Project No: MAR/MET/12 Report No: MAR/MET75W/AIA/B

ARBORICULTURAL IMPACT ASSESSMENT
TREE PROTECTION SPECIFICATION

Marrickville Metro
Section 75W

Prepared for: AMP CAPITAL

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Revision B

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INSTITUTE OF AUSTRALIAN CONSULTING ARBORICULTURISTS
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MANAGING URBAN TREES™

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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 AMP Capital in relation to the Section 75W Application for the Marrickville Metro Shopping Centre Redevelopment. The purpose of this Report is to undertake a Visual Tree Assessment[1] (VTA), determine the impact of the proposed works on the trees, and where appropriate, recommend the use of sensitive construction methods to minimise adverse impacts.

1.1.2 Previous Arboricultural Reports (Rev A - dated 19th February 2010, Rev B - dated 17th May 2010, Rev C - dated 23rd May 2010, Rev B – dated 17th December 2012, Rev A – dated 11th October 2017) for the Marrickville Metro project have been prepared by treeiQ. Tree numbering from the previous reports has been used for consistency.

1.1.3 In preparing this Report, the author is aware of and has taken into account the objectives of the *Marrickville DCP (2.20 Generic Provisions - Tree Management)*, *Marrickville Street Tree Masterplan (2014), Australian Standard 4970 Protection of Trees on Development Sites (2009)*, *Australian Standard 4373 Pruning of Amenity Trees (2007), Australian Standard 2303 Tree Stock for Landscape Use (2015)* and *Safe Work Australia Guide for Managing Risks of Tree Trimming and Removal Work (2016).*

Refer to Methodology **(Appendix 1)**

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

- Demolition Plan (Rev E) – prepared by Hames Sharley, dated 09/04/18
- General Arrangement Plan Ground Floor (Rev E) – prepared by Hames Sharley, dated 10/04/18
- Demolition Plan (Rev 2) - prepared by Cardno, dated 05/04/15 (Edinburgh Rd/Railway Pde)
- Landscape Existing Tree Plan (no. 10, Issue E) – prepared by Site Image, dated 10/04/18
- Landscape Plan (no. T-102, Issue C) – prepared by Site Image, dated 06/04/18
- Landscape Plan (no. T-103, Issue C) – prepared by Site Image, dated 06/04/18
- Landscape Details Softscape (no. T-501, Issue C) – prepared by Site Image, dated 06/04/18
- Landscape Details (no. T-502, Issue C) – prepared by Site Image, dated 06/04/18
- Street Tree Pit Detail (no. T-503, Issue A) – prepared by Site Image, dated 06/04/18
- Landscape Sections (no. T-601, Issue C) – prepared by Site Image, dated 06/04/18

Refer to Plans **(Appendix 2)**

1.2 The Proposal

1.2.1 The proposal is for a Section 75W Application for the Marrickville Metro Shopping Centre Redevelopment. The supplied plans show the proposed works in the vicinity of the existing trees includes the:

- Demolition of existing structures and pavements
- Construction of a new retail building
- Installation of landscape treatments along the Smidmore Street, Edinburgh Road and Murray Street road reserve areas
- Road widening and modification of the existing roundabout on Edinburgh Road/Railway Parade

Refer to Plans **(Appendix 2)**

[1] Mattheck & Breloer (2003)

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2.0 RESULTS

2.1 The Site

2.1.1 The site is a commercial allotment located to the south of the existing Marrickville Metro Shopping Centre, and is bound by Smidmore Street to the north, Murray Street to the east, and Edinburgh Road to the south and west.

2.1.2 An existing warehouse building occupies the eastern area of the site and a smaller single commercial building is positioned in the centre-west. The site is irregular in shape and is generally level.

2.1.3 An additional section of the site is located at the junction of Edinburgh Road/Railway Parade. The area is irregular in shape and rises toward the north at the junction of Bedwin Road.

2.2 The Trees

2.2.1 Forty-three (43) trees (and groups of trees) were assessed using the Visual Tree Assessment[2] (VTA) criteria and notes, and consist of a mix of locally indigenous, Australian native and exotic species.

2.2.2 As required by Clause 2.3.2 of *Australian Standard 4970 (2009) Protection of Trees on Development Sites (AS-4970)*, each tree assessed has been allocated a Retention Value. The Retention Value is based on the tree's Useful Life Expectancy and Landscape Significance with consideration to its health, structural condition and site suitability. The Retention Values do not consider 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

Refer to Tree Assessment Schedule **(Appendix 3)**

2.2.3 A search of the BioNet Atlas of NSW Wildlife Database was undertaken in September 2017. Trees 79 and 83 *Eucalyptus nicholii* (Narrow Leaf Peppermint) were identified at the site and are listed as a *Vulnerable Species* under the NSW *Biodiversity Conservation Act (2016)* and the Commonwealth *Environment Protection and Biodiversity Conservation Act (1999).*[3] Tree 92 *Syzygium paniculatum* (Lillypilly) was identified at the site and is listed as an *Endangered Species* under the NSW *Biodiversity Conservation Act (2016)*.[4] Based on their location within the road reserve, these trees are planted specimens and not a component of a locally indigenous vegetation community.

3.0 ARBORICULTURAL IMPACT ASSESSMENT

3.1 Trees 57-60, 67 & 68

3.1.1 Trees 57-60 and 68 have been identified as *Ficus microcarpa* var. 'Hillii' (Hills Weeping Fig) and *Acacia floribunda* (White Sally Wattle) and are located adjacent to the existing shopping centre.

[2] Mattheck & Breloer (2003)
[3] NSW Office of Environment and Heritage (2011)
[4] NSW Environment & Heritage (2013)

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3.1.2 Consent to remove these trees was provided under Condition D29 of the Masterplan Development Application.

3.2 Trees 62-64

3.2.1 Trees 62-64 have been identified as *Ficus microcarpa* var. *'*Hillii' (Hills Weeping Fig) and are located within the western road reserve of Murray Street, near the junction of Smidmore Street. The trees have been allocated a moderate to high Landscape Significance and a Retention Value of *Consider for Retention*.

3.2.2 The supplied plans show no works are proposed within the Tree Protection Zone (TPZ) areas of Trees 62-64.

3.3 Trees 65 & 66

3.3.1 Trees 65 and 66 have been identified as *Ficus microcarpa* var. 'Hillii' (Hills Weeping Fig) and are located on the northern side of Smidmore Street, adjacent to the existing shopping centre building. The trees have been allocated a high Landscape Significance and a Retention Value of *Consider for Retention*.

3.3.2 The supplied plans show that landscape works including the installation of new pavement surfaces and timber decking are proposed within the TPZ areas of Trees 65 and 66. The extent of works represents *Major Encroachments* as defined by AS-4970. Clause 3.3.4 of AS-4970 notes that design factors and tree sensitive methods can be used to minimise the impact of the encroachment.

3.3.3 Recommendations

The following methods are recommended within the TPZ areas of Trees 65 and 66 to minimise adverse impacts:

- Demolition of existing structures and pavements should be undertaken using tree sensitive methods. Where possible, existing underground structures should be left in-situ.
- Decking, walls and seating (and other structures as required) should be supported on isolated piered footings (with all other parts of the structures positioned above existing ground levels to minimise excavation and root loss). Excavation for the pier holes should be undertaken using tree sensitive methods (hand/hydrovac/airspade etc). Pier hole locations should be flexible to enable the retention of roots (>25mmø, or as deemed necessary by the Project Arborist).
- Pavements (including sub-base materials) should be installed above or at existing grade and utilize existing sub-base layers where possible. Surfaces and sub-base materials should be thinned as required above roots (with appropriate root protection installed). The design and levels of pavements/kerbs should be modified to enable the retention of roots (>25mmø, or as deemed necessary by the Project Arborist).
- Plant installation should be undertaken using hand tools and roots (>25mmø) should be retained and protected. No mechanical cultivation/ripping of soils should be undertaken.

3.4 Trees 69-74

3.4.1 Trees 69-74 have been identified as *Ficus microcarpa* var. 'Hillii' (Hills Weeping Fig) and are located on the northern side of Smidmore Street, near the junction of Edinburgh Road. The trees have been allocated a high Landscape Significance and a Retention Value of *Consider for Retention*.

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3.4.2 The supplied plans show that soft landscape works are proposed within the TPZ areas of Trees 69-74. The extent of works represents *Major Encroachments* as defined by AS-4970. Clause 3.3.4 of AS-4970 notes that tree sensitive methods can be used to minimise the impact of the encroachment.

3.4.3 Recommendations

The following methods are recommended within the TPZ areas of Trees 69-74 to minimise adverse impacts:

- Plant installation should be undertaken using hand tools and roots (>25mmø) should be retained and protected. No mechanical cultivation/ripping of soils should be undertaken.

