Project No: ALL/SAI/17 Report No: ALL/SAI/AIA/C

ARBORICULTURAL IMPACT ASSESSMENT
TREE PROTECTION SPECIFICATION

All Saints Catholic College
Leacocks Lane
Casula

PREPARED FOR: SYDNEY CATHOLIC SCHOOLS

15th August 2017

Revision C

Authors:

Anna Hopwood
Grad. Cert (Arboriculture)
Dip. Horticulture (Arboriculture)
Dip. Horticulture (Landscape Design)

Martin Peacock
BSc (hons.) Arboriculture
Dip. Horticulture (Landscape Design)
HN Dip. Arboriculture
N Dip. Horticulture

p. 0404 424 264
f. 02 9012 0924
po box 146 summer hill 2130
info@treeiQ.com.au
abn 62 139 088 832

treeiQ.com.au

Contents

p. 0404 424 264
f. 02 9012 0924
po box 146 summer hill 2130
info@treeiQ.com.au
abn 62 139 088 832

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1.0 INTRODUCTION

1.1 Background

1.1.1 This Arboricultural Impact Assessment Report and Tree Protection Specification was prepared for Fulton Trotter Architects, on behalf of Sydney Catholic Schools, in relation to the site masterplan for All Saints Catholic College, Casula.

1.1.2 The purpose of this report is to undertake a Visual Tree Assessment[1] (VTA) of the subject trees, determine the impact of the proposed works on the subject trees, and where appropriate, recommend the use of sensitive construction methods and tree protection measures to minimise adverse impacts.

1.1.3 In preparing this report the author is aware of and has taken into account the objectives of Liverpool City Council's *Tree Management Policy (2016), Australian Standard 4970-2009 Protection on Tree Development Sites, Australian Standard 4373-2007 Pruning of Amenity Trees* and *Australian Standard 2303-2015 Tree Stock for Landscape Use.*

Refer to Methodology **(Appendix 1)**

1.1.4 This impact assessment is based on an assessment of the following supplied documentation/plans only:

- Site Plan – Existing/Demolition (Dwg No. ACD_1002/P5, dated 10.08.17) prepared by Fulton Trotter
- Site Plan – Proposed (Dwg No. ACD_1003/P5, dated 10.08.17) prepared by Fulton Trotter
- Preliminary Landscape Design Report (980-Z8-01, dated July 2017) prepared by OHD Landscape Architects

Refer to Plans **(Appendix 2)**

1.2 The Proposal

1.2.1 The supplied plans show that the proposed works include:

- Demolition of structures and pavements
- Alterations and ddditions to existing buildings (Blocks A, B2, B3, B4, B5, B6, B7, B8, C, D1, D2, N & P)
- External works including landscaping, paving, covered walkways, pavilion and C.O.L.A buildings
- Modifications to the existing carpark line marking, bus bay, pedestrian entry and resurfacing of existing gravel road with asphalt

Refer to Plans **(Appendix 2)**

2.0 RESULTS

2.1 The Site

2.1.1 The site is located at Leacocks Lane approximately 300m to the east of the Hume Highway at Casula. The site has an elevation of approximately 40-53m Australian Height Datum (AHD).

2.1.2 The site is bound by Leacock Regional Park to the north, south and east, and Leacocks Lane to the west.

2.1.3 The site comprises of double storey brick classrooms and school buildings, and pavement areas including artificial turf, garden beds and grassed areas.

[1] Mattheck & Breloer (2003)

p. 0404 424 264
f. 02 9012 0924
po box 146 summer hill 2130
info@treeiQ.com.au
abn 62 139 088 832

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2.2 The Trees

2.2.1 Fifty (50) trees (including groups of trees) were surveyed as part of this assessment and consist predominantly of a mix of locally indigenous and Australian native species such as *Eucalyptus* spp. (Eucalypt species), *Callistemon* spp. (Bottlebrush species) and *Melaleuca* spp. (Paperbark species).

2.2.2 All of the trees are covered by Liverpool City Council's *Tree Management Policy (2016)*.[2]

2.2.3 As required by Clause 2.3.2 of *Australian Standard 4970 Protection of Trees on Development Sites (2009)*, each of the trees assessed has been allocated a Retention Value. The Retention Value is based on the trees' Useful Life Expectancy and Landscape Significance with consideration to their health, structural condition and site suitability. The Retention Values do not take into account any proposed development works and are not a schedule for tree retention or removal. The trees have been allocated one of the following Retention Values:

- Priority for Retention
- Consider for Retention
- Consider for Removal
- Priority for Removal

2.2.4 The site has a very low percentage of canopy cover due to the large amount of hardstand/pavement areas. In general, the trees are relatively small specimens which are of low quality. In this regard, of the fifty (50) trees assessed, forty six (46) trees were determined of being of moderate or low Landscape Significance. Only four (4) trees have high Landscape Significance and have been allocated a Retention Value of *Priority for Retention*.

2.2.5 A search of the BioNet Atlas of NSW Wildlife Database was undertaken in June 2017. No individual threatened tree species that were listed within this database for the area were identified during the current field investigations of the site. The ecological value of the trees has not been assessed and is beyond the scope of this report.

2.2.6 Full results of the VTA are shown in the Tree Assessment Schedule **(Appendix 3)**.

3.0 ARBORICULTURAL IMPACT ASSESSMENT

3.1 Trees to be removed

3.1.1 The supplied plans show that thirty two (32) trees will need to be removed to accommodate the proposed development. This includes twenty one (21) trees with a Retention Value of *Consider for Retention,* nine (9) trees with a Retention Value of *Consider for Removal* and two (2) trees with a Retention Value of *Priority for Removal*.

3.1.2 Table 1: Trees to be removed

Priority for Retention	Consider for Retention	Consider for Removal	Priority for Removal
5, 6, 7, 8, 10, 11, 12, 13, 14, 15, 16, 17, 19, 20, 21, 22, 23, 24, 25, 26 & 34	5, 6, 7, 8, 10, 11, 12, 13, 14, 15, 16, 17, 24 & 34	9, 30, 31, 35, 36, 37, 38, 39 & 40	32 & 33

3.1.3 No trees with a Retention Value of *Priority for Retention* are proposed for removal.

[2] Liverpool City Council (2017)

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f. 02 9012 0924
po box 146 summer hill 2130
info@treeiQ.com.au
abn 62 139 088 832

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3.2 Trees to be retained

3.2.1 The supplied plans show that eighteen (18) trees are proposed for retention as part of the development. This includes four (4) trees with a Retention Value of *Priority for Retention,* four (4) trees with a Retention Value of *Consider for Retention* and ten (10) trees with a Retention Value of *Consider for Removal.*

3.2.2 Table 2: Trees to be retained

Priority for Retention	Consider for Retention	Consider for Removal	Priority for Removal
1, 2, 3 & 4	18, 27, 28 & 29	41, 42, 43, 44, 45, 46, 47, 48, 49 & 50	

3.3 Works within Tree Protection Zones

3.3.1 Works are proposed within the Tree Protection Zone (TPZ) areas of three (3) trees (Trees 1-3) to be retained as discussed below.

3.3.2 The supplied plans also show that stairs, pavements and a stepped retaining wall are proposed within the TPZ areas of Trees 1 and 2. The extent of work represents *Major Encroachments* as defined by *Australian Standard 4970 Protection of Trees on Development Sites 2009* (AS-4970).

3.3.3 Extensive information has been published relating to the use of tree sensitive design and construction methods which can be used to minimise impacts of development on tree health and reduce conflict between trees and built structures. Much of this information has been incorporated into best practice guidelines and standards (i.e. *British Standard 5837 Trees in Relation to Design, Demolition and Construction 2012* & *AS-4970*). Specifically, Clause 3.3.4 of AS-4970 notes that design factors and tree sensitive methods can be used to minimize the impact of the encroachment.

3.3.4 Recommendations

The following tree sensitive methods should be used within the TPZ areas of Trees 1 and 2 to minimise the impact of works on the trees:

- Existing retaining wall to the west of trees and will have partially restricted the spread of roots in this direction. This retaining wall should be left in situ.
- Demolition works should be undertaken using tree sensitive methods. Where possible, existing footings and sub-base materials should be left in situ and reused.
- Pavement surfaces should be installed at or above existing grade (including sub-base layers and kerbs) and designed as to eliminate the need for high levels of compaction of the underlying soil profile. In addition, the basal flare/buttressing of each tree should be taken into account when designing pavements and kerbs in close proximity to trees.
- Stairs should be installed on a piered footing. The location of piers should be determined by preliminary hand excavation to enable the retention of roots (>25mmø) where deemed necessary by the Project Arborist. In excavated areas where roots (>25mmø) are present and are to be retained, the location of the piers should be adjusted.

p. 0404 424 264
f. 02 9012 0924
po box 146 summer hill 2130
info@treeiQ.com.au
abn 62 139 088 832

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- Stepped retaining wall should be installed at or above existing grade on a piered footing to minimise excavation. Piers should be installed in the same manner as for the stairs (as detailed above).

