AUSTRALIS
Tree Management

Arboriculture Impact Assessment

Lot 2 in DP 1015843
469-483 Balmain Road, Lilyfield, NSW 2040

Commissioned By: Andreas Brohl
Roche Group Pty Limited
365 New South Head Road,
DOUBLE BAY NSW 2028

Date: 20 April 2023
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Revision: 3

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Arboriculture Qualification AQF 5

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Document Details

Document Title	Arboriculture Impact Assessment
Client Contact	Andreas Brohl from Roche Group Pty Limited
Property Details	469-483 Balmain Road, Lilyfield, NSW 2040
Legal Description	Lot 2 in DP 1015843
LGA	Inner West
Zone	IN2 Light Industrial

Australis Reference	Revision Number	Date	Details
20231948	1	30 March 2023	For Client Review
20231948	2	3 April 2023	Update for Tree No.'s 12 to 20 (Site-Specific DCP, May 2022)
20231948	3	20 April 2023	Updated T8 location and other minor amendments

Meredith Gibbs
Australis Tree Management
20 April 2023

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Australis Tree Management has no affiliation with any private contractors, associations or nurseries involved in the tree removal and pruning business. This ensures an impartial approach to all recommendations given regarding tree removals, tree hazard inspections and surveys. The Principal of the business, Meredith Gibbs, has a certificate level 5 in Arboriculture obtained from Northern Sydney Institute, Ryde TAFE College, NSW in 2003.

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1. Summary

Australis Tree Management has been commissioned by Andreas Brohl from Roche Group Pty Limited to complete an *Arboriculture Impact Assessment* (AIA) in accordance with *AS4970 Protection of trees on development sites*. *'TreeAZ'* (Version 10.10-ANZ) was used to determine retention values.

The *Arboriculture Impact Assessment* undertook assessment of twenty (20) existing trees within the subject site and within 3m of boundaries on adjoining properties including nature strips to establish tree retention values the health and condition of the trees, potential impacts from proposed works and to provide recommendations regarding tree retention, protection and removals. The tree defects and symptoms that were encountered have been discussed and a detailed tree schedule is included in Appendix A.

The proposed development is comprised of mixed use (light industrial, creative industry and residential) along with associated works.

The inspection at 469-483 Balmain Road, Lilyfield, NSW 2040 was performed on the 9 November 2022 by visibly inspecting the trees from accessible points at ground level from the subject site and public areas only. I completed a modified *Tree Survey Form* (Matheny & Clark, 1994), applied *'TreeAZ'* ratings (Barrell, 2016) as well as taking supporting photographs of the trees.

In total twenty (20) trees were assessed. Trees selected for retention and will require tree protection measures to ensure their long-term survival. Trees selected for removal as they will be significantly impacted by the proposed works and Site-Specific Development Control Plan, Amendment 16 To Part G - Leichhardt Development Control Plan 2013 469-483 Balmain Road, Lilyfield

- Four (4) trees on adjoining properties are proposed for retention will require protection.
- Sixteen (16) trees on the nature strips are proposed for removal.

Recommendations are provided to protect trees from the activities associated with the proposed demolition and construction works areas. Trees proposed for retention will require tree protection measures throughout the development works to ensure their long-term survival.

The *Tree Protection Plan and Specifications* form part of the overall construction documentation package. These must be followed throughout all construction phases of the project. The tree protection plans provide a layout of tree protection fencing and other tree protection measures. Tree protection specifications are detail requirements for the qualified project arborist engaged throughout the construction process. It includes tree management, monitoring guidelines and project hold points. All tree protection measures are to be in place and certified by the project arborist prior to commencement of demolition

works or site establishment. All TPZ areas are to be maintained throughout the period of the works.

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Acronyms

Abbreviation	Term	Definition
ATM	Australis Tree Management	
DBH	Diameter at breast height	The diameter of a tree's stem typically measured with a diameter tape at 1.4 metres height (AS4970-2009).
DCP	Development Control Plan	
ENCR	Encroachment	Proposed or existing TPZ encroachments (AS4970-2009)
LEP	Local Environmental Plan	
LGA	Local Government Authority	
SRZ	Structural Root Zone	The SRZ is the area required for tree stability. A larger area is required to maintain a viable tree (AS4970-2009).
TPP	Tree Protection Plan	Showing the TPZs for trees being retained taking into account the proposed development (AS4970-2009).
TPZ	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 (AS4970-2009).

2. Introduction

2.1. Brief

Andreas Brohl from Roche Group Pty Limited has provided instruction to inspect and assess the health and condition of the subject trees located at and adjacent to 469-483 Balmain Road, Lilyfield, NSW 2040, which may include any tree within the vicinity of the proposed works and trees that may be located on adjoining properties. I have prepared an Arboriculture Impact Assessment in accordance with (AS 4970-2009 *Protection of trees on development sites*) on the proposed impacts of the development works on the subject trees. This report will provide recommendations regarding tree protection during the development process as well as replacement tree species for trees proposed for removal.

2.2. Project Description

The DA comprises the following elements:

- Concept Proposal (pursuant to Section 4.23 of the *Environmental Planning and Assessment Act 1979* and in satisfaction of Clause 6.25(4) of the *Inner West Local Environmental Plan 2022* [IWLEP 2022]) including:
  - *Land uses consistent with those permitted under the IWLEP 2022, including for 'residential flat buildings' and 'light industries'.*
  - *Maximum building envelope.*
  - *Design principles and controls that address each of the requirements set out under Clause 6.25(4) or the IWLEP 2022.*
- Detailed Development Application comprising:
  - *Partial demolition of existing buildings and structure within the site.*
  - *Site preparation works, including termination or relocation of site services and infrastructure, remediation, tree removal and the erection of site protection fencing.*
  - *Construction and use of a new development comprising residential apartment buildings and light industries, including adaptive reuse of existing buildings and erection of new buildings, for:*
    - *6,000m^2 of light industrial uses, at least 1,200m^2 of which would be used for light industries associated with creative purposes*
    - *89 residential apartments, of which 5 would be used for the purpose of affordable housing*
  - *Basement car parking for 158 vehicles for staff and residents, and a new loading dock for employment uses.*
  - *Public domain, communal open space, landscaping and tree planting.*
  - *Publicly accessible through-site links, and footpath widening to Balmain Road and Alberto Street.*

Fitout and use of the employment tenancies and business identification signage would be the subject of separate future DAs where required.

- Four (4) trees on adjoining properties are proposed for retention will require protection.
- Sixteen (16) trees on the nature strips are proposed for removal.

2.3. Site Description

The site is currently a warehouse in average condition with trees located on the nature strips with no trees located on site.

2.4. 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 Council Tree Protection Policies.
- Identify Tree Protection Zones for all trees assessed and assess the likely impacts from the development on the trees.
- Provide preliminary advice and tree protection recommendations for trees proposed for retention and protection.

2.5. 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.

Australis Tree Management (Meredith Gibbs) provides consulting arborist services only and does not provide services such as climbing, pruning, tree removal, root investigations or root pruning. This report is and impartial professional assessment only and does not derive any financial benefit from specifying pruning or other physical services.

2.6. Documents Provided

Supplier	Date Supplied	Document Date	File Name
Roche Group Pty Limited	9/11/22	4/10/22	*9179-2 Plan Sheet 1 of 7 Sheets.pdf*
	7/3/2023	7/3/2023	*2522121_469-483 Balmain Road_X_L_Tree Plan.pdf*
	31/3/2023	5/2022	*Site-Specific Development Control Plan, Amendment 16 To Part G - Leichhardt Development Control Plan 2013 469-483 Balmain Road, Lilyfield.pdf*

Table 1. Documents Provided

2.7. 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, soils assessments or aerial inspections were not performed. This report has been prepared in accordance with Inner West Council and 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 mitigate detrimental impacts on the subject trees. All tree species assessed (including unprotected trees) are included in the 'Tree Schedule' in
Appendix A.

2.8. Field Visit

The unaccompanied site visit was conducted on 9 November 2022. All observations were from ground level without detailed investigations. The weather at the time of the inspection was sunny and clear with adequate visibility.

Location Map

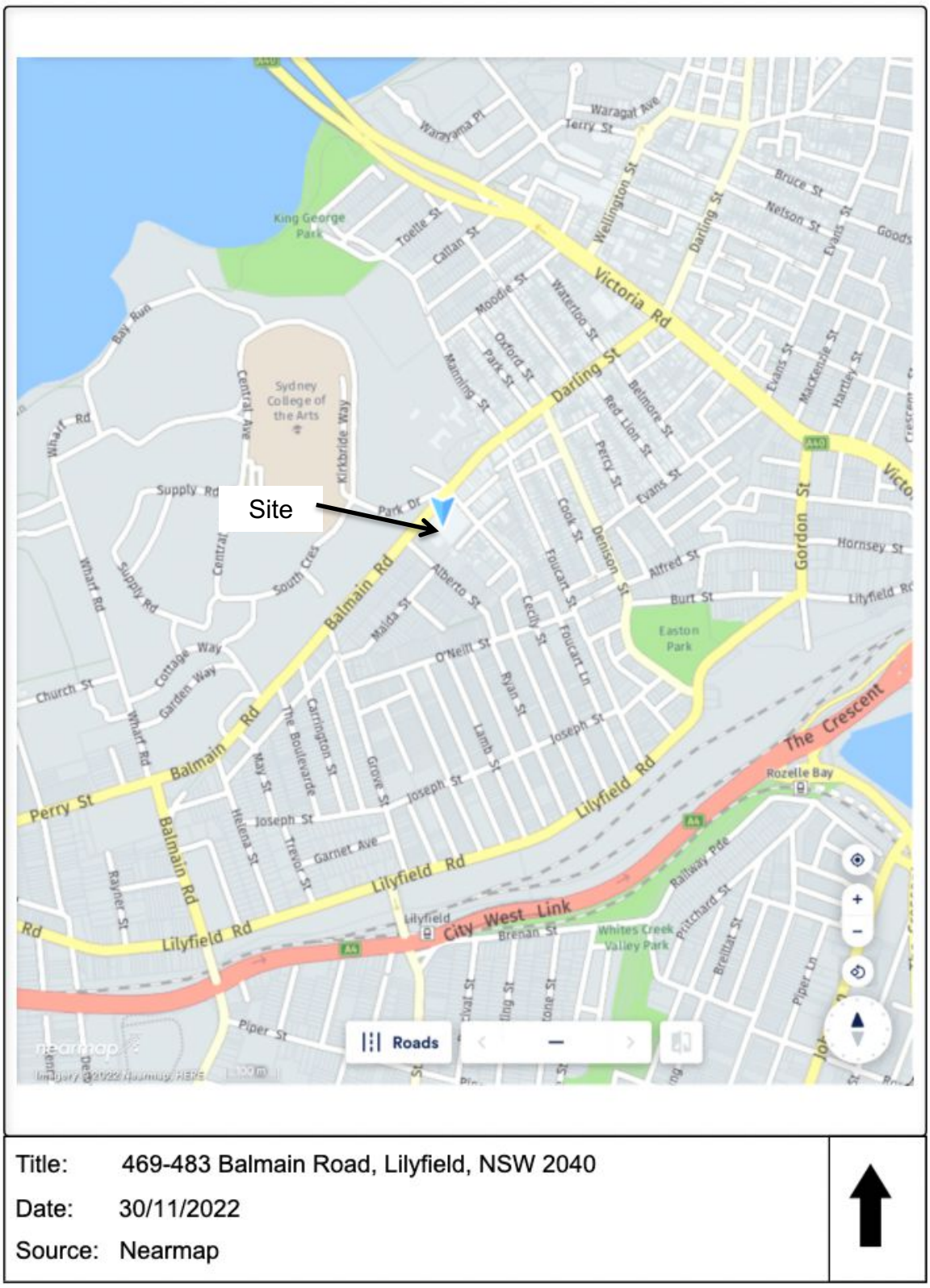


Figure 1. Location Map

3. The Site

3.1. Brief Site Description

The Site is legally described as Lot 2 DP1015843 and has an area of 6,824m2. The site is generally rectangular in shape and is bounded by Balmain Road, Cecily Street, Fred Street and Alberto Street, Lilyfield.

The Site is located approximately 500m southwest of Victoria Road, approximately 5km northwest of the Sydney Central Business District (CBD) and approximately 1km from Lilyfield light rail station.

The Site is located in the IN2 zone (light industrial), which is strategically located within the Balmain Road Industrial Precinct and is characterised by a mix of industrial land uses. Low to medium density, residential development is located to the south of the site in an R1 zone (general residential), which mostly comprises single and two dwelling houses and residential flat buildings.