3.5 Trees 75-78

3.5.1 Trees 75-78 have been identified as *Corymbia citriodora* (Lemon Scented Gum) and are located within the southern road reserve of Smidmore Street, near the junction of Edinburgh Road. Trees 75 and 77 have been allocated a high Landscape Significance and a Retention Value of *Priority for Retention*. Trees 76 and 78 have been allocated a high Landscape Significance and a Retention Value of *Consider for Retention*.

3.5.2 The supplied plans show that demolition works, construction of a new retail building and footpath renewal works are proposed within the TPZ areas of Trees 75-78. The new building footprint is located outside of the trees' Structural Root Zone (SRZ) areas. The extent of works represents *Major Encroachments* as defined by AS-4970. Clause 3.3.4 of the AS-4970 outlines that the presence of existing or past structures or obstacles affecting root growth should be considered when determining the potential impact of the encroachment.

3.5.3 A 300mm (approx.) high retaining wall is located along the north-western site boundary and adjacent to Trees 75-78. Within the site, the area to the rear of the retaining wall comprises of hard-stand. It is assumed the hardstand is supported on a 300mm deep (approx.) layer of compacted fill. It is likely that the spread of roots would have been partially restricted by the footing of the retaining wall and the sub-optimal growing conditions beneath the hardstand area.

3.5.4 Pruning of Trees 75-78 will be required to accommodate the new building. Due to the trees' crown form with limited lateral branching, the removal of a number of large diameter first and second order branches will be required. Trees 76-78 have a reduced crown densities indicating they may be subject to a degree of physiological stress. Particularly for these trees, the extent of pruning works proposed may impact tree vigour and reduce their Useful Life Expectancies. The pruning will also impact the trees' crown form and symmetry although this will be less evident when the trees are viewed from within the street. Refer to Pruning Specification (Section 3.14).

3.5.5 Recommendations

The following methods are recommended within the TPZ areas of Trees 75-78 to minimise adverse impacts to the trees:

- Demolition of existing structures and pavements should be undertaken using tree sensitive methods. Where possible, existing underground structures should be left in-situ. Where tree roots are in contact with, or have grown under existing structures or footings within SRZ areas, the structure/footing should remain in situ and be assessed by the Project Arborist to determine if they are potentially providing support to the trees' root systems.

- The new building should be supported on isolated piered footings (with all other parts of the structures positioned above existing ground levels) unless root investigations show no roots are present within the building footprint. Excavation for the pier holes should be undertaken using tree sensitive methods (hand/hydrovac/airspade etc). No excavation for footings should extend into the trees' SRZ areas.

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- Pavements (including sub-base materials) should be installed above or at existing grade and utilize existing sub-base layers where possible. Surfaces and sub-base materials should be thinned as required above roots (with appropriate root protection installed). The design and levels of pavements/kerbs should be modified to enable the retention of roots (>25mmø, or as deemed necessary by the Project Arborist).
- Plant installation should be undertaken using hand tools and roots (>25mmø) should be retained and protected. No mechanical cultivation/ripping of soils should be undertaken within the TPZ.

3.6 Trees 79, 80, 81, 82 and 84

3.6.1 Tree 79 has been identified as *Eucalyptus nicholii* (Narrow Leaf Peppermint) and Trees 80, 81, 82 and 84 have been identified as *Corymbia citriodora* (Lemon Scented Gum), and are located within the southern road reserve of Smidmore Street. Tree 79 has been allocated a moderate Landscape Significance and a Retention Value of *Consider for Retention*. Tree 80 has been allocated a high Landscape Significance and a Retention Value of *Consider for Retention*. Trees 81, 82 and 84 have been allocated a high Landscape Significance and a Retention Value of *Priority for Retention*.

3.6.2 The supplied plans show that demolition works, construction of a new retail building and footpath renewal works are proposed within the TPZ areas of Trees 79, 80, 81, 82 and 84. The extent of works represents *Major Encroachments* as defined by AS-4970. Clause 3.3.4 of AS-4970 notes that design factors and tree sensitive methods can be used to minimise the impact of the encroachment.

3.6.3 Pruning of Trees 79, 80, 81, 82 and 84 will be required to accommodate the new building. In addition, pruning in the lower eastern section of the crown of Tree 82 will also be required to accommodate the proposed pedestrian bridge connecting the existing building on the northern side of Smidmore Street to the proposed building on the southern side of the street. The proposed pedestrian bridge has been revised during the recent design development and it is now proposed at a greater setback from Tree 82. However, due to its crown form which has limited lateral branching, pruning will still be required to accommodate the pedestrian bridge and new building. Tree 80 has a reduced crown density indicating the tree may be subject to a degree of physiological stress. Particularly for this tree, the extent of pruning works proposed may impact tree vigour and potentially reduce its Useful Life Expectancy. The pruning will also impact the trees' crown form and symmetry although this will be less evident when the trees are viewed from within the street. Refer to Pruning Specification (Section 3.14).

3.6.4 Recommendations

The following methods are recommended within the TPZ areas of Trees 79, 80, 81, 82 and 84 to minimise adverse impacts:

- Demolition of existing structures and pavements should be undertaken using tree sensitive methods. Where possible, existing underground structures should be left in-situ. Where tree roots are in contact with, or have grown under existing kerb sections or footings within SRZ areas, the kerb/footing should remain in situ and be assessed by the Project Arborist to determine if they are potentially providing support to the trees' root systems.
- The colonnade area and pathway adjacent to Trees 79, 80, 81, 82 and 84 should be an elevated structure supported on isolated piered footings (with all other parts of the structure positioned above existing ground levels). Pier hole locations should be flexible to enable the retention of roots (>25mmø, or as deemed necessary by the Project Arborist). The pier diameters should be kept as small as possible to enable positioning between tree roots with minimal root pruning. Either, no fill or a no fines fill (minimum 20mm), should be installed beneath the elevated structure to maintain adequate gaseous exchange through profile. Excavation for the pier holes should be undertaken using tree sensitive methods (hand/hydrovac/airspade etc.).

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- An irrigation system with soil moisture monitors should be installed in the void beneath the elevated pathway to ensure ongoing and adequate water supply to the trees.

- New pavements (including sub-base materials) should be installed above or at existing grade and utilize existing sub-base layers where possible. Surfaces and sub-base materials should be thinned as required above roots (with appropriate root protection installed). The design and levels of pavements/kerbs should be modified to enable the retention of roots (>25mmø, or as deemed necessary by the Project Arborist).

- Plant installation should be undertaken using hand tools and roots (>25mmø) should be retained and protected. No mechanical cultivation/ripping of soils should be undertaken.

3.7 Trees 83

3.7.1 Tree 83 has been identified as *Eucalyptus nicholii* (Narrow Leaf Peppermint) and is located within the southern road reserve of Smidmore Street. The tree has been allocated a moderate Landscape Significance and a Retention Value of *Consider for Retention*.

3.7.2 The supplied plans show Tree 83 is proposed for removal as part of the landscape treatment. Anecdotally, *Eucalyptus nicholii* are a relatively short-lived species in the Sydney area. The assessment of Tree 83 has determined the trees health to be fair based on the volume of epicormic growth and deadwood within their crown, and reduced crown density. Replacement planting using a healthy, advanced-size specimen could replace the loss of amenity from tree removal within a medium timeframe.

3.8 Tree 88

3.8.1 Tree 88 has been identified as *Corymbia citriodora* (Lemon Scented Gum) and is located at the western end of the site, near the junction of Smidmore Street and Edinburgh Road. Tree 88 has been allocated a moderate Landscape Significance and a Retention Value of *Consider for Retention*.

3.8.2 The supplied plans show Tree 88 is proposed for removal to accommodate the new building footprint. Tree 88 is an early-mature specimen growing at the junction of two existing masonry walls. The tree is partially suppressed by the larger adjacent trees. Replacement planting using healthy, advanced-size specimens could replace the loss of amenity within a short to medium timeframe.

3.9 Trees 89, 90, 92, 94, 95, 98 & 100-104

3.9.1 Trees 89, 90, 92, 95, 98 and 100-104 are a mixed species planting including *Acmena smithii* 'Minor' (Lillypilly), *Syzygium paniculatum* (Lillypilly), *Leptospermum petersonii* (Lemon Scented Teatree), *Pistacia chinensis* (Chinese Pistachio) and *Callistemon viminalis* (Weeping Bottlebrush), and are located within the Edinburgh Road road reserve. Tree 94 *Elaeocarpus reticulatus* (Blueberry Ash) has recently died (as indicated by the dead foliage currently present within its crown). These trees have been allocated a low Landscape Significance and a Retention Value of *Consider for Removal.*

3.9.2 The supplied plans show Trees 89, 90, 92, 94, 95, 98 and 100-104 are proposed for removal as part of the landscape treatment. Their removal should have a low visual impact due to their relatively small size and location. Replacement planting using healthy, advanced-size specimens could replace the loss of amenity within a short timeframe.

