

arboricultural impact assessment report

AIA-01

Revision A, Issued for SSDA
18 October 2024



PROJECT

FITZGERALD AVENUE, MAROUBRA

195-213 Fitzgerald Avenue & 40-64 Yorktown Parade,
Maroubra, NSW, 2035

CLIENT / PRINCIPAL

HOMES NSW

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Acknowledgements & Qualifications

This document has been prepared by Arterra Design Pty Ltd, using the expertise of our in-house (AQF Level 5), consulting arborists, Robert Smart and/or Chloe Bristow.

Robert Smart is a member of the International Society of Arboriculture (ISA), an accredited member of the Institute of Australian Consulting Arboriculturists (IACA), a Registered Consulting Arborist with Arboriculture Australia (AA) and a licenced Quantified Tree Risk Assessment (QTRA) practitioner. Robert Smart has over 25 years' experience in assessing and managing trees in complex development sites. Robert is also a Registered Landscape Architect with over 30 years' experience.



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i EXECUTIVE SUMMARY

This Arboricultural Impact Assessment has been prepared by Arterra on behalf of Homes NSW for a State Significant Development Application (SSD-71454960) for the redevelopment of existing social housing (the Project) at 195-213 Fitzgerald Avenue and 40-64 Yorktown Parade, Maroubra (the Site). The Project involves the replacement of the 33 social housing units across eight 2 storey apartment buildings and a single storey dwelling with 144 units across four 3 storey buildings and two part 3/part 4 storey buildings.

This report assesses the potential impacts of construction works that are proposed to occur in relation to proposed development. A detailed tree assessment and impact schedule was completed for all the existing trees close to the proposed works. (Refer to Appendix 4.2 – Tree Impact Assessment Schedule). The trees were photographed, allocated a unique identification number and plotted onto a scaled survey base plan for referencing and identification throughout the report and for future discussions and co-ordination with all Contractors and stakeholders (Refer to Appendix 4.1 – Tree Plans).

A total of **144** trees were assessed for this report. Note there are 141 tree ID numbers assigned, however two of the IDs relate to grouping of 2 trees. We also note that **22** of the trees assessed are public street trees. (Six (**6**) of located on Yorktown Parade, and the remaining sixteen (**16**) located on Fitzgerald Avenue). All other trees are located within the site boundary.

The trees assessed are trees that would be considered 'prescribed trees' under the Randwick City Council Development Control Plan (DCP) 2013. Small trees, shrubs (<6.0m) and dead trees have typically not been included in our assessment, unless they are street trees.

Table i: Assessed Tree Population and Retention Value

Retention Value	Existing Total Number of Trees	% of total	Trees Proposed to be Retained	Trees Proposed to be Removed
<i>High</i>	5	3%	2	3
<i>Moderate</i>	27	19%	14	13
<i>Low</i>	88	61%	9	79
<i>Very Low / Remove</i>	24	17%	-	24
Total trees on site	144	100%	25	119

The following points arise from the impact assessment:

- **25** trees are to be retained and protected.
- **119** trees are to be removed. With regard to the 119 trees removed:
 - **3** are rated with **High** retention value
 - **13** are rated with **Moderate** retention value
 - **103** are rated with either a **Low or Very Low/ Remove** retention value. The majority of these specimens are identified as weed/invasive species, exotic fruit trees or other relatively small and insignificant trees.

A focus of the development has been to retain and protect the street trees fronting Fitzgerald Avenue and Yorktown Parade, in particular trees **T140** (*Ficus microcarpa var hillii*) and **T44** (*Ficus rubiginosa*).

As summarised above, **25** trees that are to be retained and protected:

- **18** trees have no or minimal foreseeable impact from construction related activity.
- **6** trees (T04, T42, T44, T137, 139 and T140) have a 'minor encroachment' (<10%) into their nominal TPZs and is considered acceptable and likely to have minimal impact to the trees
- **1** tree (T136) has a major root zone incursion of 18%. This level of incursion is undesirable, but this incursion does only occur on one side of the tree for services installation and is considered tolerable in this instance given the extensive areas available to the tree on the remaining undisturbed side and the fact that roots may be able to regrow into the disturbance from the properly pruned root ends in the future.
- Some trees will require the relatively **minor surface oriented impacts** to be very carefully managed during demolition and construction. These surface related impacts are shown shaded on the Tree Retention and Removal Plan (T-02) and noted in the schedule. Given the surface oriented nature of these works it is expected that any root loss and disturbance would be minimal.
- To manage tree related impacts some areas will require the **use of non-destructive excavation** (using either hand digging, compressed air (air spade), water vacuum extraction or underboring techniques) within their TPZs to install new stormwater and electrical services. Refer to Section 2.7 further details.

- Only **1** tree (**T42**) will require minor canopy pruning to be undertaken. The pruning is considered to be less than 10% of the overall canopy and therefore acceptable. Refer to Section 2.7.

Most importantly it will be vital to ensure the appointed Contractor ensures the required tree protection measures are put in place, are maintained, and that sufficient care is displayed by all sub-contractors during the construction. This document has been prepared by Arterra, using the expertise of our in-house consulting arborist (AQF Level 5), Robert Smart. Robert is a member of the International Society of Arboriculture - Australian Chapter and is also a Registered Consulting Arborist with Arboriculture Australia.



Robert Smart AAILA , ISA, AA, IACA

Director, Registered Landscape Architect (054), Registered Consulting Arborist (1804).

1.0 INTRODUCTION

1.1 Background

This Arboricultural Impact Assessment has been prepared by Arterra on behalf of Homes NSW for a State Significant Development Application (SSD-71454960) for the redevelopment of existing social housing (the Project) at 195-213 Fitzgerald Avenue and 40-64 Yorktown Parade, Maroubra (the Site). The Project involves the replacement of the 33 social housing units across eight 2 storey apartment buildings and a single storey dwelling with 144 units across four 3 storey buildings and two part 3/part 4 storey buildings.

The purpose of this report is to provide an assessment of the likely tree impacts and arboricultural advice regarding the development proposal for the site and to address the Secretary’s Environmental Assessment Requirements (SEARs) for the project issued on 6 June 2024 which identified the following specific assessment requirements:

Table 1 – SEARs Requirements

Item	Description of Requirement	Section Reference (this report)
8. Trees and Landscaping	Assess the number, location, condition and significance of any trees to be removed and retained and note any existing canopy coverage to be retained on site	Refer: - Section 2.3 Number of Trees - Section 2.8 Existing Canopy Cover - Appendix 4.2 – Detailed Schedule of Trees - Appendix 4.1 – Existing Tree Plans
	Provide a detailed site-wide landscape plan, that: <ul style="list-style-type: none"> • Details the proposed site planting, including location, number and species of plantings, heights of trees at maturity and proposed canopy coverage (as a percentage of the site area) • Provides evidence that opportunities to retain significant trees have been explored and/or informs the plan • Demonstrates how the proposed development would: <ul style="list-style-type: none"> ○ Provide a detailed site-wide landscape plan, that: <ul style="list-style-type: none"> ▪ details the proposed site planting, including location, number and species of plantings, heights of trees at maturity and proposed canopy coverage (as a percentage of the site area). ▪ provides evidence that opportunities to retain significant trees have been explored and/or informs the plan. ▪ demonstrates how the proposed development would: <ul style="list-style-type: none"> ▪ contribute to long term landscape setting in respect of the site and streetscape. ▪ mitigate the urban heat island effect and ensure appropriate comfort levels on-site. ▪ contribute to the objective of increased urban tree canopy cover. ▪ Maximise opportunities for green infrastructure, consistent with Greener Places and having regard to any bush fire risk. 	Refer: Refer to separate Landscape Master Plan Report

Items listed above relating to the existing trees on the site are addressed directly by Arterra, however, the remaining items listed have been addressed in collaboration with the Project Landscape Architect. Refer to Landscape documentation for site wide landscape plan addressing landscape related matters.

1.2 The Site

The Site is located within the Randwick City Council local government area (LGA) and is zoned R3 Medium Density Residential under the Randwick Local Environmental Plan (LEP) 2012.

The Site has a total area of approximately 9,596 square metres (sqm) with frontages to Fitzgerald Avenue to the north and Yorktown Parade to the south. Refer to Figure 1 below.

The existing buildings on the Site are currently occupied. There are street trees located along the Fitzgerald Avenue frontage and a series of trees within the Site between the buildings and along both street frontages.

The site is accessible by public transport with services that run along Fitzgerald Avenue with frequent services to Maroubra town centre and Bondi Junction, with connecting services to Sydney CBD.

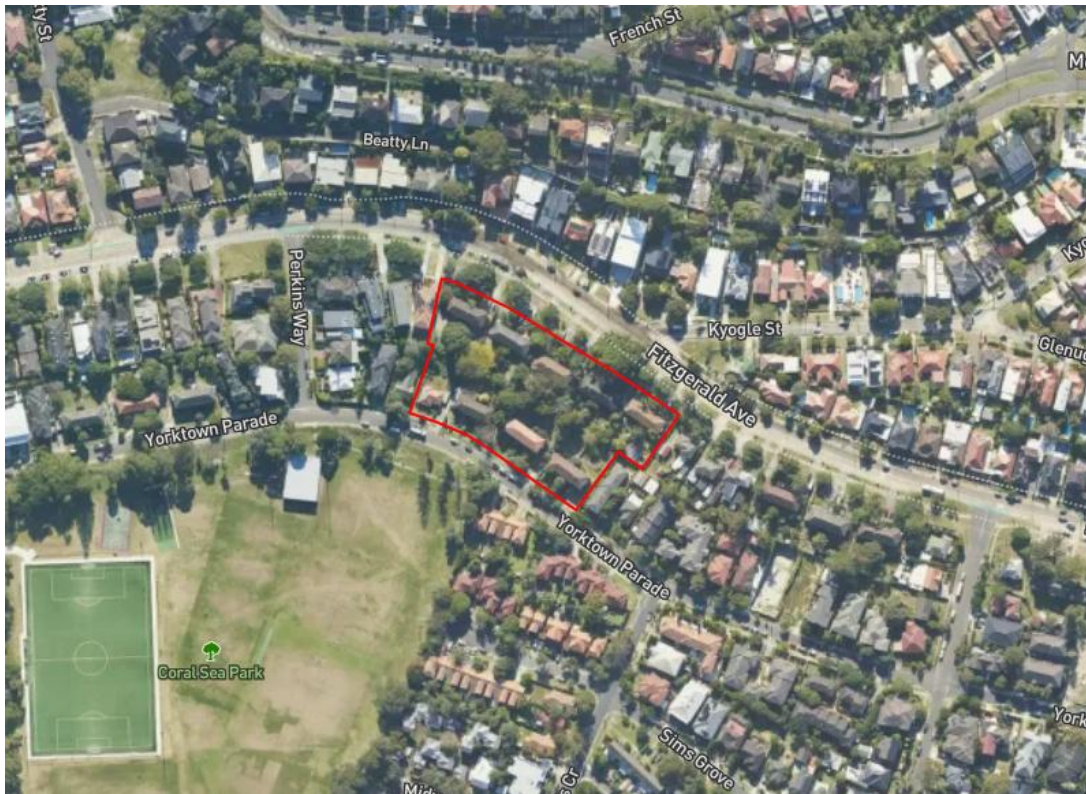


Figure 1 – Site plan – site outline shown in red (Source: Homes NSW).

1.3 Aims of this Report

This arboricultural impact assessment has been prepared to identify the trees to be retained and removed as part of the development project and to assess potential tree impacts. The specific aims of the report are to:

- assess the health and condition of the trees and record all the relevant data for existing trees;
- assess significance, Useful Life Expectancy (ULE) and retention values of the existing trees;
- provide recommendations as to which trees should ideally be retained and protected;
- identify the proposed Tree Protection Zones (TPZ) of the trees being retained;
- identify and assess the likely arboricultural impacts of the development on the trees, and
- provide recommendations on the tree protection measures that will be required during construction to ensure the trees are successfully retained.

The assessment is restricted to the trees within or immediately adjoining the site that are likely to be impacted by the works proposed works. Other trees outside the extent of the proposed works and unlikely to be impacted, are not addressed as part of this report.

All tree plans contained in this report are based on information provided to Arterra, including site survey and architectural drawings. The tree plans should only be used for reference and relating to tree issues and are not suitable for any other purpose.

1.4 Relevant Controls or Legislation

The site is proposed to be redeveloped to provide social and affordable housing. We understand the site is not heritage listed, nor in a heritage conservation area. The site does not appear to be constrained by any natural area or biodiversity mapping. The roadside verge and street trees fall under the control of RCC.

Protected Trees

Under the provisions of Clause 5.9 of the RCC LEP 2012 and Part B5 of the DCP, *a person must not, on land to which these plans apply, ringbark, cut down, top, lop, prune, remove, poison, tree root prune, destroy or injure any tree/s covered by these documents without the consent of the Council. A permit or development consent (whichever is applicable) must be obtained from Council prior to the pruning or removal of any 'Protected Tree'.* Trees that fall into the following three categories are defined as 'Protected Trees':

1. Private Trees
Any palm tree, cycad or tree fern of any size, any tree with a height of six (6) metres or more, a canopy width of four (4) metres or more, a circumference greater than one (1) metre measured one (1) metre above the ground – excluding trees listed as undesirable species in Appendix B5-2 of the DCP.
2. Public Trees
Any tree on public land, regardless of size (public land means any land which the public use or are entitled to use for a public purpose including but not limited to a public reserve, a public place, a public road, crown land, community land, public open space, a public walkway and a common), any tree in bushland (bushland has the same meaning as that defined in State Environmental Planning Policy (SEPP) No 19 – Bushland in Urban Areas).
3. Significant Trees
All trees listed in Randwick City Council's Register of Significant Trees and in Schedule 5 – Parts 1-4 (Heritage Items, Heritage Conservation Areas, Archaeological sites, Aboriginal heritage) of the RCC LEP 2012. There are no known or identified 'significant trees' on the subject site.

Exempt Species

- Approval is not required for removal of the following "Undesirable Species" as listed in Appendix B5-2 of the DCP (refer Table 1).
- Trees specified as exempt species under the RCC DCP 2013 and trees that have been declared weeds under the Environmental Protection & Biodiversity Conservation Act 1999 may be removed without the need for Council approval.