- Excavation works should be supervised by the Project Arborist and roots (>25mmø) retained as deemed necessary by the Project Arborist. No over-excavation, battering or benching should extend beyond the footprint of the proposed works and towards the trees. Root pruning should be undertaken by the Project Arborist only.

- Landscape planting should be undertaken using hand tools and roots (>25mmø) should be protected. No mechanical cultivation/ripping of soils should be undertaken. Other than minor (max 50mm) top dressing with soil conditioners, excavation and installation of new imported soil mixes should be excluded from TPZ areas.

3.3.5 The supplied plans show that a new pedestrian entry is proposed within the TPZ of Tree 3. As the encroachment into the TPZ is less than 10%, the extent of work represents a *Minor Encroachment* as defined by AS-4970. A *Minor Encroachment* is considered acceptable by AS-4970 when it is compensated for elsewhere and contiguous within the TPZ. The encroachment into the TPZ should be compensated for by extending the TPZ in areas not subject to encroachment.

3.3.6 Recommendations

The following tree sensitive methods should be used within the TPZ of Tree 3 to minimise the impact of works on the tree:

- Demolition works should be undertaken using tree sensitive methods. Where possible, existing footings and sub-base materials should be left in situ and reused.

- Excavation works should be supervised by the Project Arborist and roots (>25mmø) retained as deemed necessary by the Project Arborist. No over-excavation, battering or benching should extend beyond the footprint of the proposed works and towards the trees. Root pruning should be undertaken by the Project Arborist only.

3.4 Underground Services

3.4.1 Underground services and site infrastructure such as substations, hydrants and pumps should be located outside of TPZ areas. Where this is not possible, they should be installed using tree sensitive methods (hand/hydrovac) with the services/infrastructure located around/below roots (>25mmø, or as determined by the Project Arborist).

3.4.2 When undertaking hydro-vacuum excavation, the tip of the high pressure lance should not be pointed directly at roots at close range to avoid the removal or damage to bark. It is essential that the bark of roots remain intact.

3.4.3 Where approved by the Project Arborist, excavation using compact machinery fitted with a flat bladed bucket is permissible. Excavation using compact machinery shall be undertaken in small increments, guided by a spotter who is to look for and prevent damage to roots (>25mmø).

3.4.4 Boring methods may be used for underground service installation where the installation depth is greater than 1000mm below existing grade. Excavations for starting and receiving pits for boring equipment should be located outside of TPZ areas or located to avoid roots (>25mmø, or as determined by the Project Arborist).

p. 0404 424 264
f. 02 9012 0924
po box 146 summer hill 2130
info@treeiQ.com.au
abn 62 139 088 832
treeiQ.com.au

3.5 Pruning Works

3.5.1 The supplied plans show that Trees 1 and 2 may need to be pruned for building and construction clearance. These pruning works represent less than 5% of the trees' total crown volumes and should not reduce their Useful Life Expectancy (ULE) or affect their crown symmetry.

3.5.2 Table 3: Tree 1- *Eucalyptus microcorys* (Tallowwood)

Branch Orientation	Order of Branch	Branch Diameter	Height Above Grade	Comments	Plate No.
E	Higher order branches	<100mm	4m and below	Reduction Prune to provide building & construction clearance	1

3.5.3 Table 4: Tree 2- *Eucalyptus microcorys* (Tallowwood)

Branch Orientation	Order of Branch	Branch Diameter	Height Above Grade	Comments	Plate No.
E	Higher order branches	<100mm	4m and below	Reduction Prune to provide building & construction clearance	

3.5.4 Provision should be made within the design so that additional pruning for construction access and scaffolding/hoarding is not required. Where additional clearance is required, branches may be temporarily pushed or tied. Where branches cannot be pushed or tied back without damage, scaffolding/hoarding should be modified and constructed around branches (with appropriate branch protection installed as required).

3.5.5 Pruning works should be carried out by a Practising Arborist. The Practising Arborist should hold a minimum qualification equivalent (using the Australian Qualifications Framework) of Level 3 or above, in Arboriculture or its recognised equivalent. The Practising Arborist should have a minimum of 3 years' experience in practical Arboriculture. Pruning work should be undertaken in accordance with *Australian Standard 4373: Pruning of Amenity Trees (2007), Safe Work Australia Guide for Managing Risks of Tree Trimming and Removal Work (2016)* and other applicable legislation and codes.

3.6 Replacement Planting

3.6.1 The supplied plans show the proposed works include the planting of a number of replacement trees which should significantly increase the canopy cover across the site. These plantings include a variety of species that are to be supplied in a range of pot sizes which should provide a diverse and well-structured canopy of healthy trees with a long potential ULE. Replacement trees should be grown in accordance with *Australian Standard 2303 (2015) Tree Stock for Landscape Use.*

4.0 CONCLUSION

4.1 Fifty (50) trees (including groups of trees) were surveyed as part of this assessment and consist mainly of a mix of locally indigenous and Australian native species. The site has a very low percentage of canopy cover due to the large amount of hardstand/pavement areas, and in general, the trees are relatively small specimens which are of low quality.

4.2 The supplied plans show that the proposed works include demolition of existing structures and pavements, alterations and additions to existing buildings, external works, and modifications to the existing carpark line marking, bus bay, pedestrian entry to the site and resurfacing of existing gravel road.

p. 0404 424 264
f. 02 9012 0924
po box 146 summer hill 2130
info@treeiQ.com.au
abn 62 139 088 832

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4.3 The supplied plans show that thirty two (32) trees will need to be removed to accommodate the proposed development. These are Trees 5-17, 19-26 and 30-40. No trees with a Retention Value of *Priority for Retention* are proposed for removal.

4.4 The supplied plans show that eighteen (18) trees are proposed for retention as part of the development. These are Trees 1-4, 18, 27-29 and 41-50. Works are proposed within the TPZ areas of Trees 1-3. Trees sensitive demolition and construction methods as detailed within Sections 3.3.4 and 3.3.7 should be used within TPZ areas to minimise the impact on the trees. The trees to be retained should be protected in accordance with the Tree Protection Specification **(Appendix 5)**.

4.5 The supplied plans show that Trees 1 and 2 may need to be pruned for building and construction clearance. These pruning works represent less than 5% of the trees' total crown volumes and should not reduce their ULE or affect their crown symmetry. Pruning work should be undertaken in accordance with *Australian Standard 4373: Pruning of Amenity Trees (2007)* and *Safe Work Australia Guide for Managing Risks of Tree Trimming and Removal Work (2016).*

4.6 The supplied plans show the proposed works include the planting of a number of replacement trees which should significantly increase the canopy cover across the site. Replacement trees should be grown in accordance with *Australian Standard 2303 (2015) Tree Stock for Landscape Use*.

5.0 LIMITATIONS & DISCLAIMER

TreeiQ takes care to obtain information from reliable sources. However, TreeiQ can neither guarantee nor be responsible for the accuracy of information provided by others. Plans, diagrams, graphs and photographs in this Arboricultural Report are visual aids only and are not necessarily to scale. This Report provides recommendations relating to tree management only. Advice should be sought from appropriately qualified consultants regarding design/construction/ecological/heritage etc issues.

This Report has been prepared for exclusive use by the client. This Report shall not be used by others or for any other reason outside its intended target or without the prior written consent of TreeiQ. Unauthorised alteration or separate use of any section of the Report invalidates the Report.

Many factors may contribute to tree failure and cannot always be predicted. TreeiQ takes care to accurately assess tree health and structural condition. However, a tree's internal structural condition may not always correlate to visible external indicators. There is no warranty or guarantee, expressed or implied that problems or deficiencies regarding the trees or site may not arise in the future. Information contained in this report covers only the trees assessed and reflects the condition of the trees at the time of inspection. Additional information regarding the methodology used in the preparation of this Report is attached as Appendix 1. A comprehensive tree risk assessment and management plan for the trees is beyond the scope of this Report.

Reference should be made to any relevant legislation including Tree Management Controls. All recommendations contained within this Report are subject to approval from the relevant Consent Authority.

p. 0404 424 264
f. 02 9012 0924
po box 146 summer hill 2130
info@treeiQ.com.au
abn 62 139 088 832

treeiQ.com.au

6.0 BIBLIOGRAPHY & REFERENCES

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Standards Australia (22015), *Tree Stock for Landscape Use AS-2303.*

Standards Australia (2015) *Tree Stock for Landscape Use AS-2303.*

p. 0404 424 264
f. 02 9012 0924
po box 146 summer hill 2130
info@treeiQ.com.au
abn 62 139 088 832

treeiQ.com.au

7.0 APPENDICES

p. 0404 424 264
f. 02 9012 0924
po box 146 summer hill 2130
info@treeiQ.com.au
abn 62 139 088 832

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Appendix 1: Methodology

1.1 **Site Inspection**: This report was determined as a result of a comprehensive site during May 2017. The comments and recommendations in this report are based on findings from this site inspection.

