ArborSafe
TREE CONSULTANCY AND MANAGEMENT SYSTEMS

Arboricultural Impact Assessment

Pittwater House
c/- Neeson Murcutt Architects
70 South Creek Road
Collaroy NSW

23 October 2019

C91571 Rev 2

ASSESSMENT & REPORT COMMISSIONED BY:

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23 October 2019

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Ref: Neeson Murcutt Architects – Pittwater House

Arboricultural Impact Assessment for fifty-two (52) trees located within the vicinity of proposed development at Pittwater House, 70 South Creek Road, Collaroy, NSW

Dear Kirsty,

We are pleased to provide you with the following Arboricultural Impact Assessment for fifty-two (52) site trees within the grounds of the Pittwater House site.

Complete use of this report is authorised under the conditions limiting its use as stated in Appendix A Item 7 of *"Arboricultural Reporting Assumptions and Limiting Conditions"*.

Should you have any queries relating to this report, its recommendations, or the options considered please do not hesitate to contact us on 1300 272 671.

Regards

Jamie Oates
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1 Executive Summary

1.1.1 The following Arboricultural Impact Assessment (Report) regards fifty-two (52) trees located within the grounds of Pittwater House. The subject site was identified by the Client as possessing trees that may be impacted by a proposed development.

1.1.2 In part, the project scope was to nominate subject trees that can be retained, or require removal to facilitate this development, as well as identify and reduce potential conflicts between subject trees and site development. Accurate information on the area required for tree retention and methods/techniques suitable for tree protection during construction have been provided.

1.1.3 An arborist inspection of the subject trees was undertaken on 22 August 2019, where tree data was collected.

1.1.4 Tree retention values have been determined based upon the assessment of the trees' health, structure, dimensions, age class, life expectancy, location and environmental amenity/significance in accordance with British Standard BS 5837–2012: *Trees in Relation to Design, Demolition and Construction*. The Tree Protection Zone (TPZ) method has been derived from Australian Standard AS 4970–2009: *Protection of Trees on Development Sites*. The TPZ is defined as a specified area above and below ground and at a given distance measured radially away from the centre of the tree's trunk and which is set aside for the protection of its roots and crown.

1.1.5 Seven (7) trees were of Category A retention value. Typically trees in this category were of a significant size in the landscape, possess fair to good health and structure, a Useful Life Expectancy (ULE) of more than 25 years, made significant amenity contributions to the landscape and made high environmental contributions. Category A retention value trees are 40, 90, 93, 99, 100, 104 and 106 and have High Retention Value.

1.1.6 Sixteen (16) tree were of Category B retention value. Trees in this category were typically of a medium size, had good to fair health and good to fair structure, and a Useful Life Expectancy (ULE) of more than 15 years. Moderate Retention Value trees made moderate amenity contributions to the landscape, and made low to moderate environmental contributions. Category B retention value trees are 24, 26, 44, 45, 47, 57, 58, 86, 95, 98, 102, 105, 107, 108, 109 and 110 and have a Moderate Retention Value.

1.1.7 Twenty-Five (25) trees were of Category C retention value. Trees in this category were typically of small–medium size, of low significance in the landscape, may have poor health or structure, are easily replaceable and do not warrant design consideration. Category C retention value trees are 5, 6, 18, 19, 20, 21, 22, 23, 25, 27, 41, 42, 46, 79, 80, 81, 82, 84, 85, 88, 89, 94, 97, 101 and 116 and have a Low Retention Value.

1.1.8 A total of twenty-two trees with a range of retention values require removal to facilitate this development. Trees 90 and 100 are Category A trees that would require removal to facilitate this development. Trees 24, 44, 45, 47, 86, 95, 98 and 102 are Category B trees that would require removal to facilitate this development. Trees 19, 20, 21, 22, 41, 42, 46, 88, 89, 94, 97 and 101 are Category C trees that would require removal to facilitate this development.

1.1.9 A further four (4) trees were of Category U retention value. Trees in this category were typically of poor health and/or structure, of undesirable species and are recommended for removal irrespective of site development. Category U retention value trees are 43, 83, 87 and 96.

1.1.10 Trees 5, 40, 93, 99, 104 and 108 are trees that are to be retained with specific protection measures during the development to ensure their viable retention.

1.1.11 Trees 6, 18, 23, 25, 26, 27, 57, 58, 79, 80, 81, 82, 84, 85, 105, 106, 107, 109, 110 and 116 are to be retained with generic protection measures during the development.

2 Introduction

2.1.1 ArborSafe Australia Pty Ltd was engaged by Neeson Murcutt Architects on behalf Pittwater House (the Client) to complete an Arboricultural Impact Assessment (report) on fifty-two (52) trees located within Pittwater House at 70 South Creek Rd, Collaroy, NSW.

2.1.2 The site is located within the school grounds and includes the existing M Block building and surrounding areas of open space.

2.1.3 The report was intended to provide information on site trees and how they may be impacted upon by the proposed development. Report findings and recommendations provided are based upon guidance provided within Australian Standard AS 4970–2009: *Protection of Trees on Development Sites*.

2.1.4 Observations and recommendations provided within this report are based upon information provided by the Client and an arborist site visit.

3 Scope

3.1.1 Carry out a visual examination of the nominated trees located within the vicinity of the proposed development.

3.1.2 Inspect the nominated trees and their growing environment in the context of the proposed development.

3.1.3 Provide an objective appraisal of the subject trees in relation to their species, estimated age, health, structural condition and viability within the landscape.

3.1.4 Based on the findings of this investigation, provide independent recommendations on the retention value of the trees.

3.1.5 Nominate subject trees that can be retained or require removal to facilitate this development.

3.1.6 Review the proposed development in the context of the former Pittwater Council Development Control Plan (DCP 2014).

3.1.7 Identify and reduce potential conflicts between subject trees and site development by providing accurate information on the area required for tree retention and methods/techniques suitable for tree protection during construction.

3.1.8 Provide information on restricted activities within the area nominated for tree protection, as well as suitable construction methods to be adopted during construction.

4 Methodology

4.1 Data Collection

4.1.1 Jamie Oates of ArborSafe Australia Pty Ltd carried out a site inspection of the subject trees on 22 August 2019.

4.1.2 Trees that are the subject of this report were identified in the site plan provided by Neeson Murcutt Architects titled 'Arborist Briefing' and dated 16 August 2019.

4.1.3 The subject trees were inspected from ground level. No foliage or soil samples were taken. No aerial or internal investigations were undertaken.

4.1.4 Tree height and canopy width of ten (10) specific trees as requested and identified by the Client were accurately calculated using a Leica DISTO D510 laser distance measurer. The measurements were then rounded up to the nearest whole metre. Trunk Diameter at Breast Height (DBH) was measured with a diameter tape and provided to the nearest centimetre.

4.1.5 Data collected on site was analysed by Jamie Oates, collated into report format, and relevant recommendations were formulated.

4.2 Tree Protection Zones

4.2.1 The Tree Protection Zone (TPZ) and Structural Root Zone (SRZ) methods have been derived from the Australian Standard AS 4970–2009: *Protection of Trees on Development Sites*.

4.2.2 The TPZ is defined as a specified area above and below ground and at a given distance measured radially away from the centre of the tree's trunk and which is set aside for the protection of its roots and crown. It is the area required to provide for the viability and stability of a tree to be retained where it is potentially subject to damage by development. The radius of the TPZ is calculated by multiplying its DBH by 12. TPZ radius = DBH × 12. (Note "Breast Height" is nominally measured as 1.4m from ground level).

4.2.3 The SRZ is the area around the base of a tree required for the tree's stability in the ground. The woody root growth and soil cohesion in this area are necessary to hold the tree upright. The SRZ is nominally circular with the trunk at its centre and is expressed by its radius in metres. SRZ radius = (D × 50) ^0.42 × 0.64.

4.2.4 Retention values are determined based upon the British Standard BS 5837–2012: *Trees in Relation to Design, Demolition and Construction*. This standard categorises tree retention value based upon assessment of the tree's quality (health and structure), and life expectancy. Other criteria such as its physical dimensions, age class, location and its Amenity, Heritage and Environmental significance are also considered. A breakdown of attributes required for each category can be obtained from Appendix B – Explanation of Tree Assessment Terms.

4.3 Images and Site Photographs

4.3.1 All photographs were taken at the time of the site inspection by the inspecting arborist. Photographs have been altered for brightness and/or cropped only. Other images used within this report have been sourced from ArborPlan or via the internet. The source of all images has been referenced accordingly.

5 Observations

5.1 Aerial Images

Figure 1. Aerial image showing subject site. Red lines delineate the site and area containing the subject trees that are to be impacted by the proposed development. (Google Earth 2019).

5.2 Site Details

5.2.1 The site was located within the grounds of Pittwater House and encompasses a large area of the school campus. Specifically, the area designated in this report includes the existing M Block building, the existing car park on the southern side of site, the existing entrance on the northern side of site, as well as surrounding structures, buildings and areas of open space.

5.2.2 The site is located within the Northern Beaches Local Government Area (LGA).

5.2.3 Usage surrounding the site was a mixture of school grounds, residential properties and school buildings. The residential properties bordered the site primarily to the west.

5.2.4 To the east of the site was an Air Force Barracks and tennis court facilities and to the west were residential properties. The area to the north was residential properties on Westmoreland Ave and to the south was the busy South Creek Rd.

5.2.5 Site soils are likely to be disturbed given the sites urban setting and altered from their natural soil profiles.

5.3 Tree and Site Heritage Status

5.3.1 The subject trees, and the site itself, do not appear on any local or state register of significance or heritage.

5.3.2 The trees are all common species, of average physical dimensions, within the local area and as such hold no special significance.