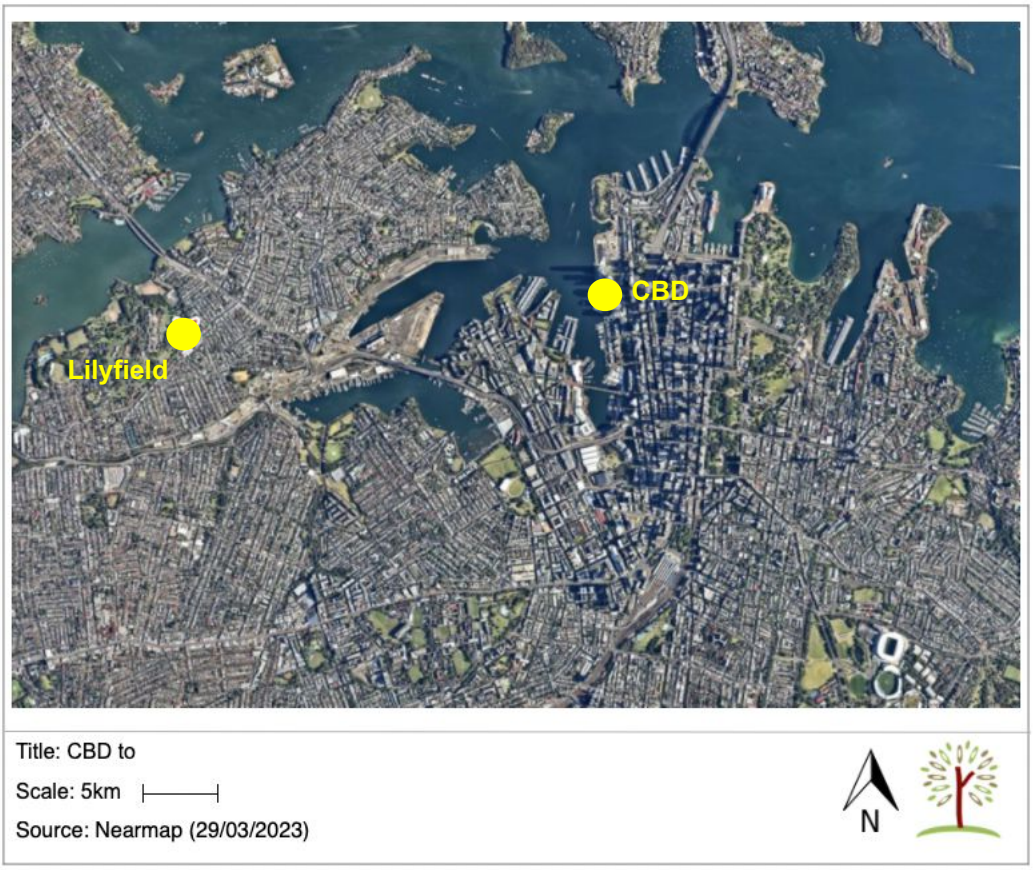


Figure 2. CBD to Lilyfield Map

3.2. Onsite Vegetation

The trees assessed are native and exotic tree species of varying ages and stages of maturity. No indigenous trees were assessed.

3.3. Location of the Trees

The assessed trees are located on the nature strips or adjoining properties. The trees have been located on the supplied site plan (Geometra Consulting dated 4/10/2022) and numbered accordingly. These plans are illustrative purposes only and should not be used directly for scaling measurements. Tree No.'s 1, 7 & 8 were not located on the supplied survey plan and have been approximately located therefore inaccuracies may occur.

3.4. Site History

Figure 3. Aerial Site Images

3.5. Climate

Lilyfield is located approximately 1.6km from the nearest weather station at Sydney – Observatory Hill. The area has an annual mean average temperature between 15.7ºc and 23.7ºc, with the annual mean rainfall averaging 84mm. The site is flat and exposed to the north-west with prevailing winds coming from the south-east.

3.6. Microclimates

The site is moderately protected by warehouses creating protection from strong winds. The buildings influence the micro-climate on site protecting the subject trees from strong winds. The existing sealed and reflective ground surfaces result in increased heat to site which can be detrimental to tree health. The available light levels throughout the site are adequate for vegetation growth. There is no permanent fixed irrigation on site.

4. Urban Heat Island

4.1. Urban Development

Increased urban densification and the loss of green spaces means that mature trees are increasingly valuable for to reduce heat. Existing trees require sufficient access to soil water or must be irrigated and in prime condition to provide maximum benefits. *The Urban Heat Island (UHI) dataset measures the effects of urbanisation on land surface temperatures across Sydney Greater Metropolitan Area for the Summer of 2015-2016. UHI shows the variation of temperature to a non-urban vegetated reference, such as heavily wooded areas or national parks around Sydney* (SEED 2022). The UHI indicates that the subject site is 9ºC above baseline.

Residential areas are exposed to significant urban heat island effects caused by thermal energy being absorbed into man-made hard surfaces and radiating heat back into the local environment (NSW SEED).

Hard surfaces absorb heat and become significantly hotter than vegetated areas. Trees are the most effective infrastructure elements for localised cooling and mature trees have higher cooling potential than smaller younger trees, though young trees have the greatest potential for cooling in the future.

Daytime near-surface air temperature declined with increasing height and canopy density providing significant cooling benefits. However, reversed at night when tall trees with dense canopies restricted longwave radiative cooling and trapped warm air beneath their crowns. To mitigate increasing urban heat through trees can be devised to local scale (Wujeska-Klause and Pfautsch, 2020).

4.2. Canopy Cover

The NSW government has set targets to increase the urban tree canopy cover throughout Sydney with a target of 40% tree canopy cover in suburban areas. The current percentage of canopy coverage for this site is 2% (SEED, 2022).

4.3. Benefits of Trees

Trees provide shade and evaporative cooling which helps reduce the urban heat island effect. Increased urban densification and the loss of green spaces means that mature trees are increasingly valuable for to reduce heat. Existing trees require sufficient access to soil water or must be irrigated and in prime condition to provide maximum benefits. Trees transperitive cooling process reduces the thermal load from sunshine.

5. Relevant Government Legislation

5.1. Relevant Government Legislation

Local Government
Inner West Local Environmental Plan (2022)
Inner West Development Control Plan, Leichhardt (2013)
State Government
Biodiversity and Conservation (2021)
Heritage Act (1977)
Environment Protection and Biodiversity Conservation Act (1999)
Vegetation in Non-Rural Areas [NSW] (2017)

Table 2. Relevant Government Legislation

5.2. Council Tree Protection

This report relies on the information contained within Inner West Local Environmental Plan and Tree Management DCP (2021 v2). 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 Management DCP (2021 v2). Trees located on council land or nature strips are protected by Council. Council may require a greater setback from proposed structures to ensure the preservation and protection of the tree. A separate permit to prune any trees within or adjacent to the property and/or any pruning of tree roots must be obtained from Council prior to any works being undertaken.

- *C2 For the purposes of this DCP, a prescribed tree is:*
  - *i. any tree with a height equal to or greater than 4 metres above ground level (existing) or*
  - *ii. any tree that is under 4 metres in height that has a trunk diameter of more than 150mm at Diameter at Breast Height (DBH at 1.4m) or*
  - *iii. any tree with a canopy spread equal to or greater than 2 metres or any palm tree or tree fern with a clean stem length equal to or greater than 4 metres above ground level (existing).*

5.3. Site-Specific Development Control Plan

Amendment 16 To Part G - Leichhardt Development Control Plan 2013
469-483 Balmain Road, Lilyfield (May 2022).

- *G12.4 Public Domian*
  - *C9 - Overhead power cables along Balmain Road, Alberto Street and Fred Street must be relocated underground and replaced with appropriate street lighting given the scale of the development and the significant aesthetic benefit resulting from undergrounding, including allowing for viable street tree planting.*

- *C10 - Replace the existing London Plane trees along Fred Street to facilitate undergrounding of utilities with more suitable shaded, screened and native plant species of 200 litre container size or greater. This should be demonstrated as part of the landscape plan submitted to Council with the development application.*

5.4. Vegetation in Non-Rural Areas [NSW] (2017)

The State Environmental Planning Policy (Vegetation in Non-Rural Areas) 2017 includes provisions requiring the preservation of trees and bushland within Central Coast Council LGA.

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.

5.5. SEPP (Biodiversity and Conservation) 2021

The State Environmental Planning Policy (*Biodiversity and Conservation*) 2021 includes provisions requiring the preservation of trees and bushland within Inner West Council LGA.

5.6. NSW Planning Portal

According to NSW Property the subject site does not contain Riparian Lands & Watercourses, Wetlands, Terrestrial Biodiversity, Environmentally Sensitive Land or Existing Green Asset.

5.7. Exempt Tree Species

The assessed tree species are not listed in the councils' list of exempt species.

5.8. Threatened Species

The subject tree species are not listed in the *NSW Biodiversity Conservation Act* (2016) or the *Environment Protection and Biodiversity Conservation Act* (1999).

5.9. Biosecurity Act 2015

The assessed tree species are not listed in the *Biosecurity Act* (2015).

5.10. Loss of Hollow-bearing Trees

The Scientific Committee, established by the *Threatened Species Conservation Act*, has made a Final Determination to list the Loss of Hollow-bearing Trees as a *Key Threatening Process* in Schedule 3 of the Act.

None of the assessed trees have hollows that may be suitable for habitat uses.

6. Tree Assessment

6.1. 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 *(Visual Tree Assessment, Mattheck & Breloer, 1994)* was of a preliminary nature and did not involve any climbing or detailed investigation beyond what was visible from accessible points at ground level.

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

Post site inspection calculations and assessments were made of the following and are included in the Tree Schedule located in Appendix A.

6.2. Methodology

The following relevant information was compiled for consideration of the proposed works. Further information can be found in the appendices.

- *Tree Survey Form* (Matheny & Clark, 1994)
- *Visual Tree Assessment* (Mattheck & Breloer, 1994)
- *TreeAZ* (Barrell, 2010) (Version 10.10-ANZ)
    - ***'A'** - Moderate and high-quality trees suitable for retention for more than 10 years, and worthy of being a material constrain*
    - ***'Z'** - Low quality trees not worthy of being material constraint*
        - *TreeAZ 'A' category trees are not required to be retained, although this is recommended. TreeAZ 'Z' category trees are not required to be removed. If they pose no risk to life or property it is recommended that they be retained.*
- Australian Standard 4970-2009 Protection of trees on development sites
    - *This document describes the best practices for the planning and protection of trees on development sites. The procedures described are based on plant biology and current best practices as covered in recently published literature.*
    - *In accordance with AS 4970-2009 tree trunk diameters were measured with a diameter tape at 1.4m high (unless stated). Tree heights are measured heights are measured with a clinometer and canopy spreads estimated accordingly.*
    - *Tree Protection Zone - 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. If the proposed encroachment is less than 10% of the area of the TPZ and is outside the SRZ, detailed root investigations should not be required. The area lost to this encroachment should be compensated for elsewhere and contiguous with the TPZ.

- *Structural Root Zone - The SRZ is the area required for tree stability. A Larger area is required to maintain a viable tree.*
- *Minor Encroachment - If the proposed encroachment is less than 10% of the area of the TPZ and is outside the SRZ, detailed root investigations should not be required. The area lost to this encroachment should be compensated for elsewhere and contiguous with the TPZ. Variations must be made by the project arborist considering relevant factors.*
- *Major Encroachment - If 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 and consideration of relevant factors.*

- AS 4373 - 2007 Pruning of amenity trees
  - *The objective of this revision is to reflect current arboricultural practices. The recommendations given in this Standard are intended to apply specifically to urban and amenity trees but exclude pruning for fruit production and silviculture.*

6.3. Species identification

Tree species identification of the subject trees was determined by visible features only at the time of the inspection. Every effort is made to correctly identify the subject trees where time permits. It is not based upon comparison against herbarium specimens. Photographs are compared with varying text listed in ‘References’.

6.4. Photography

Photographs were taken using an iPhone, iPad or Nikon D5000. 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 natural colours were applied.

6.5. Wildlife

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

7. Results

A total of eighteen (18) trees were assessed on site and within 5m of boundaries.

7.1. *'TreeAZ'* and Life Expectancy

7.1.1. **'A'** - Moderate and high-quality trees suitable for retention for more than 10 years, and worthy of being a material constraint.

Tree No.	Species	Life Expectancy
12	*Platanus x acerifolius* (London Plane Tree)	40+yrs
13	*Platanus x acerifolius* (London Plane Tree)	40+yrs
14	*Platanus x acerifolius* (London Plane Tree)	40+yrs
15	*Platanus x acerifolius* (London Plane Tree)	40+yrs
16	*Platanus x acerifolius* (London Plane Tree)	40+yrs
17	*Platanus x acerifolius* (London Plane Tree)	40+yrs
18	*Platanus x acerifolius* (London Plane Tree)	40+yrs
19	*Platanus x acerifolius* (London Plane Tree)	40+yrs
20	*Platanus x acerifolius* (London Plane Tree)	40+yrs

Table 3. *TreeAZ* 'A' Trees and Life Expectancy

7.1.2. **'Z'** - Low quality trees not worthy of being material constraint.