1.2 **Visual Tree Assessment (VTA)**: The subject tree(s) was assessed using the Visual Tree Assessment criteria and notes as described in *The Body Language of Trees – A Handbook for Failure Analysis.*[3] The inspection was limited to a visual examination of the subject tree(s) from ground level only. No internal diagnostic or tissue testing was undertaken as part of this assessment. Trees outside the subject site were assessed from the property boundaries only.

1.3 **Tree Dimensions**: The dimensions of the subject tree(s) are approximate only.

1.4 **Tree Locations:** The location of the subject tree(s) was determined from the supplied plans. Trees not shown on the plans have been plotted in their approximate location only.

1.5 **Trees & Development**: Tree Protection Zones, Tree Protection Measures and Sensitive Construction Methods for the subject tree were based on methods outlined in *Australian Standard 4970-2009 Protection of Trees on Development Sites*.

The *Tree Protection Zone* (TPZ) is described in AS-4970 as a combination of the root area and crown area requiring protection. It is an area isolated from construction disturbance, so that the tree remains viable.

The *Structural Root Zone* (SRZ) is described in AS-4970 as the area around the base of a tree required for the tree's stability in the ground. Severance of structural roots within the SRZ is not recommended as it may lead to the destabilisation and/or demise of the tree.

In some cases it may be possible to encroach into or make variations to the theoretical TPZ. A *Minor 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. A *Major Encroachment* is greater than 10% of the TPZ or inside the SRZ. In this situation the Project Arborist must demonstrate that the tree would remain viable. This may require root investigation by non-destructive methods or the use of sensitive construction methods.

1.6 **Tree Health**: The health of the subject tree(s) was determined by assessing:

I. Foliage size and colour
II. Pest and disease infestation
III. Extension growth
IV. Crown density
V. Deadwood size and volume
VI. Presence of epicormic growth

1.7 **Tree Structural Condition**: The structural condition of the subject tree(s) was assessed by:

I. Assessment of branching structure
(i.e co-dominant/bark inclusions, crossing branches, branch taper, terminal loading, previous branch failures)
II. Visible evidence of structural defects or instability
(i.e root plate movement, wounds, decay, cavities, fungal brackets, adaptive growth)
III. Evidence of previous pruning or physical damage
(i.e root severance/damage, lopping, flush-cutting, lions tailing, mechanical damage)

1.8 **Useful Life Expectancy (ULE)**: The ULE is an estimate of the longevity of the subject tree(s) in its growing environment. The ULE is modified where necessary to take in consideration tree(s) health, structural condition and site suitability. The tree(s) has been allocated one of the following ULE categories (Modified from Barrell, 2001):

I. 40 years +
II. 15-40 years
III. 5-15 years
IV. Less than 5 years

[3] Mattheck & Breloer (2003)

p. 0404 424 264
f. 02 9012 0924
po box 146 summer hill 2130
info@treeiQ.com.au
abn 62 139 088 832

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1.9 **Landscape Significance**: Landscape Significance was determined by assessing the combination of the cultural, environmental and aesthetic values of the subject tree(s). Whilst these values are subjective, a rating of high, moderate, low or insignificant has been allocated to the tree(s). This provides a relative value of the tree's Landscape Significance which may aid in determining its Retention Value. If the tree(s) can be categorized into more than one value, the higher value has been allocated.

Landscape Significance	Description
Very High	The subject tree is listed as a Heritage Item under the *Local Environmental Plan* with a local or state level of significance.
	The subject tree is listed on Council's Significant Tree Register or is considered to meet the criteria for significance assessment of trees and/or landscapes by a suitably qualified professional. The criteria are based on general principles outlines in the Burra Charter and on criteria from the Register of the National Estate.
	The subject tree is a remnant tree.
High	The subject tree creates a 'sense of place' or is considered 'landmark' tree.
	The subject tree is of local, cultural or historical importance or is widely known.
	The subject tree has been identified by a suitably qualified professional as a species scheduled as a Threatened or Vulnerable Species or forms part of an Endangered Ecological Community associated with the subject site, as defined under the provisions of the *Threatened Species Conservation Act* 1995 (NSW) or the *Environmental Protection and Biodiversity Conservation Act* 1999.
	The subject tree is known to provide habitat to a threatened species.
	The subject tree is an excellent representative of the species in terms of aesthetic value.
	The subject tree is of significant size, scale or makes a significant contribution to the canopy cover of the locality.
	The subject tree forms part of the curtilage of a heritage item with a known or documented association with that item.
Moderate	The subject tree makes a positive contribution to the visual character or amenity of the area.
	The subject tree provides a specific function such as screening or minimising the scale of a building.
	The subject tree has a known habitat value.
	The subject tree is a good representative of the species in terms of aesthetic value.
Low	The subject tree is an environmental pest species or is exempt under the provisions of the local Council's Tree Management Controls
	The subject tree makes little or no contribution to the amenity of the locality.
	The subject tree is a poor representative of the species in terms of aesthetic value.
Insignificant	The subject tree is declared a Noxious Weed under the Noxious Weeds Act

1.10 **Retention Value**: Retention Value was based on the subject tree's Useful Life Expectancy and Landscape Significance. The Retention Value was modified where necessary to take in consideration the subject tree's health, structural condition and site suitability. The subject tree(s) has been allocated one of the following Retention Values:

I. Priority for Retention
II. Consider for Retention
III. Consider for Removal
IV. Priority for Removal

<table>
<tr><th>ULE</th><th></th><th colspan="4">Landscape Significance</th></tr>
<tr><td></td><td>Very High</td><td>High</td><td>Moderate</td><td>Low</td><td>Insignificant</td></tr>
<tr><td>40 years +</td><td rowspan="3">Priority for Retention</td><td colspan="2">Priority for Retention</td><td rowspan="3">Consider for Removal</td><td rowspan="3">Priority for Removal</td></tr>
<tr><td>15-40 years</td><td>Priority for Retention</td><td>Consider for Retention</td></tr>
<tr><td>5-15 years</td><td colspan="2">Consider for Retention</td></tr>
<tr><td>Less than 5 years</td><td>Consider for Removal</td><td colspan="4">Priority for Removal</td></tr>
</table>

The above table has been modified from the Footprint Green Tree Significance and Retention Value Matrix.

p. 0404 424 264
f. 02 9012 0924
po box 146 summer hill 2130
info@treeiQ.com.au
abn 62 139 088 832

treeiQ.com.au

Appendix 2: Plans

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f. 02 9012 0924
po box 146 summer hill 2130
info@treeiQ.com.au
abn 62 139 088 832

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PROPOSED DEMOLITION

Block N - Proposed Demolition
Demolition of all internal masonry brickwork walls on upper ground. Demolition of blockwork walls and concrete slab on lower ground. Localised areas of demolition to existing concrete slab on upper ground. Localised areas of demolition of existing external brickwork and windows on northern elevation to accommodate proposed wall openings. Excavation of approximately 500 cubic meters of soil underneath block N to accommodate proposed lower ground level.

Block P - Proposed Demolition
Removal of internal masonry brickwork walls on lower ground. Removal of existing external brickwork and windows on northern elevation to accommodate proposed wall openings. Removal of external brickwork wall to east elevation to accommodate extension to tiered theatre.

Carpark linemarking amended (refer to traffic engineers report)
Existing palisade fence, intercom and gate on boundary to be removed
Existing bus drop off to be modified. Works include demolition of existing ashphalt and paving
Existing non compliance stair and ramp to be demolished

Block A - Proposed Demolition
Upper Ground Level - demolition of all internal and external brickwork walls, miscellaneous fixtures and fittings, plant equipment and roof sheeting.
Existing concrete slab and steel columns and roof structure to be retained.

Block B2 - Proposed Demolition
Demoltion of store room and external roofs and covered walkways
Linemarking for existing parking spaces; 20,21 & 22 to be removed
Existing palisade fence, intercom and gate on boundary to be removed

Block B2 - Proposed Demolition
Minor demolition of existing verandah roof and associated roof structure, gutters and downpipes.
Removal of existing window to western elevation to accommodate proposed door.

Block D2 - Proposed Demolition
Minor demolition of existing verandah roof and associated roof structure, gutters and downpipes.
Removal of existing doors and windows on northern elevation to accommodate proposed wall openings.

Block B3 - Proposed Demolition
Minor demolition of existing verandah roof and associated roof structure, gutters and downpipes.

Block B4 - Proposed Demolition
Minor demolition of existing verandah roof and associated roof structure, gutters and downpipes.