5.4 Proposed Construction

5.4.1 Plans of the existing site and of the proposed development were provided to ArborSafe on 9 August 2019 and include:

- Demolition Plan, Issue 06 08 19, Neeson Murcutt Architects Pty Ltd
- Tree Selection Plan, Issue 16 08 19, Neeson Murcutt Architects Pty Ltd
- Landscape and Traffic Plan, Issue 06 08 19, Neeson Murcutt Architects Pty Ltd

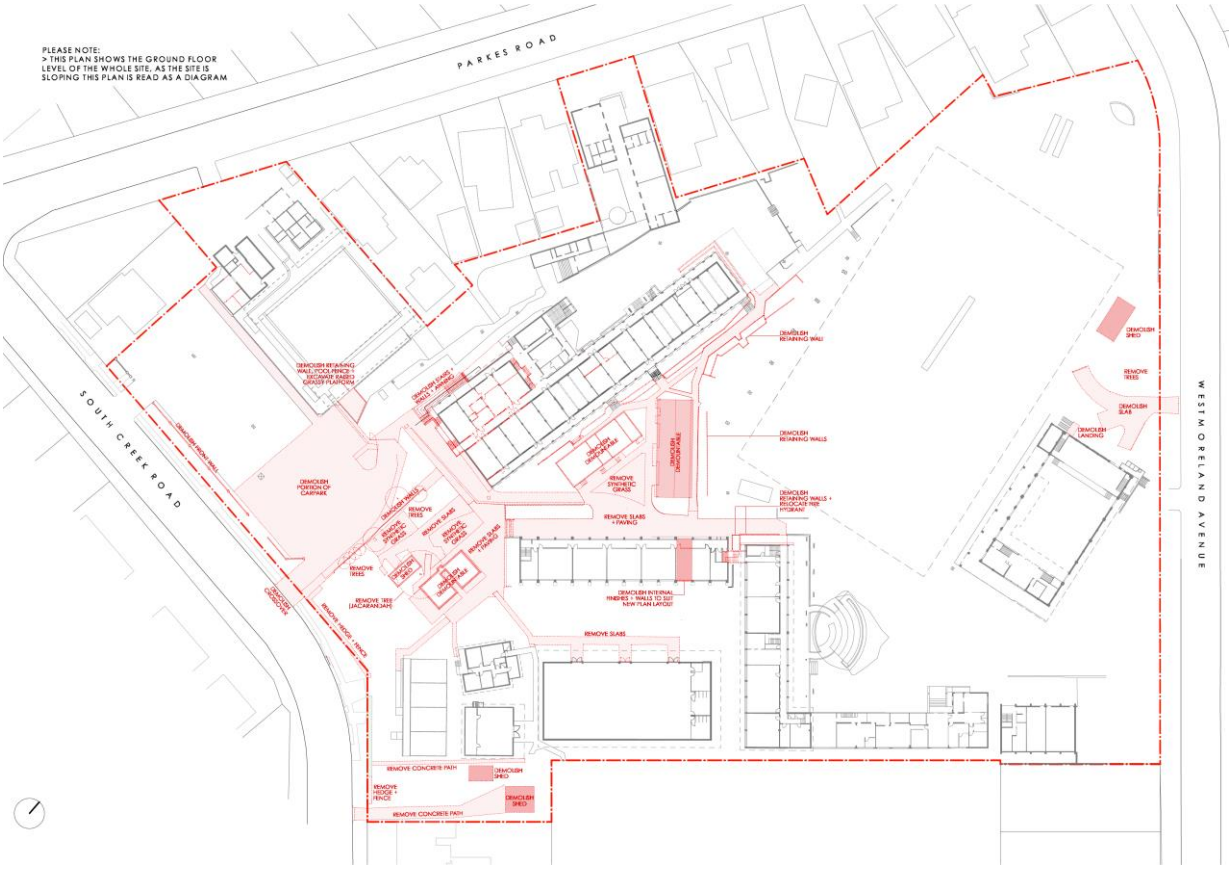


Figure 2. Excerpt from the Demolition Plan issue 060819. (Neeson Murcutt Architects 6 August 2019).

5.4.2 The proposed development has been reviewed and in summary consists of the partial demolition of the existing car park; the demolition of existing slabs, retaining walls and paving; the demolition of demountable classrooms; the renovation of the existing M Block; and the construction of a new library and admin building. The proposed development is to also encompass an area of open space and landscaping. A proposed new lift and stairs are to be installed within an existing building in the approximate centre of the site.

5.4.3 The proposed redirecting of subsoil drainage to existing storm water pipes have been reviewed in the preparation of this report.

5.5 Site Trees

5.5.1 Fifty-two (52) trees were inspected and are the subject of this report. Complete attributes for each tree can be found in Appendix C – Tree Assessment Data.

5.5.2 The project scope has been used in conjunction with the Northern Beaches Tree Preservation Order to identify subject trees within the site that require inclusion into the report.

5.5.3 Pursuant with the Northern Beaches Tree Management Policy, all trees as identified in the Tree Selection Plan that were above 5m in height and/or with a crown spread of greater than 3m have been included within this report. Small trees/shrubs within the site have been omitted from the report based on their species, current size and/or potential future size and contribution to local amenity.

5.5.4 Subject trees were located within the grounds of Pittwater House and on neighbouring properties, including Council nature strips.

5.5.5 Subject trees form part of the existing ArborPlan Tree Management System for the entire Pittwater House site and as such have been tagged, positioned on aerial imagery and visually assessed annually since 2018.

5.5.6 The subject trees have been numbered in line with the existing ArborPlan tree numbering system. Trees can be identified on site using white tree tags which are typically located at approximately 2.0m from ground level on the trunk. Trees located on neighbouring properties are not tagged.

5.5.7 As these subject trees form part of a previous survey undertaken for the entire site, trees are numbered between Tree 5 and Tree 116.

Figure 3. Site map showing subject trees. Note that icon colour indicates trees current risk rating (not Retention Value). Tree attributes are to be obtained from Appendix C – Tree Assessment Data. (ArborPlan, 2019).

6 Tree Retention Values

6.1 Determining Tree Retention Values

6.1.1 Tree Retention Value has been determined based on a combination of tree attributes. Tree retention value is based on the British Standard BS 5837–2012: *Trees in Relation to Design, Demolition and Construction*. Attributes considered when determining the retention value include tree health, structure and form, life expectancy, suitability of the tree in the context of local landscape. Arboricultural, Cultural, Environmental and Heritage significance are all also considered within the subcategories identified.

6.1.2 Collectively tree attributes are reviewed and used to categorise tree value in a development context. Additional information explaining Tree Retention Value can be found in Appendix B – Explanation of Tree Assessment Terms.

6.2 Category A Trees (High Retention Value)

6.2.1 Seven (7) trees were determined to be Category A Trees. Typically trees in this category are of high quality with an estimated remaining life expectancy of at least 25 years and of dimensions and prominence that it cannot be readily replaced in <20 years. The tree may make significant amenity contributions to the landscape and may make high environmental contributions. In some cases, trees within this category may not meet the above criteria, however possess significant heritage or ecological value. Trees of this retention value warrant design consideration and amendment to ensure their viable retention.

6.2.2 Category A trees are numbered 40, 90, 93, 99, 100 ,104 and 106.

Figure 4. Aerial image showing location of High Retention Value Trees. Note that icon colour indicates trees current risk rating (not Retention Value). Tree attributes are to be obtained from Appendix C – Tree Assessment Data. (ArborPlan, 2019).

6.2.3 Tree 93 was a Magenta Brush Cherry (*Syzygium paniculatum*). The tree was located within the minibus depot on the southern side of the site and contributes significantly to the streetscape screening value and forms a significant feature within the landscape.

6.2.4 Tree 93 was of good health and fair structure and has a life expectancy of 25–50 years.

6.2.5 The TPZ for Tree 93 was 8.2m measured at a radial distance from the centre of the trunk.

Figure 5. View to north of Tree 93, *Syzygium paniculatum* in its growing environment. (Jamie Oates, 22 August 2019).

6.2.6 Tree 100 was a Spotted Gum (*Corymbia maculata*). The tree was located east of the pool and adjacent to the southern car park on the southern side of site. This semi-mature, locally endemic species significantly contributes to the amenity and ecological value of the site. A suitable photo of this tree could not be obtained.

6.2.7 Tree 100 was of good health and structure and has a life expectancy of >50 years.

6.2.8 The TPZ for Tree 100 was 4.8m measured at a radial distance from the centre of the trunk.

6.2.9 Tree 99 was a Jacaranda (*Jacaranda mimosifolia*). The tree was located within the garden area on the southern side of the site and forms a significant feature within the landscape.

6.2.10 Tree 99 was of good health and fair structure and has a life expectancy of 15–25 years.

6.2.11 The TPZ for Tree 99 was 9.8m measured at a radial distance from the centre of the trunk.

Figure 6. View to south of Tree 99, *Jacaranda mimosifolia* in its growing environment. (Jamie Oates, 22 August 2019).

6.2.12 Tree 40 was a Spotted Gum (*Corymbia maculata*). The tree was located amongst other medium to large trees on the northern boundary of the site and forms a significant feature within the landscape and contributes greatly to the ecological and amenity value of the site.

6.2.13 Tree 40 was of good health and fair structure and has a life expectancy of 25–50 years.

6.2.14 The TPZ for Tree 40 was 10.8m measured at a radial distance from the centre of the trunk.

Figure 7. View to north of Tree 40, *Corymbia maculata* in its growing environment. (Jamie Oates, 22 August 2019).

6.2.15 Tree 104 was a Spotted Gum (*Corymbia maculata*). The tree was located on the council verge just outside the southern boundary fence adjacent to the southern car park. This locally endemic species significantly contributes to the amenity and ecological value of the site and the streetscape.

6.2.16 Tree 104 was of good health and structure and has a life expectancy of >50 years.

6.2.17 The TPZ for Tree 104 was 5.9m measured at a radial distance from the centre of the trunk.

Figure 8. View to east of Tree 104, *Corymbia maculata* in its growing environment. (Jamie Oates, 22 August 2019).

6.2.18 Tree 90 was a Brown Pine (*Podocarpus elatus*). The tree was located behind the storage sheds within the minibus depot on the southern side of the site. Whilst the lower portion of the tree is obscured by the sheds, the large crown of the tree contributes significantly to the streetscape and to the site. Due to the tree's location and surrounding infrastructure, a suitable photo of this tree could not be obtained.

6.2.19 Tree 106 was of good health and fair structure and has a life expectancy of 25–50 years.

6.2.20 The TPZ for Tree 106 was 13.3m measured at a radial distance from the centre of the trunk.

6.2.21 Tree 106 was a Lemon-scented Gum (*Corymbia citriodora*). The tree was located on the council verge just outside the southern boundary fence adjacent to the southern car park. The tree contributes significantly to the streetscape and forms a significant feature at the southern entrance of the site.

6.2.22 Tree 106 was of excellent health and good structure and has a life expectancy of 25–50 years.

6.2.23 The TPZ for Tree 106 was 10.0m measured at a radial distance from the centre of the trunk.

Figure 9. View to north-east of Tree 106, *Corymbia citriodora* in its growing environment. (Jamie Oates, 22 August 2019).

