buttress.

3 The R_{SRZ} for trees less than 0.15 m diameter is 1.5 m.

4 The R_{SRZ} formula and graph do not apply to palms, other monocots, cycads and tree ferns.

5 This does not apply to trees with an asymmetrical root plate.

Appendix K - Qualifications & Experience

Australis Tree Management
PO Box 3453, Dural NSW 2158
Mobile: 0407 103 895
ABN: 71 324 020 793
Website: www.australistrees.com.au
Email: info@australistrees.com.au

Meredith Gibbs Dip. Hort. (Arb). MAA, MAIH, MISA & MQTRA

Qualifications:	Advanced Certificate in Urban Horticulture, 1999 Horticulture Diploma (Arboriculture), Level 5, 2002 Occupational Health & Safety course 2002 Risk Management course 2002 Smart Train 008397 Collecting Catchment Data 2010 Quantified Tree Risk Assessment 2011
Currently studying:	Advanced Diploma in Applied Environmental Management Completed Collecting & Evaluate Catchment Data Interpreting Ecological Relationships Collect & Classify Native Plants Develop Bush Fire Management Plan
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
Memberships and affiliations:	Arboriculture Australia Australian Institute of Horticulture International Society of Arboriculture Quantified Tree Risk Assessment License
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 QLD 2014

Arboriculture Australia

MEMBER ISA International Society of Arboriculture

Australian Institute of Horticulture Inc.

Quantified Tree Risk Assessment

Appendix L - References

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.

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

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.

Holroyd City Council (2013) *Holroyd Development Control Plan*

Holroyd City Council (2003) *Tree Management Order*.

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

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.

Mattheck, C. (1998) *Design In Nature, Learning From Trees.* Springer Verlag, Heidelberg New York.

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.

New South Wales National Parks and Wildlife Service & NSW Dept Infrastructure, Planning & Natural Resources (2009). *Vegetation Penrith – 9030 Native Vegetation Map Report Edition no 4.*

Phillips, R. (1978) *Trees In Britain, Europe and North America*. Pan Books, London, UK.

Rowell, R.J. (1991) *Ornamental Flowering Trees In Australia.* UNSW, Sydney Australia.