Table 2 – Exempt Species as per Randwick City Council DCP 2013

Species Name	Common Name
<i>Ailanthus altissima</i>	Tree of Heaven
<i>Alnus jorullensis</i>	Evergreen Alder
<i>Bambusa</i> species	Bamboo species
<i>Celtis occidentalis [assumed to apply to C. sinensis as well]</i>	Hackberry
<i>Cotoneaster</i> species	Cotoneaster
<i>Cupressocyparis x leylandii</i>	Leyland Cypress
<i>Erythrina</i> species	Coral tree
<i>Ficus elastica</i>	Rubber tree
<i>Lagunaria patersonia</i>	Norfolk Island Hibiscus
<i>Ligustrum</i> species	Privet
<i>Morus</i> species	Mulberry
<i>Nerium oleander</i>	Oleander
<i>Ochna serrulata</i>	Ochna
<i>Olea europea var. africana</i>	African Olive
<i>Populus</i> species	Poplars
<i>Salix</i> species	Willows
<i>Schefflera actinophylla</i>	Umbrella tree
<i>Syagrus romanzoffianum</i>	Cocos Palm
<i>Toxicodendron succedaneum</i>	Rhus tree

Note: Any tree with a height of less than six (6) metres, a canopy width of less than four (4) metres or a circumference less than one (1) metre measured one (1) metre above the ground may be pruned and/or removed without the consent of RCC. This excludes palm trees, cycads or tree ferns of any size, which are protected by Part B5 of the RCC DCP 2013. (https://www.randwick.nsw.gov.au/__data/assets/pdf_file/0013/234/04/Tree-Management-Technical-Manual-17-July-2017.pdf – accessed 03/07/2024)

It is to be noted that many of the trees assessed have been identified as species which are considered "undesirable" by Randwick City Council and are included in Table 1 above. These species include *Celtis* species, *Cotoneaster* species, *Ligustrum* species, *Morus* species, *Nerium oleander*, *Olea europea var. Africana*, *Schefflera actinophylla* and *Syagrus romanzoffianum*.

1.5 Conduct and Author Qualifications

This document has been prepared by Arterra Design Pty Ltd, using the expertise of our in-house (AQF Level 5), consulting arborists, Robert Smart and/or Chloe Bristow.

Robert Smart is a member of the International Society of Arboriculture (ISA), an accredited member of the Institute of Australian Consulting Arboriculturists (IACA), a Registered Consulting Arborist with Arboriculture Australia (AA) and a licenced Quantified Tree Risk Assessment (QTRA) practitioner. Robert Smart has over 25 years' experience in assessing and managing trees in complex development sites. Robert is also a Registered Landscape Architect with over 30 years' experience.

Furthermore, Mr Smart and Ms Bristow confirm that they have read and agree to be bound by the NSW Uniform Civil Procedure Rules 2005, Part 31 Division 2 Provisions, Schedule 7 - Expert witness code of conduct.

Arterra provides specialist consulting arborist services only; and does not provide any physical tree services such as climbing, pruning, removal, root investigations or root pruning. Our advice is based on impartial professional assessment, as we do not derive any financial benefit from specifying pruning or other physical arborist services. We do not specify any such activities unless we determine them to be essential to ongoing tree health or stability.

1.6 Key Definitions and Abbreviations

The following abbreviations are used throughout this report.

"TPZ" = Tree Protect Zone

This is the area as defined by AS 4970 – "Protection of Trees on Development Sites" and means the typical minimum area above and below ground at a given distance from the trunk to provide for protection of the tree. Most importantly it represents the root zone required to be left undisturbed to maintain a healthy and viable tree. Please note, that roots will usually extend well beyond this zone, so this represents the minimum remaining root zone required, assuming all others are lost or damaged due to construction. It is typically calculated as a circle centred on the trunk unless existing site conditions can be assessed and indicate otherwise.

"TPA" = Tree Protection Area

Although based on the nominal TPZ above, this is a consolidated and often simplified area to be applied during construction for tree protection. This area is often shaped to deal with practical construction realities whilst maintaining appropriate protection of the nominal TPZ (i.e fencing a nominal circular TPZ can be difficult and impractical. TPA areas often define a square or rectangular shape which includes the area calculated as the nominal TPZ). It often amalgamates and simplifies tree protection zones, particularly when they are overlapping and can be amended for items such as buildings, walls, pathways and existing fences. It also protects areas that are contiguous to the calculated nominal TPZ, which are to be applied when the nominal TPZ is not completely circular due to structures potentially impeding root growth, or when there is an incursion calculated within the TPZ.

"SRZ" = Structural Root Zone

This is the area as defined by AS 4970 – "Protection of Trees on Development Sites" and means the area immediately around the base of the tree at a given distance from the trunk within which the woody roots and soil cohesion are considered vital to the structural stability of the tree. Disturbance, damage or removal of soil and roots within this area will typically render the tree unstable and require its removal. It is typically calculated as a circle, centred on the trunk, unless existing site conditions can be assessed and indicate otherwise.

"DBH" = Diameter at Breast Height

This is the diameter of the trunk measured at 1.4m above ground level.

"DGL" = Diameter at Ground Level

This is the diameter of the trunk measured at ground level, but just above any root flare.

Non-Destructive Digging

This is the process of safely excavating the ground surface to minimise the risk of damage to existing tree roots. This method is used to map and locate existing tree roots within the TPZ and/or SRZ and helps to guide and inform the installation and/or construction of proposed services and/or structures which are near retained trees. This is

often achieved through hand digging using a shovel, trowel and/or fork with care not to damage the bark and wood of any roots. Compressed air (air spade) or water vacuum extraction are appropriate non-destructive alternatives to hand digging. When this work occurs within a TPZ and/or SRZ of a tree to be retained, a consulting arborist should always be present to monitor the works. Alternatively, services can be installed via under boring at a depth of not less than 1.2m below existing ground levels, when passing the tree(s).

Inclusion or Included Bark Branch Union

Growth of bark at the interface of two or more branches on the inner side of the branch union which is unable to be lost from the tree and accumulates, or is trapped, between the acutely divergent branches. This can form a weakened branch union in some species.

Epicormic Growth

Juvenile shoots produced along branches or trunks from dormant or latent buds concealed beneath bark. Production can be stimulated by fire, pruning, wounding or root damage and may also be an indicator of tree stress or decline.

1.7 Documents Reviewed

The following plans and documents were reviewed as part of this tree impact assessment:

Norton Survey Partners - Surveyors:

- Detail & Level Survey – Drawing No. 31470 (Sheet 1 to 10) dated 24/06/24.

SJB Architects:

- Architectural Package for SSDA - dated 01/10/2024 including:
 - Site Plan
 - Ground Floor Plans
 - Basement Plans
 - Elevations
 - Sections

Mott MacDonald Engineering:

- Ground Floor Drainage Plan – Drawing No. 103417-MMD-MAR-XX-DR-C-0061 issued 04/10/24

Based on the proposed architectural plans and services markups we are currently satisfied that the proposed servicing for the development can be achieved and designed to avoid major trenching or disturbance to the existing neighbouring trees to the east of the site that are proposed to be retained. It is assumed any existing services that are no longer required will be capped off and left in situ, if located under trees to be retained.

1.8 Assessment Methodology

Data Collection

Arterra attended the site to undertake a detailed assessment of the trees within the site and likely to be impacted by the proposed development. The trees' health and condition were assessed via a visual inspection undertaken from the ground only. Requisite tree data (including DBH, DGL, height & canopy spread, condition & proximity to services) were recorded using an Apple iPad and FileMaker Pro database.

The basic health and condition criteria that were inspected for each tree is summarised as follows:

- tree size, broad age-class and general balance of the tree;
- canopy foliage size, colour and density;
- dieback and epicormic growth;
- trunk or branch wounding, branch tear outs and pruning history;
- structural defects such as co-dominant stems, cracks, splits, included bark, decay;
- pests and disease evidence or occurrence;
- above-ground obstructions, and
- evidence of recent site disturbance.

All trees were photographed, given a unique identification number, and plotted onto a scaled base plan for referencing and identification throughout the report and for future discussions and co-ordination. Tree trunk diameters were measured using a metric diameter tape measure. Tree heights were measured using the two-point clinometer function of a Nikon Forestry Pro laser range finder. Canopy spreads were estimated by pacing out distances along the cardinal axis of the canopy and cross-referencing to survey information and aerial photos.

No specialised equipment or methods were employed to test for the extent of decay in any of the trees, apart from a nylon 'sounding' mallet. No plant samples were analysed or independently tested to verify or formally identify any pests or diseases.

Desktop Review and Research

Digital AutoCAD files of the proposed works were imported into Arterra's standard CAD software (ArchiCAD v27) and superimposed over the tree and site survey information. The extent of site disturbance was analysed for the proposed building works, landscaping, services and other site grading. An assessment was made of the likely extent of impacts on the TPZs, taking into account the likely construction impacts depending on the type of work being undertaken (cut or fill, suspended slabs, decks, service trenches). Various area calculations and measurements were made in the CAD software of the likely incursions into the TPZs or SRZs.

Historical aerial photography was gathered from NSW Spatial viewer. More recent aerial imagery was obtained from the NearMap website with aerial photos of the site dating from April 2024 imported into the above software for cross checking and assessment.

1.9 Pre-Development Tree Assessments – Tree Retention Values

The information gathered in the field was tabulated and the retention value assessed using a combination of techniques commonly used and recognised in the arboricultural industry. The tree life expectancy was established using the Useful Life Expectance system. A brief summary of these systems is provided below:

Useful Life Expectance (ULE)

ULE is a system based on Jeremy Barrell's ULE (Useful Life Expectancy), developed in 1993. It determines the time a tree may be expected to be retained based on its age, health, condition, safety and location. This is then moderated by the economics of maintenance or other costs of retaining the tree. A long ULE means the tree is presently expected to live longer than 40 years with minimal intervention and cost. A short ULE indicates a tree that is not expected to live longer than 5 years or may require substantial intervention or costs to retain it. The reference to 'safe' useful life expectancy is generally no longer used in the industry as it implies a certainty that cannot be delivered.

Retention Values

The proposed retention value of the trees was determined based on a considered combination of the size, age, condition and suitability of the tree. Each tree was then ranked according to one of four (4) retention categories:

1. **"High" Retention Value** – these are trees that are typically in good or very good condition, large and visually prominent, historically or environmentally important. They may also be lesser quality trees, but part of an important grouping of trees. They should represent a serious physical constraint to the development and their removal avoided where possible and feasible.
2. **"Moderate" Retention Value** – these are trees that are in good to reasonable condition and should be retained where possible and feasible to do so. They may also be lesser trees, but part of an important grouping of trees and therefore warrant retention based on the group's value.
3. **"Low" Retention Value** – these are trees that are in poor condition or have structural defects, are particularly small or commonplace, are not historically, environmentally or socially significant and should not be considered as a constraint to the development. They could be retained only if they are not likely to be impacted by, or constrain potential desirable, development outcomes.
4. **"Should Remove" / No Retention Value** – these are trees that are in very poor health, exhibit poor form, or have serious structural defects, are considered weeds or combination of all these, and therefore should be considered for removal regardless of any development.

Consideration has also been given to the relationship of the trees to one another and their proximity to the likely development areas on the site. For example, trees that are part of a closely spaced group, or are likely to be significantly misshapen or unstable with the removal of surrounding trees and structures are considered with these factors in mind.

1.10 Tree Assessment – Tree Protection Zones

In order to ensure the long-term survival and growth of any tree to be retained on the development site, a suitable area is required to be protected around the tree. This area should typically be as large as possible. It should also take into consideration:

- The size and age of the tree;
- Above and below ground properties;
- The health and condition of the tree;
- The species of tree and its tolerance to disturbance;
- Soil conditions, type, depth and site hydrology, and

- Site specific conditions and any existing obstructions to root development.

The TPZs have been calculated using the formula and criteria outlined in AS4970-2009 - Protection of Trees on Development Sites. In summary the standard applies the calculation for the radius of the TPZ as $12 \times$ (the tree trunk diameter (in metres) calculated at breast height (DBH)). DBH is taken at 1.4m above ground level.

A maximum TPZ radius will be 15m (unless crown protection is required) while the minimum TPZ radius shall be 2m. The TPZ is typically assumed to be radial and centred on the centre of the tree's trunk unless other site factors or tree canopy size and location dictate an adjustment. Encroachments of up to 10% of the area may be accepted within the TPZ as long as it is outside of the SRZ. This is known as a "minor encroachment". Encroachments greater than this, known as "major encroachments", will only be accepted with additional specific evidence that the tree will not be unduly impacted.

Whenever an encroachment is made into a TPZ, a suitable compensation should be made elsewhere and physically contiguous to the remaining TPZ.

The SRZ is the area defined as the minimum area required to retain the structural stability of the tree. The formula for calculating the SRZ is outlined in AS4970, Section 3.3.5. No encroachment into the SRZ shall typically be allowed.

2.0 BACKGROUND, OBSERVATIONS & ASSESSMENT

2.1 Site History and Existing Trees

The site was located on a portion of Australia's first major motor racing track. Commencing in 1923, 33 hectares of crown land was leased to build the track and facilities. The track was closed in 1934 and the entire area remained derelict for some time, until it was re-occupied by the NSW Housing Commission in 1947 and was developed with multiple residential buildings and a central park (Coral Sea Park). The area is now established residential which includes the site of 195-213 Fitzgerald Avenue & 40-64 Yorktown Parade.

(<https://www.randwick.nsw.gov.au/about-us/history/historic-places/plaques/site-of-maroubra-speedway> - accessed on 03/07/24)

Review of the historical aerial imagery of the site from the 1940s confirms the site was largely derelict and clear, with development by NSW Housing Commission being completed in the 1950s. This is likely when many of the existing trees were planted, with the most prominent street tree (**T140** *Ficus microcarpa* var *hillii*) appearing as a young tree in 1971, suggesting the tree was planted in the 1960s.

The following images demonstrate the general development of the site and the ages of tree planting.