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3.10 Trees 93 & 97

3.10.1 Trees 93 and 97 have been identified as *Melaleuca quinquenervia* (Broad-leafed Paperbark) and are located within the Edinburgh Road road reserve. The trees have been allocated a moderate Landscape Significance and a Retention Value of *Consider for Retention*.

3.10.2 The supplied plans show Trees 93 and 97 are proposed for removal as part of the landscape treatment. The trees have developed a poor and asymmetrical crown form as a result of repeat line clearance works. A high volume of epicormic growth is also present at the lopping points. Epicormic growth can have an increased failure potential, particularly in storms and strong winds.

3.11 Trees 105-108

3.11.1 Trees 105-108 have been identified as *Livistona australis* (Cabbage Tree Palm) and are located within the Edinburgh Road road reserve. The trees have been allocated a moderate Landscape Significance and a Retention Value of *Consider for Retention*.

3.11.2 The supplied plans show Trees 105-108 are proposed for transplanting to a location specified by Council. *Livistona australis* (Cabbage Tree Palm) are arborescent monocots and are generally tolerant of transplanting, even when of a large mature size. A tree transplanting contractor should be engaged to advise on the rootball preparation, transplanting and aftercare methods required to ensure successful relocation of these trees.

3.12 Trees A & B

3.12.1 Trees A and B have been identified as *Ficus microcarpa* var. 'Hillii' (Hills Weeping Fig) and *Lophostemon confertus* (Brush Box) respectively and are located within a landscape area at the junction of Edinburgh Road, Bedwin Road and Railway Parade. Tree A has been allocated a high Landscape Significance and a Retention Value of *Priority for Retention*. Tree B has been allocated a low Landscape Significance and a Retention Value of *Consider for Removal*.

3.12.2 State Transit Authority (STA) Approval B14 and Local Area Traffic Committee (LATC) Approval B15 requires the roundabout at the intersection of Edinburgh Road and Railway Parade to be upgraded. The supplied plans show that road widening, regrading and kerb installation works are proposed within the TPZ areas of Trees A and B. The extent of works represents a *Major Encroachment* for Tree A and a *Minor Encroachment* for Tree B. Clause 3.3.4 of the AS-4970 outlines that both the presence of existing or past structures or obstacles affecting root growth, and species tolerance to construction impacts should be considered when determining the potential impact of the encroachment.

3.12.3 The presence of the existing kerb and carriageway on Railway Parade is likely to have partially restricted root development on the southern side of Tree A. Furthermore, *Ficus* spp. (Figs) are generally considered tolerant of relatively high degrees of root disturbance/loss as evident from the species suitability for transplanting. Therefore, with the implementation of best practice tree protection measures, a *Major Encroachment* which is outside of the Structural Root Zone (SRZ) and is limited to approximately one quadrant of the TPZ is unlikely to impact the tree's health, structural condition or Useful Life Expectancy.

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3.12.4 Recommendations

The following methods are recommended within the TPZ areas of Tree A to minimise adverse impacts:

- Demolition of existing pavements and kerbs should be undertaken using tree sensitive methods.
- Tree sensitive excavation and root pruning (undertaken by the Project Arborist) should be undertaken prior to the road widening works. Excavation using compact machinery fitted with a flat bladed bucket is permissible when undertaken in small increments and when approved by the Project Arborist. No excavation should be undertaken within the tree's SRZ.
- No over excavation, benching or battering should be undertaken to the rear of the new kerb.

3.13 Trees C-E

3.13.1 Trees C-E have been identified as *Corymbia citriodora* (Lemon Scented Gum) and *Elaeocarpus reticulatus* (Bueberry Ash) and are located within a landscape area at the junction of Edinburgh Road, Bedwin Road and Railway Parade. Tree C has been allocated a moderate Landscape Significance and a Retention Value of *Consider for Retention*. Trees D and E have been allocated a low Landscape Significance and a Retention Value of *Consider for Removal.*

3.13.2 STA Approval B14 and LATC Approval B15 requires the roundabout at the intersection of Edinburgh Road and Railway Parade to be upgraded. The supplied plans show Trees C-E are proposed for removal to accommodate road widening as part of the upgrading works. Their removal should have a low visual impact due to their relatively small size and location. Replacement planting using healthy, advanced-size specimens could replace the loss of amenity within a short timeframe.

3.14 Pruning Specification

3.14.1 The supplied plans show that Trees 75-82 and 84 will need to be pruned to provide clearance to the new building as outlined within Tabled 1-7 below.

3.14.2 Table 1: Tree 75

Branch Orientation	Order of Branch	Branch Diameter	Height Above Grade	Comments	Plate No.
SE	1st	300mm	6.5m	2 x branches	6
SE	Higher order	<50mm		Selectively reduce to suitable small diameter lateral branches	

3.14.3 Table 2: Tree 76

Branch Orientation	Order of Branch	Branch Diameter	Height Above Grade	Comments	Plate No.
SE	1st	275mm	6m		7
SE	1st	250mm	10m		7
SE	Higher order	<50mm		Selectively reduce to suitable small diameter lateral branches	

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3.14.4 Table 3: Tree 77

Branch Orientation	Order of Branch	Branch Diameter	Height Above Grade	Comments	Plate No.
S	2nd	200mm	6m	2 x branches	8
SE	3rd	100mm	7m		8
S	Higher order	<50mm		Selectively reduce to suitable small diameter lateral branches	

3.14.5 Table 4: Tree 78

Branch Orientation	Order of Branch	Branch Diameter	Height Above Grade	Comments	Plate No.
S	1st	250mm	6m		9
S	1st	125mm	8m		9
S	1st	125mm	10m		9
S	Higher order	<50mm		Selectively reduce to suitable small diameter lateral branches	

3.14.6 Table 5: Tree 79

Branch Orientation	Order of Branch	Branch Diameter	Height Above Grade	Comments	Plate No.
S	2nd	100mm	4m		10
SW	2nd	150mm	4.5m		10
S	3rd	100mm	5m	Reduction Prune to vertical branch	10
S	3rd	150mm	5.5m	Reduction Prune to vertical branch	10
S	Higher order	<50mm		Selectively reduce to suitable small diameter lateral branches	

3.14.7 Table 6: Tree 80

Branch Orientation	Order of Branch	Branch Diameter	Height Above Grade	Comments	Plate No.
S	1st	200mm	6.5m		11
SW	3rd	100mm	6.5		11
S	1st	125mm	7m		11
SE	1st	100mm	8.5m		11
S	1st	125mm	9m		11
	Higher order	<50mm		Selectively reduce to suitable small diameter lateral branches	

3.14.8 Table 7: Tree 81

Branch Orientation	Order of Branch	Branch Diameter	Height Above Grade	Comments	Plate No.
SW	2nd	200mm	8m	Selectively reduce to 2nd order lateral branches	12

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SE	3rd	75mm	8.5m		13
S	2nd	75mm	10m		13
SW	1st	125mm	12m		13
S	1st	150mm	12m		13
S	Higher order	<50mm		Selectively reduce to suitable small diameter lateral branches	

3.14.9 Table 8: Tree 82

Branch Orientation	Order of Branch	Branch Diameter	Height Above Grade	Comments	Plate No.
S	2nd	200mm	12m	Prune large diameter central branch from group of 3	14
SW	3rd	100mm	14m		14
S	2nd	200mm	10m	Prune to vertical 1st order branch	14
SW	2nd	150mm	8m		14
E	2nd x3	150-175	8m	Prune for pedestrian bridge	15
S	Higher order	<50mm		Selectively reduce to suitable small diameter lateral branches	

3.14.10 Table 9: Tree 84

Branch Orientation	Order of Branch	Branch Diameter	Height Above Grade	Comments	Plate No.
S	2nd	200mm	9m	Selectively reduce to 2nd order lateral branch	16
S	1st	250mm	10m		16
	Higher order	>75mm		Selectively reduce to suitable small diameter lateral branches	

3.14.11 The assessment of the pruning requirements detailed in this Report was estimated from ground level only. 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).

3.14.12 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.

3.15 Replacement Planting

3.15.1 The supplied plans show replacement street trees are proposed along Edinburgh Road and Murray Street. The trees should be supplied as advanced-size stock to help offset the loss of amenity resultant from the tree removals.