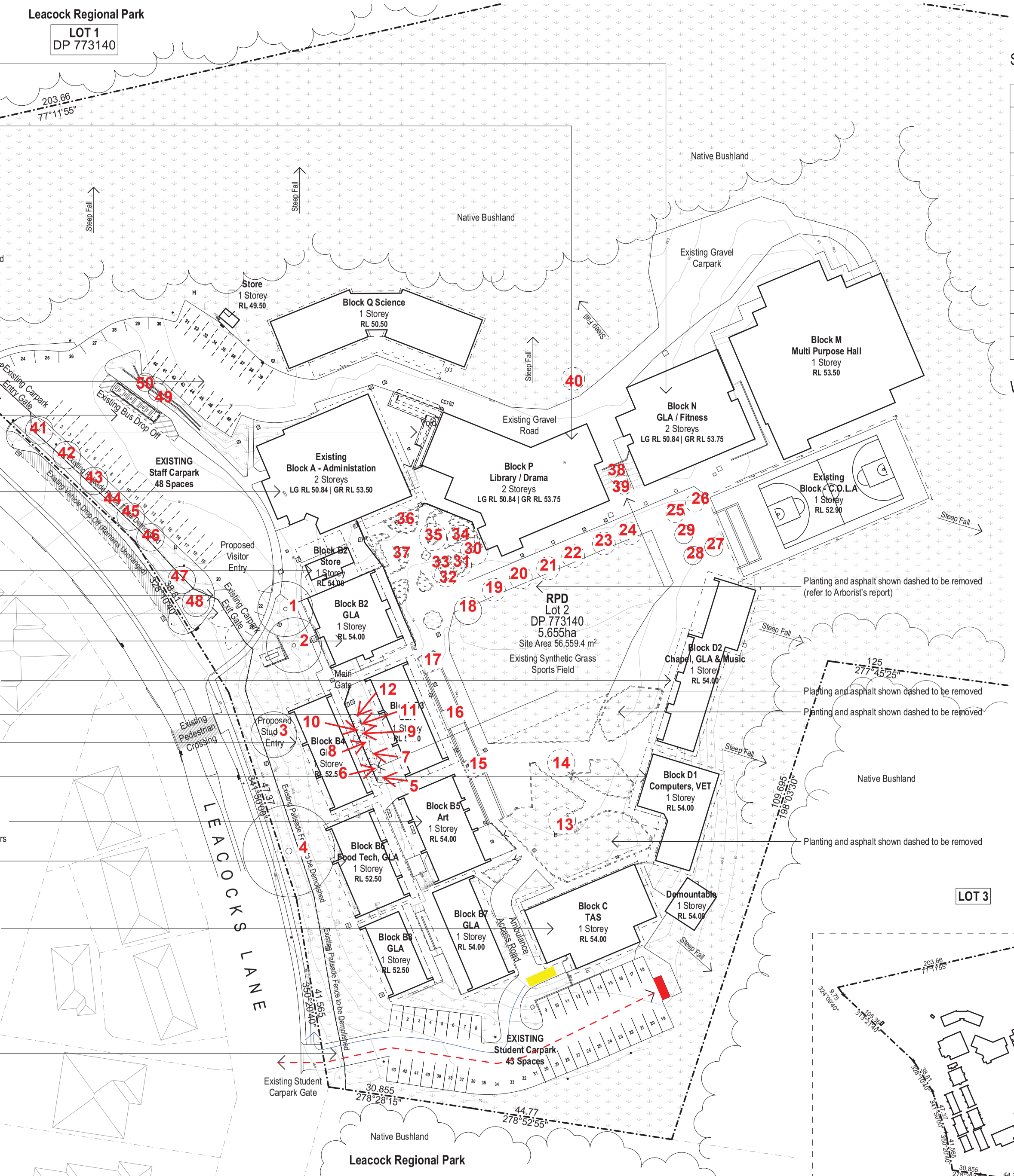
Block D1 - Proposed Demolition
Minor demolition of existing verandah roof and associated roof structure, gutters and downpipes.
Removal of existing door opening to accommodate proposed door to required AS1428.1 2009
Internal Refurbishment and removal of internal non loadbearing walls

Block B5 - Proposed Demolition
Minor demolition of existing verandah roof and associated roof structure, gutters and downpipes.
Demolition of internal walls, plumbing fixtures and fittings.
Removal of existing external doors and windows on west elevation to accommodate proposed bifold doors

Block B6 - Proposed Demolition
Minor demolition of existing verandah roof and associated roof structure, gutters and downpipes.

Block C - Proposed Demolition
Minor demolition of existing verandah roof and associated roof structure, gutters and downpipes.
Removal of existing doors and windows on northern elevation to accommodate proposed wall openings.

Existing Student Carpark Gate/ Fence to be removed



1 SITE PLAN
EXISTING / DEMOLITION
SCALE 1:1000

75mm @ (A3) fullsize

plot date: Thursday, 10 August 2017 file location: S:\7023CA01 All Saints Casula\DRAWINGS\7023CA01_Site.pln

SITE INFORMATION

Site Description	Lot 2 DP 773140
Site Area (Including Asset Protection Zone)	5.655ha 56,554.40m2
Existing Building Footprint Area (Excluding Verandahs)	5,850m²
Proposed Building Footprint Area (Excluding Verandahs)	6,430m²
Existing Deep Soil Planting	40,463m² (71%)
Proposed Deep Soil Planting	40,377m² (71%)
Existing Site Gross Floor Area (Enclosed)	4,790m² (8%)
Proposed Site Gross Floor Area (Enclosed)	5,820m² (10%)
Existing Uncovered Outdoor Space (Accessible to Students)	4,950m²
Proposed Uncovered Outdoor Space (Accessible to Students)	3,850m²
Existing Covered Outdoor Space (Accessible to Students)	2,550m²
Proposed Covered Outdoor Space (Accessible to Students)	3,650m²

WASTE FACILITIES

Recycling bin storage site (existing)
Waste bin storage site (existing)
Recycling bin pathway to streetside collection point
Access pathway for vehicular waste pickup

SITE PLAN LEGEND

Existing Building
Proposed New Building Work
Proposed Internal Reurbishment
Building Elements to be Demolished
Existing Hard Landscaping
Proposed Hard Landscaping
Existing Soft Landscaping
Proposed Soft Landscaping
Existing Neighbouring Dwellings
Existing Bus Pickup & Drop off Zone
Existing Trees
Removed Trees
Proposed Trees
Site Boundary
Existing Fence
Extent of Work
Approximate line of bushland canopy

H Hydrant	Stop Valve
S Stormwater Pit	LP Light Pole
E Electrical Pit	PP Power Pole
SMH Sewer Man Hole	G Gas Meter

REV.	DESCRIPTION	DATE	INITIAL
P5	Consultant Issue	10.08.17	AP
P4	Consultant Issue	14.07.17	AP
P3	Landscape Architect Issue	03.07.17	AP
P2	QS Issue	09.06.17	AP
P1	Preliminary Issue	23.05.17	AP

fulton trotter ARCHITECTS

SYDNEY
LEVEL 3, 35 SPRING STREET
PO BOX 1669
BONDI JUNCTION, NSW 2022

BRISBANE
SYDNEY

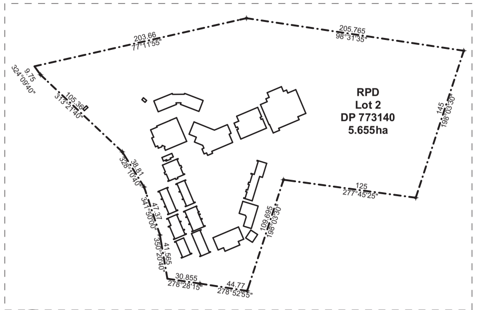
t. (02) 9369 5941
f. #Contact Fax
e. sydney@fultontrotter.com.au

DIRECTORS
Greg Isaac raia
John Ward raia
Mark Trotter fraia — VIC 17691 — NSW 4421 — QLD 1870
Paul Trotter fraia
Robert Wesener raia

NSW 6855 QLD 2920
NSW 8371 QLD 3847
NSW 4421 QLD 1870
NSW 7177 QLD 2646
NSW 5802 QLD 2633

www.fultontrotter.com.au

PHASE: **DEVELOPMENT APPLICATION**
CLIENT: SYDNEY CATHOLIC SCHOOLS
PROJECT: ALL SAINTS CATHOLIC SENIOR COLLEGE
ADDRESS: LEACOCKS LANE CASULA, NSW
DRAWING: **SITE PLAN - EXISTING / DEMOLITION**



2 PLAN
LOCATION PLAN
SCALE 1:5000

Figured dimensions take precedence over scale dimensions. Contractors must verify all dimensions on site before commencing any work or making shop drawings.