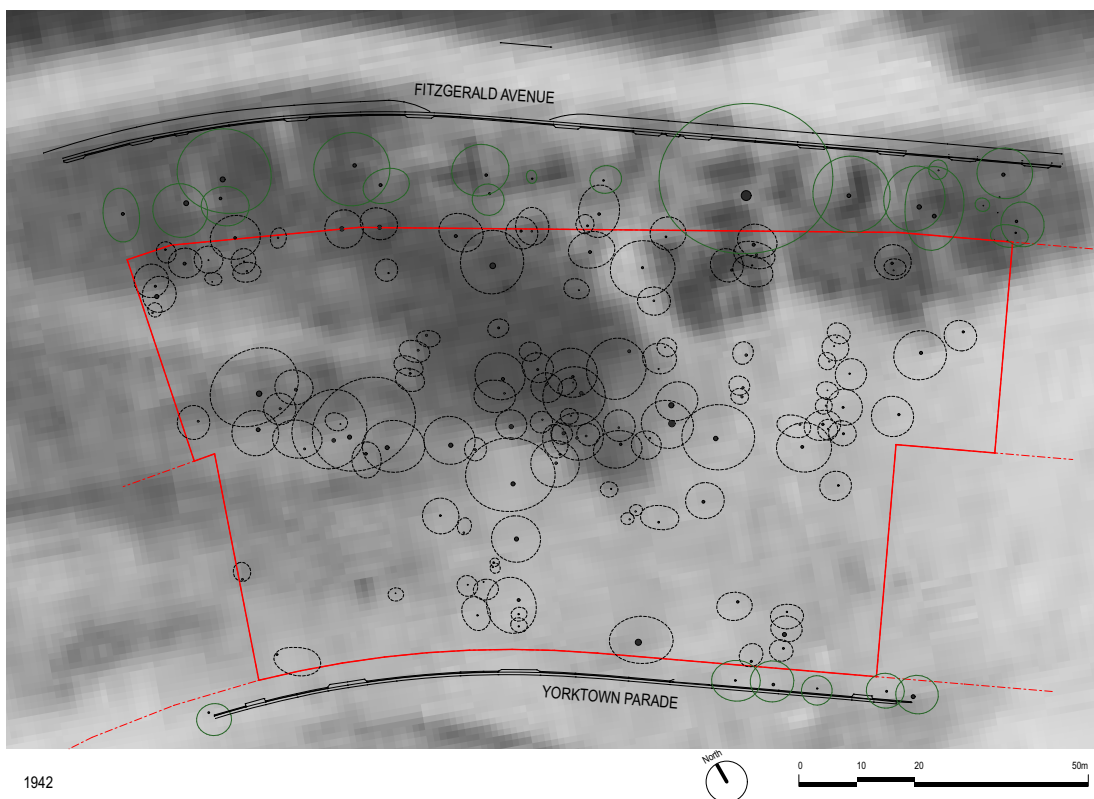


Figure 2 – Aerial image of the site in 1942 illustrating that the site had been cleared and was vacant (Source: NSW Spatial Services).



1961

Figure 3 – Aerial image of the site in 1961 illustrating the site had been developed by NSW Housing Commission into largely mid to low scale residential housing with a park (Coral Sea Park) to the south of the site across Yorktown Parade (Source: NSW Spatial Services).



1978

Figure 4 – Aerial image of the site in 1978 illustrating the site has remained as developed by NSW Housing Commission, with many of the trees appearing mature suggesting that many of the trees evident today were likely planted at the time of development in the late 1950s (Source: NSW Spatial Services).



2015

Figure 5 – Aerial image of the site in 2015 illustrating that the site appears relatively unchanged, however, several mature trees are now established and are clearly visible within and immediately adjoining the site, including **T140** (*Ficus microcarpa* var *hillii* – Hills Weeping Fig) fronting 207-209 Fitzgerald Avenue (Source: NearMap).



2023

Figure 6 – Aerial image of the site in 2023 illustrating the site as it appears today. Many of the trees have grown, with the canopies expanding much more broadly than shown in 2015 (Source: NearMap).

2.2 Soils and Landform

Due to the proximity to the coast, the site is mapped on the transition of Tuggerah and Newport Soil Landscape association. It is to be noted, however, that these soils and their inherent properties are remarkably similar, being described as a geologically recent deposit of wind-blown, fine to medium grained, well-sorted marine quartz sand. The topsoil is expected to be naturally a loose speckled grey-brown loamy sand, with little organic matter. The topsoil usually overlies a much deeper, bleached sand layer. Stones are usually absent. The natural soils are therefore expected to be apedal, non-cohesive with very low fertility and low water holding capacity and with extremely high permeability. (Chapman 1989). The natural vegetation would have been Eastern Suburbs Banksia Scrub was progressively removed during the early to mid-nineteenth century. No remnant native vegetation occurs on the site.

A site soil sample wasn't taken due to the properties being tenanted; however, it is very reasonable to expect deep, sandy soils that have been substantially re-worked, partially inverted and disturbed due to historic site development. Observations of the surface soil properties on the site would correlate to these natural soil conditions which are common throughout the area. The soil profile is expected to be typically very deep (greater than 2m) sandy soils.

Being deep and sandy soils generally means that there is less dramatic impacts between roots and infrastructure, as roots can travel deeper and more easily beneath roadways, pathways and building footings. This does not mean, however, that surface roots will not still cause issues. Experience has shown that many trees will still develop shallow roots systems in an attempt to access any rains that fall and provide structural stability in the otherwise non-cohesive soils. Many large and surface-oriented roots are observed on and around the site.

Site soils are unlikely to significantly affect or influence tree protection. The sandy soils mean that soil compaction is not a significant issue. It should be noted however that the soil conditions mean that any excavations near the trees will have to be carefully considered. If excavations are undertaken, they are unlikely to be self-supporting and it will not be possible to create extensive temporary batter slopes that would extend into adjoining TPZs, as this will adversely impact tree protection. It is likely that any excavations for basements, and the like, near to any trees to be retained and protected will have to be supported by appropriate temporary shoring or otherwise executed using sheet or contiguous piling techniques, even when quite shallow.

The naturally sandy soil conditions may facilitate non-destructive digging techniques that may be required to install footings and dig trenches, however any such trenches may require difficult and costly temporary shoring to prevent them collapsing.

2.3 Identification and Assessment of Existing Trees

The trees on this site represent a range of species, conditions and sizes. There are numerous trees that are often weed species, exotic fruit trees or other relatively small and insignificant trees. These specimens should not be considered a constraint to the development.

There are a total of **144 trees** on or immediately adjacent the site. Note there are 141 tree ID numbers assigned, however two of the IDs relate to groupings of 2 trees. The following Table 2 shows the breakdown of the tree population, by retention values.

Table 3: Assessed Tree Population and Retention Value

Retention Value	Number of Trees	%
<i>High</i>	5	3%
<i>Moderate</i>	27	19%
<i>Low</i>	88	61%
<i>Very Low / Remove</i>	24	17%
<i>Total trees on site</i>	144	100%

Following are the general observations related to the tree population across this site:

- There are **five (5)** High retention value trees that were identified in the assessment:
 - **T62** is a *Glochidion ferdinandi* in the back gardens of the residential flat buildings fronting Fitzgerald Avenue
 - **T65** is an *Araucaria columnaris* is towards the western end of the site in the back gardens of the residential flat buildings fronting Fitzgerald Avenue
 - **T90** is a *Eucalyptus robusta* that is endemic to the local area of Maroubra and is located relatively central to the site.
 - **T140** is a *Ficus microcarpa var hillii* growing in the generously wide verge on the southern side of Fitzgerald Avenue
 - **T44** is a *Ficus rubiginosa* growing in the generously wide verge on the southern side of Fitzgerald Avenue

- The high value trees on Fitzgerald Avenue are large and visually prominent street trees. They appear to be in excellent health, they make a valuable contribution to the canopy coverage of the area and are to be a focus of protection. These trees offer extensive canopy cover and though these specimens are typically species which are relatively tolerant of root disturbance, serious consideration will still need to be taken with regards to appropriate setbacks of the developable area. Minor incursions could be supported.
- A total of **112** trees (**78%**) assessed on, or immediately adjacent, the site have been rated as either a 'Low' or 'Very Low/Remove' retention value. Many are noted as exempt or weed/invasive species.

The existing trees to be retained and protected are predominantly outside of the site, with the street trees fronting Fitzgerald Avenue and Yorktown Parade being the focus for retention, in particular trees **T140** (*Ficus microcarpa var hillii*) and **T44** (*Ficus rubiginosa*). Detailed information on each tree including height, trunk diameter, canopy spread, age class and condition are provided in Appendix 4.2 - 'Tree Impact Assessment Schedule'.



Figure 7 – View to **T140** *Ficus microcarpa var hillii* (Hills Weeping Fig) fronting 207-209 Fitzgerald Avenue. This is a High retention value tree, with excellent street prominence and a large, significant, spreading canopy. The tree is located within a generous verge setback on the southern side of Fitzgerald Avenue and is a street tree. Serious consideration will need to be taken with regards to building setbacks to retain the expansive canopy and extensive root system. This tree is to be retained and protected (Photos: Arterra 02/07/24).



Figure 8 – Street trees fronting Fitzgerald Avenue to the north of the site are a mix of 'High' and 'Moderate' retention values, with only a few being rated 'Low' retention. These trees are to be a focus of protection, particularly with regards to construction, as some of their TPZs extend into the site. Though they are located within a generously wide verge, consideration will need to be given of the proposed services locations and potential driveway entries to avoid impacts to these trees (Photo: Arterra 04/06/24).



Figure 9 – The trees pictured above are street trees to the eastern end of Fitzgerald Avenue and are predominantly 'Moderate' retention values, with only a few being rated 'Low' retention. These trees are to be a focus of protection, particularly with regards to construction, as some of their TPZs extend into the site. Though they are located within a generously wide verge, consideration will need to be given of the proposed services locations and potential driveway entries to avoid impacts to these trees (Photo: Arterra 04/06/24).

2.4 Tree Biology and Tree Care Basics

Trees are dynamic living organisms. Trees can be very susceptible to damage, stress and decline rapidly if overly impacted by construction. Trees take decades to grow but can be injured and killed in a very short timeframe. This is particularly due to the irreparable damage to the often shallow, extensive and unseen root systems. It is rarely possible to repair a stressed or damaged tree, after the damage has occurred. Proper protection is the key to minimising construction related impacts. Severing of roots within the SRZ can also lead to potentially unsafe instability of the tree as a structure.

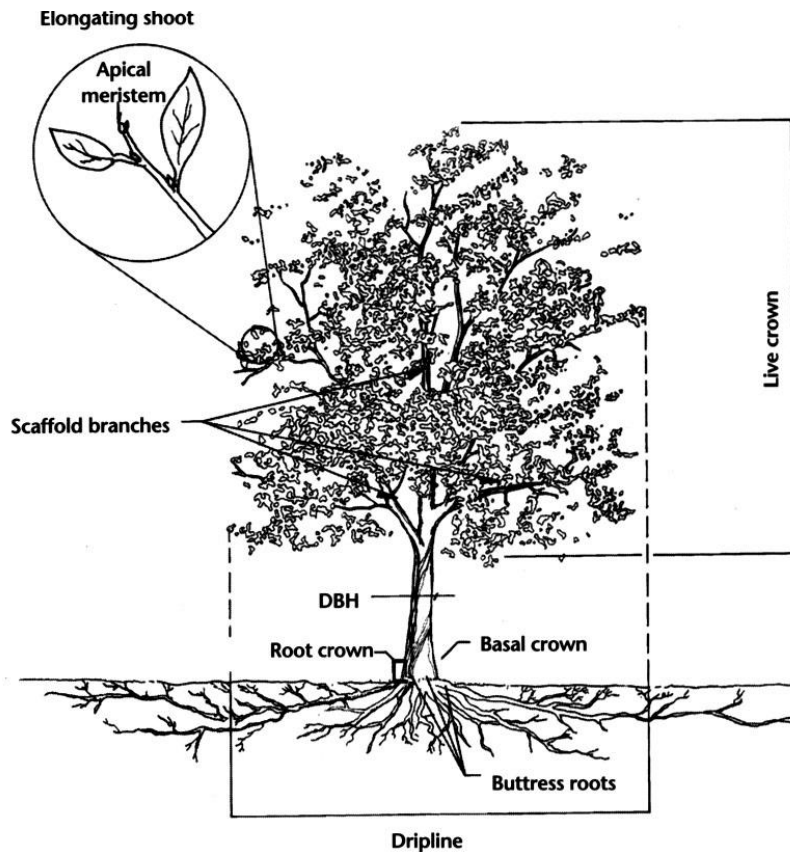


Figure 10 – Typical form and structure of a tree illustrating the typical form, location and extent of root growth (Source: Matheny and Clark, 1998).

Basic Tree Needs

As a living organism a tree remains alive by completing the following chemical reaction - Carbon Dioxide and water in combination with chlorophyll and light is converted to Glucose and Oxygen [$\text{CO}_2 + \text{H}_2\text{O} + \text{light} = \text{sugar (C}_6\text{H}_{12}\text{O}_6 \text{ [Glucose]} + \text{O}_2$].

The process ultimately leads to the plant cells 'respiring' and producing energy for survival, a natural requirement for all living cells. Anything that affects a plant's photosynthesis and then cellular respiration will affect the overall plant health. The limiting factors of photosynthesis and respiration will typically be the availability of oxygen, water and nutrients that make up the important chemical molecules and reactions.

Trees therefore have five basic requirements to survive and successfully grow:

1. Oxygen (and particularly oxygen within the soil);
2. Water (a cellular necessity and primarily taken up by the tree roots);
3. Light & Sufficient Foliage (in order to photosynthesise and create the resources needed for cellular survival);
4. Soil (for physical anchorage and critical chemical nutrients), and
5. Physical Space (both above and below ground to grow).

Importantly, a minimum of 15% soil oxygen is required for active root growth and nutrient uptake. Less than 10% available soil oxygen starts to restrict root extension and growth and a minimum of 3% soil oxygen is required to just maintain root existence. Less than this will result in root death (Harris 1999).

One of the most insidious effects of construction on trees is often that of soil compaction or covering of root zones with impervious surfaces, as it:

- Reduces infiltration rates of surface water;

- Reduces the availability of water to the roots as they can't naturally extract remaining moisture when soil becomes too dry;
- Reduces air to roots (roots cease to function properly and die without oxygen);
- Increased soil strength caused by compaction means that roots need more energy to grow through it or can't even physically penetrate the soil;
- Roots are physically broken or crushed and there is increased potential for fungal and pathogen attack. (Harris 1999).