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3.15.2 Replacement planting should be supplied/installed in accordance with the *Marrickville Street Tree Masterplan (2014)* and *Australian Standard 2303 (2015) Tree Stock for Landscape Use.*

4 CONCLUSION

4.1 Forty-three (43) trees were assessed in preparation of this Report, and consist of a mix of locally indigenous, Australian native and exotic species.

4.2 The proposal is for a Section 75W Application for the Marrickville Metro Shopping Centre Redevelopment. The supplied plans show the proposed works in the vicinity of the existing trees include the demolition of existing structures and pavements, construction of a new retail building and installation of landscape treatments along the road reserve areas. In addition, STA Approval B14 and LATC Approval B15 requires road widening and modification of the existing roundabout on Edinburgh Road/Railway Parade

4.3 The supplied plans show that seventeen (17) trees (Trees 83, 88-90, 92, 93, 95, 97, 98 and 100-104, C, D & E) are to be removed to accommodate the proposed development. Consent to remove Tree 57-60, 67, and 68 was provided under Condition D29 of the Masterplan Development Application.

4.4 The supplied plans show twenty-two (22) trees (Trees 62-66, 69-82, 84, A & B) are to be retained as part of the proposed development. Tree sensitive design, demolition and construction methods should be used to minimise adverse impacts (refer to Section 3.0). The trees should be protected in accordance with the Tree Protection Specification **(Appendix 5)**.

4.5 The supplied plans show that four (4) trees (Trees 105-108) are proposed for transplanting to a location specified by Council. *Livistona australis* (Cabbage Tree Palm) are arborescent monocots and are generally tolerant of transplanting, even when of a large mature size. A tree transplanting contractor should be engaged to advise on the rootball preparation, transplanting and aftercare methods required to ensure successful relocation of these trees.

4.6 The supplied plans show that Trees 75-82 and 84 will need to be pruned to provide clearance to the new building. Trees 76-78 and 80 have a reduced crown densities indicating the trees may be subject to a degree of physiological stress. Particularly for these trees, the extent of pruning works proposed may impact tree vigour and potentially reduce their Useful Life Expectancies. The pruning will also impact the trees' crown form and symmetry although this will be less evident when the trees are viewed from within the street. 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.

4.7 The supplied plans show replacement street trees are to be installed along Edinburgh Road and Murray Street. The trees should be supplied as advanced-size stock to help offset the loss of amenity resultant from the tree removals. Replacement planting should be supplied/installed in accordance with the *Marrickville Street Tree Masterplan (2014)* and *Australian Standard 2303 (2015) Tree Stock for Landscape Use.*

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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.

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

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7.0 APPENDICES

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Appendix 1: Methodology

1.1 **Site Inspection**: This report was determined as a result of a comprehensive site during September 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.*[5] The inspection was limited to a visual examination of the subject tree(s) from ground level only. No internal diagnostic 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.

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
(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

[5] Mattheck & Breloer (2003)

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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

ULE		Landscape Significance			
	Very High	High	Moderate	Low	Insignificant
40 years +	Priority for Retention	Priority for Retention		Consider for Removal	Priority for Removal
15-40 years		Priority for Retention	Consider for Retention		
5-15 years		Consider for Retention			
Less than 5 years	Consider for Removal	Priority for Removal			

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

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Appendix 2: Plans

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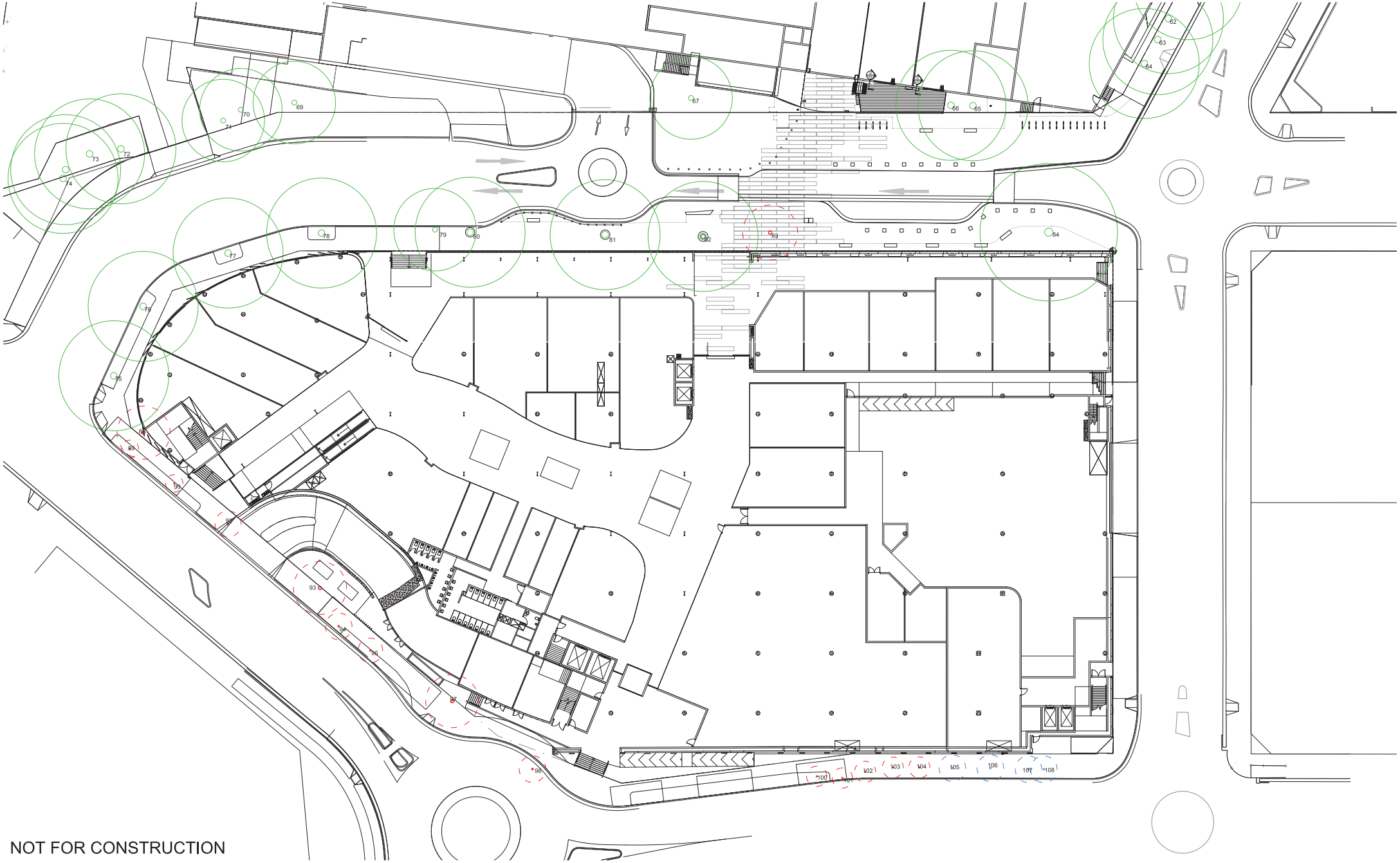


NOT FOR CONSTRUCTION

The contractor shall check and verify all work on site (including work by others) before commencing the landscape Installation. Any discrepancies are to be reported to the Project Manager or Landscape Architect prior to commencing work. Do not scale this drawing. Any required dimensions not shown shall be referred to the Landscape Architect for confirmation.