6.3 Category B Trees (Moderate Retention Value)

6.3.1 Sixteen (16) trees were considered to have a Moderate Retention Value. Typically trees in this category are of moderate quality with an estimated remaining life expectancy of 15–25 years and prominence of size dimensions that cannot be readily replaced within 10 years. They may make moderate amenity contributions to the landscape and make low/moderate environmental contributions. Trees with this retention value warrant minor design consideration in an attempt to allow for their retention.

6.3.2 Category B trees are numbered 24, 26, 44, 45, 47, 57, 58, 86, 95, 98, 102, 105, 107, 108, 109 and 110.

Figure 10. Aerial image showing location of Moderate Retention Value Trees. Note that icon colour indicates trees current risk rating (not Retention. Value). Tree attributes are to be obtained from Appendix C – Tree Assessment Data. (ArborPlan, 2019).

6.3.3 Tree 47 was a Narrow-leaved Black Peppermint (*Eucalyptus nicholii*). This relatively shorted lived Eucalyptus species is endemic to the New England area of NSW. This tree was of mature size and in good health and fair structure. Active termites were observed as well as a large trunk wound that potentially harbours decay. The tree has a ULE of 10–15 years only.

6.3.4 The TPZ for Tree 47 was 9.4m measured at a radial distance from the centre trunk.

Figure 11. View to north of Tree 47, *Eucalyptus nicholii* in its growing environment. (Jamie Oates, 22 August 2019).

6.4 Category C Trees (Low Retention Value)

6.4.1 Twenty-Five (25) trees were identified as being Category C Trees. Trees in this category are of low quality with an estimated remaining life expectancy of 5–15 years, or young trees that are easily replaceable, may have poor health and/or structure, are easily replaceable, or are of undesirable species and do not warrant design consideration.

6.4.2 Category C trees are: Trees 5, 6, 18, 19, 20, 21, 22, 23, 25, 27, 41, 42, 46, 79, 80, 81, 82, 84, 85, 88, 89, 94, 97, 101 and 116.

Figure 12. Aerial image showing location of Low Retention Value Trees. Note that icon colour indicates trees current risk rating (not Retention Value). Tree attributes are to be obtained from Appendix C – Tree Assessment Data. (ArborPlan, 2019).

6.4.3 Trees 79, 80, 81, 82, 84 and 85 are all examples of Category C trees. Species include Weeping Bottlebrush (*Callistemon viminalis*), Willow Myrtle (*Agonis flexuosa*) and Kanooka (*Tristaniopsis laurina*). These species' have a relatively small mature size potential. Whilst they offer some screening and amenity value, they are easily replaceable, hence their Low Retention Value.

6.4.4 As an example, the TPZ for Tree 82 was 2.5m measured at a radial distance from the centre trunk.

Figure 13. View to east of Trees 79, 80, 81, 82, 84 and 85 in their growing environment. (Jamie Oates, 22 August 2019).

6.5 Category U Trees (Unsuitable for Retention)

6.5.1 Four (4) trees were found to be in such a condition that they cannot realistically be retained as viable trees in the context of the current land use for longer than five years. These trees may be dead and/or of a species recognised as a weed that resulted in them being unretainable. These trees should be removed irrespective of any future development on the site.

6.5.2 Category U Trees were 43, 83, 87 and 96.

Figure 14. Aerial image showing location of Remove Retention Value Trees (Nil/No Retention Value). Note icon colour indicates trees current risk rating (not Retention Value). Tree attributes are to be obtained from Appendix C – Tree Assessment Data. (ArborPlan, 2019).

6.5.3 Tree 96 was a Cheese Tree (*Glochidion ferdinandi*) tree located within the garden area on the southern side of the site. The tree has experienced multiple stem failures resulting in poor structure and a low ULE. This tree is recommended for removal irrespective of any further development.

Figure 15. View to north of Tree 96, *Glochidion ferdinandi* in its growing environment. Note the large failure wounds. (Jamie Oates, 22 August 2019).

7 Discussion

7.1 Major and Minor TPZ Encroachment

7.1.1 The proposed development will significantly impact twenty-two (22) site trees identified within this report. Trees will require removal if they are located within the development footprint or have major encroachment into their TPZs.

7.1.2 Trees with minor or no encroachment may be retained with specific, generic or no protection requirements throughout the construction stage.

7.1.3 For the purposes of this report trees to be removed or retained have been identified as those:

- Requiring removal due to major encroachment into their TPZ
- Retainable and requiring specific protection requirements throughout construction (i.e. generic requirements plus arborist supervision and careful construction methods within their TPZ)
- Retainable and requiring generic tree protection measures only (i.e. protective fencing and restriction of activities within the TPZ).

7.2 Summary of Impacts by Proposed Development

7.2.1 Review of the proposed design has been undertaken in the context of tree retention and removal across the site. The proposed development consists of the partial demolition of the existing car park; the demolition of existing slabs, retaining walls and paving; the demolition of demountable classrooms; the renovation of the existing M Block; and the construction of a new library and admin building. The proposed development is to also encompass an area of open space and landscaping. A proposed new lift and stairs are to be installed within an existing building in the approximate centre of the site.

7.2.2 The development will affect twenty-two (22) site trees. These trees will require removal prior to development due to being within the proposed design footprint or major encroachment into their TPZs.

7.2.3 A further six (6) trees consisting of Category A trees 40, 93, 99 and 104; Category B Tree 108 and Category C Tree 5 will require specific protection measures during construction to enable their retention.

7.2.4 Twenty (20) Trees of various retention values were identified as being located away from proposed works or have no significant works within their TPZs. These trees may be retained and require generic protection measures only such as fencing and restriction of work activities in their TPZs during construction. These are Trees 6, 18, 23, 25, 26, 27, 57, 58, 79, 80, 81, 82, 84, 85, 105, 106, 107, 109, 110 and 116.

7.3 Tree Removal

7.3.1 Trees 90 and 100 are Category A trees that have major encroachment into their TPZs or are located in the proposed development footprint. Trees 24, 44, 45, 47, 86, 95, 98, 102 are Category B trees that have major encroachment into their TPZs or are located in the proposed development footprint. Trees 19, 20, 21, 22, 41, 42, 46, 88, 89, 94, 97 and 101 are Category C trees that have major encroachment into their TPZs or are located in the proposed development footprint. With regards to each of these trees where their trunk was located outside of the proposed development, construction works were identified as being required within their TPZs. These encroachments were determined to be greater than 10% of the total TPZ area resulting in the trees being structurally compromised or long term reduction in health due to the extent of root loss.

7.4 Tree Retention

7.4.1 Tree 5 is a Category C tree that has proposed demolition of a retaining wall within the southern portion of its TPZ. These works are regarded as a major encroachment as they are greater than 10% of the total TPZ area. However, this tree is retainable providing all demolition in the TPZ is performed carefully in a root sensitive manner. Below grade works must be performed under Project Arborist supervision.

7.4.2 Tree 40 is a Category A tree that has proposed building demolition works within the western portion of its TPZ. These works are regarded as a major encroachment as they are greater than 10% of the total TPZ area. However, this tree is retainable providing all demolition in the TPZ is performed carefully in a root sensitive manner. Below grade works must be performed under Project Arborist supervision.

7.4.3 Tree 93 is a Category A tree that has proposed carpark resurfacing works within the eastern portion of its TPZs. These works are regarded as a major encroachment as they encompass greater than 10% of the total TPZ area. However, this tree can be retained providing excavation works to lift existing surfaces are only permitted at the extent of the TPZs (no greater than 10% area encroachment) and performed in a root sensitive manor. New carpark surfacing is to be placed at a finished depth no greater than existing. All excavation and other below grade works are to be supervised by the Project Arborist.

7.4.4 Tree 99 is a Category A tree that has proposed building demolition and landscaping works involving footpath construction within its TPZ. These works are regarded as a major encroachment as they are greater than 10% of the total TPZ area. This tree is retainable providing new footpath construction is performed above grade in a manner sensitive to tree roots. All demolition in the TPZ must be performed carefully under Project Arborist supervision.

7.4.5 Tree 104 is a Category A tree that has proposed carpark demolition and landscaping works involving footpath construction within its TPZ. These works are regarded as a major encroachment as they are greater than 10% of the total TPZ area. This tree is retainable providing new footpath construction is performed above grade in a manner sensitive to tree roots. All demolition in the TPZ must be performed carefully under Project Arborist supervision.

7.4.6 Tree 108 is a Category B tree that has proposed Substation construction with its TPZ. This encroachment is minor as it is less than 10% of the total TPZ. This tree is retainable providing new Substation construction is performed in a manner sensitive to tree roots. All demolition in the TPZ must be performed carefully under Project Arborist supervision.

7.5 Proposed Pruning

7.5.1 Tree 108 will require pruning of its crown to facilitate new Substation installation. Pruning is minor and limited to the lower northern portion of the crown only. Pruning is to focus on the removal of terminal branches and all works are to be performed in line with AS 4373–2007: *Pruning of Amenity Trees*.

7.5.2 No further retained trees were identified as requiring significant pruning works to their crowns. In the event construction activity should require crown pruning all works are to be performed in line with AS 4373–2007: *Pruning of Amenity Trees*.

7.6 Additional Excavation/Trenching within TPZs

7.6.1 In the event additional excavation is required within the TPZs of retained trees identified within this report, or any other site trees, arborist involvement will be required to ensure works are undertaken in accordance with the Australian Standard AS 4970–2009: *Protection of Trees on Development Sites.*

7.6.2 Excavation/trenching within the TPZs of retained trees should be undertaken using sensitive construction methods such as manual excavation, hydro-vac or air spade.

8 Recommendations

8.1 Tree Removal

8.1.1 Twenty-two (22) trees would require removal to facilitate this development. These are trees 19, 20, 21, 22, 24, 41, 42, 44, 45, 46, 47, 86, 88, 89, 90, 94, 95, 97, 98, 100, 101 and 102.

8.1.2 Four (4) trees were recommended for removal irrespective of future development on the site. These are Trees 43, 83, 87 and 96.

8.2 Tree Retention

8.2.1 Six (6) trees, numbered 5, 40, 93, 99, 104 and 108 were recommended for retention and require specific protection measures during construction to ensure they remain viable following the completion of works. These trees have proposed demolition and/or construction activity with likely excavation or below grade works within their TPZs. The Tree Protection Plan (Appendix D) identifies the areas of encroachment into the TPZs of retaining trees and how these trees are to be protected. A summary of specific protection requirements for these trees is provided below.

8.2.2 Excavation, including below grade demolition, is to be carried out only under arborist supervision. No excavation should occur within the SRZ of these trees. It was recommended that the proposed excavation commence at the outer extent of the TPZ and move inwards to minimise root damage to the trees.