Tree Tolerance

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

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

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

2.5 The Proposed Development

The proposed development comprises demolition of existing buildings and the construction of four 3 storey and two part 3/part 4 storey residential flat buildings to accommodate 144 social and affordable housing apartments, a communal room and a single level basement car park including bulk earthworks, tree removal and associated landscaping and public domain works.

The proposed works will result in a major site disturbance which will have potentially significant impacts on the trees within and adjacent to the site.

The proposed development will involve:

- Demolition works;
- Use of large scale civil and earthmoving equipment;
- Access to and from the site with large trucks and construction plant;
- Major excavations;
- Large stockpiles of excavated material and demolition waste;
- Stockpiles/ storage of building materials;
- Trenching for services;
- Major building works involving concreting, painting and general construction;
- Use of large cranes;
- Parking for site personnel and deliveries;
- Paving and retaining walls, and
- Landscaping.

Key Assumptions:

- New pedestrian paths within the TPAs shall be constructed at or above the existing surface levels to minimise surface root impacts.
- Temporary battering or grading will not occur in the designated TPA. Excavation for footings or basements adjacent to the TPA will be undertaken using piling or other temporary vertical shoring methods.
- Despite the above, the line of disturbance outside of the building line has been typically estimated at a minimum of 2.0m from the face of the building to allow for provision of water proofing, services, access and scaffolding around the building during construction.
- All construction access, haulage routes and deliveries are to be away from trees and TPAs as much as possible. Where practicable, deliveries should be taken from Yorktown Parade.
- Where no spot levels or proposed contours are indicated it is assumed that the existing surface levels are retained.
- It is assumed that any new landscape grading within the nominated tree protection areas will be minimal and installed using high quality, imported manufactured topsoil. No cultivation of the existing soils shall be undertaken within the defined TPA.

- For any retaining walls situated near trees, their footings will be oriented away from the trees (ie footings will extend no further than the face closest to the tree). Other construction approaches and details can be considered, with review and approval from supervising consulting arborist.

2.6 Tree Impact and Removal Assessment

The intention of this assessment is to clearly illustrate the trees to be retained and removed as part of the development. It is also to determine any incursions into the retained trees' root zones and canopies by the proposed development and evaluate the likely impacts of the proposed works on the trees. A detailed listing of the incursions and likely impacts of the proposed development on each tree is shown in Appendix 4.2 - Tree Impact Assessment Schedule and Appendix 4.1 - Tree Plans.

It is to be noted that a total of **119** trees are to be removed. With regard to the trees removed **103** are rated with a Low or Very Low/ Remove retention value. They are within the footprint of the proposed works. The trees proposed to be removed are predominantly exotic and/or weed/invasive species. A focus of the development has been to retain and protect the larger and more significant trees within the generous street verge fronting Fitzgerald Avenue.

Table 4 – Tree Impacts & TPZ Incursions (per AS4970-2009)

Tree ID	Species	Common Name	TPZ % Incursion (AS4970)	Comment
T04	<i>Glochidion ferdinandi</i>	Cheese Tree	10% (Minor)	-
T42	<i>Banksia serrata</i>	Old Man Banksia	10% (Minor)	Other surface-oriented impacts for the driveway to be managed. Non-destructive trenching to be employed for elec. feed in.
T44	<i>Ficus rubiginosa</i>	Port Jackson Fig	2% (Minor)	-
T136	<i>Eucalyptus robusta</i>	Swamp Mahogany	18% (Major Incursion)	Extensive surrounding areas unaffected or undisturbed compensating for potential loss
T137	<i>Ficus rubiginosa</i>	Port Jackson Fig	8% (Minor)	-
T139	<i>Ficus rubiginosa</i>	Port Jackson Fig	8% (Minor)	-
T140	<i>Ficus macrocarpa</i> var. <i>hillii</i>	Hills Weeping Fig	10% (Minor)	Other surface oriented impacts for pathways and protective filling to be managed.

As summarised above, **25** trees that are to be retained and protected:

- **11** trees have no or minimal foreseeable impact from construction related activity. These trees are not discussed further in this report.
- **6** trees (T04, T42, T44, T137, 139 and T140) have a 'minor encroachment' (<10%) into their nominal TPZs and is considered acceptable and likely to have minimal impact to the trees
- **1** tree has a major root zone incursion of 18%. This level of incursion is undesirable, but this incursion does only occur on one side of the tree for services installation and is considered tolerable in this instance given the extensive areas available to the tree on the remaining undisturbed side and the fact that roots may be able to regrow into the disturbance from the properly pruned root ends in the future.
- Some trees will require the relatively **minor surface oriented impacts** to be very carefully managed during demolition and construction. These surface related impacts are shown shaded on the Tree Retention and Removal Plan (T-02) and noted in the schedules. Given the surface oriented nature of these works it is expected that any root loss and disturbance would be minimal.
- To manage tree related impacts some areas will require the **use of non-destructive excavation** (using either hand digging, compressed air (air spade), water vacuum extraction or underboring techniques) within their TPZs to install new stormwater and electrical services. Refer to Section 2.7 below for further details.
- Only **1** tree (**T42**) will require minor canopy pruning to be undertaken. The pruning is considered to be less than 10% of the overall canopy and acceptable. Refer to Section 2.7 below for further details.

2.7 Surface and Other Impacts to be Managed During Demolition and Construction

T140 *Ficus var. hillii* (Hills Weeping Fig) – Minor Incursion of 9.4%

This tree is a 'High' retention value tree, growing to the north of the site and within the very wide and generously sized verge fronting Fitzgerald Avenue. Though the tree is located within the verge, the nominal TPZ of this tree enters the site on the northern boundary. To accommodate the nominal TPZ, the proposed building has been set back from the boundary to minimise disturbance. Given the building setback, there is a minor incursion of 9.4% expected to the south of the tree to allow for the construction of the proposed building, including basement and ground level excavations. Shore piling is to be utilised for the construction of the building when passing the southern side of this tree to retain the existing soil levels and avoid battering into the Tree Protection Area.

To aid in retaining and protecting the existing tree roots of **T140**, which are currently buttressing above the existing soil level, the nominal TPZ is to be backfilled with 300-400mm of sandy soil to cover over the exposed roots. This will enable landscape access pathways to be installed above the existing levels without impacting on the existing root system. It is recommended that the proposed pathways be concrete installed directly on top of the sandy fill, rather than suspended decking or pavements. Though suspended decking and pavements are typically considered appropriate around existing trees, they can often lead to conflicts with the existing root system, particularly when considering the position and placement of screw piles and/or posts. This tree is likely to have a vast weblike structure of roots of varying sizes immediately below the ground surface. This weblike structure of roots makes the positioning of screw piles/posts very difficult to achieve and may potentially lead to unnecessary ground and root disturbances. Alternatively, by filling around the existing surface roots with sandy soil, a standard concrete footpath can be installed above the existing buttressing roots with little to no impact to the existing ground surface and existing roots. Refer to the images and detail below for reference.

Care will need to be taken to ensure that there is no cutting or excavation proposed around the base of this tree (or any other tree) below the existing surveyed levels (ie: swales). It is recommended to build up the existing levels and manipulate swales and/or a bund into the fill to direct any stormwater/overland flows away from the proposed built form. The existing stormwater service is to be retained in place under this tree and utilised as part of the diversion works. No canopy pruning is expected to be undertaken.



Figure 11 – View of the base of **T140** *Ficus microcarpa var hillii* (Hills Weeping Fig) fronting 207-209 Fitzgerald Avenue. As shown above, this tree has a large and extensive buttress root system extending around the base of this tree, predominantly to the trees southern side. Serious consideration will need to be taken with regards to appropriate setbacks of the developable area to protect these roots. Roots are to be covered over with sandy soil to protect them from disturbances. The buttressing roots of a *Ficus* sp. are often above the surface ground level, with a weblike structure of roots immediately under the surface. These roots often pose difficulties with traditional installation of concrete footpaths. In this instance an alternate method needed to be considered to install the proposed footpath which works with and protects the existing tree roots of the adjoining fig tree (Photo: Arterra 02/07/24).



Figure 12 – Example in Ashmore of footpath proposed under Fig tree - Traditional installation of a concrete footpath on the existing ground surface was not an achievable option that protected the trees ongoing health. To protect the existing Fig tree and the above ground roots, the area under the trees was back filled with nominally 300-400mm of sandy soil. This covered over and protected the existing roots and created a level pad to install the concrete pathway without impacting on or compromising the existing roots (Photo: Arterra 20/07/20).



Figure 13 – Example in Ashmore of footpath proposed under Fig tree – This is the footpath installed and finished under the Fig tree. The footpath was installed above the existing surface levels and above the existing tree roots (Photo: Arterra 06/11/21).

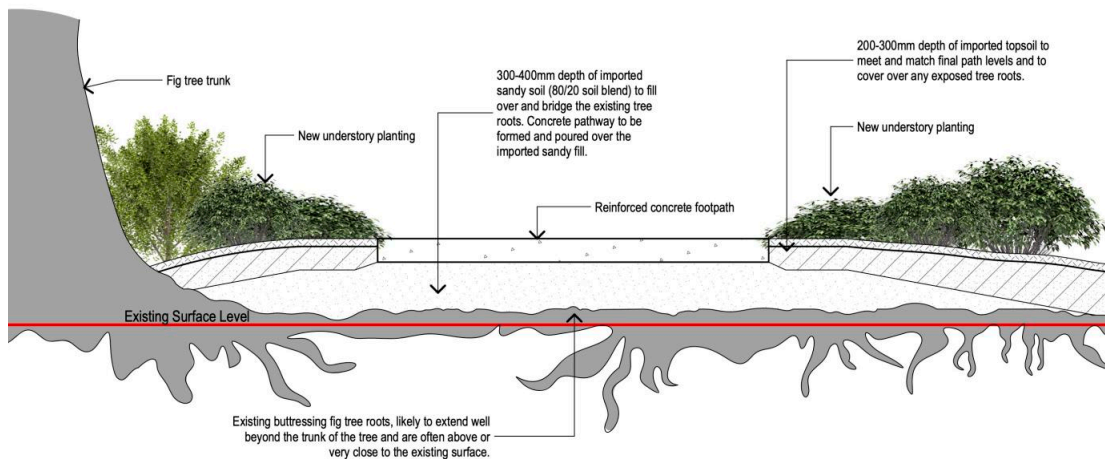


Figure 14 – Detail example of proposed concrete footpath over existing Fig tree roots, ensuring 300-400mm of sandy soil over the existing roots to protect them from disturbance (Photo: Arterra).



Figure 15 – View of tree **T140** *Ficus microcarpa var hillii* (Hills Weeping Fig) fronting 207-209 Fitzgerald Avenue. This is a large and significant tree, that is the focus of retention and protection (Photo: Arterra 02/07/24).

T41 & T42 *Banksia serrata* (Old Man Banksia) – Minor Incursion of 10%, Minor Surface Impacts and Minor Pruning
 These trees are ‘Moderate’ retention value trees, growing to the north of the site. They are street trees within the large and generous verge fronting Fitzgerald Street. Though the trees are located outside of the site, the nominal TPZ of these trees enters the site on the northern boundary. There is a minor incursion of 10% to the southern side of T42 to allow for the excavation of the proposed basement and the basement access driveway and the installation of a new electrical substation.

The proposed driveway to the west of tree T42 and east of T41 is to be constructed at or above existing levels. Pavement depths are to be minimised and the extent of pavement is to be modified to limit impacts within the tree protection zone. It is to be noted, to further minimise root disturbances to these trees, the proposed electrical

services across the Fitzgerald Avenue verge are to be installed non-destructively using either hand digging, compressed air (air spade), water vacuum extraction or underbore techniques and must be located to the far west of the existing driveway. All non-destructive works must be undertaken with Project Arborist present. Roots greater than 40mm in diameter are to be retained and protected and the proposed service is to be carefully threaded around and underneath the retained roots and available voids to avoid root damage and to protect the adjoining trees. It is expected that the installation of the substation kiosk will require isolated excavations, and the construction of the substation concrete pad mount easement is likely to be constructed above existing levels, therefore, minimal surface impacts are expected beyond the kiosk itself.

It is to be noted that the final location of the substation is subject to authority approval, and it is our strong recommendation that it be relocated to a position outside of all identified and designated TPAs.

Tree protection fencing to be maintained in place during construction works and only removed to complete final landscape works. It is expected that this work will result in minor surface impacts only.

Selective and incremental pruning is likely to be required to the west of this tree to achieve standard vehicle clearances for general basement access. Pruning is to be undertaken to a maximum height of 3.5m from the driveway pavement level, with only low-level branches to be pruned. The upper western canopy of the tree is to be retained and protected. Given the area of canopy that will be retained that overhangs the proposed driveway, primary construction access is not suitable adjacent to this tree. Refer to image below for extent of pruning required. This pruning is considered acceptable and is dealt with more specifically in Section 3.3 - Canopy Pruning and Pruning Methodology.



Figure 16 – Tree **T42** *Banksia serrata* – extent of pruning required to achieve basement access. Given the wide spreading canopy, this area is not suitable for construction access (Photo: Arterra 04/06/24).

T139 & T137 *Ficus rubiginosa* (Port Jackson Fig)– Minor Incursion of 8% and T136 *Eucalyptus robusta* (Swamp Mahogany)– Major Incursion of 18%

These trees are 'Moderate' retention value trees, growing to the northeast of the site and within the very wide and generously sized verge fronting Fitzgerald Avenue. Though the trees are located within the verge, the nominal TPZ of these trees enters the site on the northeastern boundary. To accommodate the nominal TPZs, the proposed building has been set back from the boundary to minimise disturbance, however, there is a minor incursion expected to tree T139 and a major incursion expected to tree T136 to install and construct the proposed stormwater services to the southern side of these trees.

Though this level of theoretical incursion within the trees TPZ is not desirable, the trees are located within a generous, wide verge that is unlikely to be disturbed. This allows for a contiguous area surrounding each tree that should compensate and appropriately offset the anticipated expected root loss.



Figure 17 – Trees **T139** *Ficus rubiginosa* (left) and **T136** *Eucalyptus robusta*–Minor incursions expected to the southern side of these trees for the installation of new stormwater services (Photo: Arterra 04/06/24).