Tree No.	Species	Life Expectancy
1	*Lagerstroemia indica* (Crepe Myrtle)	15-40yrs
2	*Lagerstroemia indica* (Crepe Myrtle)	15-40yrs
3	*Tristaniopsis laurina* (Water Gum)	40+yrs
4	*Howea forsteriana* (Kentia Palm)	40+yrs
5	*Elaeocarpus reticulatus* (Blueberry Ash)	40+yrs
6	*Callistemon viminalis* (Weeping Bottlebrush)	15-40yrs
7	*Elaeocarpus reticulatus* (Blueberry Ash)	15-40yrs
8	*Callistemon viminalis* (Weeping Bottlebrush)	15-40yrs
9	*Platanus x acerifolius* (London Plane Tree)	40+yrs
10	*Platanus x acerifolius* (London Plane Tree)	40+yrs
11	*Platanus x acerifolius* (London Plane Tree)	40+yrs

Table 4. *TreeAZ* 'Z' Trees and Life Expectancy,

7.2. Tree Significance

Tree Significance Assessment Criteria (IACA)

Low	Medium	High
1, 2, 3, 4, 5, 6, 7, 9, 10, 11,	8	12, 13, 14, 15, 16, 17, 18, 19 20

Table 5. Tree Significance

7.3. Trees Proposed for Retention

Tree No.	Species	TPZ	Proposed Encroachment
4	*Howea forsteriana* (Kentia Palm)	3m	0%
5	*Elaeocarpus reticulatus* (Blueberry Ash)	2m	0%
7	*Elaeocarpus reticulatus* (Blueberry Ash)	2.0m	0%
8	*Callistemon viminalis* (Weeping Bottlebrush)	2.4m	0%

Table 6. Trees Proposed for Retention

7.4. Trees Proposed for Removal

Tree No.	Species	TPZ	Proposed Encroachment
1	*Lagerstroemia indica* (Crepe Myrtle)	2.0m	100%
2	*Lagerstroemia indica* (Crepe Myrtle)	2.0m	100%
3	*Tristaniopsis laurina* (Water Gum)	2.0m	100%
6	*Callistemon viminalis* (Weeping Bottlebrush)	2.4m	100%
9	*Platanus x acerifolius* (London Plane Tree)	2.0m	100%
10	*Platanus x acerifolius* (London Plane Tree)	2.0m	100%
11	*Platanus x acerifolius* (London Plane Tree)	2.0m	100%
12	*Platanus x acerifolius* (London Plane Tree)	6.6m	100%
13	*Platanus x acerifolius* (London Plane Tree)	6.6m	100%
14	*Platanus x acerifolius* (London Plane Tree)	4.8m	100%
15	*Platanus x acerifolius* (London Plane Tree)	3.6m	100%
16	*Platanus x acerifolius* (London Plane Tree)	4.2m	100%
17	*Platanus x acerifolius* (London Plane Tree)	4.8m	100%
18	*Platanus x acerifolius* (London Plane Tree)	3.6m	100%
19	*Platanus x acerifolius* (London Plane Tree)	6.0m	100%
20	*Platanus x acerifolius* (London Plane Tree)	7.2m	100%

Table 7. Trees Proposed for Removal

7.5. Approximate Site Canopy Cover

Existing	Proposed For Removal	Proposed For Retention
1328m^2	1312m^2	16m^2

Table 8. Approximate Site Canopy Cover

8. The Proposed Development

The development proposed is for the mixed use (light industrial, creative industry and residential) and associated works. The following must be considered and assessed to their impacts to trees.

8.1. Tree Tolerance

Generally, older and larger trees tolerate construction impacts less. Different species also have different tolerance of injury and disturbance. Importantly it needs to be stressed, that a tree does not “heal” from injury. Any injury made to a tree, results in the tree expending considerable energy reserves to create new growth that “seals” and surrounds a wound and then attempting to compensate structurally and physically for any losses. Impacts to trees are therefore cumulative and a series of otherwise small and unrelated impacts can easily result in the death of a tree.

A tree that is already compromised or showing signs of stress is far less likely to tolerate construction impacts due to its lower levels of energy reserves and already weakened state. Therefore, a tree that is only in a fair condition or poor condition is less likely to tolerate construction impacts than a young tree in good or excellent condition.

Weakened or stressed trees are also far less able to combat the myriad of normal environmental stresses and pathogens that are naturally imposed against them such as drought, decay, fungi, bacteria and insect pests.

The site works proposed will result in site disturbances, excavation and re-grading. This means that some trees will require removal. Only those trees that have a reasonable and practical chance of being successfully retained have been targeted for retention and protection.

8.2. Demolition

The demolition and removal of the building can cause damage to trees. The subject trees should be protected prior to the removal of the adjacent wall to prevent damage to the trees.

8.3. Wind Exposure

Trees growing in dense stands become prone to windthrow when surrounding trees are removed, which exposes the remaining trees to the full force of the wind. Trees growing in an open environment are generally shorter and strongly tapered. The construction of buildings adjacent to trees results in the removal of surrounding trees that provide protection. Buildings also alter to natural wind directions. These changes are likely to increase wind stresses on retained trees, which may result in branch failures until the tree has time to adapt and strengthen to the new conditions.

9. Discussion

9.1. Onsite Trees Proposed for Retention

9.1.1. Tree No. 4 *Howea forsteriana* (Kentia Palm)

9.1.1.1. This planted, native tree is located on the adjoining property being 14-22 Fred Street and is protected by council. This semi mature tree has a spreading habit and is growing in a codominant class with symmetrical form. It is expected to increase in size by approximately 50% ages. It has a dominant trunk with the crown showing good (4) health.

9.1.1.2. The root zone is unknown with a car park nearby. The nearby buildings provide significant protection from strong winds and the palm provides minor shading and currently provides some screening from the street.

9.1.1.3. This tree has a *'TreeAZ'* rating of 'Z1' and an estimated life expectancy of 40+yrs. It is considered low in significance (IACA, 2010).

9.1.1.4. There are no proposed works within its 2m TPZ and no canopy pruning is required.

9.1.2. Tree No. 5 *Elaeocarpus reticulatus* (Blueberry Ash)

9.1.2.1. This planted, native tree is located on the adjoining property being 14-22 Fred Street and is protected by council. This semi mature tree has an upright habit and is growing in a dominant class with dense form. It is expected to increase in size by approximately 50% as it ages. It has a dominant trunk with the crown showing excellent (5) health.

9.1.2.2. The root zone is unknown with a car park nearby. The adjacent building provides significant protection from strong winds and the tree provides shading and currently provides minor screening from the building.

9.1.2.3. This tree has a *'TreeAZ'* rating of 'Z1' and an estimated life expectancy of 40+yrs. It is considered low in significance (IACA, 2010).

9.1.2.4. There are no proposed works within its 2m TPZ and no canopy pruning is required.

9.1.3. Tree No. 7 *Elaeocarpus reticulatus* (Blueberry Ash)

9.1.3.1. This planted, native tree is located on the adjoining property being 14-22 Fred Street and is protected by council. It was not accessible for a detailed inspection. This mature tree has an upright habit and is growing in a codominant class with symmetrical form. It is expected to increase in size by approximately 50% as it ages. It has a dominant trunk with the crown showing average (3) health. The amount of deadwood was determined as low and small being approximately <10% of the canopy with epicormic growth being low and young at approximately <10%.

9.1.3.2. The root zone is garden with a building nearby. The building provides major protection from strong winds and the tree provides minor shading as well as providing minor screening.

9.1.3.3. This tree has a *'TreeAZ'* rating of 'Z1' and an estimated life expectancy of 15-40yrs. It is considered low in significance (IACA, 2010).

9.1.3.4. The proposed building demolition is within the TPZ and the tree will require protection.

9.1.4. Tree No. 8 *Callistemon viminalis* (Weeping Bottlebrush)

9.1.4.1. This planted, native tree is located on the adjoining property being 14-22 Fred Street and is protected by council. It was not accessible for a detailed inspection. This mature tree has an upright habit and is growing in a codominant class with symmetrical form. It is expected to increase in size by approximately 20% as it ages. It has a dominant trunk with the crown showing average (3) health. The amount of deadwood was determined as low and small being approximately <10% of the canopy with epicormic growth being low and young at approximately <10%. No significant issues were sighted.

9.1.4.2. The root zone is garden with a building nearby. The building provides major protection from strong winds and the tree provides minor shading as well as currently providing minor screening from the street.

9.1.4.3. This tree has a *'TreeAZ'* rating of 'Z1' and an estimated life expectancy of 15-40yrs. It is considered medium in significance (IACA, 2010).

9.1.4.4. The proposed building demolition is within the TPZ and the tree will require protection.

9.2. Onsite Trees Proposed for Removal

9.2.1. Tree No. 1 *Lagerstroemia indica* (Crepe Myrtle)

9.2.1.1. This planted, exotic tree is located on the Balmain Road nature strip and is protected by council regardless of its size. This mature tree has an upright habit and is growing in a dominant class with symmetrical form. It is expected to increase in size by approximately 20% as it ages. It has a multi trunked trunk with the crown showing average (3) health. The amount of deadwood was determined as low and small being approximately <10% of the canopy with epicormic growth being low and of varying ages at approximately 10%-25%. The tree has suckers coming from the base of the tree, branch wound, the structural condition appears to be fair.

9.2.1.2. The root zone is paved with a foot path and road nearby. The nearby building provides significant protection from strong winds and the tree provides minor shading to the street but no screening.

9.2.1.3. This tree has a *'TreeAZ'* rating of 'Z1' and an estimated life expectancy of 15-40yrs. It is considered low in significance (IACA, 2010).

9.2.1.4. The tree is located within the proposed subsurface services envelope and therefore proposed for removal.

9.2.2. Tree No. 2 *Lagerstroemia indica* (Crepe Myrtle)

9.2.2.1. This planted, exotic tree is located on the Balmain Road nature strip and is protected by council regardless of its size. This mature tree has a upright habit and is growing in a dominant class with symmetrical form. It is expected to increase in size by approximately 20% as it ages. It has a multi trunked trunk with the crown showing average (3) health. The amount of deadwood was determined as low and

small being approximately <10% of the canopy with epicormic growth being low and of varying ages at approximately 10%-25%. The tree also has suckers coming from the base of the tree,

9.2.2.2. The root zone is paved with a foot path and road nearby. The nearby building provides significant protection from strong winds and the tree provides minor shading to the street but no screening.

9.2.2.3. This tree has a *'TreeAZ'* rating of 'Z1' and an estimated life expectancy of 15-40yrs. It is considered low in significance (IACA, 2010).

9.2.2.4. The tree is located within the proposed subsurface services works and is proposed for removal.

9.2.3. Tree No. 3 *Tristaniopsis laurina* (Water Gum)

9.2.3.1. This planted, native tree is located on the Cecily Street nature strip and is protected by council regardless of size. This young tree has a spreading habit and is growing in a dominant class with dense form. It is expected to increase in size by approximately 100% as it matures. It has a dominant trunk with the crown showing good (4) health. The tree has branch wound and the structural condition appears to be fair.

9.2.3.2. The root zone is grass with a foot path and road nearby. The nearby building provides partial protection from strong winds and the tree provides minor shading to the street but no screening.

9.2.3.3. This tree has a *'TreeAZ'* rating of 'Z1' and an estimated life expectancy of 40+yrs. It is considered low in significance (IACA, 2010).

9.2.3.4. The tree is located within the proposed subsurface services works and is proposed for removal.

9.2.4. Tree No. 6 *Callistemon viminalis* (Weeping Bottlebrush)

9.2.4.1. This planted, native tree is located on site and is protected by council. This mature tree has an upright habit and is growing in a dominant class with symmetrical form. It is expected to increase in size by approximately 20% as it ages. It has a

dominant trunk with the crown showing low (2-3) health. The amount of deadwood was determined as medium and small being approximately 10%-25% of the canopy with epicormic growth being low and of varying ages at approximately 10%-25%. No significant issues were sighted.

9.2.4.2. The root zone is sealed with a car park nearby. The adjacent buildings provide significant protection from strong winds and the tree provides shading to the existing car park as well as providing some screening from the street.

9.2.4.3. This tree has a *'TreeAZ'* rating of 'Z1' and an estimated life expectancy of 15-40yrs. It is considered low in significance (IACA, 2010).

9.2.4.4. The tree is located within the proposed deep soil planting area and is proposed for removal.

9.2.5. Tree No.'s 9, 10 & 11 *Platanus x acerifolius* (London Plane Tree)

9.2.5.1. These planted, exotic trees are located on the Fred Street nature strip and are protected by council regardless of their size. These young trees have an upright habit and are growing in dominant classes with sparse form. They are expected to increase in size by approximately 500% as they mature. They have dominant trunks with the crown showing average (3) health.

9.2.5.2. The root zone is grass with a foot path and road nearby. The nearby building provides significant protection from strong winds. The trees provide no shading and no screening.

9.2.5.3. These trees have *'TreeAZ'* ratings of 'Z1' and estimated life expectancies of 40+yrs. They are considered low in significance (IACA, 2010).

9.2.5.4. The trees are located within the proposed subsurface services works and are proposed for removal.

9.2.5.5. C10 - *Replace the existing London Plane trees along Fred Street to facilitate undergrounding of utilities*… (Site-Specific Development Control Plan, Amendment 16 To Part G - Leichhardt Development Control Plan 2013 469-483 Balmain Road, Lilyfield)

9.2.6. Tree No.'s 12 to 20 *Platanus x acerifolius* (London Plane Tree)

9.2.6.1. These planted, exotic trees are located on the Fred Street nature strip and are protected by council. These mature trees have spreading habits and are growing in codominant classes with dense form. They are expected to increase in size by approximately 10% as the age. They have dominant trunks with the crown showing good (4) health. The amount of deadwood in each tree was determined as low and small being approximately <10% of the canopy with epicormic growth being low and of varying ages at approximately 25%-50%. The trees have raised and damaged the foot path as well as suffering from significant pruning events for line clearance resulting in excessive watersprout growth.

9.2.6.2. The root zone is grass with a foot path and road nearby. The adjacent building provides partial protection from strong winds and the tree provides major shading to the street as well as providing major screening from the street.

9.2.6.3. These trees have *'TreeAZ'* ratings of 'A2' and estimated life expectancy of 40+yrs. They are considered high in significance (IACA, 2010).