8.2.3 Works should be undertaken using techniques that are sensitive to tree roots to avoid unnecessary damage. Such techniques include:

- Excavation using a high-pressure water jet and vacuum truck
- Excavation using an Air Spade with vacuum truck
- Excavation by hand.

8.2.4 Machine excavation should be prohibited within the TPZs of retained trees unless undertaken at the direct consent from the project arborist.

8.2.5 Roots discovered are to be treated with care and minor roots (<40mm diameter) pruned with a sharp, clean handsaw or secateurs. All significant roots (>40mm diameter) are to be recorded, photographed and reported to the project arborist.

8.2.6 Other proposed surfacing within the TPZ is to be installed above existing grade and be of a permeable nature to allow the passage of air and moisture. If the surfacing is to be load bearing, then it is suggested that a geogrid/web or similar is incorporated to ensure the rooting area below does not become compacted.

8.3 Tree Pruning

8.3.1 Tree 108 will require pruning of its crown to facilitate new Substation installation. Pruning must be limited to the lower portion of the crown that will directly impact the proposed substation only. Where feasible to do so branches should be tied back during construction to allow the long term retention. Pruning is to focus on the removal of small (<100mm diameter) terminal branches and all works are to be performed in line with AS 4373–2007: *Pruning of Amenity Trees*.

8.3.2 In the event pruning is required to facilitate future construction works, the Project Arborist must be notified to assess the extent of works required and impact of future tree health. Where applicable the Project Arborist will recommend consultation and seek authorisation from the consent authority prior to works being completed.

8.3.3 In these instances, all pruning is to be in accordance with the Australian Standard AS 4373–2007: *Pruning of Amenity Trees* and undertaken by a suitably qualified arborist (minimum AQF 3 arborist).

8.3.4 Where reduction pruning is required, pruning should focus on the removal of smaller diameter branches where feasible and remove no greater than 10% of the total crown. Branches no greater than 50mm diameter are to be removed unless specifically approved by the project arborist.

8.4 Protection and Reporting Measures During Construction

8.4.1 All trees to be retained require protection during the construction stage. Tree protection measures include a range of:

- Activities restricted within the TPZ
- Protective fencing
- Trunk and ground protection
- Tree protection signage
- Involvement from the project arborist
- Project milestones
- Compliance reporting

8.5 Activities Prohibited within the TPZ

1. Machine excavation including trenching
2. Storage
3. Preparation of chemicals, including cement products
4. Parking of vehicles and plant
5. Refuelling
6. Dumping of waste
7. Wash down and cleaning of equipment
8. Placement of fill
9. Lighting of fires
10. Soil level changes
11. Temporary or permanent installation of utilities and signs
12. Physical damage to the tree

8.6 Protective Fencing Specification

8.6.1 Protective fencing is to be installed as far as practicable from the trunk of any retained trees. Fencing should be erected as per the image below before any machinery or materials are brought to site and before commencement of works (including demolition).

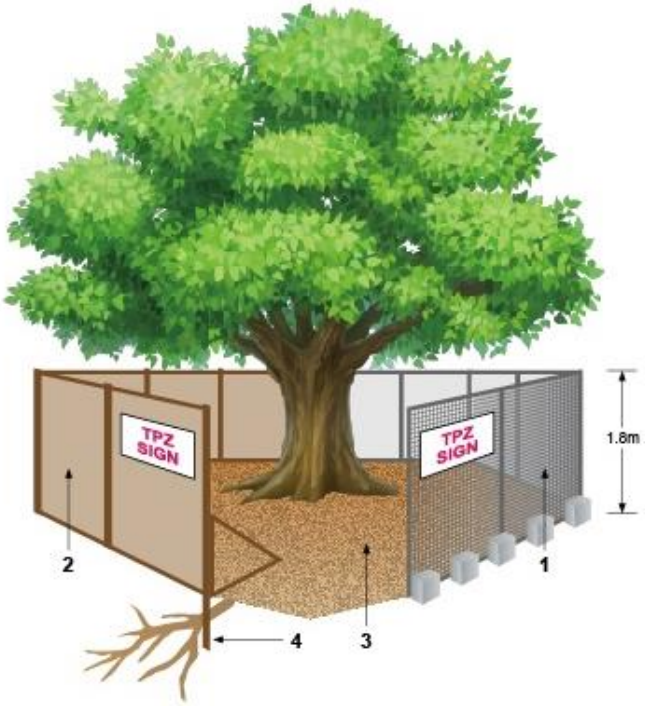
8.6.2 In some areas of the site (i.e. protection of trees on neighbouring properties) existing boundary fencing may be used as an alternative to protective fencing.

8.6.3 Once erected, protective fencing must not be removed or altered without approval from the project arborist. The TPZ fencing should be secured to restrict access.

8.6.4 TPZ fencing is to be a minimum of 1.8m high and mesh or wire between posts must be highly visible. Fence posts and supports should have a diameter greater than 20mm and should ideally be freestanding, otherwise be located clear of the roots. See image below.

8.6.5 Tree protection fencing must remain intact throughout all proposed construction works and must only be dismantled after their conclusion. The temporary dismantling of tree protection fencing must only be done with the authorisation of a consulting arborist and/or the responsible authority.

8.6.6 The subject trees themselves must also not to be used as a billboard to support advertising material. Affixing nails or screws into the trunks of trees to display signs of any type is not a recommended practice in the successful retention of trees.



Legend:

1. Chain wire mesh panels with shade cloth attached (if required), held in place with concrete feet
2. Alternative plywood or wooden paling fence panels. This fencing material also prevents building materials or soil entering the TPZ
3. Mulch installation across surface of TPZ (at discretion of the project arborist). No excavation, construction activity, grade changes, surface treatment or storage materials of any kind are permitted within the TPZ
4. Bracing is permissible within the TPZ. Installation of supports should avoid damaging roots.

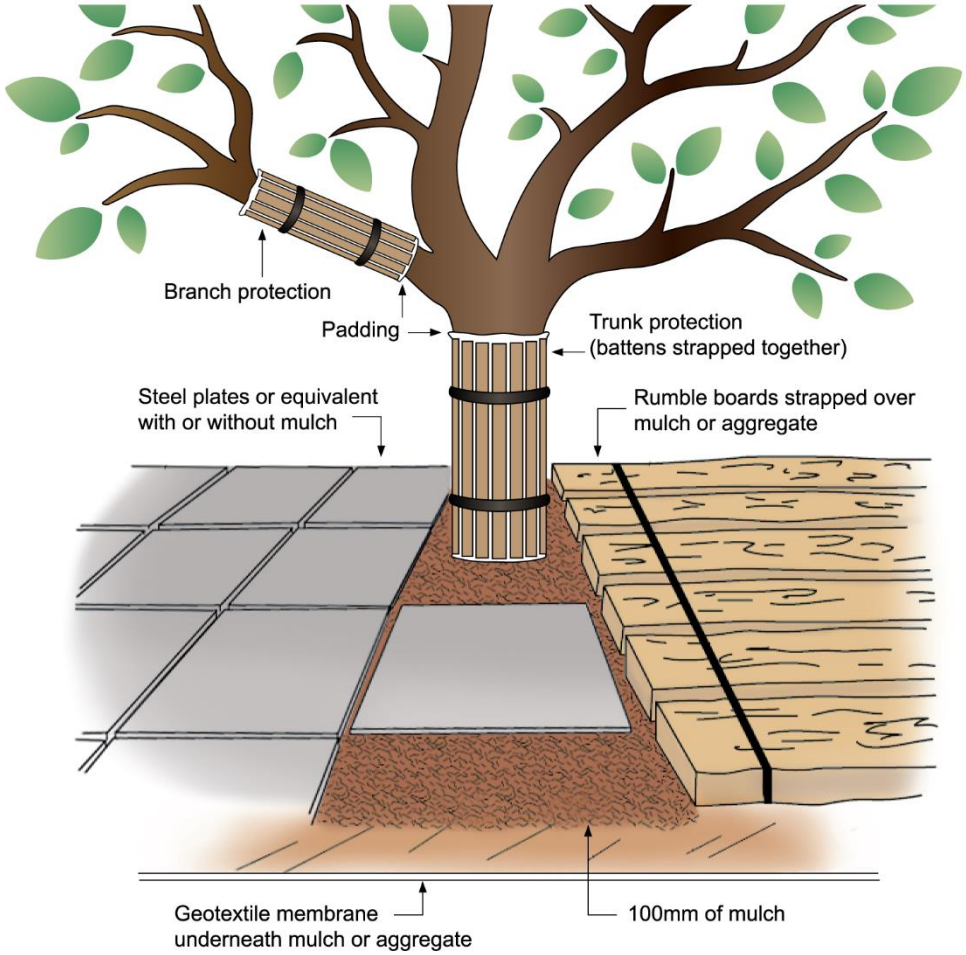
Figure 16. Depicts standard fencing techniques. (AS 4970–2009)

8.7 Trunk and Ground Protection

8.7.1 Given that proposed works are often within the TPZs of retained trees, standard protective fencing may not always be a viable method of protection. In these areas trunk protection and ground protection should be installed prior to the commencement of works and remain in place until after construction works have been completed.

8.7.2 Where construction access into the TPZ of retained trees cannot be avoided, the root zone of each tree must be protected using either steel plates or rumble board strapped over mulch/aggregate until such a time as permanent above ground surfacing (cellular confinement system or similar) is to be installed.

8.7.3 Trunk and ground protection should be undertaken in line with the Australian Standard AS 4790–2009: *Protection of Trees on Development Sites* as per the image below:



Notes:

1. For trunk and branch protection use boards and padding that will prevent damage to bark. Boards are to be strapped to trees, not nailed or screwed.
2. Rumble boards should be of a suitable thickness to prevent soil compaction and root damage.

Figure 17. Depicts trunk and ground protection techniques. (AS 4970–2009).

8.8 Tree Protection Signs

8.8.1 Signs identifying the TPZ should be placed at 10m intervals around the edge of the TPZ and should be visible from within the development site.

Figure 18. Depicts standard fencing techniques. (AS 4970–2009).

8.9 Project Arborist

8.9.1 An official "Project Arborist" must be commissioned to oversee the tree protection, any works within the TPZ's and complete regular monitoring compliance certification.

8.9.2 The project arborist must have minimum five (5) years industry experience in the field of arboriculture, horticulture with relevant demonstrated experience in tree management on construction sites, and Diploma level qualifications in arboriculture – AQF Level 5.