Issue	Revision Description	Drawn	Check	Date
E	Updated T79	JD	NM	10.04.2018
D	Revised for Comments	JD	NM	27.02.2018
C	CMI Coordination	JW	NM	14.11.2017
B	Architectural Coordination	JD	NM	27.09.2017
A	For Comment	JD	NM	22.09.2017

LEGEND

- Existing Tree to be Retained
- Existing tree to be Removed
- Existing tree to be transplanted

Note:
To be read In conjunction with Tree IQ arboricultural report

Key Plan:

SITE IMAGE
Landscape Architects
Level 1, 3-5 Baptist Street
Redfern NSW 2016
Australia
Tel: (61 2) 8332 5600
Fax: (61 2) 9698 2877
www.siteimage.com.au

Client:
AMP CAPITAL

Project:
Marrickville Metro Shopping Centre Redevelopment
34 Victoria Rd, Marrickville NSW

Drawing Name:
Landscape Existing Tree Plan

SECTION 75W

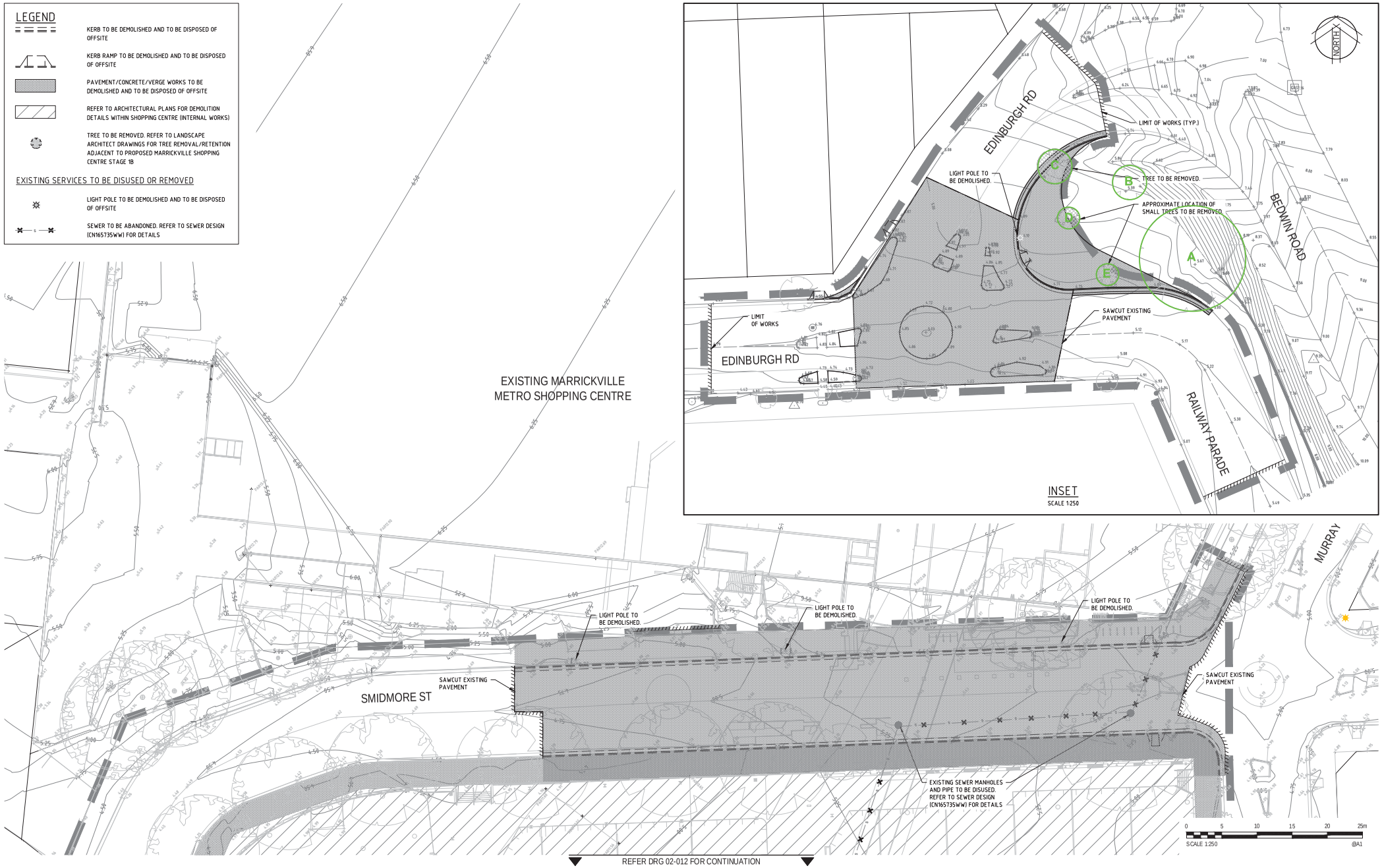
Scale: 1:250 @ A1
0 1 2 4 6 10m

Job Number: SS16-3593

Drawing Number: 010

Issue: E

A1



Rev.	Date	Description	Des.	Verif.	Appd.
2	5/04/2018	UPDATED SMALL TREE LOCATIONS ON RAILWAY TERRACE	AL		GN
1	29/03/2018	ISSUED FOR 85% TENDER	AL	CV	GN

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		Date
Drawn	AR	29/03/2018
Checked	AL	29/03/2018
Designed	AL	29/03/2018
Verified	CV	29/03/2018
Approved	GN	29/03/2018

Client: AMP CAPITAL INVESTORS
Project: MARRICKVILLE METRO SHOPPING CENTRE STAGE 1B
13 - 55 EDINBURGH ROAD, MARRICKVILLE
Title: DEMOLITION PLAN
SHEET 1 OF 2

Status: FOR TENDER ONLY
NOT TO BE USED FOR CONSTRUCTION PURPOSES

DATUM	PROJECT NO.	Scale	Size
AHD	80216045	1:250	A1

Drawing Number: CV-1BPD-02-011
Revision: 2

DATE PLOTTED: 5 April 2018 10:08 AM BY: ADRIAN LU
XREFs: XR-80216045-C1-1B-SURV 2D, XR-80216045-C1-1B-ARCH DGN, XR-80216045-C1-1B-DES(CN, XR-80216045-C1-1B-SHEET LAYOUT, X210026-CI-Demolition, X210026-CI-Existing Survey, XR-80216045-C1-1B-EXISTING CONTS, XR-80216045-GN-LOGO, X210026-CI-Nearmap Existing Survey, XR-80216045-C1-1B-UTILITIES, XR-80216045-CI-1B-BDRY
CAD File: \\cardno.com\global\AUNSW\Directory\Structure\Projects\802\PY16045_Marrickville Metro Stage 1a\Drawings - 1b\Build\CV-1BPD-02-011-012.dwg

Appendix 3: Tree Assessment Schedule

Tree No.	Species	DBH (mm)	Height (m)	Radial Crown Spread (m)	Health Rating	Structural Condition Rating	Comments	ULE (years)	L/Significance	Retention Value	Radial TPZ (m)	Radial SRZ (m)	Implication
62	*Ficus microcarpa* var. 'Hillii' (Hills Weeping Fig)	550	13	5	Good	Poor	Wound/s with advanced stages of decay. Branch inclusions. Trunk cavity, minor.	5-15	Moderate	Consider for Retention	6.6	2.6	Retain. No works within TPZ.
63	*Ficus microcarpa* var. 'Hillii' (Hills Weeping Fig)	850	17	10	Good	Fair	Wound/s with early stages of decay. Branch inclusions.	5-15	High	Consider for Retention	10.2	3.1	Retain. No works within TPZ.
64	*Ficus microcarpa* var. 'Hillii' (Hills Weeping Fig)	950	17	9	Good	Fair	Wound/s with early stages of decay. Branch inclusions. Failed lower branch, presumed resulting from high sided vehicle impact.	5-15	High	Consider for Retention	11.4	3.3	Retain. No works within TPZ.
65	*Ficus microcarpa* var. 'Hillii' (Hills Weeping Fig)	350 300 600	18	9	Good	Fair	Structures with SRZ. Branch inclusion/s. Wound/s with advanced stages of decay. Branch contact with steel cage.	5-15	High	Consider for Retention	9.1	3	Retain. Major encroachment, landscape works.
66	*Ficus microcarpa* var. 'Hillii' (Hills Weeping Fig)	400 450 300	18	12	Good	Fair	Co-dominant inclusion. Wound, advanced stages of decay.	5-15	High	Consider for Retention	8.2	2.9	Retain. Major encroachment, landscape works.
69	*Ficus microcarpa* var. 'Hillii' (Hills Weeping Fig)	1000	18	9	Good	Good	Wound/s with early stages of decay. Low volumes of small diameter (<25mm) epicormic growth.	5-15	High	Consider for Retention	12	3.4	Retain. Major encroachment, landscape works.
70	*Ficus microcarpa* var. 'Hillii' (Hills Weeping Fig)	800 600	19	8	Good	Fair	Codominant inclusion. Wound/s with early stages of decay. Low volumes of small diameter (<25mm) epicormic growth. Mechanical damage to exposed surface roots.	5-15	High	Consider for Retention	12	3.4	Retain. Major encroachment, landscape works.
71	*Ficus microcarpa* var. 'Hillii' (Hills Weeping Fig)	600 450	19	10	Good	Fair	Codominant inclusion. Wound/s with early stages of decay. Low volumes of small diameter (<25mm) epicormic growth.	5-15	High	Consider for Retention	9	3	Retain. Major encroachment, landscape works.