9.2.6.4. The trees are located within the proposed subsurface services works and are proposed for removal.

9.2.6.5. C10 - *Replace the existing London Plane trees along Fred Street to facilitate undergrounding of utilities…* (Site-Specific Development Control Plan, Amendment 16 To Part G - Leichhardt Development Control Plan 2013 469-483 Balmain Road, Lilyfield)

10. Recommendations

10.1. Trees Proposed for Retention

10.1.1. Tree No. 4 *Howea forsteriana* (Kentia Palm) is a codominant and semi mature native tree located on the adjoining property. It is in fair condition with a *'TreeAZ'* rating of 'Z1', a 40+yrs life expectancy and low in significance. There are no proposed works within the 3m TPZ and no canopy pruning is required.

- Recommendations
  - Tree protection fencing

10.1.2. Tree No. 5 *Elaeocarpus reticulatu*s (Blueberry Ash) is a dominant and semi mature native tree located on the adjoining property. It is in fair condition with a *'TreeAZ'* rating of 'Z1', a 40+yrs life expectancy and low in significance. There are no proposed works within the 3m TPZ and no canopy pruning is required.

- Recommendations
  - Tree protection fencing

10.1.3. Tree No. 7 *Elaeocarpus reticulatus* (Blueberry Ash) is a codominant and mature native tree located on the adjoining property. It is in fair condition with a *'TreeAZ'* rating of 'Z1', a 15-40yrs life expectancy and low in significance. The proposed building demolition is within the TPZ and the tree will require protection. No canopy pruning is required.

- Recommendations
  - Tree protection fencing
  - Protection structure installed to protect canopy during demolition

10.1.4. Tree No. 8 *Callistemon viminalis* (Weeping Bottlebrush) is a codominant and mature native tree located on the adjoining property. It is in fair condition with a *'TreeAZ'* rating of 'Z1', a 15-40yrs life expectancy and medium in significance. The proposed building demolition is within the TPZ and the tree will require protection. No canopy pruning is required.

- Recommendations
  - Tree protection fencing
  - Protection structure installed to protect canopy during demolition

10.2. Trees Proposed for Removal

10.2.1. Tree No. 1 *Lagerstroemia indica* (Crepe Myrtle) is a dominant and mature exotic tree located nature strip. It is in fair condition with a *'TreeAZ'* rating of 'Z1', a 15-40yrs life expectancy and low in significance. The tree is located within the proposed subsurface services envelope therefore proposed for removal.

10.2.2. Tree No. 2 *Lagerstroemia indica* (Crepe Myrtle) is a dominant and mature exotic tree located nature strip. It is in fair condition with a *'TreeAZ'* rating of 'Z1', a 15-40yrs life expectancy and low in significance. The tree is located within the proposed subsurface services envelope therefore proposed for removal.

10.2.3. Tree No. 3 *Tristaniopsis laurina* (Water Gum) is a dominant and young native tree located nature strip. It is in fair condition with a 'TreeAZ' rating of 'Z1', a 40+yrs life expectancy and low in significance. The tree is located within the proposed subsurface services envelope therefore proposed for removal.

10.2.4. Tree No. 6 *Callistemon viminalis* (Weeping Bottlebrush) is a dominant and mature native tree located onsite. It is in fair condition with a *'TreeAZ'* rating of 'Z1', a 15-40yrs life expectancy and low in significance. The tree is located within the proposed new deep soil planting envelope therefore proposed for removal.

10.2.5. Tree No.'s 9, 10 & 11 *Platanus x acerifolius* (London Plane Tree) are dominant and young exotic trees located on the nature strip. They are in fair condition with *'TreeAZ'* ratings of 'Z1', 40+yrs life expectances and low in significance. The trees are located within the proposed subsurface services envelope therefore proposed for removal.

10.2.6. Tree No.'s 12 to 20 *Platanus x acerifolius* (London Plane Tree) are codominant and mature exotic trees located on the nature strip. They are in fair condition with *'TreeAZ'* ratings of 'A2', 40+yrs life expectancies and high in significance. The trees are located within the proposed subsurface services envelope therefore proposed for removal.

11. Tree Protection and Management Programme

11.1. Tree Retention & Removal List

Tree No.	Species	TPZ (m)	Status	Location
1	Lagerstroemia indica (Crepe Myrtle)	2.0m	Remove	Nature Strip
2	Lagerstroemia indica (Crepe Myrtle)	2.0m	Remove	Nature Strip
3	Tristaniopsis laurina (Water Gum)	2.0m	Remove	Nature Strip
4	Howea forsteriana (Kentia Palm)	3.0m	Retain	Adjoining
5	Elaeocarpus reticulatus (Blueberry Ash)	2.0m	Retain	Adjoining
6	Callistemon viminalis (Weeping Bottlebrush)	2.4m	Remove	Onsite
7	Elaeocarpus reticulatus (Blueberry Ash)	2.0m	Retain	Adjoining
8	Callistemon viminalis (Weeping Bottlebrush)	2.4m	Retain	Adjoining
9	Platanus x acerifolius (London Plane Tree)	2.0m	Remove	Nature Strip
10	Platanus x acerifolius (London Plane Tree)	2.0m	Remove	Nature Strip
11	Platanus x acerifolius (London Plane Tree)	2.0m	Remove	Nature Strip
12	Platanus x acerifolius (London Plane Tree)	6.6m	Remove	Nature Strip
13	Platanus x acerifolius (London Plane Tree)	6.6m	Remove	Nature Strip
14	Platanus x acerifolius (London Plane Tree)	4.8m	Remove	Nature Strip
15	Platanus x acerifolius (London Plane Tree)	3.6m	Remove	Nature Strip
16	Platanus x acerifolius (London Plane Tree)	4.2m	Remove	Nature Strip
17	Platanus x acerifolius (London Plane Tree)	4.8m	Remove	Nature Strip
18	Platanus x acerifolius (London Plane Tree)	3.6m	Remove	Nature Strip
19	Platanus x acerifolius (London Plane Tree)	6.0m	Remove	Nature Strip
20	Platanus x acerifolius (London Plane Tree)	7.2m	Remove	Nature Strip

Table 9. Tree Retention and Removal List

11.2. Tree Protection Measures

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

11.2.1. **Tree Protection** - All tree parts must be protected - This includes roots, trunks and branches. *The TPZ distance is measured radially from the trunk*.

11.2.2. **Trunk Protection** - If working within TPZ, trunk protection shall consist of hessian or padding wrapped around the trunk, two meter 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.

11.2.3. **Fencing** - A 1.8m chain wire fence, secured and fastened to prevent movement be installed in accordance with *AS4970-2009 protection of trees on development sites* and *AS 4687-2007 Temporary Fencing and Hoarding*. The TPZ distances are located within the tree schedule. Woody roots must not be damage during fencing TPZ fencing installation. The installation of all required tree protection fencing must include shade cloth attached to the fencing to reduce transport of dust,

particulates and liquids from entering the tree protection zone. No fence relocation is permitted without Arborist permission.

11.2.4. **Canopy Protection** - Protective structure installed to protect canopy during demolition. Scaffolding or secure screening with boards to protect the canopy from falling building materials.

11.2.5. **Ground Protection** - Ground surface protection must be installed if construction access is required through any TPZ. Protected with boarding (ie scaffolding board or plywood sheeting or similar material), placed over a layer of mulch to a depth of at least 100mm and geotextile fabric. The protective boarding must be left in place for the duration of the construction and development.

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

11.2.7. **Machinery Movements** - When machinery movements are required within the TPZ then a geotextile permeable membrane to be laid under mulch or crushed rock under rumble boards must be in place.

11.2.8. **Foot Traffic** - Raised platforms using scaffolding and boards or similar must be constructed if foot traffic occurs within TPZ. Scaffold with boards is sufficient.

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

- soil cutting or fill including trenching
- machine excavation including trenching;
- excavation for silt fencing;
- soil cultivation, disturbance or compaction;
- stockpiling, storage or mixing of materials;
- preparation of chemicals, including preparation of cement products;
- parking of vehicles and plant;
- disposal of liquids and refueling;
- dumping of waste;
- disposal of building materials;
- was placement of fill;
- lighting of fires;
- soil level changes;
- temporary or permanent installation of utilities and signs, and
- physical damage to the tree.

- site offices or shed locations

11.2.10. **Scaffolding** - All construction scaffolding must be erected around all branches not approved for pruning or removal.

11.2.11. **Canopy Pruning** - No pruning is expected, However, if access pruning is required and is permitted by council - Pruning must be limited to the removal of 3rd order branches with a maximum diameter of 100mm at the branch collar that encroaches and overhangs the proposed development. Remove of all dead stubs and failed branches leaving a clean cut with no splinters or pieces of wood that may prevent wound wood closure. This will enable wound wood development and reduce the risk of fungal infection. 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.

11.2.12. **Mulch** - Within the TPZ fencing up to 100mm 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.

11.2.13. **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. Micro-irrigation lines must be connected to a designated water source that remains connected throughout the development works.

11.2.14. **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.

11.2.15. **Fertilisation** - Any tree requiring fertilisation should be performed at the discretion of the site arborist only.

11.2.16. Tree Monitoring Schedule

11.2.17. During site occupation all TPZ's and trees must be monitored, assessed and recorded by the project arborist according to council's determinations.

11.2.18. Any work that occurs within a TPZ must be witnessed and directed by the project arborist.

11.2.19. 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.

11.2.20. Any excavation work within a Tree Protection Zone must be monitored by the project arborist.

11.3. Root Pruning

11.3.1. Where developments are constructed within the TPZ hand excavation must occur to locate structural roots with a diameter of greater than 40mm.

11.3.2. Root exposure must be applied with hand tools or Air Spade to prevent damage to the root system.

11.3.3. Roots measuring over 40mm in diameter within the Tree Protection Zone and outside the Structural Root Zone may be pruned at the discretion of the project arborist or by an AQF level 3 arborist or higher.

11.3.4. All pruning equipment must be sharp and clean. Secateurs, loppers or pruning saws should be used and can be cleaned with methylated spirits to prevent disease and pathogen spread.

11.3.5. Bolt or wire cutters must not be used for root pruning.

11.4. Root Care

11.4.1. Any exposed roots must be wrapped or covered with hessian or cloth and kept moist to prevent drying out and sunburn until backfilling occurs.

11.4.2. Backfill must be watered in and mulched with composted leaf mulch.

11.5. Project Arborist Monitoring

1	Project arborist (level 5) must oversee tree retention with written confirmation from the owner or site manager
2	All tree related matters must be discussed with the project arborist
3	The builder / site manager is responsible to inform the project arborist of any issues during works
4	Project arborist must maintain a monthly log including site visits, notes and photographs
5	Project arborist must provide feedback the builder, site manager or council

Table 10. Project Arborist Monitoring

11.6. Project Arborist Supervision

An Arborist with minimum qualifications in Arboriculture of Level 5 (under the Australian Qualification Framework) must oversee various stages of work within the Tree Protection Zone of any tree listed for retention. The Arborist must certify compliance with each key milestone as detailed below.

1	Project arborist to mark or tag all trees to be removed (red) and retain (green) with confirmed and agreement with site manager prior to ANY onsite works
2	Project arborist to mark tree protection fencing locations prior to ANY onsite works
3	During demolition of any ground surface materials (paving, concrete, grass etc) within the Tree Protection Zone (TPZ) of any tree to be retained

Table 11. Project Arborist Supervision

11.7. Project Arborist Hold Points

Hold Point	Task	Timing
1	Tree Protection Plan be onsite prior to works (AS4970-2009)	Prior to demolition of any structures
2	Approve tree tagging for tree retention and removal	
4	Inspect Tree Protection Fencing with signage (AS4970-2009)	
5	Install Trunk Protection where applicable	As required prior to works proceeding
6	Supervise all work within any TPZ's	As required during works
7	Tree Inspection	Monthly during all construction works
8	Final Tree Inspection	Post construction

Table 12. Project Arborist Hold Points

11.8. Tree Protection Plan

AUSTRALIS Tree Management

Tree Protection Plan

AS 4970-2009 Protection of trees on development sites

Site Address:

469 - 483 Balmain Road, Lilyfield, NSW 2040

Client:

Roche Group Pty Limited

Date:

20 April 2023

Reference:

20231948

Version:

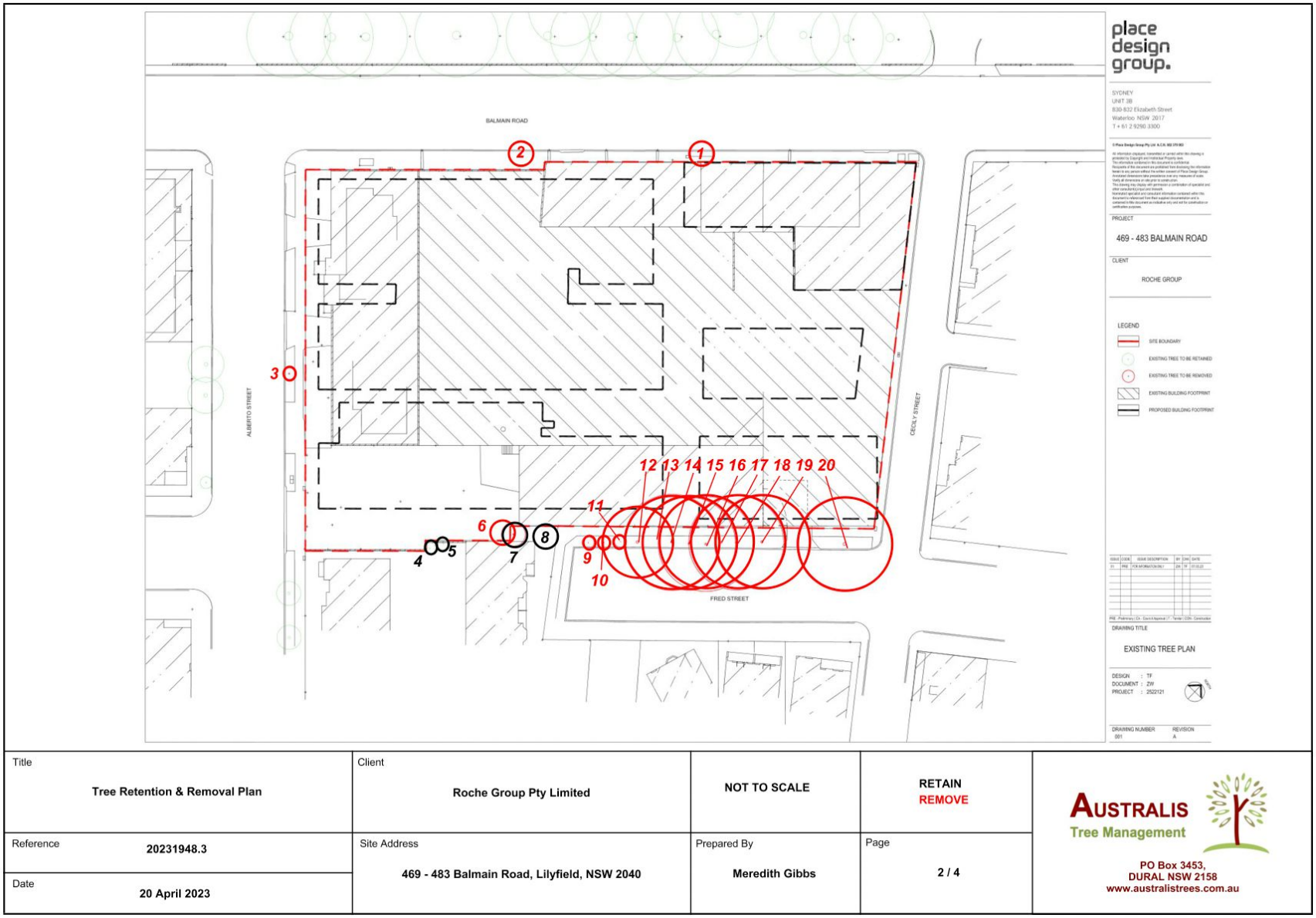
3

Prepared By:

Meredith Gibbs

PO Box 3453,
DURAL NSW 2158
www.australistrees.com.au

Tree List	
1	Lagerstroemia indica (Crepe Myrtle)
2	Lagerstroemia indica (Crepe Myrtle)
3	Tristaniopsis laurina (Water Gum)
4	Howea forsteriana (Kentia Palm)
5	Elaeocarpus reticulatus (Blueberry Ash)
6	Callistemon viminalis (Weeping Bottlebrush)
7	Elaeocarpus reticulatus (Blueberry Ash)
8	Callistemon viminalis (Weeping Bottlebrush)
9	Platanus x acerifolius (London Plane Tree)
10	Platanus x acerifolius (London Plane Tree)
11	Platanus x acerifolius (London Plane Tree)
12	Platanus x acerifolius (London Plane Tree)
13	Platanus x acerifolius (London Plane Tree)
14	Platanus x acerifolius (London Plane Tree)
15	Platanus x acerifolius (London Plane Tree)
16	Platanus x acerifolius (London Plane Tree)
17	Platanus x acerifolius (London Plane Tree)
18	Platanus x acerifolius (London Plane Tree)
19	Platanus x acerifolius (London Plane Tree)
20	Platanus x acerifolius (London Plane Tree)



Title: **Tree Retention & Removal Plan**	Client: **Roche Group Pty Limited**	**NOT TO SCALE**	**RETAIN** / **REMOVE**
Reference: **20231948.3**	Site Address: **469 - 483 Balmain Road, Lilyfield, NSW 2040**	Prepared By: **Meredith Gibbs**	Page: **2 / 4**
Date: **20 April 2023**			

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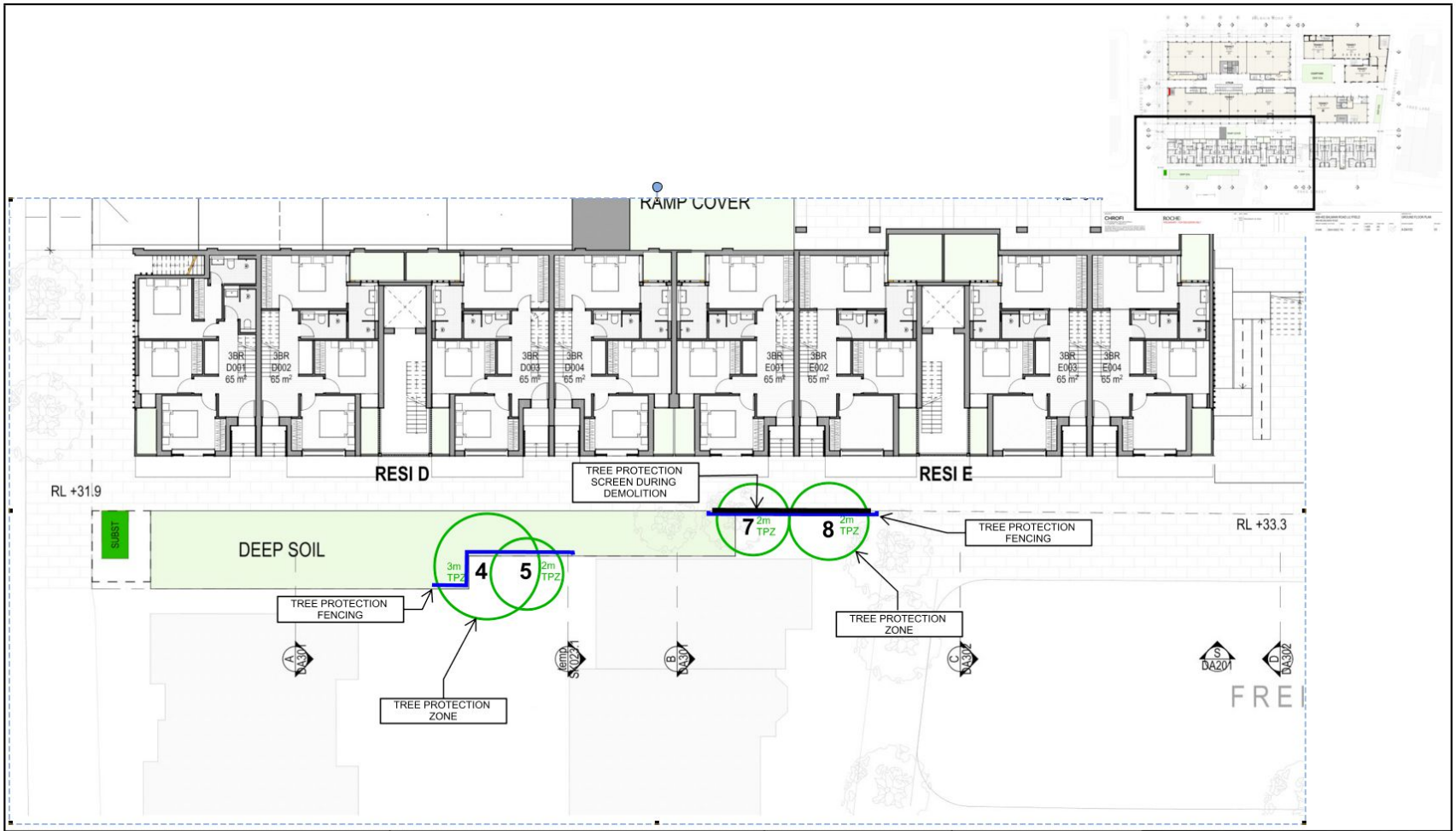

Title **Tree Protection Plan** *AS 4970-2009 Protection of trees on development sites*	Client **Roche Group Pty Limited**	Scale 0 1 5 Metres	
Reference **20231948.3**	Site Address **469 - 483 Balmain Road, Lilyfield, NSW 2040**	Prepared By **Meredith Gibbs**	Page **3 / 5**
Date **20 April 2023**			

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www.australistrees.com.au

Project Arborist Monitoring

Project arborist (level 5) must oversee tree retention with written confirmation from the owner or site manager

All tree related matters must be discussed with the project arborist

The builder / site manager is responsible to inform the project arborist of any issues during works

Project arborist must maintain a monthly log including site visits, notes and photographs

The project arborist must provide feedback to the owner / builder / notes and site manager / council.

All tree related matters must be discussed with the project arborist

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Project Hold Points

Prior to demolition of structures
Tree Protection Plan & Specifications must be onsite prior to works

Project arborist must oversee tree retention

Project arborist must inspect Tree Protection Fencing including adequate signage

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As required
The builder / site manager is responsible to inform the project arborist of any issues during works

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During all construction works
Project arborist must inspect trees monthly

Post construction
Final Tree Inspection

Activities Excluded From Tree Protection Zones

No soil level changes
Machine excavation including trenching
Excavation for silt fencing
Cultivation
Preparation of chemicals
Parking of vehicles and machinery
Refuelling
Dumping of waste
Wash down and cleaning of equipment
Placement of fill
Lighting of fires
Temporary or permanent installation of utilities
Physical damage to the tree
Bolt cutters or wire cutters must not be used for root pruning

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Activities Permissible Within Tree Protection Zones

Any excavation work within a Tree Protection Zone must be monitored by the project arborist.

Roots measuring over 40mm in diameter within the Tree Protection Zone and outside the Structural Root Zone may be pruned at the discretion of the project arborist.

Root exposure must be applied with hand tools or Air Spade to prevent damage to the root system.

All root pruning equipment must be sharp and clean. Secateurs, loppers or pruning saws should be used and can be cleaned with methylated spirits to prevent disease and pathogen spread. No bolt cutters.

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.

Tree Protection Fencing

A 1.8m chain wire fence, secured and fastened to prevent movement be installed in accordance with AS4970-2009 and AS 4687-2007. Woody roots must not be damage during fencing TPZ fencing installation. No fence relocation is permitted without Arborist permission.

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

Within the TPZ fencing up to 50mm 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.

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

Tree protection fencing must include shade cloth attached to the fencing to reduce transport of dust, particulates and liquids from entering the TPZ.

Canopy Protection

Scaffold or screen installed with boards to protect canopy for demolition works

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Foot Traffic Platforms

Ground protection against foot traffic is required within the TPZ. Scaffolding with timber boards attached

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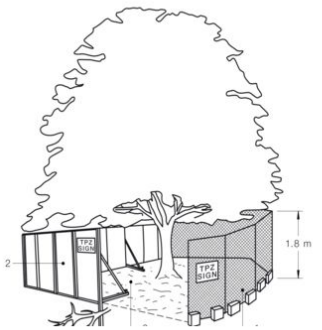

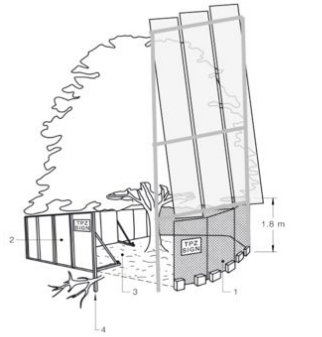

Compliance Inspection Check List

Council Conditions and the following list will be checked during each inspection. Failure will result in non compliance.

Tree protection fencing in place
Trunk protection in place
Ground protection in place
Correct signage attached
Mulch installed
Irrigation installed
Scaffolding installation damage
Evidence of tree protection fencing adjustments
Evidence tree damage
Evidence of machinery movements, foot traffic or work within TPZ fencing

Title: **Tree Protection Specifications** *AS 4970-2009 Protection of trees on development sites*	Client: **Roche Group Pty Limited**		
Reference: **20231948.3**	Site Address: **469 - 483 Balmain Road, Lilyfield, NSW 2040**	Prepared By: **Meredith Gibbs**	Page: **4 / 4**
Date: **20 April 2023**			

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DURAL NSW 2158
www.australistrees.com.au