8.9.3 Inspections are to be conducted by the project arborist at several key points during the construction in order to ensure that protection measures are being adhered to during construction stages and decline in tree health or additional remediation measures can be identified.

8.10 Project Milestones

8.10.1 The following visits and milestones were recommended as to when on-site tree inspection by the project arborist is required:

Item	Purpose of Visit	Timing of Visit(s)	Prerequisites
1	Pre-start induction	Following sign off from Item 1. Contractor to provide a minimum of five days advance notice for this visit.	Prior to commencement of works. All parties involved in the project to attend.
2	Supervision of works in TPZ's including all regrading and excavations	Whenever there is work planned to be performed within the TPZ's. Contractor to provide a minimum of five days advance notice for such visits.	
3	Regular site inspections	Minimum frequency monthly for the duration of the project.	The checklist must be completed by the Project Arborist at each site inspection and signed by both parties.
4	Final sign off	Following completion of works.	Practical completion of works and prior to tree protection removal.

8.11 Compliance Reporting

8.11.1 Following each inspection, the project arborist shall prepare a report detailing the condition of the trees. These reports should certify whether or not the works have been completed in compliance with the consent relating to tree protection.

8.11.2 These reports should contain photographic evidence where required to demonstrate that the work has been carried out as specified.

8.11.3 Matters to be monitored and included in these reports should include tree condition, tree protection measures and impact of site works which may arise from changes to the approved plans.

8.11.4 The reports and Compliance Statements shall be submitted to the Project Manager (as well as the Clients' nominated representative) following each inspection.

8.11.5 The reports and any Non-Compliance Statements shall be submitted to the Project Manager (as well as the Clients' nominated representative) if tree protection conditions have been breached. Reports should contain clear remedial action specifications to minimise any adverse impact on any subject tree.

8.12 Offset Tree Planting

8.12.1 Offset planting should reflect the number of trees removed and the initial loss of amenity and biomass. New trees should be of long-term potential and sourced from a reputable supplier.

8.12.2 Replacement tree species must suit their location on the site in terms of their potential physical size and their tolerance(s) to the surrounding environmental conditions. To avoid unethical or unprofessional tree selection and/or their placement within the landscape, replacement tree species must be selected in consultation with a consulting arborist, who can also assist in implementing successful tree establishment techniques.

8.12.3 Replacement tree species must have the genetic potential to reach a mature size potential of those trees removed to facilitate the development. As a guide, potential height will be a minimum of 10m (or more) and produce a spreading canopy so as they may provide amenity value to the property and contribute to the tree canopy of the surrounding area in the future.

8.13 Trenching for Installation of Underground Services

8.13.1 Where excavation or trenching is required to facilitate installation of underground services within the TPZs of any site trees arborist supervision is required. Works should be undertaken using techniques that are sensitive to tree roots to avoid unnecessary damage. Such techniques include:

1. Excavation by hand
2. Excavation using a high-pressure water jet and vacuum truck
3. Excavation using an Air Spade with vacuum truck.

8.13.2 Machine excavation should be prohibited within the TPZs of retained trees unless undertaken at the direct consent from the project arborist and/or the responsible authority.

9 References

- Australian Standard AS 4373–2007: *Pruning of Amenity Trees*, Standards Australia, GPO Box 476, Sydney, New South Wales, 2001
- Australian Standard AS 4970–2009: *Protection of Trees on Development Sites*, Standards Australia, GPO Box 476, Sydney, New South Wales, 2001
- British Standard BS 5837–2012: Trees in Relation to Design, Demolition and Construction.

10 Appendices

10.1 Appendix A – Arboricultural Reporting Assumptions and Limiting Conditions

1. Any legal description provided to the consultant is assumed to be correct. Any titles and ownership of any property are assumed to be good. No responsibility is assumed for matters legal in character.
2. It is assumed that any property/project is not in violation of any applicable codes, ordinances, statutes or other government regulations.
3. Care has been taken to obtain all information from reliable sources. All data has been verified in so far as possible, however, the consultant can neither guarantee nor be responsible for the accuracy of the information provided by others.
4. The consultant shall not be required to give testimony or to attend court by reason of this report unless subsequent contractual arrangements are made, including payment of an additional fee for such services.
5. Loss or alteration of any part of this report invalidates the entire report.
6. Possession of this report or a copy thereof does not imply right of publication or use for any purpose by anyone but the person to whom it is addressed, without the prior written consent of the consultant.
7. Neither all nor any part of the contents of this report, nor any copy thereof, shall be used for any purpose by anyone but the person to whom it is addressed, without the written consent of the consultant. Nor shall it be conveyed by anyone, including the Client, to the public through advertising, public relations, news, sales or other media, without the written consent of the consultant.
8. This report and any values expressed herein represent the opinion of the consultant and the consultant's fee is in no way contingent upon the reporting of a specified value, a stipulated result, the occurrence of a subsequent event, nor upon any finding to be reported.
9. Sketches, diagrams, graphs and photographs in this report, being intended as visual aids, are not necessarily to scale and should not be construed as engineering or architectural reports or surveys unless expressed otherwise.
10. Information contained in this report covers only those items that were examined and reflect the condition of those items at the time of inspection.
11. Inspection is limited to visual examination of accessible components without dissection, excavation or probing. There is no warranty or guarantee expressed or implied that the problems or deficiencies of the plants or property in question may not arise in the future.

10.2 Appendix B – Explanation of Tree Assessment Terms

Tree name: Provides the botanic name, (Genus, species, sub-species, variety and cultivar where applicable) in accordance with the International Code of Botanical Nomenclature (ICBN), and an accepted common name.

Age: Refers to the life cycle of the tree

Category	Description
Young	Newly planted tree not fully established may be capable of being transplanted or easily replaced.
Juvenile	Tree is small in terms of its potential physical size and has not reached its full reproductive ability.
Semi-mature	Tree in active growth phase of life cycle and has not yet attained an expected maximum physical size for its species and/or its location.
Mature	Tree has reached an expected maximum physical size for the species and/or location and is showing a reduction in the rate of seasonal extension growth.
Senescent	Tree is approaching the end of its life cycle and is exhibiting a reduction in vigour often evidenced by natural deterioration in health and structure.

Health: Summarises the health and vigour of the tree

Category	Description
Excellent	Canopy full with dense foliage coverage throughout, leaves are entire and are of an excellent size and colour for the species with no visible pathogen damage. Excellent growth indicators, e.g. seasonal extension growth.
Good	Canopy full with minor variations in foliage density throughout, leaves are entire and are of good size and colour for the species with minimal or no visible pathogen damage. Good growth indicators.
Fair	Canopy with moderate variations in foliage density throughout, leaves not entire with reduced size and/or atypical in colour, moderate pathogen damage. Reduced growth indicators, visible amounts of deadwood/dieback, and epicormic growth.
Poor	Canopy density significantly reduced throughout, leaves are not entire, are significantly reduced in size and/or are discoloured, significant pathogen damage. Significant amounts of deadwood and/or epicormic growth, noticeable dieback of branch tips, possibly extensive.
Dead	No live plant material observed throughout the canopy, bark may be visibly delaminating from the trunk and/or branches.

Table 1. ArborSafe Structure Descriptors

Structure: Summarises the structure of the tree from roots to crown

Category	Description
Good	Good form and branching habit. Minor structural defects that are insignificant and typical or common within the species. e.g. included bark, co-dominant stems. No fungal pathogens present. No visible wounds to the trunk and/or root plate.
Fair	Moderate structural defects present that impact longevity e.g. apical leaders sharing common union(s). Minor damage to structural roots. Small wounds present where decay could begin. No fungal pathogens present. A fair representation of the species.
Poor	Significant structural defects present that have a significant impact on longevity and result in a poor representation of the species e.g. Branch/stems with included bark with failure likely within 0–5 years. Wounding evident with cavities and/or decay present. Damage to structural roots.
Hazardous	Serious structural defects with failure determined to be imminent (<12 months). Defects may include active splits and/or partial branch or root plate failures. Tree requires immediate arboricultural works to alleviate the associated risk.

Useful Life Expectancy (ULE): Useful Life Expectancy refers to an expected period of time the tree can be retained within the landscape before its amenity value declines to a point where it may detract from the appearance of the landscape and/or becomes potentially hazardous to people and/or property. ULE values consider tree species, current age, health, structure and location. ULE values are based on the tree at the time of assessment and do not consider future changes to the tree's location and environment which may influence the ULE value.

Category:
0–5 Years
5–10 Years
10–20 Years
20–30 Years
30–50 Years
>50 Years

Tree Retention Value: (based upon BS 5837–2012: *Trees in relation to design, demolition and construction* – recommendations)

Category and definition	Criteria (including sub-categories where appropriate)		
Category U			
Trees in such a condition that they cannot realistically be retained as viable trees in the context of the current land use for longer than 5 years.	• Trees that have a severe structural defect that are not remediable such that their failure is expected within 12 months. • Trees that will become unviable after removal of other Category U trees (e.g. where for whatever reason the loss of companion shelter cannot be mitigated by pruning). • Trees that are dead or are showing signs of significant, immediate and irreversible overall decline. • Trees infected with pathogens of significance to the health and or safety of other trees nearby • Low quality trees suppressing adjacent trees of better quality. • Noxious weeds or species categorised as weeds within the local area. **Note:** Category U trees can have existing or potential conservation value* which might make it desirable to preserve.		
	1. Arboricultural Qualities	**2. Landscape qualities**	**3. Cultural and environmental values**
Category A			
Trees of High Quality with an estimated remaining life expectancy of at least 25 years and of dimensions and prominence that it cannot be readily replaced in <20 years.	Trees that are particularly good examples of their species, especially if rare or unusual (in the wild or under cultivation); or those that are important components of groups or avenues.	Trees or groups of significant visual importance as arboricultural and/or landscape features. (e.g. feature and landmark trees).	Trees, groups or plant communities of significant conservation, historical, commemorative or other value (e.g. remnant trees, aboriginal scar trees, critically endangered plant communities, trees listed specifically within a Heritage statement of significance).
Category B			
Trees of Moderate Quality with an estimated remaining life expectancy of 15–25 years and of dimensions and prominence that cannot be readily replaced within 10 years.	Trees that might be included within Category A but are downgraded because of diminished condition such that they are unlikely to be suitable for retention beyond 25 years.	Trees that are visible from surrounding properties and/or the street but make little visual contribution to the wider locality.	Trees with conservation or other cultural value (trees within conservation areas or landscapes described within a statement of significance, locally indigenous species).
Category C			
Trees of Low Quality with an estimated remaining life expectancy of 5–15 years, or young trees that are easily replaceable.	Trees of very limited value or such impaired condition that they do not qualify in higher categories.	Trees offering low or only temporary/transient landscape benefits.	Trees with no material conservation or other cultural value.