PROJECT NUMBER	DIRECTOR	CHECKED
7023CA02	GI	

DRAWING NUMBER	REVISION
ACD_1002	P5

Appendix 3: Tree Assessment Schedule

Tree No.	Species	Height (m)	Radial Crown Spread (m)	DBH (mm)	Health Rating	Structural Rating	Comments	Age Class	ULE (years)	L/Sign	Retention Value	Radial TPZ (m)	Radial SRZ (m)	Implication
1	*Eucalyptus microcorys* (Tallowwood)	15	7	450	Good	Good	ArborSite 133. Small (<25mmø) deadwood in low volumes. Partially suppressed. Adaptive growth.	Mature	15-40	High	Priority for Retention	5.4	2.4	Retain. Major encroachment. Use tree sensitive methods.
2	*Eucalyptus microcorys* (Tallowwood)	16	7	500	Good	Good	ArborSite 132. Small (<25mmø) & medium (25-75mmø) epicormic growth in moderate volumes. Co-dominant inclusions, minor. Adaptive growth.	Mature	15-40	High	Priority for Retention	6	2.5	Retain. Major encroachment. Use tree sensitive methods.
3	*Eucalyptus tereticornis* (Forest Red Gum)	14	6	350 350	Good	Good	ArborSite 131. Small (<25mmø) epicormic growth in low volumes. Bark inclusion(s), major.	Semi-mature	15-40	High	Priority for Retention	6	2.8	Retain. Minor encroachment. Pedestrian entry.
4	*Eucalyptus moluccana* (Grey Box)	16	8	500	Good	Good	Crown density 75-95%. Small (<25mmø) & medium (25-75mmø) deadwood in low volumes.	Mature	15-40	High	Priority for Retention	6	2.5	Retain. No works within TPZ.
5	*Melaleuca bracteata* (Black Tea Tree)	10	2	200	Good	Good	ArborSite 129. Partially suppressed. Structures within SRZ.	Semi-mature	5-15	Moderate	Consider for Retention	2.4	1.7	Remove. New covered walkway.
6	*Melaleuca bracteata* (Black Tea Tree)	10	2	150 75	Good	Good		Semi-mature	5-15	Moderate	Consider for Retention	2	1.7	Remove. New covered walkway.
7	*Melaleuca bracteata* (Black Tea Tree)	10	2	150 100	Good	Good		Semi-mature	5-15	Moderate	Consider for Retention	2.3	1.8	Remove. New covered walkway.
8	*Melaleuca bracteata* (Black Tea Tree)	10	2	150	Good	Good	Co-dominant inclusions, minor. Bark inclusion(s), major.	Semi-mature	5-15	Moderate	Consider for Retention	2	1.5	Remove. New covered walkway.

Tree No.	Species	Height (m)	Radial Crown Spread (m)	DBH (mm)	Health Rating	Structural Rating	Comments	Age Class	ULE (years)	L/Sign	Retention Value	Radial TPZ (m)	Radial SRZ (m)	Implication
9	*Callistemon citrinus* (Lemon Scented Bottlebrush)	3	1	<50	Fair	Good	Crown density 75-95%. Heavily suppressed. Limited crown clearance. Structures in SRZ.	Young	5-15	Low	Consider for Removal	2	1.5	Remove. New covered walkway.
10	*Callistemon viminalis* (Weeping Bottlebrush)	7	2	75	Good	Good	ArborSite 130. Partially suppressed. Limited crown clearance. Structures in SRZ.	Semi-mature	5-15	Moderate	Consider for Retention	2	1.5	Remove. New covered walkway.
11	*Callistemon viminalis* (Weeping Bottlebrush)	7	2	75	Good	Good		Semi-mature	5-15	Moderate	Consider for Retention	2	1.5	Remove. New covered walkway.
12	*Callistemon viminalis* (Weeping Bottlebrush)	7	2	75 100 100	Good	Good		Semi-mature	5-15	Moderate	Consider for Retention	2	1.8	Remove. New covered walkway.
13	*Syncarpia glomulifera* (Turpentine)	5	2	175	Fair	Fair	ArborSite 156. Crossing branches. Crown density 75-95%. Small (<25mmø) epicormic growth in moderate volumes. Co-dominant inclusions, minor. Soil compaction.	Semi-mature	5-15	Moderate	Consider for Retention	2.2	1.7	Remove. New COLA.
14	*Syncarpia glomulifera* (Turpentine)	9	2	250	Good	Fair	Crossing branches. ArborSite 155. Co-dominant inclusions, major. Wound(s), no visible sign of decay. Soil compaction.	Semi-mature	15-40	Moderate	Consider for Retention	3	1.9	Remove. New COLA.
15	*Waterhousia floribunda* (Weeping Lillypilly)	4	2	150	Good	Good	ArborSite 157. Clipped. Structures within SRZ.	Semi-mature	5-15	Moderate	Consider for Retention	2	1.5	Remove. Landscape treatment.
16	*Waterhousia floribunda* (Weeping Lillypilly)	4	2	200	Good	Good	ArborSite 158. Clipped. Dieback from pruning.	Semi-mature	5-15	Moderate	Consider for Retention	2.4	1.7	Remove. Landscape treatment.
17	*Waterhousia floribunda* (Weeping Lillypilly)	4	2	200	Good	Good	ArborSite 159. Clipped.	Semi-mature	5-15	Moderate	Consider for Retention	2.4	1.7	Remove. Landscape treatment.

Tree No.	Species	Height (m)	Radial Crown Spread (m)	DBH (mm)	Health Rating	Structural Rating	Comments	Age Class	ULE (years)	L/Sign	Retention Value	Radial TPZ (m)	Radial SRZ (m)	Implication
18	*Eucalyptus microcorys* (Tallowwood)	10	5	250	Good	Good	ArborSite 142. Recently pruned.	Semi-mature	15-40	Moderate	Consider for Retention	3	1.9	Retain. No works within TPZ.
19	*Cupaniopsis anacardioides* (Tuckeroo)	7	4	100 100 75	Fair	Fair	ArborSite 143. Crown density 50-75%. Wound(s), early signs of decay. Structures within SRZ. Soil compaction.	Semi-mature	5-15	Moderate	Consider for Retention	2	1.8	Remove. New covered walkway.
20	*Cupaniopsis anacardioides* (Tuckeroo)	7	5	100 100 75 75	Fair	Good	ArborSite 144. Wound(s), early signs of decay. Structures within SRZ.	Semi-mature	5-15	Moderate	Consider for Retention	2.2	1.9	Remove. New covered walkway.
21	*Cupaniopsis anacardioides* (Tuckeroo)	4	3	100	Fair	Good	ArborSite 145. Crown density 75-95%. Wound(s), no visible sign of decay. Structures within SRZ.	Semi-mature	5-15	Moderate	Consider for Retention	2	1.5	Remove. New covered walkway.
22	*Cupaniopsis anacardioides* (Tuckeroo)	7	4	125 100	Fair	Good	ArborSite 146. Crown density 50-75%. Co-dominant inclusions, minor.	Semi-mature	5-15	Moderate	Consider for Retention	2	1.7	Remove. New covered walkway.
23	*Cupaniopsis anacardioides* (Tuckeroo)	6	4	250	Fair	Good	ArborSite 147. Crown density 75-95%. Co-dominant inclusions, minor. Wound(s), advanced stages of decay. Storm damage.	Semi-mature	5-15	Moderate	Consider for Retention	3	1.9	Remove. New covered walkway.
24	*Cupaniopsis anacardioides* (Tuckeroo)	6		250	Good	Good	Crossing branches. ArborSite 148. Crown density 50-75%. Bark inclusion(s), minor.	Semi-mature	5-15	Moderate	Consider for Retention	3	1.9	Remove. New covered walkway.
25	*Cupaniopsis anacardioides* (Tuckeroo)	4	4	250	Good	Good	ArborSite 150. Crown density 75-95%. Bark inclusion(s), minor. Wound(s), various stages of decay.	Semi-mature	5-15	Moderate	Consider for Retention	3	1.9	Remove. New covered walkway.
26	*Cupaniopsis anacardioides* (Tuckeroo)	4	3	250	Good	Good	Crossing branches. Bark inclusion(s), minor.	Semi-mature	5-15	Moderate	Consider for Retention	3	1.9	Remove. New covered walkway.