Tree No.	Species	DBH (mm)	Height (m)	Radial Crown Spread (m)	Health Rating	Structural Condition Rating	Comments	ULE (years)	L/Significance	Retention Value	Radial TPZ (m)	Radial SRZ (m)	Implication
72	*Ficus microcarpa* var. 'Hillii' (Hills Weeping Fig)	400 300x2 250x2 150	18	8	Good	Good	Wound/s with early stages of decay. Low volumes of small diameter (<25mm) epicormic growth.	5-15	High	Consider for Retention	8.4	2.9	Retain. Major encroachment, landscape works.
73	*Ficus microcarpa* var. 'Hillii' (Hills Weeping Fig)	600 450 400 200	18	6	Good	Fair	Codominant inclusion. Wound/s with early stages of decay. Low volumes of small diameter (<25mm) epicormic growth.	5-15	High	Consider for Retention	9.6	3.1	Retain. Major encroachment, landscape works.
74	*Ficus microcarpa* var. 'Hillii' (Hills Weeping Fig)	1000 900x2 750	18	11	Good	Fair	Codominant inclusion. Wound/s with early stages of decay. Low volumes of small diameter (<25mm) epicormic growth.	5-15	High	Consider for Retention	15	4.3	Retain. Major encroachment, landscape works.
75	*Corymbia citriodora* (Lemon Scented Gum)	650	16	9	Good	Good	Low volumes of medium (25-75mm) diameter deadwood. Girdled roots. Existing structures within SRZ.	15-40	High	Priority for Retention	7.8	2.8	Retain. Major encroachment, building & landscape works.
76	*Corymbia citriodora* (Lemon Scented Gum)	650	16	9	Fair	Good	Crown density 50-75%. Existing structures within SRZ.	5-15	High	Consider for Retention	7.8	2.8	Retain. Major encroachment, building & landscape works.
77	*Corymbia citriodora* (Lemon Scented Gum)	550	15	7	Fair	Good	Crown density 50-75%. Low volumes of large (75mm+) diameter deadwood. Existing structures within SRZ.	15-40	High	Priority for Retention	6.6	2.6	Retain. Major encroachment, building & landscape works.

Tree No.	Species	DBH (mm)	Height (m)	Radial Crown Spread (m)	Health Rating	Structural Condition Rating	Comments	ULE (years)	L/Significance	Retention Value	Radial TPZ (m)	Radial SRZ (m)	Implication
78	*Corymbia citriodora* (Lemon Scented Gum)	650	17	8	Fair	Good	Hanger. Crown density 50-75%. Existing structures within SRZ.	5-15	High	Consider for Retention	7.8	2.8	Retain. Major encroachment, building & landscape works.
79	*Eucalyptus nicholii* (Narrow Leaf Peppermint)	400 400	9	7	Fair	Fair	Crown density 75-95%. Low volumes of medium diameter (25-75mm) deadwood. Low volumes of small diameter (<25mm) epicormic growth. Wound/s, various stages of decay. Existing structures within SRZ. Impact damage to branches.	5-15	Moderate	Consider for Retention	6.8	2.7	Retain. Major encroachment, building & landscape works.
80	*Corymbia citriodora* (Lemon Scented Gum)	550	15	7	Fair	Good	Low volumes of medium (25-75mm) diameter deadwood. Crown density 50-75%. Girdled roots. Existing structures within SRZ. Mechanical damage to exposed surface roots.	5-15	High	Consider for Retention	6.6	2.6	Retain. Major encroachment, building & landscape works.
81	*Corymbia citriodora* (Lemon Scented Gum)	650	20	12	Fair	Good	Crown density 75-95%. Low volumes of medium (25-75mm) diameter deadwood. Existing structures within SRZ.	15-40	High	Priority for Retention	7.8	2.8	Retain. Major encroachment, building & landscape works.
82	*Corymbia citriodora* (Lemon Scented Gum)	1100	20	8	Fair	Good	Crown density 75-95%. Low volumes of medium (25-75mm) diameter deadwood. Structures within SRZ.	15-40	High	Priority for Retention	13.2	3.5	Retain. Major encroachment, building &

Tree No.	Species	DBH (mm)	Height (m)	Radial Crown Spread (m)	Health Rating	Structural Condition Rating	Comments	ULE (years)	L/Significance	Retention Value	Radial TPZ (m)	Radial SRZ (m)	Implication
													landscape works.
83	*Eucalyptus nicholii* (Narrow Leaf Peppermint)	300 450	9	8	Fair	Good	Crown density 25-50%. Moderate volumes of small diameter (<25mm) deadwood. Moderate volumes of small diameter (<25mm) epicormic growth. Partially suppressed. Existing structures within SRZ.	5-15	Moderate	Consider for Retention	6.6	2.6	Remove. Landscape treatment.
84	*Corymbia citriodora* (Lemon Scented Gum)	850	20	12	Good	Good	Low volumes of medium diameter (25-50mm) deadwood. Crown density 75-95%. Structures within SRZ.	15-40	High	Priority for Retention	10.2	3.1	Retain. Major encroachment, building & landscape works.
88	*Corymbia citriodora* (Lemon Scented Gum)	300	8	7	Good	Good	Retaining wall within SRZ. Partially suppressed. Asymmetrical crown form.	5-15	Moderate	Consider for Retention	3.6	2	Remove. Building footprint.
89	*Acmena smithii* 'Minor' (Lillypilly)	75	3	2	Good	Fair	Under powerlines. Whipper snipper damage. Scale and sooty mould.	5-15	Low	Consider for Removal	2	1.5	Remove. Landscape treatment.
90	*Acmena smithii* 'Minor' (Lillypilly)	75	3	2	Fair	Good	Under powerlines. Crown density 50-75%.	5-15	Low	Consider for Removal	2	1.5	Remove. Landscape treatment.

Tree No.	Species	DBH (mm)	Height (m)	Radial Crown Spread (m)	Health Rating	Structural Condition Rating	Comments	ULE (years)	L/Significance	Retention Value	Radial TPZ (m)	Radial SRZ (m)	Implication
92	*Syzygium paniculatum* (Lillypilly)	100	3	3	Good	Fair	Pruned for powerline clearance.	5-15	Low	Consider for Removal	2	1.5	Remove. Landscape treatment.
93	*Melaleuca quinquenervia* (Broad-leafed Paperbark)	750	8	7	Good	Poor	Pruned for powerline clearance. High volumes of small diameter (<25mm) epicormic growth. Wound/s, no visible signs of decay. Poor form.	5-15	Moderate	Consider for Retention	9	3	Remove. Landscape treatment.
94	*Elaeocarpus reticulatus* (Blueberry Ash)						Dead						Remove. Landscape treatment.
95	*Leptospermum petersonii* (Lemon Scented Teatree)	200	3	2	Good	Fair	Co-dominant stem removed.	5-15	Low	Consider for Removal	2.4	1.7	Remove. Landscape treatment.
97	*Melaleuca quinquenervia* (Broad-leafed Paperbark)	1100	14	7	Good	Poor	Pruned for powerline clearance. High volumes of small diameter (<25mm) epicormic growth. Wound/s, no visible signs of decay. Poor form. Path/kerb displacement.	5-15	Moderate	Consider for Retention	13.2	3.5	Remove. Landscape treatment.
98	*Acmena smithii* 'Minor' (Lillypilly)	200 200	5	3	Good	Poor	Wound/s with early stages of decay. Co-dominant inclusion. Recently crown lifted.	5-15	Low	Consider for Removal	3.5	2	Remove. Landscape treatment.
100	*Pistacia chinensis* (Chinese Pistacio)	100	4	7	Good	Good	Not in full leaf at time of assessment. Low volumes of small diameter (<25mm) deadwood. Recently crown lifted.	15-40	Low	Consider for Removal	2	1.5	Remove. Landscape treatment.
101	*Callistemon viminalis* (Weeping Bottlebrush)	150	4	2	Good	Good	Previous branch failure. Mechanical damage to roots. Moderate volumes of small diameter (<25mm) deadwood. Recently crown lifted.	5-15	Low	Consider for Removal	2	1.5	Remove. Landscape treatment.

Tree No.	Species	DBH (mm)	Height (m)	Radial Crown Spread (m)	Health Rating	Structural Condition Rating	Comments	ULE (years)	L/Significance	Retention Value	Radial TPZ (m)	Radial SRZ (m)	Implication
102	*Acmena smithii* 'Minor' (Lillypilly)	200	4	2	Good	Good	Girdling roots. Recently crown lifted.	15-40	Low	Consider for Removal	2.4	1.7	Remove. Landscape treatment.
103	*Callistemon viminalis* (Weeping Bottlebrush)	100 100	4	2	Good	Fair	Moderate volumes of small diameter (<25mm) deadwood. Mechanical damage to base.	15-40	Low	Consider for Removal	2	1.5	Remove. Landscape treatment.
104	*Acmena smithii* 'Minor' (Lillypilly)	150	4	2	Good	Good	Recently crown lifted.	15-40	Low	Consider for Removal	2	1.5	Remove. Landscape treatment.
105	*Livistona australis* (Cabbage Tree Palm)	400	7	3	Good	Good		15-40	Moderate	Consider for Retention	4	n/a	Transplant.
106	*Livistona australis* (Cabbage Tree Palm)	400	7	3	Good	Good		15-40	Moderate	Consider for Retention	4	n/a	Transplant.
107	*Livistona australis* (Cabbage Tree Palm)	400	7	3	Good	Good		15-40	Moderate	Consider for Retention	4	n/a	Transplant.