**Where trees would otherwise be categorised as U, B or C but have significant identifiable conservation, heritage or landscape value even though only for the short term, they may be upgraded, although they might be suitable for retention only.*

Table 2. Tree Quality

		Health**			
		Excellent/ Good	Fair	Poor	Dead
Structure	Good	A	B	C	U
	Fair	B	B	C	U
	Poor	C	C	U	U
	Hazard*	U	U	U	U

**Structural hazard that cannot be remediated through mitigation works to enable safe retention.*

*** Trees of short term reduced health that can be remediated via basic, low cost plant health care works (e.g. mulching, irrigation etc.) may be designated in a higher health rating to ensure correct retention value nomination.*

10.3 Appendix C – Tree Assessment Data

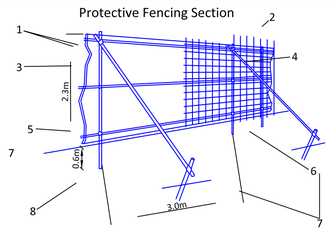
Tree no.	Botanical Name	Common Name	Trees in group	Height [m]	DBH Total (cm)	DRB (cm)	Radial TPZ (m)	TPZ area (m2)	Radial SRZ (m)	Canopy Spread [m]	Health	Structure	Age	ULE (yrs.)	Tree Defects	Arborist Comment (not specific to development)	TreeSignificance	Tree Quality Score	Tree Retention value subcategory	Recommendation
5	*Lophostemon confertus*	Queensland Box		5-10	47	51	**5.7**	101.70	**2.5**	5-10	Good	Fair	Semi-Mature	10-15	Borers/termites; Cavity(s); Deadwood/stubs > 30mm; Epicormic growth; Poor pruning; Wound(s);	Active termites noted in basal cavity during the assessment (possibly Coptotermes), recommend tree be inspected by pest expert and treated if necessary. Good long-standing wound wood development at basal defect. Rectify branch stubs to appropriate pruning targets.	Attractive landscape feature; Amenity value/shade;	C	1	Retain tree with specific protection requirements (i.e. Generic measures plus supervision of works within the TPZ and/or use of root sensitive construction techniques).
6	*Eucalyptus robusta*	Swamp Mahogany		<5	20	23	**2.4**	18.10	**1.8**	<5	Good	Fair	Juvenile	15-25	Co-dominant stems; Epicormic growth; Previous failure(s); Suckers; Wound(s);	Prune to promote apical dominance.	Attractive landscape feature;	C	2	Retain tree with generic protection requirements (i.e. protective fencing and restriction of activities within the TPZ).
18	*x Cupressocyparis leylandii*	Leyland Cypress		5-10	47	122	**5.6**	98.21	**3.6**	5-10	Good	Fair	Mature	25-50	Co-dominant stems; Crossing/rubbing branches; Damaging infrastructure; Included bark; Wound(s);	Minor displacement occurring to planter box.	Amenity value/shade;	C	2	Retain tree with generic protection requirements (i.e. protective fencing and restriction of activities within the TPZ).
19	*Syzygium smithii*	Lilly Pilly		5-10	23	39	**2.8**	24.52	**2.2**	5-10	Good	Fair	Semi-Mature	25-50	Co-dominant stems; Epicormic growth; Included bark;	Lightly shape from shade structure.	Amenity value/shade; Attractive landscape feature;	C	2	Remove - tree located within proposed development footprint or has major encroachment into its TPZ.
20	*Archontophoenix cunninghamiana*	Bangalow Palm	2	5-10	29	47	**3.5**	38.23	**2.4**	5-10	Good	Fair	Semi-Mature	25-50	Co-dominant stems;	Remove dead fronds and fruiting structures annually or as required.	Attractive landscape feature; Amenity value/shade;	C	2	Remove - tree located within proposed development footprint or has major encroachment into its TPZ.
21	*Callistemon viminalis*	Weeping Bottlebrush	8	<5	16	35	**2.0**	12.57	**2.1**	5-10	Good	Fair	Mature	15-25	Co-dominant stems; Deadwood/stubs < 30mm; Epicormic growth; Wound(s);		Attractive landscape feature; Screen value;	C	2	Remove - tree located within proposed development footprint or has major encroachment into its TPZ.
22	*Callistemon citrinus*	Crimson Bottlebrush	2	<5	16	32	**2.0**	12.57	**2.1**	5-10	Good	Fair	Mature	15-25	Co-dominant stems; Deadwood/stubs < 30mm; Epicormic growth; Wound(s);		Attractive landscape feature; Screen value;	C	2	Remove - tree located within proposed development footprint or has major encroachment into its TPZ.
23	*Syzygium paniculatum*	Magenta Brush Cherry		<5	20	25	**2.4**	18.10	**1.8**	<5	Good	Fair	Semi-Mature	25-50	Co-dominant stems; Included bark; Mechanical damage; Mechanical damage to root(s); Previous failure(s); Wound(s);		Attractive landscape feature; Amenity value/shade;	C	2	Retain tree with generic protection requirements (i.e. protective fencing and restriction of activities within the TPZ).
24	*Melaleuca quinquenervia*	Broad-leaved Paperbark		5-10	54	72	**6.5**	133.45	**2.9**	5-10	Good	Fair	Semi-Mature	25-50	Crossing/rubbing branches; Deadwood/stubs < 30mm; Wound(s);		Attractive landscape feature; Amenity value/shade;	B	1	Remove - tree located within proposed development footprint or has major encroachment into its TPZ.
25	*Callistemon viminalis*	Weeping Bottlebrush	2	5-10	27	37	**3.2**	33.07	**2.2**	5-10	Good	Fair	Mature	15-25	Co-dominant stems; Deadwood/stubs < 30mm; Included bark; Mechanical damage; Previous failure(s); Wound(s);	Rectify branch stubs to appropriate pruning targets.	Attractive landscape feature; Amenity value/shade;	C		Retain tree with generic protection requirements (i.e. protective fencing and restriction of activities within the TPZ).
26	*Eucalyptus sideroxylon*	Red Ironbark		10-15	50	57	**6.0**	113.10	**2.6**	10-15	Good	Fair	Mature	25-50	Deadwood/stubs > 30mm; Wound(s);	Tree located in neighbouring property and inspected from school grounds only.	Amenity value/shade;	B	1	Retain tree with generic protection requirements (i.e. protective fencing and restriction of activities within the TPZ).
27	*x Cupressocyparis leylandii*	Leyland Cypress		10-15	54	60	**6.5**	131.46	**2.7**	5-10	Good	Fair	Mature	25-50	Crossing/rubbing branches; Included bark; Mechanical damage; Wound(s);	Remove damaged branch at ~3m.	Amenity value/shade;	C	2	Retain tree with generic protection requirements (i.e. protective fencing and restriction of activities within the TPZ).
40	*Corymbia maculata*	Spotted Gum		20-30	90	98	**10.8**	366.44	**3.3**	20-30	Good	Fair	Mature	25-50	Co-dominant stems; Deadwood/stubs > 60mm; Previous failure(s); Resin exudation/Kino; Wound(s);	Failure of 250mm dia. branch inspected. No visible decay in wound. Previous pruning had left a 150mm dia. wound on the upper side of the branch and has likely impaired the tree's ability to produce tension wood tissue coupled with excessive weight. Additional failure north side. Report any additional failures to Site Manager. Small deadwood hanger lodged central crown. Rectify branch stubs to appropriate pruning targets.	Amenity value/shade; Attractive landscape feature; Significant due to age/size;	A	12	Retain tree with specific protection requirements (i.e. Generic measures plus supervision of works within the TPZ and/or use of root sensitive construction techniques).
41	*Flindersia australis*	Crows Ash		10-15	32	49	**3.8**	45.74	**2.5**	5-10	Good	Fair	Semi-Mature	15-25	Co-dominant stems; Deadwood/stubs < 30mm;		Amenity value/shade;	C	2	Remove - tree located within proposed development footprint or has major encroachment into its TPZ.
42	*Callistemon viminalis*	Weeping Bottlebrush		5-10	31	34	**3.7**	43.47	**2.1**	5-10	Good	Good	Semi-Mature	25-50	Co-dominant stems; Crossing/rubbing branches; Deadwood/stubs < 30mm; Included bark; Wound(s);		Amenity value/shade;	C	2	Remove - tree located within proposed development footprint or has major encroachment into its TPZ.
43	*Melaleuca quinquenervia*	Broad-leaved Paperbark		5-10	35	38	**4.2**	55.42	**2.2**	5-10	Good	Poor	Semi-Mature	5-10	Co-dominant stems; Included bark; Major root damage/Severance; Soil grade changes; Suppressed; Wound(s);	Major roots previously severed (estimated within past two years), in structural root zone. Long-term stability compromised. Tree overhangs water main which would be protected by fence in the event of failure.	Amenity value/shade;	U		Remove tree irrespective of future development.
44	*Melaleuca quinquenervia*	Broad-leaved Paperbark		15-20	71	79	**8.5**	228.05	**3.0**	5-10	Good	Fair	Mature	25-50	Co-dominant stems;		Amenity value/shade; Attractive landscape feature;	B	2	Remove - tree located within proposed development footprint or has major encroachment into its TPZ.
45	*Callistemon salignus*	Willow Bottlebrush		10-15	38	39	**4.6**	65.33	**2.2**	5-10	Good	Fair	Mature	15-25	Co-dominant stems; Crack(s)/Split(s); Deadwood/stubs > 60mm; Hanger(s); Included bark; Previous failure(s); Wound(s);	Multiple small hangers throughout crown. Remove hanger from small bottlebrush to southwest and tree that it failed from further south.	Amenity value/shade;	B	2	Remove - tree located within proposed development footprint or has major encroachment into its TPZ.
46	*Callistemon viminalis*	Weeping Bottlebrush	6	5-10	20	25	**2.4**	18.10	**1.8**	<5	Good	Fair	Semi-Mature	25-50	Co-dominant stems; Epicormic growth; Included bark;		Amenity value/shade;	C	2	Remove - tree located within proposed development footprint or has major encroachment into its TPZ.
47	*Eucalyptus nicholii*	Narrow-leaved Black Peppermint		10-15	78	91	**9.4**	275.23	**3.2**	10-15	Good	Fair	Mature	10-15	Borers/termites; Deadwood/stubs > 100mm; Epicormic growth; Included bark; Previous failure(s); Wound(s);	Termite observed in lower trunk wound, possibly Schedorhinotermes. Engage pest controller to assess for and treat pest. Monitor occlusion of trunk wound and for fungal fruiting bodies and indicators of decay. Sounding of lower trunk with mallet did not reveal significant resonance indicative of internal decay.	Amenity value/shade; Attractive landscape feature;	B	12	Remove - tree located within proposed development footprint or has major encroachment into its TPZ.