Appendix A - Tree Location Map

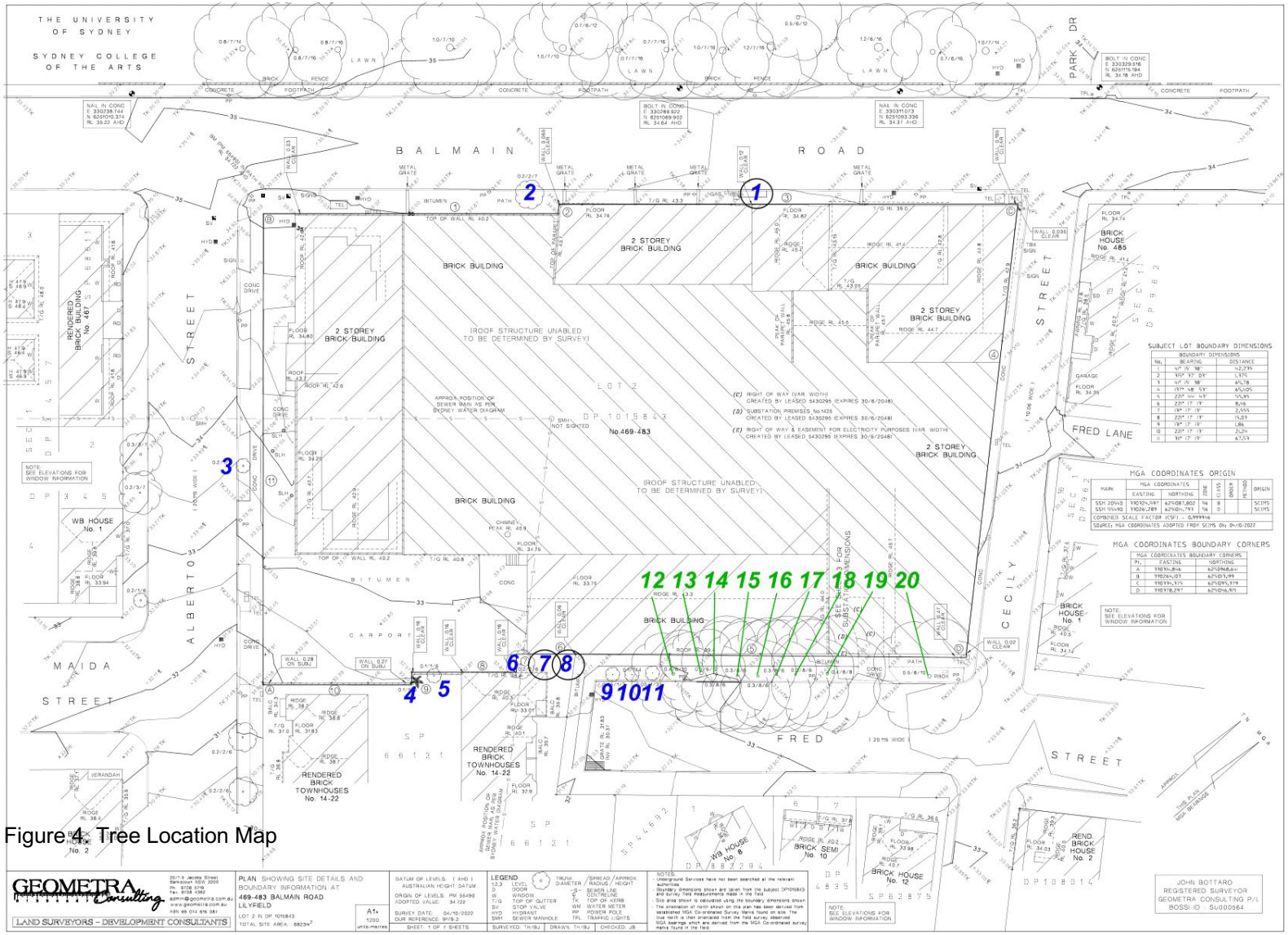


Figure 4: Tree Location Map

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 or unprotected trees not worthy of being material constraint

Appendix B - Tree Schedule

Tree No.	Species	Location	DBH (cm) multi (cm)	DGL (cm)	Height (m)	Canopy (m) radius N S E W	Age Class	Life Expectancy	Crown Class	Tree Condition	Crown Condition	Structure Condition	Deadwood Epicormics	Type	Tree AZ	Council Protected	TPZ (m) SRZ (m)	Proposed Works	Distance (m)	Proposed Encr	Proposed Status
1	Lagerstroemia indica (Crepe Myrtle)	nature strip Balmain Road	10	20	6.0	2.0 2.0 2.0 2.0	mature	15-40yrs	dominant	fair	average (3)	fair	<10% 10%-25%	exotic	Z1	Yes	2.0 1.7	subsurface services	0.0	**100%**	Remove
				Health & Condition: suckers / branch wound																	
				Existing Structure: subsurface services				Existing Structure Distance				Existing Structure Obstruction %									
2	Lagerstroemia indica (Crepe Myrtle)	nature strip Balmain Road	10	20	6.0	3.0 3.0 3.0 3.0	mature	15-40yrs	dominant	fair	average (3)	fair	<10% 10%-25%	exotic	Z1	Yes	2.0 1.7	subsurface services	0.0	**100%**	Remove
				Health & Condition: suckers																	
				Existing Structure: subsurface services				Existing Structure Distance				Existing Structure Obstruction %									
3	Tristaniopsis laurina (Water Gum)	nature strip Alberto Street	10	20	4.0	1.0 1.0 1.0 1.0	young	40+yrs	dominant	fair	good (4)	fair	0% <10%	native	Z1	Yes	2.0 1.7	subsurface services	0.0	**100%**	Remove
				Health & Condition: branch wound																	
				Existing Structure: subsurface services				Existing Structure Distance				Existing Structure Obstruction %									
4	Howea forsteriana (Kentia Palm)	adjoining 14-22 Fred Street	15		4.0	2.0 2.0 2.0 2.0	semi mature	40+yrs	codominant	fair	good (4)	fair	0% N/A	native	Z1	Yes	2.0	no works		**0%**	Retain
				Health & Condition																	
				Existing Structure				Existing Structure Distance				Existing Structure Obstruction %									
5	Elaeocarpus reticulatus (Blueberry Ash)	adjoining 14-22 Fred Street	10	10	6.0	1.0 1.0 1.0 1.0	semi mature	40+yrs	dominant	good	excellent (5)	fair	0% N/A	native	Z1	Yes	2.0 1.5	no works		**0%**	Retain
				Health & Condition																	
				Existing Structure				Existing Structure Distance				Existing Structure Obstruction %									
6	Callistemon viminalis (Weeping Bottlebrush)	onsite	20	20	6.0	2.0 2.0 2.5 3.0	mature	15-40yrs	dominant	fair	low (2-3)	fair	10%-25% 10%-25%	native	Z1	Yes	2.4 1.7	new deep soil planting	0.0	**100%**	Remove
				Health & Condition																	
				Existing Structure				Existing Structure Distance				Existing Structure Obstruction %									
7	Elaeocarpus reticulatus (Blueberry Ash)	adjoining 14-22 Fred Street	10	20	7.0	2.0 2.0 2.0 2.0	mature	15-40yrs	codominant	fair	average (3)	fair	<10% <10%	native	Z1	Yes	2.0 1.7	demolition works	1.0	**0%**	Retain
				Health & Condition: not accessible																	
				Existing Structure				Existing Structure Distance				Existing Structure Obstruction %									
8	Callistemon viminalis (Weeping Bottlebrush)	adjoining 14-22 Fred Street	20	20	7.0	3.0 2.5 2.0 2.5	mature	15-40yrs	codominant	fair	average (3)	fair	<10% <10%	native	Z1	Yes	2.4 1.7	no works	1.0	**0%**	Retain
				Health & Condition: not accessible																	
				Existing Structure				Existing Structure Distance				Existing Structure Obstruction %									
9	Platanus x acerifolius (London Plane Tree)	nature strip Fred Street	5	5	3.0	1.0 1.0 1.0 1.0	young	40+yrs	dominant	fair	average (3)	fair	N/A N/A	exotic	Z1	Yes	2.0 1.5	subsurface services	0.0	**100%**	Remove
				Health & Condition																	
				Existing Structure				Existing Structure Distance				Existing Structure Obstruction %									
10	Platanus x acerifolius (London Plane Tree)	nature strip Fred Street	5	5	3.0	1.0 1.0 1.0 1.0	young	40+yrs	dominant	fair	average (3)	fair	N/A N/A	exotic	Z1	Yes	2.0 1.5	subsurface services	0.0	**100%**	Remove
				Health & Condition																	
				Existing Structure				Existing Structure Distance				Existing Structure Obstruction %									

Tree No.	Species	Location	DBH (cm) multi (cm)	DGL (cm)	Height (m)	Canopy (m) radius	Age Class	Life Expectancy	Crown Class	Tree Condition	Crown Condition	Structure Condition	Deadwood Epicormics	Type	Tree AZ	Council Protected	TPZ (m) SRZ (m)	Proposed Works	Distance (m)	Proposed Encr	Proposed Status
11	Platanus x acerifolius (London Plane Tree)	nature strip Fred Street	5	5	3.0	1.0 1.0 1.0 1.0 N S E W	young	40+yrs	dominant	fair	average (3)	fair	N/A N/A	exotic	Z1	Yes	2.0 1.5	subsurface services	0.0	**100%**	Remove
				Health & Condition																	
				Existing Structure			Existing Structure Distance					Existing Structure Obstruction %									
12	Platanus x acerifolius (London Plane Tree)	nature strip Fred Street	55	55	10.0	7.0 9.5 6.5 6.0 N S E W	mature	40+yrs	codominant	fair	good (4)	fair	<10% 25%-50%	exotic	A2	Yes	6.6 2.6	subsurface services	0.0	**100%**	Remove
				Health & Condition	raised foot path / significant pruning events for line clearance / wastersprouts / trunk damage																
				Existing Structure			Existing Structure Distance					Existing Structure Obstruction %									
13	Platanus x acerifolius (London Plane Tree)	nature strip Fred Street	55	60	12.0	6.0 9.5 6.5 6.0 N S E W	mature	40+yrs	codominant	fair	good (4)	fair	<10% 25%-50%	exotic	A2	Yes	6.6 2.7	subsurface services	0.0	**100%**	Remove
				Health & Condition	raised foot path / significant pruning events for line clearance / wastersprouts																
				Existing Structure			Existing Structure Distance					Existing Structure Obstruction %									
14	Platanus x acerifolius (London Plane Tree)	nature strip Fred Street	40	45	8.0	5.0 8.0 5.0 6.0 N S E W	mature	40+yrs	codominant	fair	good (4)	fair	<10% 25%-50%	exotic	A2	Yes	4.8 2.4	subsurface services	0.0	**100%**	Remove
				Health & Condition	raised foot path / significant pruning events for line clearance / wastersprouts																
				Existing Structure			Existing Structure Distance					Existing Structure Obstruction %									
15	Platanus x acerifolius (London Plane Tree)	nature strip Fred Street	30	40	8.0	5.0 8.0 5.0 6.0 N S E W	mature	40+yrs	codominant	fair	good (4)	fair	<10% 25%-50%	exotic	A2	Yes	3.6 2.3	subsurface services	0.0	**100%**	Remove
				Health & Condition	raised foot path / significant pruning events for line clearance / wastersprouts																
				Existing Structure			Existing Structure Distance					Existing Structure Obstruction %									
16	Platanus x acerifolius (London Plane Tree)	nature strip Fred Street	35	40	8.0	5.0 8.0 5.0 6.0 N S E W	mature	40+yrs	codominant	fair	good (4)	fair	<10% 25%-50%	exotic	A2	Yes	4.2 2.3	subsurface services	0.0	**100%**	Remove
				Health & Condition	raised foot path / significant pruning events for line clearance / wastersprouts																
				Existing Structure			Existing Structure Distance					Existing Structure Obstruction %									
17	Platanus x acerifolius (London Plane Tree)	nature strip Fred Street	40	45	8.0	5.0 8.0 5.0 6.0 N S E W	mature	40+yrs	codominant	fair	good (4)	fair	<10% 25%-50%	exotic	A2	Yes	4.8 2.4	subsurface services	0.0	**100%**	Remove
				Health & Condition	raised foot path / significant pruning events for line clearance / wastersprouts																
				Existing Structure			Existing Structure Distance					Existing Structure Obstruction %									
18	Platanus x acerifolius (London Plane Tree)	nature strip Fred Street	30	40	8.0	5.0 8.0 5.0 6.0 N S E W	mature	40+yrs	codominant	fair	good (4)	fair	<10% 25%-50%	exotic	A2	Yes	3.6 2.3	subsurface services	0.0	**100%**	Remove
				Health & Condition	raised foot path / significant pruning events for line clearance / wastersprouts																
				Existing Structure			Existing Structure Distance					Existing Structure Obstruction %									
19	Platanus x acerifolius (London Plane Tree)	nature strip Fred Street	50	60	8.0	6.0 9.0 6.0 7.0 N S E W	mature	40+yrs	codominant	fair	good (4)	fair	<10% 25%-50%	exotic	A2	Yes	6.0 2.7	subsurface services	0.0	**100%**	Remove
				Health & Condition	raised foot path / significant pruning events for line clearance / wastersprouts																
				Existing Structure			Existing Structure Distance					Existing Structure Obstruction %									
20	Platanus x acerifolius (London Plane Tree)	nature strip Fred Street	60	70	10.0	8.0 7.0 9.0 5.5 N S E W	mature	40+yrs	codominant	fair	good (4)	fair	<10% 25%-50%	exotic	A2	Yes	7.2 2.8	subsurface services	0.0	**100%**	Remove
				Health & Condition	raised foot path / significant pruning events for line clearance / wastersprouts 30/11/2022																
				Existing Structure			Existing Structure Distance					Existing Structure Obstruction %									

Appendix C - Tree Schedule Definitions and Information

Location

- Adjoining Property / Nature Strip / On Site

Dimensions

- Diameter at breast height at 1.4m (DBH) / Diameter at ground level (DGL)

Height

- Height measured in meters determined with a clinometer or estimated by eye

Canopy

- Canopy spread measured radially estimated by eye

Age Class

- Young - Recently planted or seeded
- Semi mature - < 20% of life expectancy
- Mature - 20% - 80% of life expectancy
- Over mature - > 80% of life expectancy

Life Expectancy

- >5 years / 5-15 years / 15-40 years / 40+ years

Crown Class

- Dominant - Crown extends above general canopy; not restricted by other trees.
- Co-dominant - Crown forms the bulk of the general canopy but crowded by other trees.
- Intermediate - Crown extends into dominant / co dominant canopy but quite crowded on all sides.
- Emergent - Crown development restricted from surrounding trees.
- Suppressed - Crown development restricted from overgrowing trees.