Tree No.	Species	Height (m)	Radial Crown Spread (m)	DBH (mm)	Health Rating	Structural Rating	Comments	Age Class	ULE (years)	L/Sign	Retention Value	Radial TPZ (m)	Radial SRZ (m)	Implication
27	*Cupaniopsis anacardioides* (Tuckeroo)	3	3	250	Good	Good	ArborSite 154.	Semi-mature	5-15	Moderate	Consider for Retention	3	1.9	Retain. No works within TPZ.
28	*Cupaniopsis anacardioides* (Tuckeroo)	4	3	75 75 75 75	Good	Good	ArborSite 153. Bark inclusion(s), minor. Wound(s), early signs of decay.	Semi-mature	5-15	Moderate	Consider for Retention	2	1.7	Retain. No works within TPZ.
29	*Cupaniopsis anacardioides* (Tuckeroo)	3	3	75 75 75	Good	Good	ArborSite 152. Wound(s), no visible sign of decay.	Semi-mature	5-15	Moderate	Consider for Retention	2	1.6	Retain. No works within TPZ.
30	*Eucalyptus* sp. (Eucalypt)	8	5	200	Poor	Fair	ArborSite 141. Crown density 50-75%. Small (<25mmø) deadwood in moderate volumes. Partially suppressed. Wound(s), various stages of decay.	Mature	5-15	Low	Consider for Removal	2.4	1.7	Remove. New admin building.
31	*Callistemon viminalis* (Weeping Bottlebrush)	7	5	75 100 175 150	Fair	Fair	ArborSite 161. Asymmetric crown form. Crown density 25-50%. Small (<25mmø) deadwood in low volumes. Partially suppressed. Phototrophic lean, moderate.	Mature	5-15	Low	Consider for Removal	3.2	2.2	Remove. New admin building.
32	*Callistemon viminalis* (Weeping Bottlebrush)	2		100	Good	Poor	Lopped.	Mature	<5	Low	Priority for Removal	2	1.5	Remove. New admin building.
33	*Backhousia myrtifolia* (Grey Myrtle)	2	1	75 100 <50	Fair	Fair	Myrtle rust.	Semi-mature	<5	Low	Priority for Removal	2	1.7	Remove. New admin building.
34	*Casuarina glauca* (Swamp She-oak)	13	5	225	Good	Good	ArborSite 139. Small (<25mmø) deadwood in low volumes.	Semi-mature	15-40	Moderate	Consider for Retention	2.8	1.8	Remove. New admin building.
35	*Eucalyptus* sp. (Eucalypt)	8	4	300 300 200	Good	Fair	Crossing branches. Wound(s), various stages of decay. Trunk cavity(s), minor. Lopped.	Mature	5-15	Low	Consider for Removal	5.6	2.7	Remove. New admin building.

Tree No.	Species	Height (m)	Radial Crown Spread (m)	DBH (mm)	Health Rating	Structural Rating	Comments	Age Class	ULE (years)	L/Sign	Retention Value	Radial TPZ (m)	Radial SRZ (m)	Implication
36	*Syzygium australe* (Brush Cherry Lillypilly)	4	4	100 100	Good	Good	Group of 2. ArborSite 163.	Young	5-15	Low	Consider for Removal	2	1.7	Remove. New admin building.
37	*Syzygium australe* (Brush Cherry Lillypilly)	4	2	100 75	Good	Good	Group of 2. ArborSite 162.	Young	5-15	Low	Consider for Removal	2	1.6	Remove. New admin building.
38	*Banksia integrifolia* (Coastal Banksia)	7	4	200	Good	Good	ArborSite 149.	Mature	15-40	Low	Consider for Removal	2.4	1.7	Remove. New entrance.
39	*Grevillea* 'Moonlight' (Grevillea cvs)	5	2	100	Good	Good	Group pf 3.	Mature	5-15	Low	Consider for Removal	2	1.5	Remove. New entrance.
40	*Eucalyptus* sp. (Eucalypt)	5	2	100	Good	Good	No access base.	Semi-mature	15-40	Low	Consider for Removal	2	1.5	Remove. APZ & deck.
41	*Jacaranda mimosifolia* (Jacaranda)	6	3	150 150	Good	Fair	Crown contact with fence. Bark inclusion(s), minor. Lopped with resultant epicormics.	Semi-mature	15-40	Low	Consider for Removal	2.6	2	Retain. No works within TPZ.
42	*Jacaranda mimosifolia* (Jacaranda)	5	3	150 100	Good	Fair	Bark inclusion(s), minor. Wound(s), various stages of decay. Lopped with resultant epicormics.	Semi-mature	15-40	Low	Consider for Removal	2.3	1.8	Retain. No works within TPZ.
43	*Jacaranda mimosifolia* (Jacaranda)	4	3	150	Good	Good	Crossing branches.	Semi-mature	15-40	Low	Consider for Removal	2	1.5	Retain. No works within TPZ.
44	*Jacaranda mimosifolia* (Jacaranda)	4	3	150	Good	Good	Crossing branches.	Semi-mature	15-40	Low	Consider for Removal	2	1.5	Retain. No works within TPZ.

Tree No.	Species	Height (m)	Radial Crown Spread (m)	DBH (mm)	Health Rating	Structural Rating	Comments	Age Class	ULE (years)	L/Sign	Retention Value	Radial TPZ (m)	Radial SRZ (m)	Implication
45	*Jacaranda mimosifolia* (Jacaranda)	4	3	100 200	Good	Good	Crossing branches.	Semi-mature	15-40	Low	Consider for Removal	2.8	2.1	Retain. No works within TPZ.
46	*Jacaranda mimosifolia* (Jacaranda)	4	3	100 200	Good	Good	Crossing branches. Pruned/lopped for powerline clearance.	Semi-mature	15-40	Low	Consider for Removal	2.8	2.1	Retain. No works within TPZ.
47	*Jacaranda mimosifolia* (Jacaranda)	8	5	175 200	Good	Good	Mechanical damage to exposed surface roots. Soil compaction.	Semi-mature	5-15	Low	Consider for Removal	3.2	2.2	Retain. No works within TPZ.
48	*Jacaranda mimosifolia* (Jacaranda)	6	4	125 75	Good	Good	Crown contact with fence.	Semi-mature	5-15	Low	Consider for Removal	2	1.6	Retain. No works within TPZ.
49	*Callistemon salignus* (Willow Bottlebrush)	5	4	200	Fair	Fair	Crown density 75-95%. Small (<25mmø) deadwood in moderate -dominant inclusions, major. Structures within SRZ.	Mature	5-15	Low	Consider for Removal	2.4	1.7	Retain. No works within TPZ.
50	*Melaleuca armillaris* (Bracelet Honey Myrtle)	4	2	300	Good	Fair	Small (<25mmø) deadwood in low volumes. Bark inclusion(s), minor.	Mature	5-15	Low	Consider for Removal	3.6	2	Retain. No works within TPZ.

Appendix 4: Plates

Plate 1: Showing Trees 1 & 2

Plate 2: Showing Trees 6-12

Plate 3: Showing Trees 13 & 14

Plate 4: Showing Trees 16 & 17

Plate 5: Showing Trees 19-29

Plate 6: Showing Trees 30-40

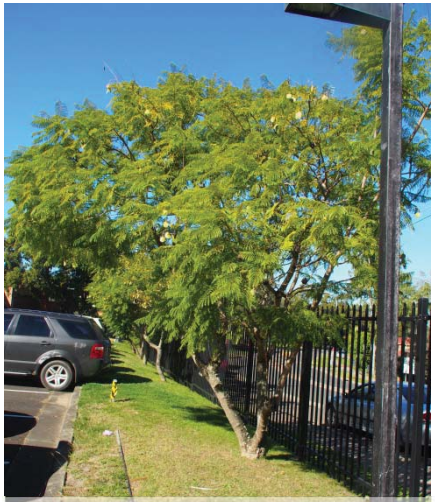


Plate 7: Showing Trees 41-48

Appendix 5: Tree Protection Specification

1.0 Appointment of Project Arborist

A Project Arborist shall be engaged prior the commencement of work on-site and monitor compliance with the protection measures. The Project Arborist shall inspect the tree protection measures and Compliance Certification shall be prepared by the Project Arborist for review by the Principal Certifying Authority prior to the release of the Compliance Certificate.

The Project Arborist shall have a minimum qualification equivalent (using the Australian Qualifications Framework) of NSW TAFE Certificate Level 5 or above in Arboriculture.

1.1 Compliance

Contractors and site workers shall receive a copy of these specifications a minimum of 3 working days prior to commencing work on-site. Contractors and site workers undertaking works within the Tree Protection Zone shall sign the site log confirming they have read and understand these specifications, prior to undertaking works on-site.

The Project Arborist shall undertake regular site inspections and certify that the works are being undertaken in accordance with this specification.

Compliance Documentation shall be prepared by the Project Arborist following each site inspection. The Compliance Documentation shall include documentary evidence of compliance with the tree protection measures and methods as outlined within this Specification. Upon the completion of the works, a final assessment of the trees shall be undertaken by the Project Arborist and future recommended management strategies implemented as required.

1.2 Tree & Vegetation Removal

The trees to be removed shall be removed prior to the establishment of the tree protection measures. Tree removal works shall be undertaken in accordance with the *Workcover Code of Practice for the Amenity Tree Industry* (1998).

Tree and vegetation removal shall not damage the trees to be retained.

1.3 Tree Protection Zone

The trees to be retained shall be protected prior and during construction from activities that may result in an adverse effect on their health or structural condition. The area within the Tree Protection Zone (TPZ) shall exclude the following activities, unless otherwise stated:-

- Modification of existing soil levels, excavations and trenching
- Mechanical removal of vegetation
- Movement of natural rock
- Storage of materials, plant or equipment or erection of site sheds
- Affixing of signage or hoarding to the trees
- Preparation of building materials, refueling or disposal of waste materials and chemicals
- Lighting fires
- Movement of pedestrian or vehicular traffic
- Temporary or permanent location of services, or the works required for their installation
- Any other activities that may cause damage to the tree

NOTE: If access, encroachment or incursion into the TPZ is deemed essential, prior authorisation is required by the Project Arborist.