Tree no.	Botanical Name	Common Name	Trees in group	Height [m]	DBH Total (cm)	DRB (cm)	Radial TPZ (m)	TPZ area (m2)	Radial SRZ (m)	Canopy Spread [m]	Health	Structure	Age	ULE (yrs.)	Tree Defects	Arborist Comment (not specific to development)	TreeSignificance	Tree Quality Score	Tree Retention value subcategory	Recommendation
57	*Banksia integrifolia*	Coast Banksia		5-10	26	31	**3.1**	30.58	**2.0**	<5	Good	Good	Semi-Mature	25-50	Mechanical damage; Resin exudation/Kino; Wound(s);	Remove small damaged branch at ~2.5m to west. Group includes tree to east.	Amenity value/shade; Attractive landscape feature;	B	2	Retain tree with generic protection requirements (i.e. protective fencing and restriction of activities within the TPZ).
58	*Banksia integrifolia*	Coast Banksia		5-10	31	37	**3.7**	43.47	**2.2**	<5	Good	Good	Semi-Mature	25-50	Co-dominant stems; Wound(s);		Amenity value/shade; Attractive landscape feature;	B	2	Retain tree with generic protection requirements (i.e. protective fencing and restriction of activities within the TPZ).
79	*Syzygium floribundum*	Weeping Lilly Pilly		<5	23	23	**2.7**	23.48	**1.8**	5-10	Good	Good	Semi-Mature	15-25	Dieback;		Attractive landscape feature;	C	1	Retain tree with generic protection requirements (i.e. protective fencing and restriction of activities within the TPZ).
80	*Tristaniopsis laurina*	Kanooka		<5	22	35	**2.6**	21.94	**2.1**	<5	Good	Fair	Semi-Mature	25-50	Co-dominant stems; Deadwood/stubs < 30mm; Epicormic growth; Included bark;		Attractive landscape feature;	C	2	Retain tree with generic protection requirements (i.e. protective fencing and restriction of activities within the TPZ).
81	*Callistemon sp.*	Bottlebrush	3	5-10	20	26	**2.4**	18.55	**1.9**	<5	Good	Fair	Semi-Mature	15-25	Co-dominant stems; Epicormic growth; Wound(s);		Attractive landscape feature;	C	2	Retain tree with generic protection requirements (i.e. protective fencing and restriction of activities within the TPZ).
82	*Callistemon viminalis*	Weeping Bottlebrush		5-10	21	37	**2.5**	19.59	**2.2**	5-10	Fair	Fair	Mature	10-15	Deadwood/stubs < 30mm; Dieback; Wound(s);		Attractive landscape feature;	C	2	Retain tree with generic protection requirements (i.e. protective fencing and restriction of activities within the TPZ).
83	*Agonis flexuosa*	Willow Myrtle/Peppermint		5-10	71	83	**8.5**	228.82	**3.1**	10-15	Good	Poor	Mature	5-10	Cavity(s); Co-dominant stems; Crossing/rubbing branches; Deadwood/stubs > 60mm; Decay; Fungal fruiting body(s); Included bark; Wound(s);	Tree heavily decayed in both stems and at base. Species generally tolerant and responsive to internal decay and tree of squat form, thus failure considered possible.	Amenity value/shade;	U		Remove tree irrespective of future development.
84	*Agonis flexuosa*	Willow Myrtle/Peppermint		5-10	53	58	**6.3**	126.17	**2.6**	5-10	Fair	Fair	Mature	10-15	Cavity(s); Co-dominant stems; Decay; Wound(s);	Decay in southern stem with good response growth. Monitor for further degradation.	Amenity value/shade;	C	1	Retain tree with generic protection requirements (i.e. protective fencing and restriction of activities within the TPZ).
85	*Callistemon viminalis*	Weeping Bottlebrush		5-10	21	26	**2.6**	20.72	**1.9**	5-10	Good	Fair	Semi-Mature	10-15	Co-dominant stems; Epicormic growth; Included bark;		Attractive landscape feature;	C	2	Retain tree with generic protection requirements (i.e. protective fencing and restriction of activities within the TPZ).
86	*Archontophoenix alexandrae*	Alexandra Palm	2	5-10	28	48	**3.3**	34.97	**2.4**	5-10	Good	Fair	Semi-Mature	25-50	Co-dominant stems;	Remove dead fronds and fruiting structures annually or as required.	Amenity value/shade;	B	2	Remove - tree located within proposed development footprint or has major encroachment into its TPZ.
87	*Callistemon viminalis*	Weeping Bottlebrush	2	5-10	29	40	**3.4**	37.14	**2.3**	5-10	Fair	Poor	Mature	<5	Co-dominant stems; Deadwood/stubs > 30mm; Decay; Dieback; Fungal fruiting body(s); Included bark; Previous failure(s); Wound(s);	Tagged tree has significant decay related dysfunction in southern crown, fruiting body at ~1.5m. Tree to north has suffered substantial previous failure resulting in poor structure.		U		Remove tree irrespective of future development.
88	*Unknown sp.*	Unknown sp.		5-10	16	32	**2.0**	12.57	**2.1**	<5	Good	Fair	Semi-Mature	15-25	Co-dominant stems;	No reproductive parts available for identification. Possibly Persea sp.	Attractive landscape feature;	C	2	Remove - tree located within proposed development footprint or has major encroachment into its TPZ.
89	*Persea americana*	Avocado		5-10	25	25	**3.0**	28.27	**1.8**	5-10	Good	Good	Semi-Mature	25-50			Attractive landscape feature;	C	2	Remove - tree located within proposed development footprint or has major encroachment into its TPZ.
90	*Podocarpus elatus*	Brown Pine		10-15	111	101	**13.3**	557.39	**3.3**	10-15	Good	Fair	Mature	25-50	Co-dominant stems; Deadwood/stubs > 30mm; Included bark; Wound(s);	No cracks, splits or separation observed.	Amenity value/shade; Significant due to age/size;	A	1	Remove - tree located within proposed development footprint or has major encroachment into its TPZ.
93	*Syzygium paniculatum*	Magenta Brush Cherry		5-10	68	66	**8.2**	209.18	**2.8**	10-15	Good	Fair	Mature	25-50	Co-dominant stems; Deadwood/stubs > 30mm; Included bark;		Amenity value/shade; Attractive landscape feature;	A	2	Retain tree with specific protection requirements (i.e. Generic measures plus supervision of works within the TPZ and/or use of root sensitive construction techniques).
94	*Magnolia figo var. crassipes*	Port Wine Magnolia		5-10	30	69	**3.6**	41.35	**2.8**	5-10	Good	Fair	Mature	25-50	Co-dominant stems; Epicormic growth; Wound(s);		Attractive landscape feature;	C	2	Remove - tree located within proposed development footprint or has major encroachment into its TPZ.
95	*Brachychiton acerifolius*	Illawarra Flame Tree		5-10	37	44	**4.4**	61.93	**2.3**	5-10	Fair	Fair	Mature	15-25	Deadwood/stubs > 30mm; Dieback; Epicormic growth; Hanger(s); Wound(s);	30mm diameter well supported hanging branch lower canopy northern aspect.	Amenity value/shade;	B	2	Remove - tree located within proposed development footprint or has major encroachment into its TPZ.
96	*Glochidion ferdinandi*	Cheese Tree		10-15	47	57	**5.7**	101.70	**2.6**	5-10	Good	Poor	Mature	<5	Epicormic growth; Hanger(s); Included bark; Previous failure(s); Weak union(s); Wound(s);	80mm diameter well supported hanging branch lower canopy southern aspect. Second branch failure from included union. Ground staff to monitor major unions for cracks, splits or separation after inclement weather events.	Amenity value/shade;	U		Remove tree irrespective of future development.
97	*Jacaranda mimosifolia*	Jacaranda		5-10	36	52	**4.3**	59.04	**2.5**	5-10	Fair	Fair	Semi-Mature	5-10	Co-dominant stems; Crossing/rubbing branches; Dieback; Epicormic growth; Included bark; Poor pruning; Uncharacteristic form; Wound(s);	Health has improved. Reduced TLE due to structure.		C	1	Remove - tree located within proposed development footprint or has major encroachment into its TPZ.
98	*Brachychiton acerifolius*	Illawarra Flame Tree		10-15	36	40	**4.3**	58.63	**2.3**	5-10	Good	Good	Semi-Mature	25-50	Deadwood/stubs > 30mm; Dieback; Pests/Insects; Soil problems;		Amenity value/shade;	B	2	Remove - tree located within proposed development footprint or has major encroachment into its TPZ.
99	*Jacaranda mimosifolia*	Jacaranda		10-15	81	92	**9.8**	299.35	**3.2**	5-10	Good	Fair	Mature	15-25	Crossing/rubbing branches; Deadwood/stubs < 30mm; Dieback; Epicormic growth; Poor pruning; Wound(s);		Amenity value/shade; Attractive landscape feature;	A	12	Retain tree with specific protection requirements (i.e. Generic measures plus supervision of works within the TPZ and/or use of root sensitive construction techniques).
100	*Corymbia maculata*	Spotted Gum		10-15	40	50	**4.8**	72.38	**2.5**	10-15	Good	Good	Semi-Mature	>50	Co-dominant stems; Deadwood/stubs > 30mm; Pests/Insects;		Amenity value/shade; Attractive landscape feature;	A	12	Remove - tree located within proposed development footprint or has major encroachment into its TPZ.