T04 *Glochidion ferdinandi* (Cheese Tree)– Minor Incursion of 10%

This tree is a 'Low' retention value tree, growing to the south east of the site fronting Yorktown Parade. Though the tree is located within the verge, the nominal TPZ of this tree enters the site on the southeastern boundary. To accommodate the nominal TPZ, the proposed building has been set back from the boundary to minimise disturbance, however, there is likely to be a minor incursion expected to the northern side of the tree to install and construct the new stormwater services. This incursion is considered acceptable, as it is only a minor encroachment into the nominal TPZ and is unlikely to affect the long term health of this tree.



Figure 18 – Tree **T04** *Glochidion ferdinandi*– Minor incursion expected to the northern side of this tree for the installation of new landscape structures (Photo: Arterra 04/06/24).

T02 *Cupaniopsis anacardioides* (*Tuckeroo*)– Surface Impacts Expected

This tree is a 'Low' retention value tree, growing to the southeast of the site fronting Yorktown Parade. Though the tree is located within the verge, the nominal TPZ of this tree enters the site on the southeastern boundary. The proposed stormwater service, which connects across the verge and into an existing kerb inlet pit, passes well within the TPZ and also the SRZ of this tree. Given the close proximity of the proposed stormwater service to the tree it must be installed non-destructively using either hand digging, compressed air (air spade), water vacuum extraction or underbore techniques to minimise impacts. All non-destructive works must be undertaken with Project Arborist present. Roots greater than 40mm in diameter are to be retained and protected and the proposed service is to be carefully threaded around and underneath the retained roots and available voids to avoid root damage and to protect the adjoining trees.



Figure 19 – Tree T02 *Cupaniopsis anacardioides* – Minor surface impacts expected for the construction of a new stormwater line installed non-destructively (Photo: Arterra 04/06/24).

2.8 Existing Canopy Cover

Canopy coverage has been calculated as a percentage (%) of the site area. This has been calculated using the m² of 'projected' canopy onto the underlying ground surface within the site boundary. Overlapping canopy is not counted twice. Likewise, street and park trees that overhang onto the site would contribute to the measurement of the sites canopy coverage. Table 3 below outlines the existing canopy cover for the site and the canopy cover following tree removal. Refer to Landscape Architectural documentation for the ultimate proposed canopy coverage once new tree planting is undertaken.

Table 5: Existing Canopy Cover

Tree Canopy Coverage	Canopy Coverage (m ²)	% of Total Site Area
Existing Canopy Coverage	2,977	31%
Canopy Cover to be Removed	2,894	30%
Canopy Cover to be Retained	84	1%

2.9 Potential Tree Related Impacts to be Managed During Construction

The potential impacts from the proposed construction and activity discussed above can be summarised as tree damage and 'reduced life expectancy' caused by:

- Root loss and disturbance due to inappropriate excavation for the building and services;
- Compaction of the root zone from storage or stockpiling of materials;
- Contamination of the soil from; the preparation of chemicals, wash down/ cleaning of equipment, refuelling of vehicles and dumping of waste;
- Compaction of the root zones from haul roads and the parking or use of vehicles/ plant equipment;
- Root disturbances from unauthorised cut and fill and soil level changes;
- Physical damage to the tree trunks and branches from passing machinery;
- Damage to the tree roots from landscaping and pedestrian pathway construction, and
- Inappropriate or excessive pruning for construction access.

The following section of this report provides the recommendations and proposed measures that will aim to minimise and avoid these impacts as much as realistically possible.

3.0 TREE MANAGEMENT RECOMMENDATIONS

3.1 Potential Minor Amendments to Site Layout and Designs to Reduce Tree Impacts

As the Consulting Arborists, Arterra has consulted with Homes NSW and aimed to minimise the impact on the existing trees to be retained. The trees noted for removal, as well as those to be retained, have been given careful consideration.

To further improve tree protection and to reduce tree impacts, it is our recommendation, that the current proposed substation location be reviewed. Ideally this should be located outside of the identified Tree Protection Areas. The final location of the substation is still subject to authority approval and the related tree impacts should be considered when assessing and deciding its final location.

3.2 Management of Construction Period Tree Impacts

The following recommendations are made to specifically reduce the negative construction impacts on the existing trees identified to be retained:

- Ensure that all work within the identified TPAs is carried out with appropriate skill and care to limit surface impacts. If roots greater than 40mm diameter are encountered, works shall cease and direction sought from the project arborist before proceeding further.
- Appropriately fence all TPAs outside of the already noted incursions for the duration of all major site construction work. See Appendix 4.1 Tree Plans for locations and extent.
- Carefully control and fence access to and from the construction areas so that movement does not occur through any TPAs other than for the already identified building incursions.
- Ensure all the new above and below ground services are excluded from running through any TPAs beyond any already noted incursions.
- Minimise the re-grading of the ground surface within the identified TPAs, beyond the noted building incursions, in order to meet and match proposed pathways and other building levels. Where it is required, limit it to a maximum depth of 300mm above existing ground levels and ensure it is only quality sandy manufactured organic garden mix or other suitable site topsoils. No excavation below existing levels shall typically be allowed.
- Mulching of the entire TPAs as specified in Tree Plans. This will aid tree health with moisture retention, limit possible compaction from pedestrian traffic, and improve soil conditions within the TPAs.
- Avoid digging into existing root zones for the installation of any proposed landscaping around the trees and the installation sizes of new plants to be 5L or less to ensure that excavations are less than 200mm in depth. It is recommended to build up soil levels for any new planting areas to a maximum of 200mm to enable the new planting to occur without disturbing existing tree roots.
- Do not allow storage or stockpiling of any materials or site sheds within established TPAs unless that it can be demonstrated that this will not impact on the tree retention and it is specifically approved in writing by the Project Consulting Arborist.

3.3 Canopy Pruning and Pruning Methodology

To be constructed, the proposal will potentially require minor canopy pruning to one **(1) tree (T42 *Banksia serrata* – Old Man Banksia)** to provide access and construction clearances. All pruning should be minimised where possible. It is likely that the pruning will be less than 10% of the canopy. In the authors opinion, this is considered acceptable. Should pruning be required, the following must be undertaken:

- A suitably qualified Tree Contractor/Utility Arborist shall be employed to undertake the pruning and they shall be a member of Arboriculture Australia or equivalent body. They are to be employed, instructed, and directly supervised in their activities by an Arborist with a minimum AQF level 4 qualification in arboriculture.
- The Head Contractor/Development Manager is to submit to the Project Consulting Arborist the name(s), relevant qualifications, trade certificates, first aid and memberships, licenses and experience of the chosen utility arborist personnel.
- Only the specified 'selective pruning' is to be undertaken as overseen and directed by the Project Consulting Arborist. Work shall be done 'incrementally' until the appropriate access clearance is achieved (no greater than 3.5m from the finish driveway level).
- All pruning works are to be completed according to AS4373 - Pruning of Amenity Trees.
- The Tree Contractor shall prune only the parts of trees as directed by the Project Consulting Arborist. The resulting pruning wounds are not to be treated.
- The Tree Contractor shall minimise the size and number of wounds resulting from all pruning and ensure the remaining canopy is balanced with appropriate foliage weight and crown distribution. They shall use only clean, sharp pruning implements for all pruning work, ensuring that cuts are made without damage, tearing, or bruising to remaining vascular tissue.

- Access to the foliage shall be from the ground using equipment with suitable reach to access the required canopy. This is considered possible once demolition is complete or during placement of scaffold.
- Where tree work can result in a danger to other workers on the site, 'spotter' personnel shall be placed to ensure the work is undertaken safely.
- All branches and foliage that are pruned are to be chipped and removed from the site. All chipping activities shall be undertaken within the site boundaries, where feasible.

3.4 Proposed Tree Protection & Construction Activity Sequencing

The following sequence of activities should be followed for this project:

1. A Tree Protection Specification & Plan is to be prepared and issued as part of the construction contract prior to any construction work.
2. The Project Consulting Arborist, Landscape Architect, Civil and Structural Engineers, Client and Contractor Site Foreman are to meet prior to beginning any work on the site to discuss and review all work procedures, construction access routes, stockpiling and tree protection measures (including fence types and locations, access, craneage points, piling methods etc.).
3. Contractors to discuss locations and type of any sediment and erosion controls (if any) and install them with minimal tree impact when within or passing through the TPA.
4. Existing pathways, fences, driveways, furniture and shrubs are to be carefully removed from within the TPA.
5. Trees identified for removal on the Tree Protection and Removal Plan (T-02) are to be identified on site and clearly marked. Removal and clearing of existing trees should be done by qualified arboricultural staff with care not to impact or damage other surrounding trees throughout the process. Stumps are to be ground when near remaining trees to avoid the use of excavators and the like from grubbing out stumps, which may lead to damage of any intertwined roots.
6. Designated TPAs are to be mulched with 75mm of recycled hardwood woodchip mulch to improve soil conditions around tree and remain in place until future final landscaping.
7. Trunk protection to be placed on all trees to be retained, where shown on Tree Plans.
8. Ground protection boards, or equivalent, are to be placed in areas where the Tree Protection Area is not able to be completely fenced or unanticipated access is required.
9. A utility Arborist is to undertake selective pruning of canopy or branches to facilitate construction of the building and provide pedestrian access clearances without accidental damage to the tree canopy. Minimal pruning is expected for access or scaffolding, as buildings have typically been appropriately set back from the trees.
10. The Construction Phase TPA is to be clearly defined and fenced off with a 1.8m high metal or plywood temporary fence prior to any further work within the vicinity of the trees as shown on the Tree Plans. Any required rumble boards shall be installed to protect TPA areas where temporary access is required.
11. Plywood (or similar) is to be placed under any scaffolds or pedestrian works paths when they are running through any identified TPAs.
12. Building works to be completed (external).
13. Contractor to remove the TPA fencing and only then install final pathways and landscaping within the TPAs under the trees, but only after construction of the building exterior and all civil works are completed.

3.5 Demolition Work Near Trees or within TPAs

Demolition of paths and other structures required within a TPA shall be done with small-tracked equipment or by hand, with care to limit surface damage and disturbance of the root zone. All such work within TPAs shall be supervised and overseen by a qualified project consulting arborist. Paving sections being removed must not be dragged across exposed roots. With existing pavement removed, the ground and roots are to be appropriately protected until new paving is installed and trafficking of the area minimised.

3.6 Tree Protection Fencing & Definition of TPAs

Establish a clearly defined tree protection zone as indicated in Appendix 4.1 Tree Plans. Install a 1.8m high temporary fence with either plywood hoarding or temporary steel mesh or chain wire fencing with adequate lateral bracing. Fencing shall comply with the requirements of AS4687-2007 Temporary fencing and hoardings. These areas around the trees shall be delineated as a "Tree Protection Zone" during the remaining construction process, via appropriate weatherproof signage at not more than 30m spacing. Access will typically be excluded from these zones and the levels will be left largely at the existing levels with the exception of the installation of the 75mm of mulch where noted. No stockpiling, excavation, trenching, re-fuelling or material storage should be allowed in this area without prior approval from the project consulting arborist.

3.7 Ground Protection within TPAs

Vehicular movement and access shall typically not be required or approved through the TPAs. If it is absolutely necessary and it is proposed to create any access or haul road, or similar, within the TPA of a retained tree, the Contractor shall install rumble strips / boards over the designated TPA ground surface. No excavation shall be allowed. The contractor shall first place a suitable permeable geotextile to the extent required and then a 100mm thick layer of wood chip mulch or coarse no-fines gravel over the extent to be covered with the rumble strip / boards. Then place hardwood boards (minimum 3600 x 200 x 75mm) on their flat edge, side by side, with a 30 - 50mm gap to form a rumble strip. These boards are to be held together with three galvanised metal bracing straps nailed to each board. The two outer straps are to be approximately 200mm in from the ends of the boards. The third strap is to be along the centre line of the boards.

Another appropriate alternative would be to install HDPE Ground Protection Mats. This mat can be laid as two parallel tracks or a single roadway, linked together with metal connections. These are extremely durable and manoeuvrable and can withstanding vehicle weights up to 80 tonnes.



Figure 20 – Example of acceptable Tree Protection Area ground protection (Photo: Arterra).



Figure 21 – Example of acceptable Tree Protection Area ground protection (Photo: Arterra).

3.8 Trunk and Lower Branch Protection

A trunk barrier is to be erected around the circumference of the tree trunk and root buttress where shown. This barrier will consist of two to three 'rings' of 50mm diameter unsocked ag-line wrapped around tree trunk or branch and the ends cable tied to secure in place. A layer of battens is to be placed over and tight to the ag-lines. The battens are to have a maximum spacing of 50mm. The height of the battens is to be at least 2.4 metres or to the height of the first branches. Lower large branches may require the same protection if likely to be damaged by passing vehicles or equipment. Secure battens in place with galvanised steel bracing straps. Do not nail or screw into or otherwise injure the trunk or bark. Battens may be made from any suitable waste timber of similar sizes and depths. All sharp or protruding edges are to be properly covered with tape or similar padding.



Figure 22 – Example of acceptable Trunk Protection batten installation (Photo: Arterra).

3.9 Provision of Temporary Irrigation

At the sole discretion of the Project Consulting Arborist, a temporary, automated (battery powered timer is sufficient) watering system may need to be placed within the TPAs to maintain adequate water to the retained trees and help maintain their healthy condition. This can be a surface mounted 'residential-style' soaker hose and/or surface sprinkler system. It is to be visible above ground and the spray delivered so that its operation can be easily visible and verified. It should be on a designated supply line, separate from other construction related water supplies to minimise its likelihood of being disconnected.

Typically, during spring and summer months it should be set to run for a minimum of 20 minutes every day, in the early morning. During, autumn and winter months it should be set to run for 1 hour once every week. The operation can be suspended temporarily in periods of extensive and/or prolonged rain.

The system is to remain in place for the duration of construction, or until the Project Consulting Arborist approves its removal. It may be removed to allow the final landscape treatments to proceed. If accidentally disturbed or damaged by construction activities, it is to be reinstated as soon as practicable.