Growth Habit:

- Upright - straight upright narrow canopy
- Leaning – trunk leaning from the root base
- Multi-Stemmed - multiple trunks originating from or near the basal area

Crown Form:

- Symmetrical - even and balanced in all directions
- Asymmetrical - uneven canopy
- Dense - full and dense foliage within the canopy
- Sparse - thin foliage density with open areas in the canopy

Tree Condition

- **Good** - The crown is unrestricted. Free of pests, diseases and obvious structural issues. Has adequate vigour, foliage volume, size and colour.
- **Fair** - The crown is not significantly restricted. Minor signs of pests and diseases. Some signs of damage or branch failures from storms. Some signs of reduced health or potential decline. They tree may improve in health or deteriorate in health and condition and may improve with remedial works.
- **Poor** - The crown is significantly restricted. Major signs of pests and diseases. Significant signs of damage or branch failures where structural integrity may be compromised or the tree is in decline and unlikely to recover.
- **Senescent** - The tree is overmature and show irreversible decline, dying or nearly dead.
- **Dead** - The tree is no longer capable of photosynthesis, osmosis and turgidity. Any dead tree must be assessed for hollow bearing capabilities and habitat potential.

Removed

- No longer present at location.

Crown Condition

- 1 - Severe decline, <20% canopy density; major dead wood
- 2 - Declining, 20-60% canopy density; twig and branch dieback
- 3 - Average / low vigour, 60-90% canopy density; twig dieback
- 4 - Good, 90-100% canopy density; little or no dieback or other problems
- 5 - Excellent, 100% canopy density; no deadwood or other problems

Structural Condition

- Poor - Wounds with fungal fruiting bodies, excessive included bark unions, numerous previous failures, significant wounds.
- Fair - Minor wounds, minor included bark unions, minor deadwood etc.
- Good - No significant issues and good foliage volume

Deadwood

- Low - Less than 10% of the canopy - Small, <10mm diameter and <2 metres in length / Large, >10mm diameter and >2 metres in length
- Medium - Between 10% and 50% of the canopy - Small, <10mm diameter and <2 metres in length / Large, >10mm diameter and >2 metres in length
- High - Greater than 50% of the canopy - Small, <10mm diameter and <2 metres in length / Large, >10mm diameter and >2 metres in length

Epicormic growth

- Low - Less than 10% of the canopy - young / mature
- Medium - Between 10% and 50% of the canopy - young / mature
- High - Greater than 50% of the canopy - young / mature

Leaning Trees

- Low - Angle Less than 15° lean
- Medium - Angle Less than 15°-30° lean
- High - Angle Less than 30°- 45° lean
- Significant **-** Greater than 45° lean

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.

Root Zone

- Compacted / Garden / Grass / Mulched / Natural Bush / Paved / Soil level lowered / Soil level raised

Structures

- Fence / Garage / Footpath / Verandah / Dwelling / Road / Driveway / Seat

Appendix D - Site Photographs

Figure 5. Trees 11 to 20 on Fred Street.

Figure 6. Foot path damage on Fred Street.

Appendix E - Thumbnail Photographs

1
Lagerstroemia indica (Crepe Myrtle)

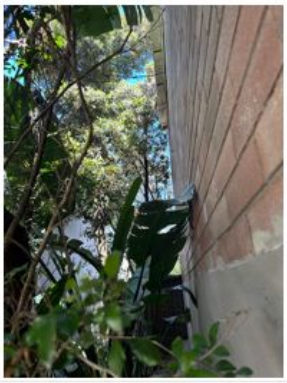
2
Lagerstroemia indica (Crepe Myrtle)

3
Tristaniopsis laurina (Water Gum)

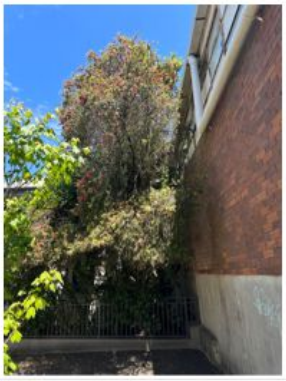
4
Howea forsteriana (Kentia Palm)

5
Elaeocarpus reticulatus (Blueberry Ash)

6
Callistemon viminalis (Weeping Bottlebrush)



7
Elaeocarpus reticulatus (Blueberry Ash)



8
Callistemon viminalis (Weeping Bottlebrush)

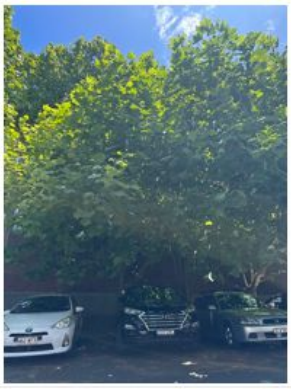
9
Platanus x acerifolius (London Plane Tree)

10
Platanus x acerifolius (London Plane Tree)

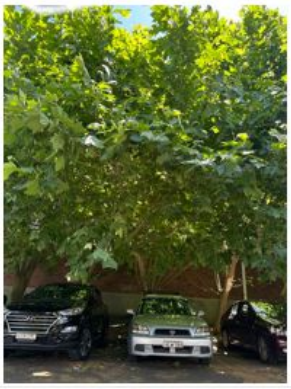
11
Platanus x acerifolius (London Plane Tree)

12
Platanus x acerifolius (London Plane Tree)

13
Platanus x acerifolius (London Plane Tree)



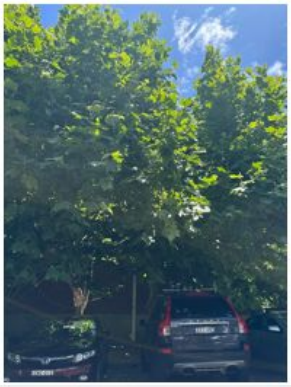
14
Platanus x acerifolius (London Plane Tree)



15
Platanus x acerifolius (London Plane Tree)

16
Platanus x acerifolius (London Plane Tree)

17
Platanus x acerifolius (London Plane Tree)



18
Platanus x acerifolius (London Plane Tree)

19
Platanus x acerifolius (London Plane Tree)

20
Platanus x acerifolius (London Plane Tree)

Appendix F - Proposed Site Plan

230125 - Balmain Rd - Preliminary Architectural Set.pdf

Appendix G - Tree Roots

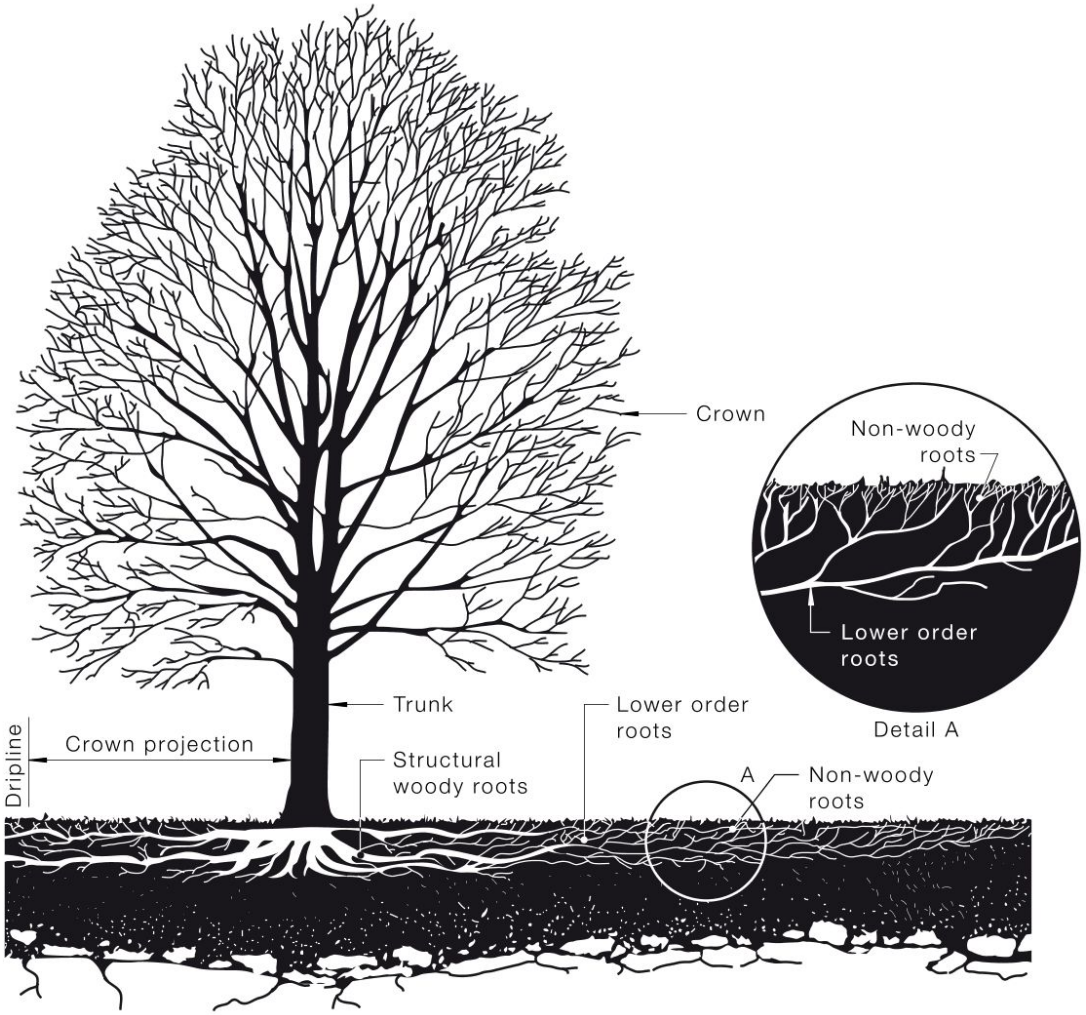


Figure 7. Tree Roots

Structural Woody Roots are large, woody roots that the tree requires for anchorage and support.

Lower Order Roots are used for anchorage, storage and transportation of water and nutrients

Non-woody Roots are fine, fibrous roots that take up water and minerals. Most absorbing roots grow upward into surface layers and mulch

Appendix H - 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).
Codominant 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 defence 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.
Crown Projection - Area within the dripline or beneath the lateral extent of the crown (Geiger, 2004)
Decay* - Degeneration and delignification of plant tissue, including wood, by pathogens or microorganisms.
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.
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 I - TreeAZ (Barrell 2010)

TreeAZ Categories (Version 10.10-ANZ)

Category Z: Unimportant 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	Young or insignificant small trees, i.e. below the local size threshold for legal protection, etc
	2	Too close to a building i.e exempt from legal protection because of proximity etc
	3	Species that cannot be protected for other reasons, i.e. scheduled noxious weeds, out of character in a setting of acknowledged importance, etc
	High risk of death or failure: Trees that are likely to be removed within 10 years because of acute health issues or severe structural failure	
	4	Dead, dying, diseased or declining
	5	Severe damage and/or structural defects where a high risk of failure cannot be satisfactorily reduced by reasonable remedial care, i.e. cavities, decay, included bark, wounds, excessive imbalance, overgrown and vulnerable to adverse weather conditions, etc
	6	Instability, i.e. poor anchorage, increased exposure, etc
	Excessive nuisance: Trees that are likely to be removed within 10 years because of unacceptable impact on people	
	7	Excessive, severe and intolerable inconvenience to the extent that a locally recognized court or tribunal would be likely to authorize removal, i.e. dominance, debris, interference, etc
	8	Excessive, severe and intolerable damage to property to the extent that a locally recognized court or tribunal would be likely to authorize removal, i.e. severe structural damage to surfacing and buildings, etc
	Good management: Trees that are likely to be removed within 10 years through responsible management of the tree population	
	9	Severe damage and/or structural defects where a high risk of failure can be temporarily reduced by reasonable remedial care, i.e. cavities, decay, included bark, wounds, excessive imbalance, vulnerable to adverse weather conditions, etc
	10	Poor condition or location with a low potential for recovery or improvement, i.e. dominated by adjacent trees or buildings, poor architectural framework, etc
	11	Removal would benefit better adjacent trees, i.e. relieve physical interference, suppression, etc
	12	Unacceptably expensive to retain, i.e. severe defects requiring excessive levels of maintenance, etc