Tree No.	Species	DBH (mm)	Height (m)	Radial Crown Spread (m)	Health Rating	Structural Condition Rating	Comments	ULE (years)	L/Significance	Retention Value	Radial TPZ (m)	Radial SRZ (m)	Implication
108	*Livistona australis* (Cabbage Tree Palm)	400	8	3	Good	Good		15-40	Moderate	Consider for Retention	4	n/a	Transplant.
A	*Ficus microcarpa* var. 'Hillii' (Hills Weeping Fig)	1500	25	20	Good	Good	Branch inclusion/s. Exposed surface roots.	15-40	High	Priority for Retention	15	4	Retain. Major encroachment, Railway Pde civil works.
B	*Lophostemon confertus* (Brush Box)	600	10	8	Fair	Poor	Codominant inclusion/s, major. Partially supressed.	5-15	Low	Consider for Removal	7.2	2.7	Retain. Major encroachment, Railway Pde civil works.
C	*Corymbia citriodora* (Lemon Scented Gum)	500	12	6	Good	Good	Kerb within SRZ. Moderate volumes of medium diameter (25-75mm) deadwood.	5-15	Moderate	Consider for Retention	6	2.5	Remove. Railway Parade Civil Works.
D	*Elaeocarpus reticulatus* (Bueberry Ash)	150	5	2	Good	Good	Heavily suppressed.	5-15	Low	Consider for Removal	2	1.5	Remove. Railway Parade Civil Works.
E	*Elaeocarpus reticulatus* (Bueberry Ash)	150	4	2	Good	Good	Heavily suppressed.	5-15	Low	Consider for Removal	2	1.5	Remove. Railway Parade Civil Works.

Appendix 4: Plates

Plate 1: Showing Trees 65 & 66

Plate 2: Showing Trees 76-78

Plate 3: Showing Trees 80-84

Plate 4: Showing Trees 65 & 66

Plate 5: Showing Trees 100-108

Plate 6: Showing pruning Tree 75

Plate 7: Showing pruning Tree 76

Plate 8: Showing pruning Tree 77

Plate 9: Showing pruning Tree 78

Plate 10: Showing pruning Tree 79

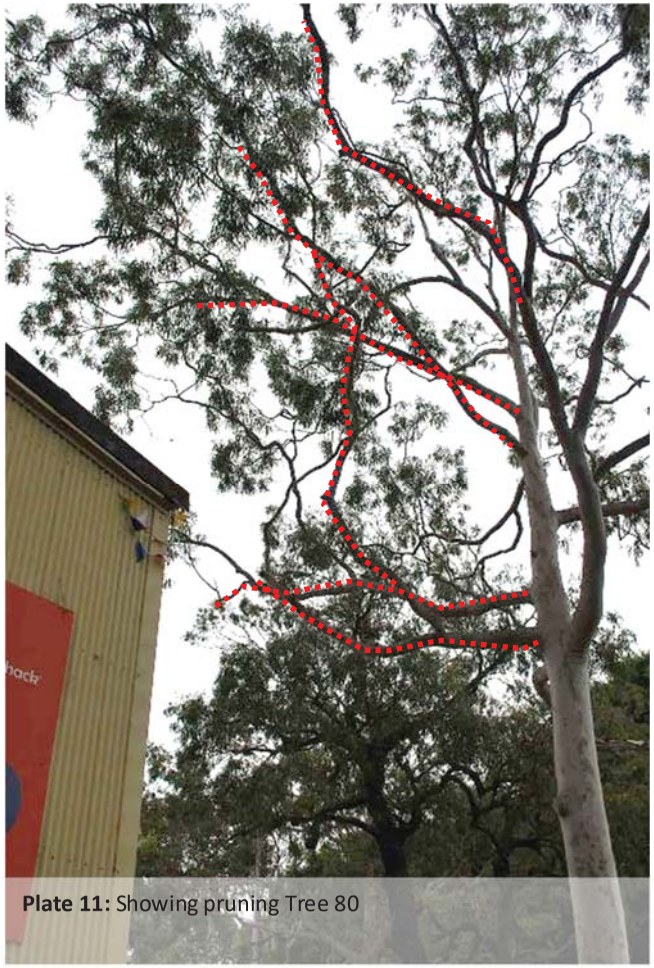

Plate 11: Showing pruning Tree 80

Plate 12: Showing pruning Tree 81

Plate 13: Showing pruning Tree 81

Plate 14: Showing pruning Tree 82

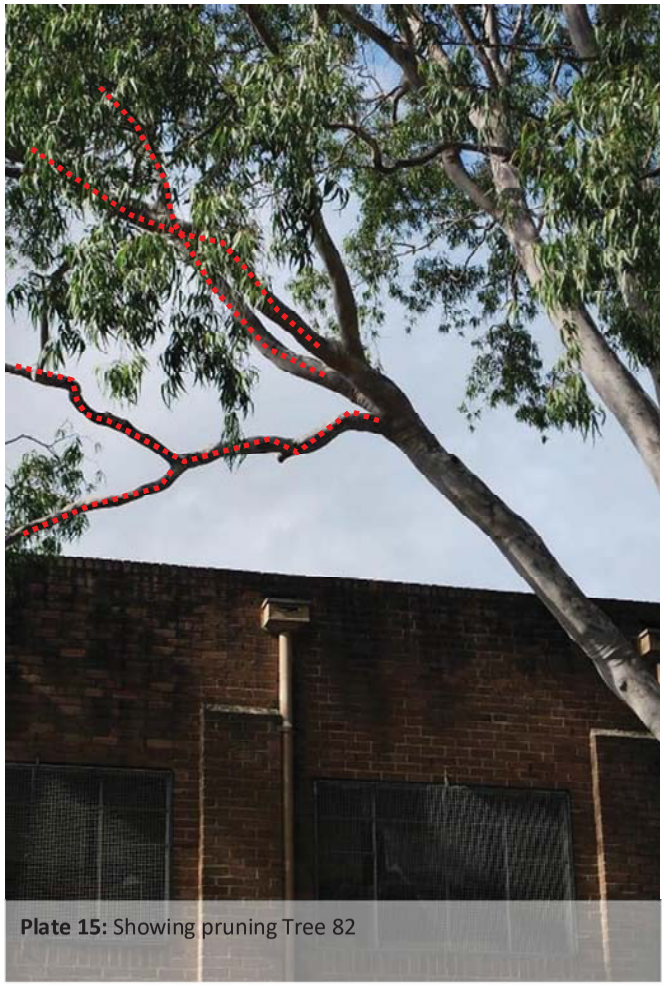

Plate 15: Showing pruning Tree 82

Plate 16: Showing pruning Tree 84

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 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 Site Arborist.

1.3 Site Management

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

1.4 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)**.

1.5 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.

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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.

1.6 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).**

1.7 Trunk Protection

Trunk protection shall be installed onto Trees 65-67, 75-78, 80, 81 and 84. 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.

1.8 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 1.6). Machinery should not contact the tree's roots, trunk, branches and crown.

The existing pavement shall be carefully lifted by hand to minimise damage to the existing sub-base and to prevent damage to tree roots. Wherever possible, the existing sub-base material 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. Exposed roots shall be protected from direct sunlight, drying out and extremes of temperature by covering with a 10mm thick jute geotextile fabric. The geotextile fabric shall be kept in a damp condition at all times. 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.

1.9 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.

New sub-base material shall be a 20mm no-fines road base (Benedict Sand & Gravel - Product Code 20NF/RB or similar approved material). Recycled concrete aggregates shall not be used to avoid raising soil pH levels.

If required, bedding sand shall be a washed river sand (recycled crushed paving blends shall not be used). The bedding sand shall be consolidated with a pedestrian-operated plate compactor only. If possible, the pavement material shall be permeable.

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.

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1.10 Underground Services

Underground service installation within the TPZ shall be supervised by the Project Arborist.

The installation of underground services shall be located outside of the TPZ. Where this is not possible, they shall be installed using either hydrovac or hand excavation methods with the services installed around/below roots (>25mmø, or as determined by the Project Arborist).