1.4 Tree Protection Fencing

TPZ fencing shall be located at the perimeter of the TPZ. Where TPZ areas overlap, TPZ fencing may be combined to form a single larger TPZ area. The exact location of the fencing shall be confirmed through consultation between the Head Contractor/Project Manager and the Project Arborist prior to the commencement of works. Fencing may be setback to allow for demolition/construction access and for the installation of pavements only where appropriate ground protection is installed and approved by the Project Arborist.

p. 0404 424 264
f. 02 9012 0924
po box 146 summer hill 2130
info@treeiQ.com.au
abn 62 139 088 832

treeiQ.com.au

As a minimum, the Tree Protection Fence shall consist of 1.8m high wire mesh panels supported by concrete feet. Panels shall be fastened together and supported to prevent sideways movement. The tree shall not be damaged during the installation of the Tree Protection Fencing. Refer to Typical Tree Protection Details (3) **(Appendix 6)**.

1.5 Site Management

Materials, waste storage, and temporary services shall not be located within the TPZ.

1.6 Scaffolding

Where possible, scaffolding shall not be located within the TPZ. Scaffolding shall not be in contact with the tree. As necessary, this shall be achieved by erecting scaffolding around branches. Branches shall be tied back and protected as deemed necessary by the Project Arborist. Refer to Typical Tree Protection Details (5) **(Appendix 6)**.

1.7 Works within the Tree Protection Zones

In some cases works within the TPZ may be authorized by the determining authority. **These works shall be supervised by the Project Arborist**. When undertaking works within the TPZ, care should be taken to avoid damage to the tree's root system, trunks and lower branches.

If roots (>25mmø) are encountered during the demolition, excavation and construction works, these roots must be retained in an undamaged condition and advice sought from the Project Arborist. Adjustment of final levels and design shall remain flexible to enable the retention of roots (>25mmø) where deemed necessary by the Project Arborist.

Drilling/piling machinery shall be of a suitable size to not damage the tree's roots, trunk, branches and crown. No clearance pruning is permitted to allow for machinery access. Machinery shall work in conjunction with an observer to ensure that adequate clearance from trees is maintained at all times.

1.8 Ground Protection

Where deemed necessary by the Project Arborist, machinery movements shall be restricted to areas of existing pavement or from areas of temporary ground protection such as ground mats or steel road plates. Refer to Typical Tree Protection Details (3) **(Appendix 6).**

1.9 Trunk Protection

Where required by the Project Arborist, trunk protection shall be installed. Trunk protection shall be installed by wrapping padding (either carpet underlay or 10mm thick jute geotextile mat) around the trunk and first order branches to a minimum height of 2m. Timber battens (90 x 45mm) spaced at 150mm centres shall be strapped together and placed over the padding. Timber battens must not be fixed to the trees. Refer to Typical Tree Protection Details (3) **(Appendix 6)**. Branch protection shall be installed as deemed necessary by the Project Arborist.

1.10 Structure & Pavement Demolition

Demolition of existing structures/pavement within the TPZ shall be supervised by the Project Arborist. Machinery is to be excluded from the TPZ unless operating from the existing slabs, pavements or areas of ground protection (refer to Section 1.8). Machinery should not contact the tree's roots, trunk, branches and crown.

The existing pavement shall be carefully lifted to minimise damage to the underlying soil profile (or sub-base materials) and to prevent damage to tree roots. Wherever possible, existing sub-base materials shall remain in-situ.

When removing slab sections within TPZ, machinery shall work backwards out of the TPZ to ensure machinery remains on un-demolished sections of slab at all times. Wherever possible, footings or elements below grade shall be retained to minimise disturbance to the tree's roots. Where deemed necessary by the Project Arborist, the structures shall be shattered prior to removal with a hand-operated pneumatic/electric breaker.

If roots (>25mmø) are encountered during the demolition works, these roots must be retained in an undamaged condition and advice sought from the Project Arborist. Where the Project Arborist determines that the tree is using underground elements (i.e footings, pipes, rocks etc.) for support, these elements shall be left in-situ.

p. 0404 424 264
f. 02 9012 0924
po box 146 summer hill 2130
info@treeiQ.com.au
abn 62 139 088 832

treeiQ.com.au

1.11 Pavement/Kerb Installation

Installation of the pavements and sub-base within the TPZ shall be supervised by the Project Arborist. The new surfaces and sub-base materials shall be placed at or above grade to minimise excavations and retain roots (unless prior root mapping results show above sensitive construction to be unnecessary).

If roots (>25mmø) are encountered during the installation of the new sub-base and surfaces, these roots must be retained in an undamaged condition and advice sought from the Project Arborist. Adjustment of final levels and design shall remain flexible to enable the retention of structural roots (>25mmø) where deemed necessary by the Project Arborist.

Where required, new kerbs within the TPZ should be modified to bridge tree roots (>25mmø) unless root pruning is approved and undertaken by the Project Arborist.

1.12 Footings within TPZ

Footing installation within TPZ areas shall be supervised by the Project Arborist. Other than for the isolated piers, all other parts of the structure shall be installed above grade. The locations of piers within the TPZ shall be determined by preliminary hand excavation (refer to Section 1.14). In excavated areas where roots (>25mmø) are present and are to be retained, the location of the pier shall be adjusted. The piers within the TPZ shall be sheathed to prevent encapsulation of roots by concrete.

Drilling/piling machinery shall be excluded from the TPZ unless operating from an area where ground protection has been installed (refer to Section 1.8) or from the existing slabs or pavements. Drilling/piling machinery shall be of a suitable size to not damage the trees' roots, trunk, branches and crown. No clearance pruning is permitted to allow for machinery access. Machinery shall work in conjunction with an observer to ensure that adequate clearance from trees is maintained at all times.

1.13 Site Infrastructure & Services

Site infrastructure such as substations, hydrants and pumps and underground service installation within the TPZ shall be supervised by the Project Arborist. The installation of underground services and site infrastructure shall be located outside of the TPZ. Where this is not possible, they shall be installed using tree sensitive methods (hand/hydrovac) with the services/infrastructure located around/below roots (>25mmø, or as determined by the Project Arborist).

When undertaking hydro-vacuum excavation, the tip of the high pressure lance shall not to be pointed directly at roots at close range to avoid the removal or damage to bark. It is essential that the bark of roots remain intact.

Where approved by the Project Arborist, excavation using compact machinery fitted with a flat bladed bucket is permissible. Unless specified otherwise, excavation using compact machinery shall be undertaken in small increments, guided by a spotter who is to look for and prevent damage to roots (>25mmø).

Boring methods may be used for underground service installation where the installation depth is greater than 1000mm below existing grade. Excavations for starting and receiving pits for boring equipment should be located outside of TPZ areas or located to avoid roots (>25mmø, or as determined by the Project Arborist).

1.14 Excavations, Root Protection & Root Pruning

Excavations and root pruning within the TPZ shall be supervised by the Project Arborist. Excavations within the TPZ shall be avoided wherever possible.

Excavations within the TPZ shall be undertaken by hand or using hydro vacuum excavation methods (or similar approved device) to protect tree roots. If there is any delay between excavation works and backfilling, exposed roots shall be protected from direct sunlight, drying out and extremes of temperature by covering with a 10mm thick jute mat. The mat shall be kept in a damp condition at all times.

Hand excavation and root pruning shall be undertaken along the excavation line prior to the commencement of mechanical excavation. Roots (>25mmø) shall be pruned by the Project Arborist only. Roots (<25mmø) may be pruned by the Principal Contractor. Root pruning shall be undertaken with clean, sharp secateurs or a pruning saw to ensure a smooth wound face, free from tears. Damaged roots shall be pruned behind the damaged tissues with the final cut made to an undamaged part of the root.

No over-excavation, battering or benching shall be undertaken beyond the footprint of any structure unless approved by the Project Arborist.