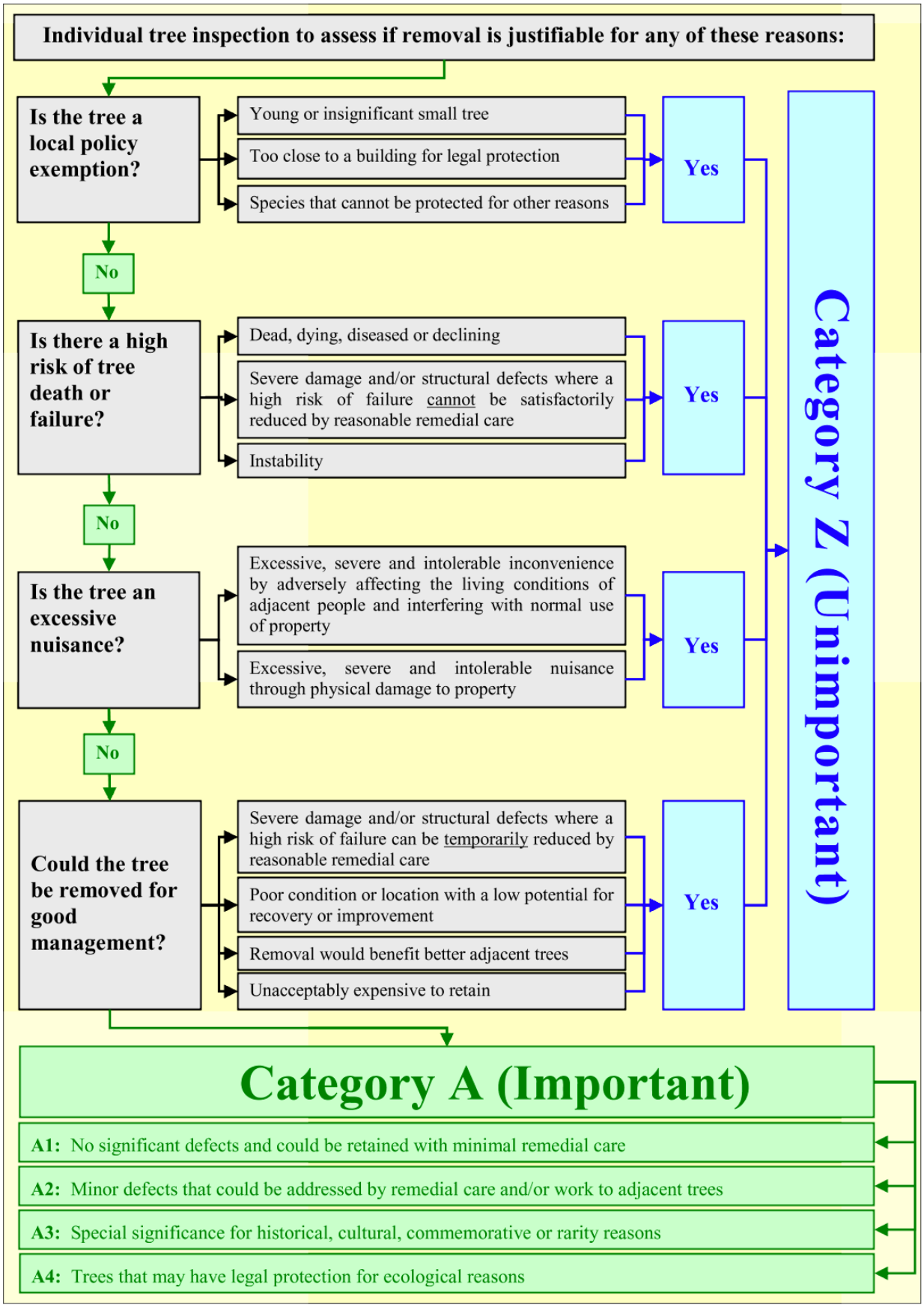
NOTE: Z trees with a high risk of death/failure (Z4, Z5 & Z6) or causing severe inconvenience (Z7 & Z8) at the time of assessment and need an urgent risk assessment can be designated as ZZ. ZZ trees are likely to be unsuitable for retention and at the bottom of the categorization hierarchy. In contrast, 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

Category A Important trees suitable for retention for more than 10 years and worthy of being a material constraint	
A1	No significant defects and could be retained with minimal remedial care
A2	Minor defects that could be addressed by remedial care and/or work to adjacent trees
A3	Special significance for historical, cultural, commemorative or rarity reasons that would warrant extraordinary efforts to retain for more than 10 years
A4	Trees that may be worthy of legal protection for ecological reasons (Advisory requiring specialist assessment)

NOTE: Category A1 trees that are already large and exceptional or have the potential to become so with minimal maintenance, can be designated as AA at the discretion of the assessor. Although all A and AA trees are sufficiently important to be material constraints, AA trees are at the top of the categorization hierarchy and should be given the most weight in any selection process.

TreeAZ is designed by Barrell Tree Consultancy (www.barrelltreecare.co.uk) and is reproduced with their permission

TreeAZ Flow Chart



Appendix J - Tree Significance Assessment Criteria (IACA)

Tree Significance - Assessment Criteria

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.

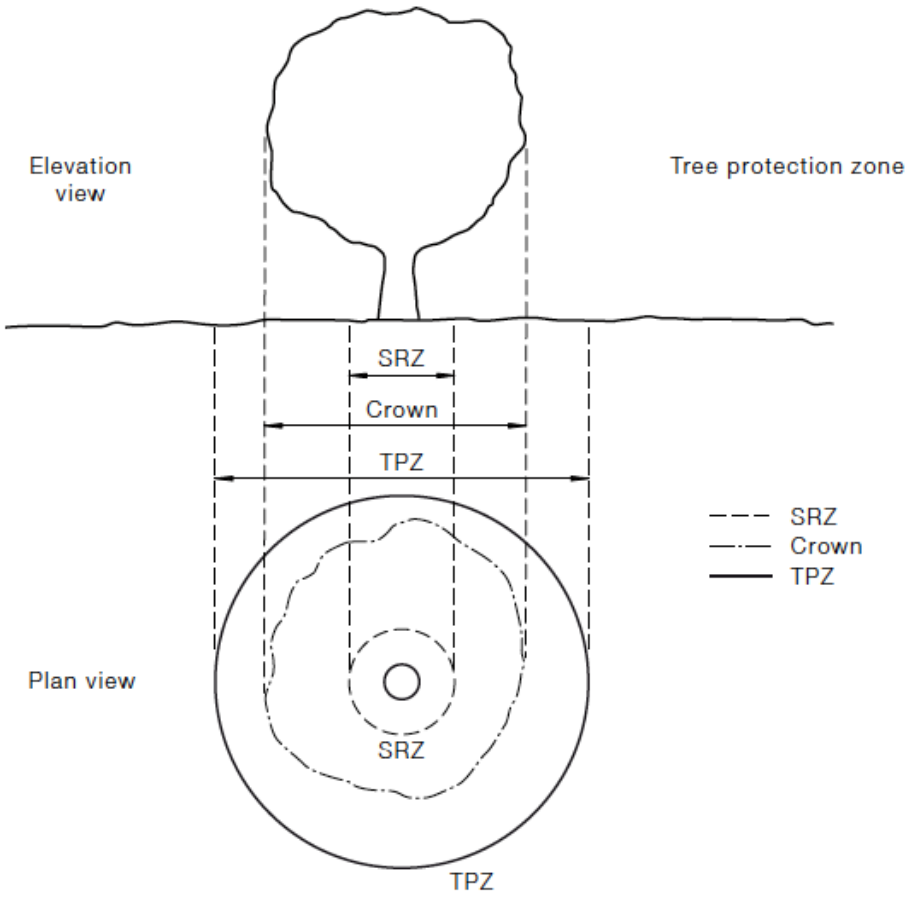
Note: The assessment criteria are for individual trees only, however, can be applied to a monocultural stand in its entirety e.g. hedge.

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

Appendix K - 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.



TPZ is measured radially from the trunk

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.

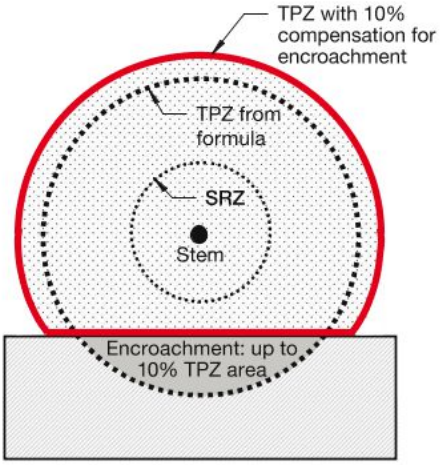
Appendix L - Tree Protection Zone Encroachments AS4970-2009

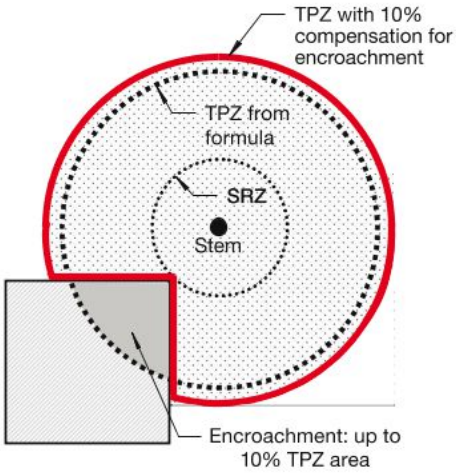
Minor Encroachments

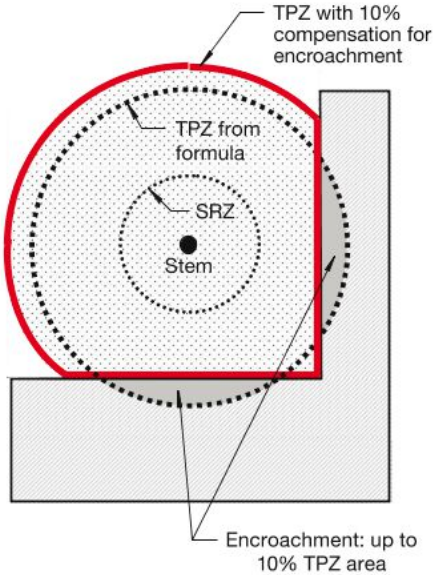
The proposed encroachment is less than 10% of the area of the TPZ and is outside the SRZ. The area lost to this encroachment should be compensated for elsewhere and contiguous with the TPZ.

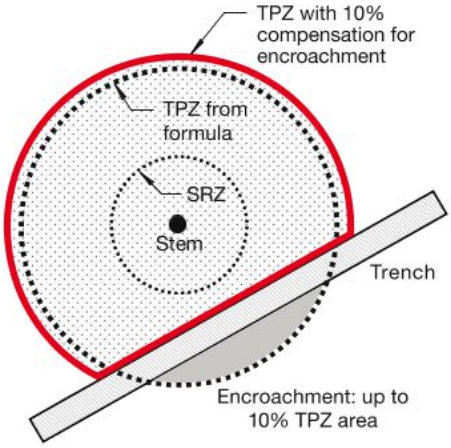
Major Encroachments

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 M - Qualifications & Experience

Meredith Gibbs

Updated December 2022

Qualifications:

1999 Advanced Certificate in Urban Horticulture
2002 Horticulture Diploma (Arboriculture) AQF Level 5
2002 Occupational Health & Safety course
2002 Risk Management course
2002 Smart Train 008397
2010 Collecting Catchment Data
2011 Quantified Tree Risk Assessment
2014 Quantified Tree Risk Assessment
2015 Horticulture Diploma (Arboriculture) AQF Level 5
2018 White Card Number 2234996

Practical experience:

1996 - 1998 Nursery Hand - Horticulturist
1988 - 2001 Garden Maintenance - Horticulturist
1997 - 2004 Silver Springs Nursery (Owner/Operator)
2000 - Australis Tree Management (Owner/Operator)

Memberships and affiliations:

Arboriculture Australia
Australian Institute of Horticulture
Australian Plant Society of NSW
Burrendong Botanic Garden & Arboretum
International Society of Arboriculture
Quantified Tree Risk Assessment Registered User
Society of Municipal Arborists
Waite Arboretum
Women in Arboriculture

Insurance:

Professional Indemnity Insurance
Liberty International Underwriters
$10,000,000.00
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 Conference - Parramatta 2004
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 - Brisbane 2008
ISAAC Conference Workshop Dr. David Lonsdale 2008
ISAAC Conference Workshop Dr. Phillip Gibbons 2008
ISAAC Conference - Newcastle 2009
ISAAC Conference - Adelaide 2010
ISA International Conference Parramatta 2011
ISA International Conference Workshop Dr. Ken James 2011
Arboriculture Australia Annual Conference - Sunshine Coast 2014
Arboriculture Australia Annual Conference - Adelaide 2015
Arboriculture Australia Annual Conference - Canberra 2017
Jeremy Barrell Arboriculture Australia Workshop 2017
Arboriculture Australia Annual Conference - Hobart 2018
Arboriculture Australia Annual Conference - Alice Springs 2019
Arboriculture Australia Annual Conference - Gold Coast 2022

Past Projects

Pennant Street, Castle Hill, 2006
Fairway Drive, Kellyville, 2012
Summit Care, Baulkham Hills, 2013
105-115 Portman Street, Zetland, 2016
114 Tallawong Road, Rouse Hill, 2016
2 Lexington Drive, Bella Vista, 2016
The Hermitage, Gledswood Hills, 2010-2019
105 Cudgegong Road, Rouse Hill Development, 2018
33 Greenwich Road, Greenwich Redevelopment, 2017- 2022
Gosford Park Redevelopment, 2019
Blacktown Workers Sports Club Redevelopment, 2016-2019
Gregory Hills Industrial Estate, 2019
Grand Reve, Castle Hill, 2020
Carrington Road, Castle Hill, 2020
Solent Circuit, Norwest, 2021
Hubertus Country Club, Luddenham, 2021
McCall Gardens, Terry Road, Box Hill, 2022

Appendix N - Bibliography and References

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

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https://www.lmbc.nsw.gov.au/Maps/index.html?viewer=BVMap

NSW Government (2022) *NSW Planning Portal* for 469-483 Balmain Road, Lilyfield, NSW 2040. Visited 30 November 2022.
https://www.planningportal.nsw.gov.au/spatialviewer/#/find-a-property/address

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Shigo, A.L. (1986) *A New Tree Biology Dictionary*, Shigo and Trees Associates, New Hampshire, USA.

Wujeska-Klause, Agnieszka & Pfautsch, Sebastian (2020) *The Best Urban Trees for Daytime Cooling LeaveNights Slightly Warmer Urban Studies*. School of Social Sciences, Locked Bag 1797, Penrith, NSW 2751, Australia Forests 2020, 11, 945; doi:10.3390/f11090945