3.10 Final Landscaping within TPZs

Once final levels are set by the finished structural elements. The final trimming and landscaping shall be judiciously undertaken. The final pedestrian pavements shall be installed without undue excavation or compaction to the soil and all soft landscaping within the TPZ will be installed with care to avoid root disturbance via irrigation trenching, lighting installation and the planting of larger plants. The installation of 100-200mm of new garden mix topsoil over the pre-existing soil will provide a suitable medium in which to plant new plants without damage to existing tree roots. Permanent irrigation (if used) shall be installed as spray heads located outside of TPAs and spraying inwards. All other services such as electrical services shall also be designed and installed to avoid any excavation or trenching around the trees.

3.11 Final Building and Pedestrian Clearance Pruning

Once the final levels and finishes are in place the Project Consulting Arborist shall direct and supervise any remaining selective pruning of any lower peripheral branches to the retained trees to achieve any clearances for final pedestrian or building access. This shall be minimised as much as possible. It is anticipated that the final pruning of any of the retained trees will be far less than 5% of the existing canopy and will not have any serious impact to the trees' health or habit.

The branches of the tree shall only be pruned as specifically needed and directed by the Project Consulting Arborist. Work is to be in strictly accordance with to AS4373 - Pruning of Amenity Trees. Do not treat wounds. Only clean, sharp pruning implements shall be used for all pruning work, ensuring that cuts are made without damage, tearing or bruising of the vascular tissue.

3.12 Other Tree Protection Measures to be Implemented

The following is a summary of the main measures that will be required during construction. These should be adopted for the Construction Contract and conditioned by Council.

Controlled Construction Access & Parking

Construction access points and stockpiling and storage areas shall be clearly identified and fenced where appropriate. Uncontrolled access points and parking of vehicles outside of designated areas is to be avoided. If temporary access is required through a tree protection zone, ground protection shall be employed to limit soil compaction and root damage and disturbance.

Clearing and Removal of Trees to be Removed

Removal and clearing of existing trees should be done by qualified arboricultural staff with care not to impact or damage other surrounding trees throughout the process. Existing stumps should be grubbed out or ground in a controlled fashion to remove wood that may decay and promote unwanted pathogens.

Communication - Tool Box Meetings and Construction Inductions

All contractors and subcontractors shall be inducted prior to working on the site. All inductions shall include description and identification of the Tree Protection Zones and the restriction on work and activities with regard to trees. The site foreman shall ensure that all new staff and contractors are appropriately inducted and that brief "tool box" meetings are conducted regularly to ensure Tree Protection is maintained at the forefront of all construction workers minds.

3.13 References

- Chapman, G.A and Murphy, C.L 1989, Soil landscapes of the Sydney 1:100 000 Sheet Report, Soil Conservation Service of NSW, Sydney, NSW.
- Harris, R.W, Clark, J.R & Matheny, Nelda P, 1999, *Arboriculture: Integrated management of landscape trees, shrubs and vines*. 3rd Ed. Prentice Hall. New Jersey, US
- Matheny, Nelda P and Clark J.R, 1998, *Trees and development - a technical guide to preservation of trees during land development*, International Society of Arboriculture, Illinois, US.
- Roberts, J. Jackson, N. and Smith, M. 2006. *Tree roots in the built environment. No.8* Research for Amenity Trees, Dept. for Communities and Local Government, London.
- Standards Australia, 2007, *AS 4373-2007 Pruning of amenity trees*. Standards Australia, Sydney.
- Standards Australia, 2009, *AS 4970-2009 Protection of Trees on Development Sites*. Standards Australia, Sydney.
- Standards Australia, 2007, *AS 4687-2007 Temporary fencing and hoardings*. Standards Australia, Sydney.

- End of report -

4.0 APPENDICES

4.1 Tree Plans



ID	Tree Species	Common Name	Trunk Diameter (cm)	Height (m)	Retention Value	Recommendation
1	Campanula medium	Common Bellflower	100	1.50	Low	Remove
2	Campanula medium	Common Bellflower	100	1.50	Low	Remove
3	Campanula medium	Common Bellflower	100	1.50	Low	Remove
4	Campanula medium	Common Bellflower	100	1.50	Low	Remove
5	Campanula medium	Common Bellflower	100	1.50	Low	Remove
6	Campanula medium	Common Bellflower	100	1.50	Low	Remove
7	Campanula medium	Common Bellflower	100	1.50	Low	Remove
8	Campanula medium	Common Bellflower	100	1.50	Low	Remove
9	Campanula medium	Common Bellflower	100	1.50	Low	Remove
10	Campanula medium	Common Bellflower	100	1.50	Low	Remove
11	Campanula medium	Common Bellflower	100	1.50	Low	Remove
12	Campanula medium	Common Bellflower	100	1.50	Low	Remove
13	Campanula medium	Common Bellflower	100	1.50	Low	Remove
14	Campanula medium	Common Bellflower	100	1.50	Low	Remove
15	Campanula medium	Common Bellflower	100	1.50	Low	Remove
16	Campanula medium	Common Bellflower	100	1.50	Low	Remove
17	Campanula medium	Common Bellflower	100	1.50	Low	Remove
18	Campanula medium	Common Bellflower	100	1.50	Low	Remove
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29	Campanula medium	Common Bellflower	100	1.50	Low	Remove
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31	Campanula medium	Common Bellflower	100	1.50	Low	Remove
32	Campanula medium	Common Bellflower	100	1.50	Low	Remove
33	Campanula medium	Common Bellflower	100	1.50	Low	Remove
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40	Campanula medium	Common Bellflower	100	1.50	Low	Remove
41	Campanula medium	Common Bellflower	100	1.50	Low	Remove
42	Campanula medium	Common Bellflower	100	1.50	Low	Remove
43	Campanula medium	Common Bellflower	100	1.50	Low	Remove
44	Campanula medium	Common Bellflower	100	1.50	Low	Remove
45	Campanula medium	Common Bellflower	100	1.50	Low	Remove
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56	Campanula medium	Common Bellflower	100	1.50	Low	Remove
57	Campanula medium	Common Bellflower	100	1.50	Low	Remove
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59	Campanula medium	Common Bellflower	100	1.50	Low	Remove
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61	Campanula medium	Common Bellflower	100	1.50	Low	Remove
62	Campanula medium	Common Bellflower	100	1.50	Low	Remove
63	Campanula medium	Common Bellflower	100	1.50	Low	Remove
64	Campanula medium	Common Bellflower	100	1.50	Low	Remove
65	Campanula medium	Common Bellflower	100	1.50	Low	Remove
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67	Campanula medium	Common Bellflower	100	1.50	Low	Remove
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70	Campanula medium	Common Bellflower	100	1.50	Low	Remove
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74	Campanula medium	Common Bellflower	100	1.50	Low	Remove
75	Campanula medium	Common Bellflower	100	1.50	Low	Remove
76	Campanula medium	Common Bellflower	100	1.50	Low	Remove
77	Campanula medium	Common Bellflower	100	1.50	Low	Remove
78	Campanula medium	Common Bellflower	100	1.50	Low	Remove
79	Campanula medium	Common Bellflower	100	1.50	Low	Remove
80	Campanula medium	Common Bellflower	100	1.50	Low	Remove
81	Campanula medium	Common Bellflower	100	1.50	Low	Remove
82	Campanula medium	Common Bellflower	100	1.50	Low	Remove
83	Campanula medium	Common Bellflower	100	1.50	Low	Remove
84	Campanula medium	Common Bellflower	100	1.50	Low	Remove
85	Campanula medium	Common Bellflower	100	1.50	Low	Remove
86	Campanula medium	Common Bellflower	100	1.50	Low	Remove
87	Campanula medium	Common Bellflower	100	1.50	Low	Remove
88	Campanula medium	Common Bellflower	100	1.50	Low	Remove
89	Campanula medium	Common Bellflower	100	1.50	Low	Remove
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96	Campanula medium	Common Bellflower	100	1.50	Low	Remove
97	Campanula medium	Common Bellflower	100	1.50	Low	Remove
98	Campanula medium	Common Bellflower	100	1.50	Low	Remove
99	Campanula medium	Common Bellflower	100	1.50	Low	Remove
100	Campanula medium	Common Bellflower	100	1.50	Low	Remove

TREE RETENTION VALUE NOTES
 The proposed retention value of the trees was determined based on a considered combination of the size, age, condition and suitability of the tree. Each tree was then ranked according to one of 4 retention categories:

- "High" Retention Value** — these are trees that are typically in good or very good condition, large and visually prominent, historically or environmentally important. They should represent a serious physical constraint to development and their removal avoided where possible and feasible.
- "Moderate" Retention Value** — these are trees that are in good to reasonable condition, with no major structural defects and could be retained where possible and feasible to do so.
- "Low" Retention Value** — these are trees that are of poor condition or have structural defects, are particularly small or common place, are not historically, environmentally or socially significant and should not be considered as a constraint to development. They could be retained only if they are not likely to be impacted by or constrain potentially desirable development outcomes.
- "Very Low" Retention Value** — these are trees that are in very poor health, or poor form, or have serious structural defects, are considered weeds or combination of all these, and therefore should be considered for removal regardless of any development.

Consideration has also been given to the relationship of the trees to one another and their proximity to the likely development areas on the site. For example, trees that are part of a closely spaced group, or are likely to be significantly misshapen or unstable with the removal of surrounding trees and structures are considered with these factors in mind.

Tree Retention Value Legend

- Extent of canopy as verified by site measure and aerial photos
- Nominal Tree Protection Zone (TPZ)
- Nominal Structural Root Zone (SRZ)
- Tree Identification Number
- High Retention value
- Moderate Retention value
- Low Retention value (Note: no TPZs and SRZs shown for these trees)
- Very Low Retention value (should remove) (Note: no TPZs and SRZs shown for these trees)

Basement Driveway

Driveway to be constructed at or above existing levels. Pavement depth to be minimised and pavement extent to be modified to limit impacts within the TPA. Tree protection fencing to be maintained in place during construction works and only removed to complete final landscape works. Selective and incremental pruning may be required to be undertaken to a maximum height of 3.5m from driveway pavement level to the west of tree T42 *Banksia serrata*. This area is not suitable for primary construction access. Project Consulting Arborist to be present to observe all works within the TPA of this tree. Minor incursion expected to the southern side of T42 of 10% for excavation to install a new substation, to construct the building and for basement driveway access works. Final substation location subject to authority approval. Should the substation remain in this location, the services connections are to be positioned to the far west of the driveway and installed using non-destructive methods (ie hand dig, vacuum extraction, etc). This is to avoid impacts to both trees T41 and T42

T140 - Ficus var. hillii (Hills Weeping Fig) - Minor Incursion

Building has been appropriately set back to avoid conflicts with existing tree canopy and to minimise root zone incursion. Incursion considered minor (9.4%) for excavation to construct the building. Shore piling is to be utilised for the construction of the building when passing the southern side of this tree to retain the existing soil levels and avoid battering into the Tree Protection Area. Tree protection area to be filled with 300-400mm depth of sandy soil to protect existing above ground buttressing roots. Proposed landscape pathways are to be sensitively installed above the imported sandy soils to avoid conflicts with the existing roots. Project Consulting Arborist to be present to observe all works within the TPA of this tree. Existing stormwater line to be retained and utilised under tree.

T139 and T137 - Minor Incursion & T136 - Major Incursion

Minor incursion expected to the southern side of T139 and T137 and a major incursion expected to the southern side of T136 to allow for stormwater connection/installation into existing SW pit. Project Consulting Arborist to be present to observe all works within the TPA of these trees.

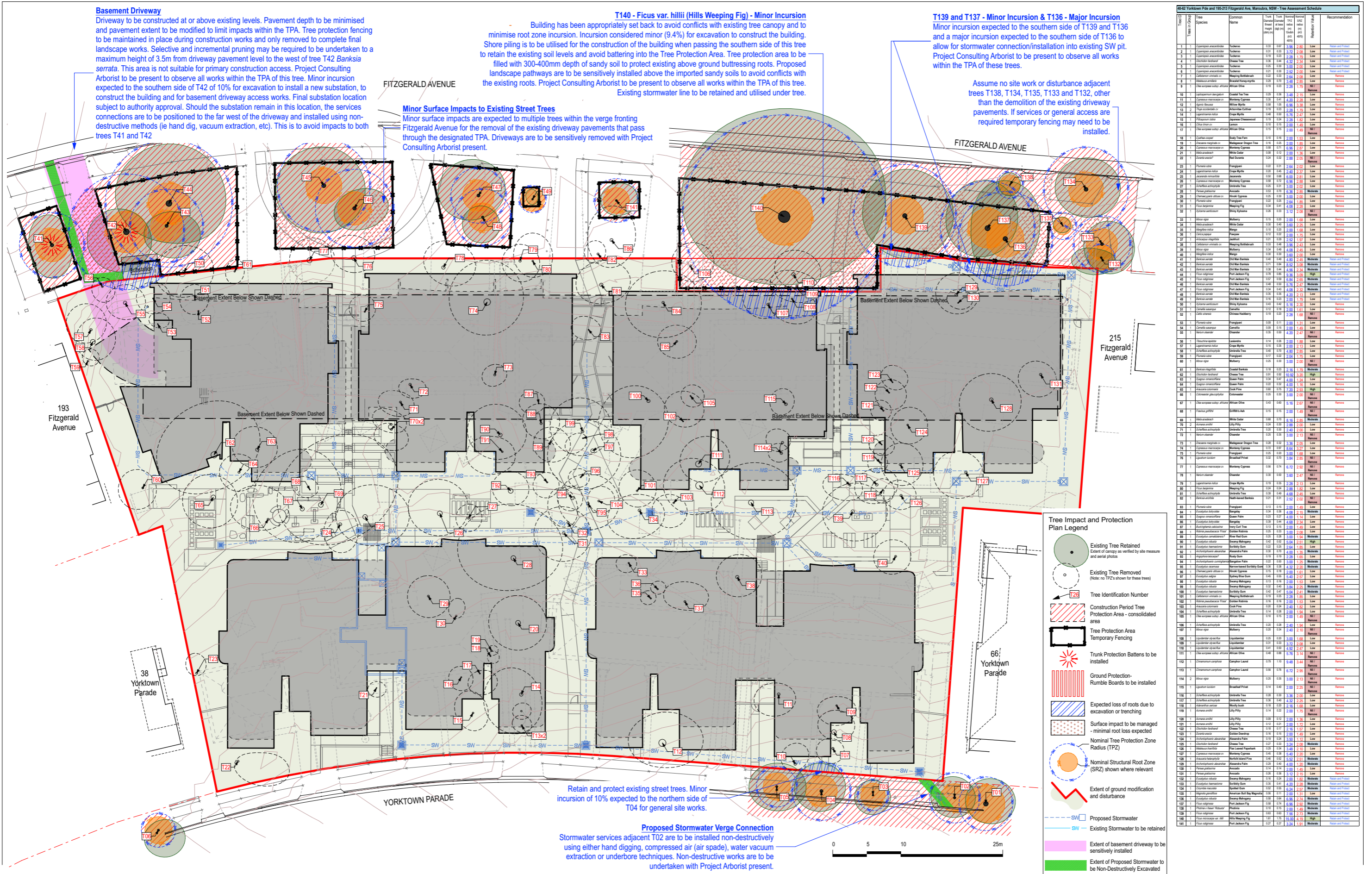
Assume no site work or disturbance adjacent trees T138, T134, T135, T133 and T132, other than the demolition of the existing driveway pavements. If services or general access are required temporary fencing may need to be installed.