Alternatively, boring methods may be used for underground service installation where the installation depth is greater than 800mm below existing grade. Excavations for starting and receiving pits for boring equipment shall be located outside of the TPZ or located to avoid roots (>25mmø, or as determined by the Project Arborist).

1.11 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.

No over-excavation, battering or benching shall be undertaken beyond the footprint of any structure unless approved by the Project Arborist. Hand excavation and root pruning shall be undertaken along the excavation line prior to the commencement of mechanical excavation to prevent tearing and shattering damage to the roots from excavation equipment.

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.

1.12 Footings within the 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.

Drilling/piling machinery shall be excluded from the TPZ unless operating from an area where ground protection has been installed (refer to Section 1.6) 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 Plant Installation

Plant installation within the TPZ shall be undertaken using hand tools and roots (>25mmø) shall be protected. No mechanical cultivation/ripping of soils shall be undertaken within the TPZ.

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Appendix 6: Typical Tree Protection Details

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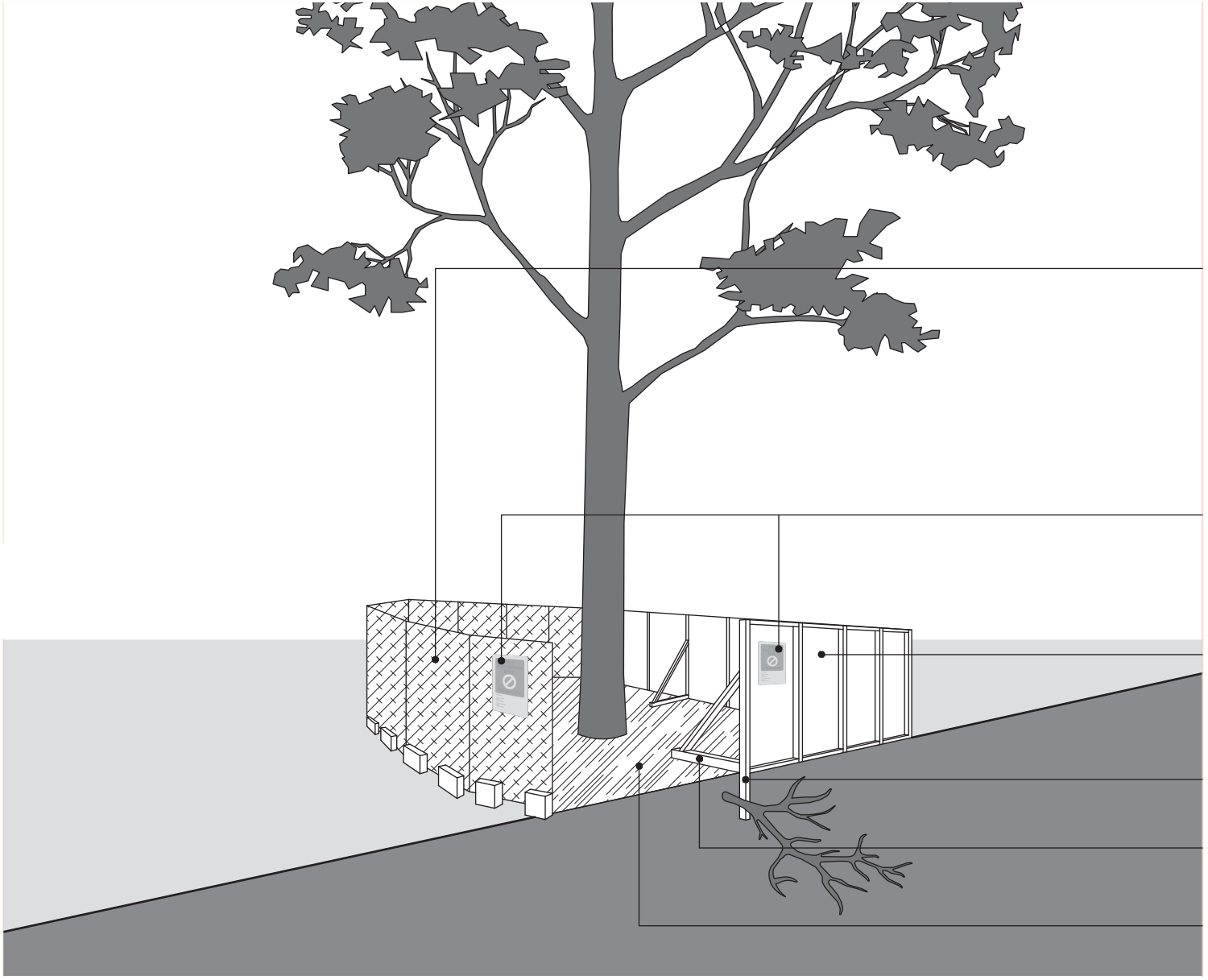


Note:
No excavation, construction activity, grade changes, surface treatment or storage of materials of any kind is permitted within the TPZ.

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.

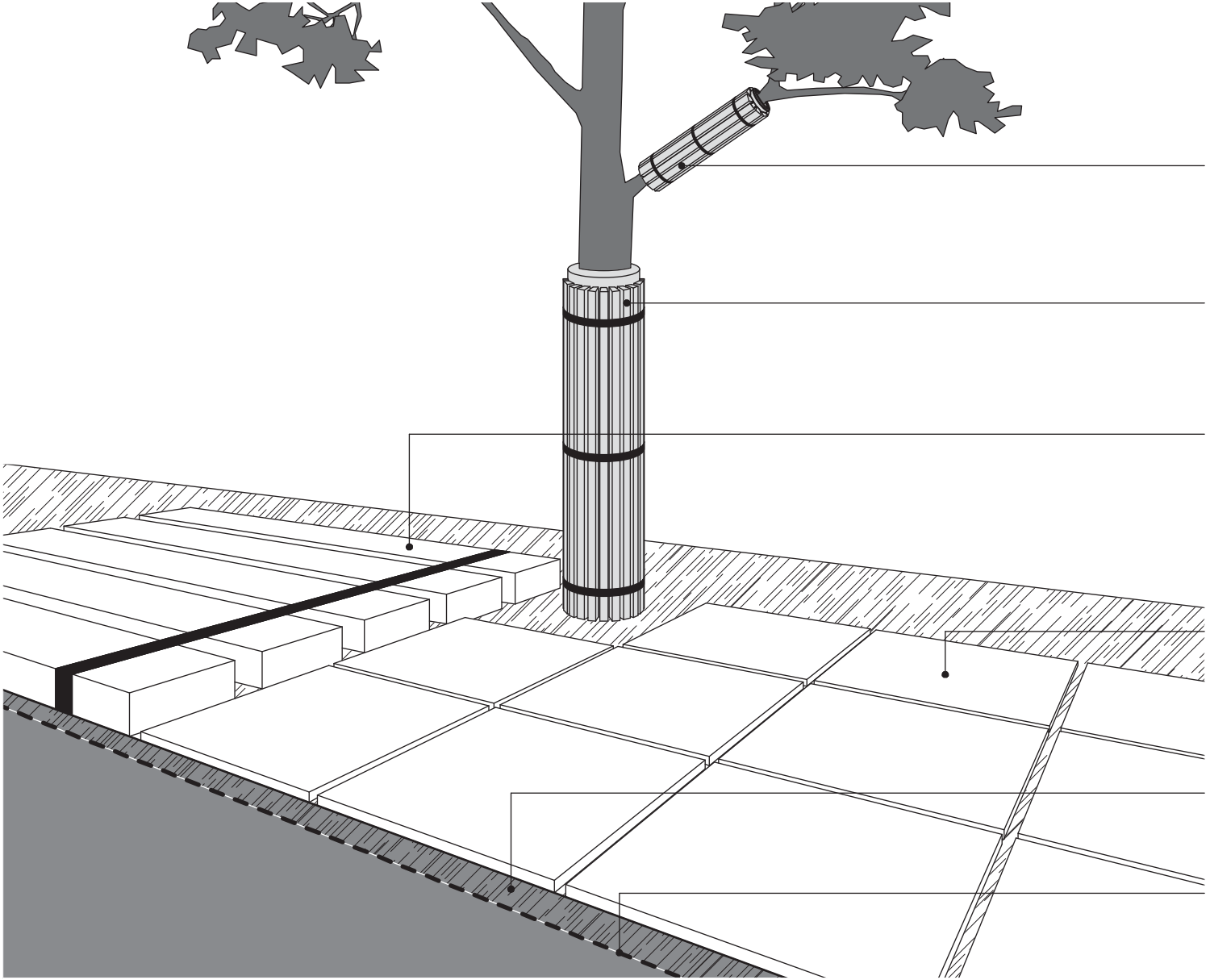
Installation of supports should avoid damaging roots.

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