Tree no.	Botanical Name	Common Name	Trees in group	Height [m]	DBH Total (cm)	DRB (cm)	Radial TPZ (m)	TPZ area (m2)	Radial SRZ (m)	Canopy Spread [m]	Health	Structure	Age	ULE (yrs.)	Tree Defects	Arborist Comment (not specific to development)	TreeSignificance	Tree Quality Score	Tree Retention value subcategory	Recommendation
101	*Archontophoenix alexandrae*	Alexandra Palm		5-10	25	40	**3.1**	29.41	**2.3**	5-10	Good	Fair	Semi-Mature	25-50	Co-dominant stems;	Remove dead fronds and fruiting structures annually or as required.	Attractive landscape feature; Amenity value/shade;	C	1	Remove - tree located within proposed development footprint or has major encroachment into its TPZ.
102	*Callistemon viminalis*	Weeping Bottlebrush	2	5-10	28	55	**3.4**	36.28	**2.6**	5-10	Good	Fair	Mature	15-25	Co-dominant stems; Deadwood/stubs < 30mm; Epicormic growth; Wound(s);		Amenity value/shade;	B	2	Remove - tree located within proposed development footprint or has major encroachment into its TPZ.
104	*Corymbia maculata*	Spotted Gum		10-15	49	63	**5.9**	108.62	**2.7**	10-15	Good	Good	Semi-Mature	>50	Co-dominant stems; Deadwood/stubs > 30mm; Pests/Insects; Wound(s);		Amenity value/shade; Attractive landscape feature;	A	1	Retain tree with specific protection requirements (i.e. Generic measures plus supervision of works within the TPZ and/or use of root sensitive construction techniques).
105	*Corymbia maculata*	Spotted Gum		5-10	35	44	**4.2**	55.42	**2.3**	10-15	Good	Good	Semi-Mature	15-25	Deadwood/stubs < 30mm; Hanger(s); Suppressed; Wound(s);	Minor deadwood / hangers over low use area.	Amenity value/shade; Attractive landscape feature;	B	2	Retain tree with generic protection requirements (i.e. protective fencing and restriction of activities within the TPZ).
106	*Corymbia citriodora*	Lemon-scented Gum		15-20	83	99	**10.0**	311.65	**3.3**	20-30	Excellent	Good	Mature	25-50	Crossing/rubbing branches; Deadwood/stubs > 30mm; Wound(s);	Remove small lateral branch over footpath, 30mm dia. final cut. Remove crossing branches <40mm dia. from internal crown.	Amenity value/shade; Attractive landscape feature; Significant due to age/size; Suitable to site conditions; Dominant landscape feature; Outstanding example of species;	A	12	Retain tree with generic protection requirements (i.e. protective fencing and restriction of activities within the TPZ).
107	*Corymbia maculata*	Spotted Gum		5-10	31	39	**3.7**	43.47	**2.2**	10-15	Good	Good	Semi-Mature	15-25	Borers/termites; Deadwood/stubs < 30mm; Resin exudation/Kino; Suppressed; Wound(s);	Tree responding well to minor borer activity on lower trunk.	Amenity value/shade; Attractive landscape feature;	B	2	Retain tree with generic protection requirements (i.e. protective fencing and restriction of activities within the TPZ).
108	*Corymbia maculata*	Spotted Gum		5-10	54	68	**6.5**	131.92	**2.8**	5-10	Good	Good	Semi-Mature	25-50	Co-dominant stems; Deadwood/stubs > 30mm; Epicormic growth; Resin exudation/Kino; Wound(s);		Amenity value/shade; Attractive landscape feature;	B	2	Retain tree with specific protection requirements (i.e. Generic measures plus supervision of works within the TPZ and/or use of root sensitive construction techniques).
109	*Lagunaria patersonii*	Norfolk Island Hibiscus		5-10	33	54	**4.0**	50.76	**2.6**	5-10	Good	Fair	Semi-Mature	>50	Co-dominant stems; Epicormic growth; Included bark; Wound(s);	Council tree - not tagged.	Amenity value/shade;	B	2	Retain tree with generic protection requirements (i.e. protective fencing and restriction of activities within the TPZ).
110	*Eucalyptus tereticornis*	Forest Red Gum		20-30	38	47	**4.6**	65.33	**2.4**	5-10	Good	Good	Semi-Mature	>50	Deadwood/stubs < 30mm; Epicormic growth; Suppressed; Wound(s);	Council tree - not tagged.	Amenity value/shade;	B	2	Retain tree with generic protection requirements (i.e. protective fencing and restriction of activities within the TPZ).
116	*Callistemon salignus*	Willow Bottlebrush		5-10	16	24	**2.0**	12.57	**1.8**	<5	Good	Fair	Semi-Mature	5-10	Co-dominant stems; Inappropriate location;			C	2	Retain tree with generic protection requirements (i.e. protective fencing and restriction of activities within the TPZ).

10.4 Appendix D – Tree Protection Plan

Protective Fencing Section



1. Standard scaffold poles
2. Uprights to be driven into ground
3. Panels secured to uprights with wire and where necessary standard scaffold clamps
4. Weldmesh wired to the uprights and horizontals
5. Standard clamps
6. Wire twisted and secured on inside face of fencing to avoid easy dismantling
7. Ground level
8. Approximately 0.6m driven into the ground

Protective Fencing

To be erected prior to the commencement of all works on site, and retained in place throughout construction. To comprise either 2.4m wooden site hoarding; or a 2.1m high scaffolding framework, with uprights at maximum 3.5m spacings, every other one braced to the ground with 45 degree struts; supporting standard anti-climb 'Heras' welded mesh fence panels secured with anti-lift devices to concrete or plastic bases pinned to the ground by scaffold uprights sunk to a minimum depth of 500mm; individual panels fixed to each other with at least 2 clamps and to scaffolding with heavy-duty cable ties. "TREE PROTECTION ZONE - KEEP OUT" or similar notices to be attached to every fifth panel.

Arborist Supervision

An Arborist experienced in tree protection on construction sites shall be engaged prior to the commencement of work on the site. The Arborists tasks will be to monitor and report regularly on the condition of the retained trees. The site Arborist shall be present to supervise any excavation, trenching or tunneling within the TPZ of any retained trees.

The schedule of works for the development shall acknowledge the role of the site Arborist and the need to protect the retained trees. Sufficient notice shall be given to the Arborist where his/her attendance is required. Should the proposed design change from that reviewed, additional arboricultural assessment will be required.

Areas on site where the supervision of a consulting arborist are:

1. Location of protective fencing and ground boarding.
2. Lifting/excavation of existing hard surfacing within TPZs
3. Construction of above-ground hard surfacing.

Excavation within TPZ

Within Tree Protection Zones the first 750mm depth of any excavation, whether for exploratory purposes, proposed foundations, hard surfacing, or underground services shall be undertaken by hand or using sensitive techniques (e.g. Air-spade of hyro-vac) under arboricultural supervision. Soil is to be cleared from roots with care not to cause damage. All damaged roots will be cut cleanly with a hand saw or secateurs. The edge of the excavation closest to the trees will be covered with hessian sacking to prevent drying out, and if necessary be shuttered with an appropriate material to prevent soil collapse. Where appropriate, the soil beneath this depth may be sheet piled; and deeper excavation may be undertaken by machine provided it works from outside the Tree Protection Zone edge.

Protective fencing to be located as far from the trunks of retained trees as practicable and beyond the TPZ where feasible.

Demolition of existing structures and line marking of car park proposed in TPZs. Works to be performed with care to avoid damage to tree roots. Any excavation or below grade works within TPZs must be supervised by Project Arborist.

Demolition and excavation works within the TPZs of retained trees is to carried out under arborist supervision using careful construction methods (e.g. hand excavation, air-spade or hydro-vac)

Trees 6, 89, 90, 100 and 102 not identified on site survey. Locations shown as indicative only.

Demolition of existing structures and new car park proposed in TPZs. Proposed parking to be outside TPZs or above grade and installed in a manner not to impact tree roots. Any excavation or below grade works within TPZs must be supervised by Project Arborist.

LEGEND

Tree trunk & number:	5	Cat. A TPZ:	
Category U TPZ & No:	[43]	Cat. B TPZ:	
Tree to be removed for devt:		Cat. C TPZ:	

Tree Retention Value

Trees have been categorised to allow an accurate account of which should and should not be a constraint. Tree categories are determined according to their health condition, quality and value.

Cat. U:- Trees to be removed irrespective of devt.
Cat. A:- Trees of high quality and value
Cat. B:- Trees of moderate quality and value
Cat. C:- Trees of low quality and value

Cat. A retention value trees should be retained, planned around and be protected from damage.

Cat. B retention value trees should be retained if possible.

Cat. C retention value trees will not be retained where they impose a significant constraint on development.

Cat. U retention value trees are unretainable for the forseeable future and typically recommended for removal irrespective of site development.

Tree Protection Zones (TPZs)

A model is used to assist in the prediction of the likely impact of development on retained trees. This model is based on the Diameter of Trunk at Breast Height (DBH) for an individual specimen.

TPZ = DBH x 12
(DBH measured at 1.5m on trunk)

It is recommended that an area around each retained tree should be protected from disturbance "in order to avoid (unacceptable) damage to the roots or rooting environment" (as a result of root severance or damage, or compaction or pollution of the soil).

These Tree Protection Zones ('TPZs') have been calculated for all retained trees and are shown as areas bordered in green, blue or grey according to tree category. These zones are normally portrayed as a circle of a fixed radius from the centre of the trunk.

The Structural Root Zone (SRZ) is the area required for tree stability. A larger area is required to maintain a viable tree. The SRZ only needs to be calculated when major encroachment into a TPZ is proposed. There are many factors that affect the size of the SRZ (e.g. tree height, crown area, soil type, soil moisture). The SRZ may also be influenced by natural or built structures, such as rocks and footings. An indicative SRZ radius can be determined from the trunk diameter measured immediately above the root buttress using the following formula:

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

Root investigation may provide more information on the extent of these roots.

Permissible Encroachment in TPZs

As per the Australian Standard AS4970-2009 *Protection of Trees on Development Sites* a major encroachment into the TPZ of any tree is considered to occur when it is beyond 10% of the total TPZ area. A minor encroachment is determined as being less than 10% of the total TPZ area. If the proposed encroachment is minor and is outside the SRZ, detailed root investigations should not be required. The area lost to this encroachment should be compensated for elsewhere and contiguous with the TPZ. If the proposed encroachment is major or inside the SRZ, the project arborist must demonstrate that the tree(s) would remain viable. The area lost to this encroachment should also be compensated for elsewhere and contiguous with the TPZ. This may require root investigation by non-destructive methods and consideration of relevant factors.

PROJECT:	Arboricultural Impact Assessment Pittwater House School		
CLIENT:	C.M.S Surveyors Pty Ltd.		
DRAWING:	Tree Protection Plan		
DRAWING NO.:	ASTPP01	Rev.2	23.10.2019
BASED ON:	Survey Plan 4883G C.M.S Surveyors Pty Ltd.		
SCALE:	Do not scale		
DRAWN BY:	NA		

ArborSafe