Minor Surface Impacts to Existing Street Trees

Minor surface impacts are expected to multiple trees within the verge fronting Fitzgerald Avenue for the removal of the existing driveway pavements that pass through the designated TPA. Driveways are to be sensitively removed with Project Consulting Arborist present.

Retain and protect existing street trees. Minor incursion of 10% expected to the northern side of T04 for general site works.

Proposed Stormwater Verge Connection
Stormwater services adjacent T02 are to be installed non-destructively using either hand digging, compressed air (air spade), water vacuum extraction or underbore techniques. Non-destructive works are to be undertaken with Project Arborist present.



ID	Tree ID	Species	Common Name	Trunk DBH (mm)	Tree Height (m)	Canopy Spread (m)	TPZ (m)	SRZ (m)	Retention Value	Recommendation
1	T01	Leucadendron arborescens	Leucadendron	150	10.0	10.0	10.0	10.0	Low	Retain and Protect
2	T02	Leucadendron arborescens	Leucadendron	150	10.0	10.0	10.0	10.0	Low	Retain and Protect
3	T03	Leucadendron arborescens	Leucadendron	150	10.0	10.0	10.0	10.0	Low	Retain and Protect
4	T04	Leucadendron arborescens	Leucadendron	150	10.0	10.0	10.0	10.0	Low	Retain and Protect
5	T05	Leucadendron arborescens	Leucadendron	150	10.0	10.0	10.0	10.0	Low	Retain and Protect
6	T06	Leucadendron arborescens	Leucadendron	150	10.0	10.0	10.0	10.0	Low	Retain and Protect
7	T07	Leucadendron arborescens	Leucadendron	150	10.0	10.0	10.0	10.0	Low	Retain and Protect
8	T08	Leucadendron arborescens	Leucadendron	150	10.0	10.0	10.0	10.0	Low	Retain and Protect
9	T09	Leucadendron arborescens	Leucadendron	150	10.0	10.0	10.0	10.0	Low	Retain and Protect
10	T10	Leucadendron arborescens	Leucadendron	150	10.0	10.0	10.0	10.0	Low	Retain and Protect
11	T11	Leucadendron arborescens	Leucadendron	150	10.0	10.0	10.0	10.0	Low	Retain and Protect
12	T12	Leucadendron arborescens	Leucadendron	150	10.0	10.0	10.0	10.0	Low	Retain and Protect
13	T13	Leucadendron arborescens	Leucadendron	150	10.0	10.0	10.0	10.0	Low	Retain and Protect
14	T14	Leucadendron arborescens	Leucadendron	150	10.0	10.0	10.0	10.0	Low	Retain and Protect
15	T15	Leucadendron arborescens	Leucadendron	150	10.0	10.0	10.0	10.0	Low	Retain and Protect
16	T16	Leucadendron arborescens	Leucadendron	150	10.0	10.0	10.0	10.0	Low	Retain and Protect
17	T17	Leucadendron arborescens	Leucadendron	150	10.0	10.0	10.0	10.0	Low	Retain and Protect
18	T18	Leucadendron arborescens	Leucadendron	150	10.0	10.0	10.0	10.0	Low	Retain and Protect
19	T19	Leucadendron arborescens	Leucadendron	150	10.0	10.0	10.0	10.0	Low	Retain and Protect
20	T20	Leucadendron arborescens	Leucadendron	150	10.0	10.0	10.0	10.0	Low	Retain and Protect
21	T21	Leucadendron arborescens	Leucadendron	150	10.0	10.0	10.0	10.0	Low	Retain and Protect
22	T22	Leucadendron arborescens	Leucadendron	150	10.0	10.0	10.0	10.0	Low	Retain and Protect
23	T23	Leucadendron arborescens	Leucadendron	150	10.0	10.0	10.0	10.0	Low	Retain and Protect
24	T24	Leucadendron arborescens	Leucadendron	150	10.0	10.0	10.0	10.0	Low	Retain and Protect
25	T25	Leucadendron arborescens	Leucadendron	150	10.0	10.0	10.0	10.0	Low	Retain and Protect
26	T26	Leucadendron arborescens	Leucadendron	150	10.0	10.0	10.0	10.0	Low	Retain and Protect
27	T27	Leucadendron arborescens	Leucadendron	150	10.0	10.0	10.0	10.0	Low	Retain and Protect
28	T28	Leucadendron arborescens	Leucadendron	150	10.0	10.0	10.0	10.0	Low	Retain and Protect
29	T29	Leucadendron arborescens	Leucadendron	150	10.0	10.0	10.0	10.0	Low	Retain and Protect
30	T30	Leucadendron arborescens	Leucadendron	150	10.0	10.0	10.0	10.0	Low	Retain and Protect
31	T31	Leucadendron arborescens	Leucadendron	150	10.0	10.0	10.0	10.0	Low	Retain and Protect
32	T32	Leucadendron arborescens	Leucadendron	150	10.0	10.0	10.0	10.0	Low	Retain and Protect
33	T33	Leucadendron arborescens	Leucadendron	150	10.0	10.0	10.0	10.0	Low	Retain and Protect
34	T34	Leucadendron arborescens	Leucadendron	150	10.0	10.0	10.0	10.0	Low	Retain and Protect
35	T35	Leucadendron arborescens	Leucadendron	150	10.0	10.0	10.0	10.0	Low	Retain and Protect
36	T36	Leucadendron arborescens	Leucadendron	150	10.0	10.0	10.0	10.0	Low	Retain and Protect
37	T37	Leucadendron arborescens	Leucadendron	150	10.0	10.0	10.0	10.0	Low	Retain and Protect
38	T38	Leucadendron arborescens	Leucadendron	150	10.0	10.0	10.0	10.0	Low	Retain and Protect
39	T39	Leucadendron arborescens	Leucadendron	150	10.0	10.0	10.0	10.0	Low	Retain and Protect
40	T40	Leucadendron arborescens	Leucadendron	150	10.0	10.0	10.0	10.0	Low	Retain and Protect
41	T41	Leucadendron arborescens	Leucadendron	150	10.0	10.0	10.0	10.0	Low	Retain and Protect
42	T42	Leucadendron arborescens	Leucadendron	150	10.0	10.0	10.0	10.0	Low	Retain and Protect
43	T43	Leucadendron arborescens	Leucadendron	150	10.0	10.0	10.0	10.0	Low	Retain and Protect
44	T44	Leucadendron arborescens	Leucadendron	150	10.0	10.0	10.0	10.0	Low	Retain and Protect
45	T45	Leucadendron arborescens	Leucadendron	150	10.0	10.0	10.0	10.0	Low	Retain and Protect
46	T46	Leucadendron arborescens	Leucadendron	150	10.0	10.0	10.0	10.0	Low	Retain and Protect
47	T47	Leucadendron arborescens	Leucadendron	150	10.0	10.0	10.0	10.0	Low	Retain and Protect
48	T48	Leucadendron arborescens	Leucadendron	150	10.0	10.0	10.0	10.0	Low	Retain and Protect
49	T49	Leucadendron arborescens	Leucadendron	150	10.0	10.0	10.0	10.0	Low	Retain and Protect
50	T50	Leucadendron arborescens	Leucadendron	150	10.0	10.0	10.0	10.0	Low	Retain and Protect
51	T51	Leucadendron arborescens	Leucadendron	150	10.0	10.0	10.0	10.0	Low	Retain and Protect
52	T52	Leucadendron arborescens	Leucadendron	150	10.0	10.0	10.0	10.0	Low	Retain and Protect
53	T53	Leucadendron arborescens	Leucadendron	150	10.0	10.0	10.0	10.0	Low	Retain and Protect
54	T54	Leucadendron arborescens	Leucadendron	150	10.0	10.0	10.0	10.0	Low	Retain and Protect
55	T55	Leucadendron arborescens	Leucadendron	150	10.0	10.0	10.0	10.0	Low	Retain and Protect
56	T56	Leucadendron arborescens	Leucadendron	150	10.0	10.0	10.0	10.0	Low	Retain and Protect
57	T57	Leucadendron arborescens	Leucadendron	150	10.0	10.0	10.0	10.0	Low	Retain and Protect
58	T58	Leucadendron arborescens	Leucadendron	150	10.0	10.0	10.0	10.0	Low	Retain and Protect
59	T59	Leucadendron arborescens	Leucadendron	150	10.0	10.0	10.0	10.0	Low	Retain and Protect
60	T60	Leucadendron arborescens	Leucadendron	150	10.0	10.0	10.0	10.0	Low	Retain and Protect
61	T61	Leucadendron arborescens	Leucadendron	150	10.0	10.0	10.0	10.0	Low	Retain and Protect
62	T62	Leucadendron arborescens	Leucadendron	150	10.0	10.0	10.0	10.0	Low	Retain and Protect
63	T63	Leucadendron arborescens	Leucadendron	150	10.0	10.0	10.0	10.0	Low	Retain and Protect
64	T64	Leucadendron arborescens	Leucadendron	150	10.0	10.0	10.0	10.0	Low	Retain and Protect
65	T65	Leucadendron arborescens	Leucadendron	150	10.0	10.0	10.0	10.0	Low	Retain and Protect
66	T66	Leucadendron arborescens	Leucadendron	150	10.0	10.0	10.0	10.0	Low	Retain and Protect
67	T67	Leucadendron arborescens	Leucadendron	150	10.0	10.0	10.0	10.0	Low	Retain and Protect
68	T68	Leucadendron arborescens	Leucadendron	150	10.0	10.0	10.0	10.0	Low	Retain and Protect
69	T69	Leucadendron arborescens	Leucadendron	150	10.0	10.0	10.0	10.0	Low	Retain and Protect
70	T70	Leucadendron arborescens	Leucadendron	150	10.0	10.0	10.0	10.0	Low	Retain and Protect
71	T71	Leucadendron arborescens	Leucadendron	150	10.0	10.0	10.0	10.0	Low	Retain and Protect
72	T72	Leucadendron arborescens	Leucadendron	150	10.0	10.0	10.0	10.0	Low	Retain and Protect
73	T73	Leucadendron arborescens	Leucadendron	150	10.0	10.0	10.0	10.0	Low	Retain and Protect
74	T74	Leucadendron arborescens	Leucadendron	150	10.0	10.0	10.0	10.0	Low	Retain and Protect
75	T75	Leucadendron arborescens	Leucadendron	150	10.0	10.0	10.0	10.0	Low	Retain and Protect
76	T76	Leucadendron arborescens	Leucadendron	150	10.0	10.0	10.0	10.0	Low	Retain and Protect
77	T77	Leucadendron arborescens	Leucadendron	150	10.0	10.0	10.0	10.0	Low	Retain and Protect
78	T78	Leucadendron arborescens	Leucadendron	150	10.0	10.0	10.0	10.0	Low	Retain and Protect
79	T79	Leucadendron arborescens	Leucadendron	150	10.0	10.0	10.0	10.0	Low	Retain and Protect
80	T80	Leucadendron arborescens	Leucadendron	150	10.0	10.0	10.0	10.0	Low	Retain and Protect
81	T81	Leucadendron arborescens	Leucadendron	150	10.0	10.0	10.0	10.0	Low	Retain and Protect
82	T82	Leucadendron arborescens	Leucadendron	150	10.0	10.0	10.0	10.0	Low	Retain and Protect
83	T83	Leucadendron arborescens	Leucadendron	150	10.0	10.0	10.0	10.0	Low	Retain and Protect
84	T84	Leucadendron arborescens	Leucadendron	150	10.0	10.0	10.0	10.0	Low	Retain and Protect
85	T85	Leucadendron arborescens	Leucadendron	150	10.0	10.0	10.0	10.0	Low	Retain and Protect
86	T86	Leucadendron arborescens	Leucadendron	150	10.0	10.0	10.0	10.0	Low	Retain and Protect
87	T87	Leucadendron arborescens	Leucadendron	150	10.0	10.0	10.0	10.0	Low	Retain and Protect
88	T88	Leucadendron arborescens	Leucadendron	150	10.0	10.0	10.0	10.0	Low	Retain and Protect
89	T89	Leucadendron arborescens	Leucadendron	150	10.0	10.0	10.0	10.0	Low	Retain and Protect
90	T90	Leucadendron arborescens	Leucadendron	150	10.0	10.0	10.0	10.0	Low	Retain and Protect
91	T91	Leucadendron arborescens	Leucadendron	150	10.0	10.0	10.0	10.0	Low	Retain and Protect
92	T92	Leucadendron arborescens	Leucadendron	150	10.0	10.0	10.0	10.0	Low	Retain and Protect
93	T93	Leucadendron arborescens	Leucadendron	150	10.0	10.0	10.0	10.0	Low	Retain and Protect
94	T94	Leucadendron arborescens	Leucadendron	150	10.0	10.0	10.0	10.0	Low	Retain and Protect
95	T95	Leucadendron arborescens	Leucadendron	150	10.0	10.0	10.0	10.0	Low	Retain and Protect
96	T96	Leucadendron arborescens	Leucadendron	150	10.0	10.0	10.0	10.0	Low	Retain and Protect
97	T97	Leucadendron arborescens	Leucadendron	150	10.0	10.0	10.0	10.0	Low	Retain and Protect
98	T98	Leucadendron arborescens	Leucadendron	150	10.0	10.0	10.0	10.0	Low	Retain and Protect
99	T99	Leucadendron arborescens	Leucadendron	150	10.0	10.0	10.0	10.0	Low	Retain and Protect
100	T100	Leucadendron arborescens	Leucadendron	150	10.0	10.0	10.0	10.0	Low	Retain and Protect
101	T101	Leucadendron arborescens	Leucadendron	150	10.0	10.0	10.0	10.0	Low	Retain and Protect
102	T102	Leucadendron arborescens	Leucadendron	150	10.0	10.0	10.0	10.0	Low	Retain and Protect
103	T103	Leucadendron arborescens	Leucadendron	150	10.0	10.0	10.0	10.0	Low	Retain and Protect
104	T104	Leucadendron arborescens	Leucadendron	150	10.0	10.0	10.0	10.0	Low	Retain and Protect
105	T105	Leucadendron arborescens	Leucadendron	150	10.0	10.0	10.0	10.0	Low	Retain and Protect
106	T106	Leucadendron arborescens	Leucadendron	150	10.0	10.0	10.0	10.0	Low	Retain and Protect
107	T107	Leucadendron arborescens	Leucadendron	150	10.0	10.0	10.0	10.0	Low	Retain and Protect