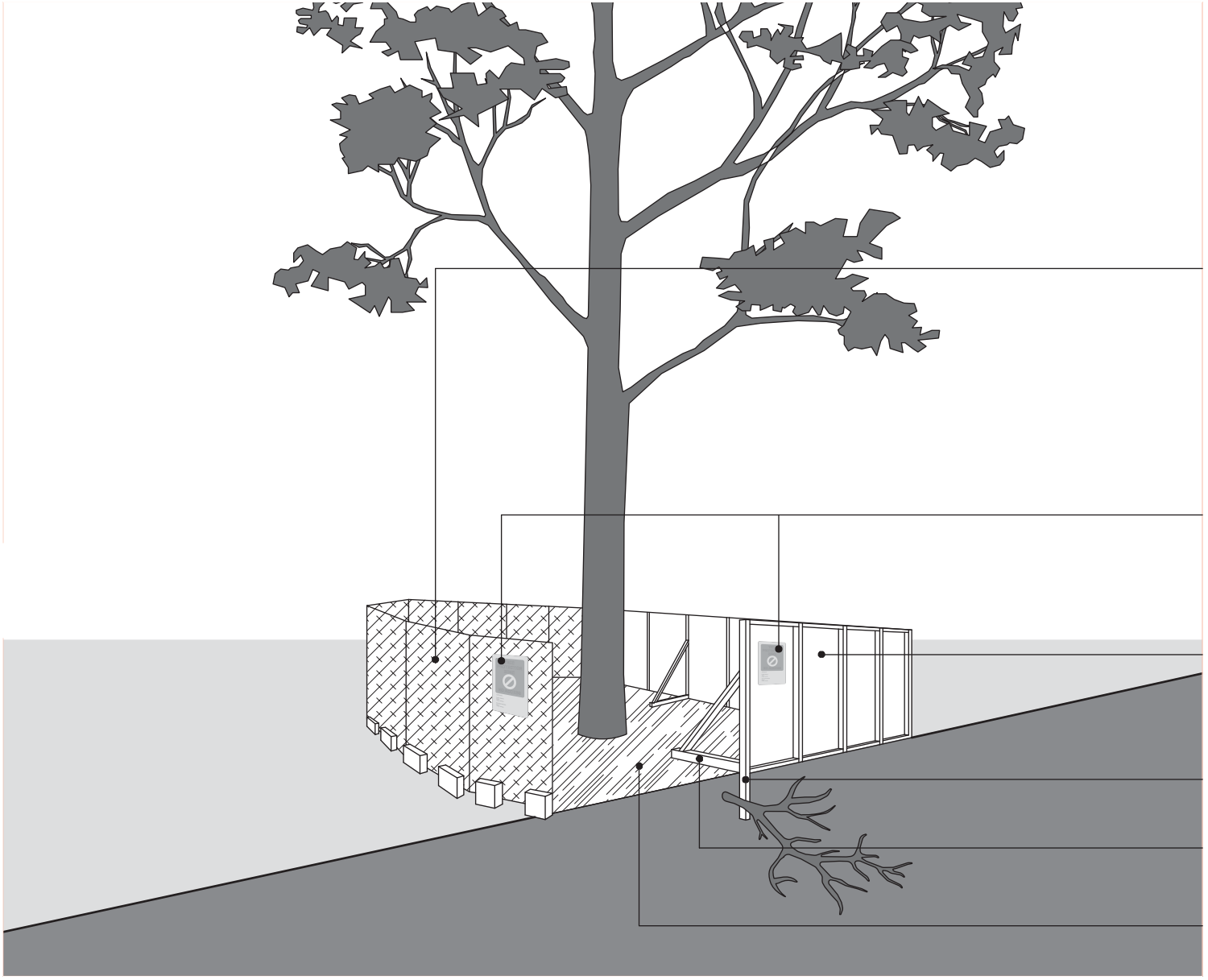
p. 0404 424 264
f. 02 9012 0924
po box 146 summer hill 2130
info@treeiQ.com.au
abn 62 139 088 832

treeiQ.com.au

Appendix 6: Typical Tree Protection Details

p. 0404 424 264
f. 02 9012 0924
po box 146 summer hill 2130
info@treeiQ.com.au
abn 62 139 088 832

treeiQ.com.au



Note:
No excavation, construction activity, grade changes, surface treatment or storage of materials of any kind is permitted within the TPZ.

Option 1 - Fencing
1.8m high chain wire mesh panels with shade cloth attached (if required), held in place with concrete feet.

Tree Protection Zone (TPZ) sign

Option 2 - Fencing
Plywood or wooden panel paling fence. This type of fencing material also prevents building materials or soil entering the TPZ.

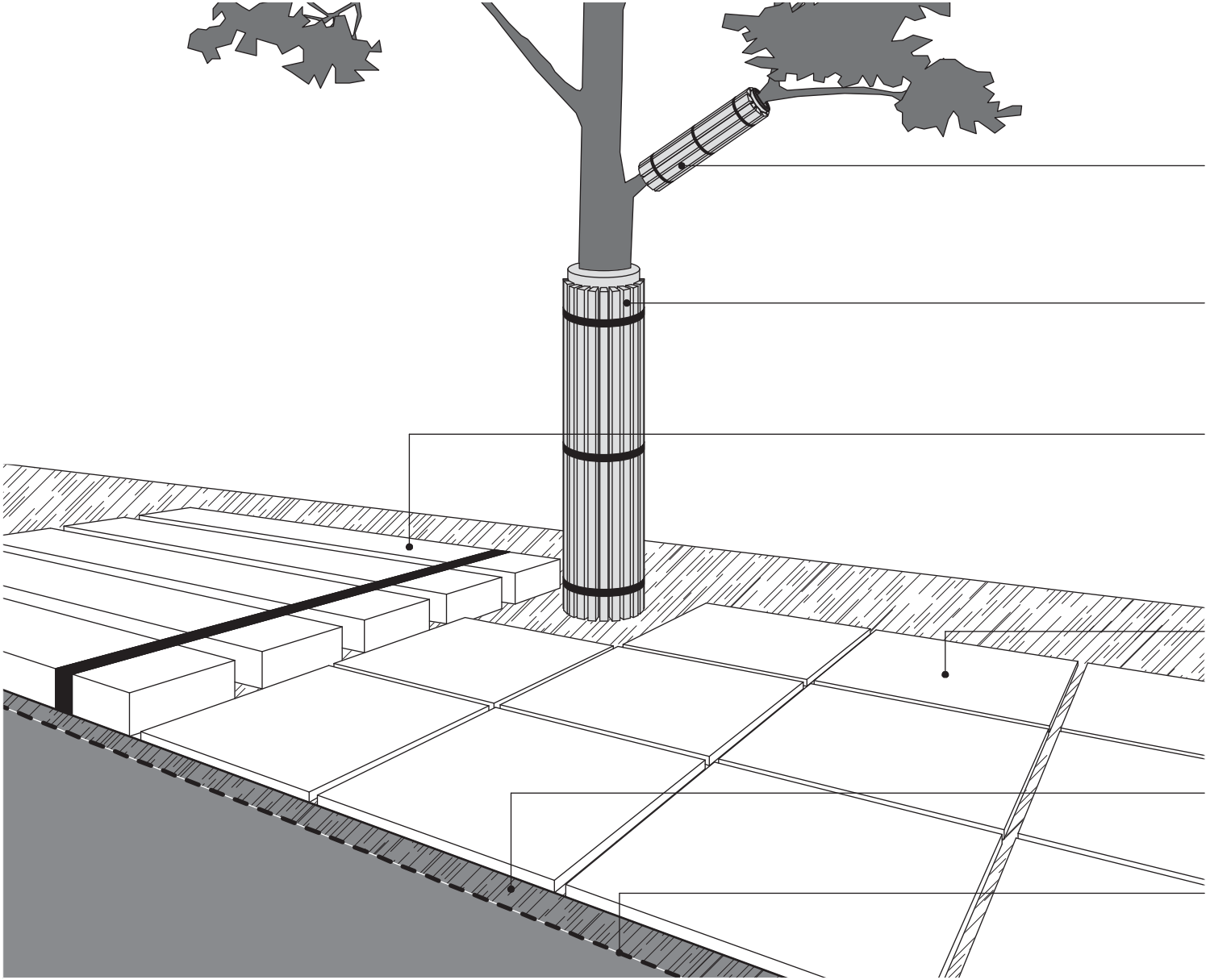
Installation of supports should avoid damaging roots.

Bracing is permissible within the TPZ.

Maximum 100mm and minimum 50mm depth mulch or aggregate layer installed across surface of TPZ.

03 Tree Protection Fencing

Not to Scale



Branch Protection - use boards and padding to prevent damage to bark on branch. Boards are to be strapped, not screwed or nailed to the branch.

Trunk Protection - use boards and padding to prevent damage to bark (minimum 2m). Boards are to be strapped, not screwed or nailed to the trunk.

Ground Protection - use device strapped over mulch or aggregate layer. Ground protection device should be of a suitable thickness to prevent soil compaction and root damage.

Steel plates (or approved equivalent) with or without mulch or aggregate layer below.

Maximum 100mm and minimum 50mm depth mulch or aggregate layer.

Geotextile fabric underneath mulch or aggregate layer.

04 Examples of Branch, Trunk and Ground Protection

Not to Scale

Branches may require pruning to erect scaffolding. Pruning may be subject to local regulations. Flexible branches should be tied back in preference to pruning.

Minimum 1.8m high hoarding. Temporary fencing may be incorporated into scaffolding as either containment screening or as hoarding.

Note:
If excavation is required for installation of support post for fencing, the Project Arborist should assess any pruning of roots greater than 20mm diameter.

Scaffold planks

Boards or plywood to be installed over mulch or aggregate layer for any areas requiring access within the TPZ.

Soleplate over geotextile. No excavation for soleplate within TPZ.

Maximum 100mm and minimum 50mm depth mulch or aggregate layer within TPZ.

Geotextile fabric

05 Indicative Scaffolding within a Tree Protection Zone (TPZ) Not to Scale