4.2 Tree Impact Assessment Schedule

40-62 Yorktown Pde and 195-213 Fitzgerald Ave, Maroubra, NSW - Tree Assessment Schedule

Tree ID	Trees in Group	Tree Species	Common Name	Height (m)	Spread Average (m)	Trunk Diameter Breast Height (dbh) (m)	Trunk Diameter at base (dgl) (m)	Nominal TPZ radius (m) 12xdbh (AS 4970)	Nominal SRZ radius (m) (AS 4970)	Age Class	Current Vigour	Current Form	Tree Origin	Noted Defects	ULE Rating	Retention Value	General Comments and Notes	Incursion and Impact	Recommendation
1	1	<i>Cupaniopsis anacardioides</i>	Tuckeroo	7.0	6.0	0.33	0.67	3.96	2.80	Mature	Good	Average	Native	Co-dominant Stems, Inclusions, Branch Tearouts	Medium (15-40 years)	Low	Street tree Yorktown Pde. Canopy pruned for overhead powerline clearance.	Nil impacts expected	Retain and Protect
2	1	<i>Cupaniopsis anacardioides</i>	Tuckeroo	6.0	6.0	0.31	0.33	3.72	2.08	Mature	Good	Average	Native	Inclusions, Co-dominant Stems	Medium (15-40 years)	Low	Street tree Yorktown Pde. Canopy pruned for overhead powerline clearance.	Stormwater services are to be installed non-destructively using either hand digging, compressed air (air spade), water vacuum extraction or underbore techniques. Non-destructive works are to be undertaken with Project Arborist present.	Retain and Protect
3	1	<i>Cupaniopsis anacardioides</i>	Tuckeroo	5.0	4.0	0.19	0.23	2.28	1.79	Mature	Good	Average	Native	Co-dominant Stems, Epicormic Growth	Medium (15-40 years)	Low	Street tree Yorktown Pde. Canopy pruned for overhead powerline clearance.	Nil impacts expected	Retain and Protect
4	1	<i>Glochidion ferdinandi</i>	Cheese Tree	7.0	6.0	0.36	0.44	4.32	2.34	Mature	Fair	Average	Endemic	Co-dominant Stems	Long (>40 years)	Low	Street tree Yorktown Pde. Canopy pruned for overhead powerline clearance.	Minor incursion of 10% expected to the northern side of this tree for general building and landscape works.	Retain and Protect
5	1	<i>Cupaniopsis anacardioides</i>	Tuckeroo	6.5	6.0	0.25	0.30	3.00	2.00	Mature	Good	Average	Native		Medium (15-40 years)	Low	Street tree Yorktown Pde. Canopy pruned for overhead powerline clearance.	Nil impacts expected	Retain and Protect
6	1	<i>Cupaniopsis anacardioides</i>	Tuckeroo	5.0	5.0	0.21	0.30	2.52	2.00	Mature	Good	Average	Native	Branch Tearouts, Major Wounding	Medium (15-40 years)	Low	Street tree Yorktown Pde. Canopy pruned for overhead powerline clearance. Branch tearouts and wounding from vehicles on southern side.	Nil impacts expected	Retain and Protect
7	1	<i>Callistemon viminalis cv.</i>	Weeping Bottlebrush	6.0	4.0	0.22	0.33	2.64	2.08	Mature	Fair	Average	Native	Co-dominant Stems, Epicormic Growth, Lean-Minor	Medium (15-40 years)	Low	Minor lean to south.	Within the proposed building works.	Remove
8	1	<i>Melaleuca amillarlis</i>	Bracelet Honey-myrtle	6.0	5.0	0.29	0.70	3.48	2.85	Over-mature	Poor	Poor	Endemic	Lean-Major, Deadwood-Minor, Branch Tearouts, Co-dominant Stems, Decay-Minor	Remove (<5 years)	Low	Major lean to north.	Within the proposed building works.	Remove
9	1	<i>Olea europaea subsp. africana</i>	African Olive	7.0	6.0	0.19	0.23	2.28	1.79	Mature	Good	Average	Invasive		Remove (<5 years)	Nil / Remove		Within the proposed building works.	Remove
10	1	<i>Leptospermum laevigatum</i>	Coastal Tea Tree	6.0	4.0	0.29	0.36	3.48	2.15	Mature	Fair	Poor	Endemic	Branch Tearouts, Deadwood-Minor, Tip Dieback, Lean-Minor	Short (5-15 years)	Low		Within the proposed building works.	Remove
11	1	<i>Cupressus macrocarpa cv.</i>	Monterey Cypress	9.0	5.0	0.35	0.41	4.20	2.28	Mature	Good	Average	Exotic		Long (>40 years)	Low	Growing close to existing building.	Within the proposed building works.	Remove
12	1	<i>Algonis flexuosa</i>	Willow Myrtle	7.5	7.0	0.58	1.05	6.96	3.38	Mature	Fair	Average	Native	Co-dominant Stems, Decay-Minor, Deadwood-Minor, Branch Tearouts, Epicormic Growth	Medium (15-40 years)	Low	Multistemmed at base.	Within the proposed building works.	Remove
13	2	<i>Thuja occidentalis cv</i>	Arborvitae Cultivar	6.0	2.0	0.19	0.23	2.28	1.79	Mature	Fair	Poor	Exotic	Co-dominant Stems	Medium (15-40 years)	Low		Within the proposed building works.	Remove
14	1	<i>Lagerstroemia indica</i>	Crepe Myrtle	8.0	7.0	0.48	0.50	5.76	2.47	Mature	Good	Average	Exotic	Deadwood-Minor, Decay-Minor, Inclusions	Long (>40 years)	Low		Within the proposed building works.	Remove
15	1	<i>Pittosporum tobira</i>	Japanese Cheesewood	7.0	6.0	0.19	0.24	2.28	1.82	Mature	Fair	Average	Exotic	Deadwood-Minor	Medium (15-40 years)	Low		Within the proposed building works.	Remove
16	1	<i>Citrus limon cv.</i>	Lemon	6.0	4.0	0.10	0.15	2.00	1.49	Over-mature	Poor	Poor	Exotic		Short (5-15 years)	Low		Within the proposed building works.	Remove
17	1	<i>Olea europaea subsp. africana</i>	African Olive	7.5	4.0	0.15	0.15	2.00	1.49	Mature	Fair	Poor	Invasive	Co-dominant Stems, Epicormic Growth, Branch Tearouts, Deadwood-Minor	Medium (15-40 years)	Nil / Remove		Within the proposed building works.	Remove
18	1	<i>Cyathea cooperi</i>	Scaly Tree Fern	6.0	2.0	0.10	0.16	2.00	1.53	Mature	Good	Average	Native		Replaceable (Small/Young)	Low		Within the proposed building works.	Remove
19	1	<i>Dracaena marginata cv.</i>	Madagascar Dragon Tree	7.0	2.0	0.16	0.25	2.00	1.85	Mature	Fair	Poor	Exotic	Decay-Minor	Replaceable (Small/Young)	Low		Within the proposed building works.	Remove
20	1	<i>Cupressus macrocarpa cv.</i>	Monterey Cypress	12.0	6.5	0.58	0.71	6.96	2.87	Mature	Good	Average	Exotic		Long (>40 years)	Low		Within the proposed building works.	Remove
21	1	<i>Melia azedarach</i>	White Cedar	7.0	4.0	0.08	0.12	2.00	1.36	Mature	Poor	Average	Native	Branch Tearouts	Medium (15-40 years)	Low		Within the proposed building works.	Remove
22	1	<i>Duranta erecta?</i>	Red Duranta	6.0	4.0	0.24	0.32	2.88	2.05	Senescent	Moribund	Poor	Exotic	Very Asymmetric Form, Tip Dieback, Lean-Major, Decay-Minor, Deadwood-Minor	Remove (<5 years)	Nil / Remove	Moribund. Very asymmetric to	Within the proposed building works.	Remove
23	1	<i>Plumeria rubra</i>	Frangipani	6.0	3.0	0.22	0.31	2.64	2.02	Mature	Good	Average	Exotic	Very Asymmetric Form, Lean-Minor	Replaceable (Small/Young)	Low	Lean to north.	Within the proposed building works.	Remove
24	1	<i>Lagerstroemia indica</i>	Crepe Myrtle	6.0	4.0	0.20	0.45	2.40	2.37	Mature	Fair	Average	Exotic	Tip Dieback	Long (>40 years)	Low	Growing under Melia canopy.	Within the proposed building works.	Remove
25	1	<i>Jacaranda mimosifolia</i>	Jacaranda	13.0	6.0	0.50	0.68	6.00	2.81	Mature	Fair	Average	Exotic	Epicormic Growth	Medium (15-40 years)	Low		Within the proposed building works.	Remove
26	1	<i>Cupressus macrocarpa cv.</i>	Monterey Cypress	9.0	6.0	0.58	0.72	6.96	2.88	Mature	Good	Average	Exotic	Deadwood-Minor	Long (>40 years)	Low		Within the proposed building works.	Remove
27	1	<i>Schefflera actinophylla</i>	Umbrella Tree	7.0	4.0	0.25	0.31	3.00	2.02	Mature	Fair	Average	Exotic		Medium (15-40 years)	Low		Within the proposed building works.	Remove
28	1	<i>Persea gratissima</i>	Avocado	10.0	8.0	0.53	0.70	6.36	2.85	Mature	Good	Average	Exotic	Deadwood-Minor	Long (>40 years)	Moderate	Surface roots evident at base of tree. Large and reasonably prominent tree in good condition.	Within the proposed building works.	Remove
29	1	<i>Chamaecyparis obtusa cv.</i>	Hinoki Cypress	8.0	4.0	0.25	0.30	3.00	2.00	Mature	Good	Average	Exotic		Medium (15-40 years)	Low		Within the proposed building works.	Remove
30	1	<i>Plumeria rubra</i>	Frangipani	6.0	4.0	0.22	0.25	2.64	1.85	Mature	Fair	Poor	Exotic	Lean-Minor, Decay-Minor	Replaceable (Small/Young)	Low	Lean to the north.	Within the proposed building works.	Remove
31	1	<i>Ficus benjamina</i>	Weeping Fig	12.0	7.0	0.34	0.41	4.08	2.28	Mature	Good	Average	Native	Tip Dieback, Deadwood-Minor	Long (>40 years)	Low	Growing in a confined and slightly raised garden bed.	Within the proposed building works.	Remove
32	1	<i>Xylosma senticosum</i>	Shiny Xylosma	8.0	6.0	0.26	0.33	3.12	2.08	Mature	Fair	Poor	Exotic	Lean-Major, Decay-Major, Branch Tearouts, Epicormic Growth, Major Wounding, Very Asymmetric Form, Tip Dieback	Remove (<5 years)	Nil / Remove	Major lean to the north. Major wounding to the base of the trunk.	Within the proposed building works.	Remove
33	1	<i>Morus nigra</i>	Mulberry	6.0	3.0	0.15	0.20	2.00	1.68	Mature	Fair	Average	Exotic		Replaceable (Small/Young)	Low		Within the proposed building works.	Remove
34	1	<i>Melia azedarach</i>	White Cedar	10.0	6.0	0.30	0.40	3.60	2.25	Mature	Good	Average	Native	Decay-Minor, Deadwood-Minor, Branch Tearouts, Epicormic Growth	Medium (15-40 years)	Low	Pruning wounds to southern stem.	Within the proposed building works.	Remove
35	1	<i>Mangifera indica</i>	Mango	6.0	3.0	0.10	0.20	2.00	1.68	Mature	Fair	Average	Exotic	Co-dominant Stems	Replaceable (Small/Young)	Low		Within the proposed building works.	Remove
36	1	<i>Carica papaya</i>	Pawpaw	7.0	6.0	0.12	0.22	2.00	1.75	Mature	Fair	Average	Exotic		Replaceable (Small/Young)	Low		Within the proposed building works.	Remove
37	1	<i>Artocarpus integrifolia</i>	Jackfruit	8.0	5.0	0.21	0.29	2.52	1.97	Mature	Fair	Average	Exotic	Tip Dieback	Replaceable (Small/Young)	Low		Within the proposed building works.	Remove
38	1	<i>Callistemon viminalis cv.</i>	Weeping Bottlebrush	7.0	4.0	0.33	0.48	3.96	2.43	Mature	Fair	Average	Native	Tip Dieback, Co-dominant Stems	Medium (15-40 years)	Low		Within the proposed building works.	Remove
39	1	<i>Morus nigra</i>	Mulberry	9.0	6.0	0.34	0.49	4.08	2.45	Mature	Fair	Average	Exotic	Deadwood-Minor, Decay-Minor	Replaceable (Small/Young)	Low		Within the proposed building works.	Remove
40	1	<i>Mangifera indica</i>	Mango	6.0	4.0	0.30	0.30	3.60	2.00	Mature	Good	Average	Exotic		Replaceable (Small/Young)	Low		Within the proposed building works.	Remove

Tree ID	Trees in Group	Tree Species	Common Name	Height (m)	Spread Average (m)	Trunk Diameter Breast Height (dbh) (m)	Trunk Diameter at base (dgl) (m)	Nominal TPZ radius (m) 12xdbh (AS 4970)	Nominal SRZ radius (m) (AS 4970)	Age Class	Current Vigour	Current Form	Tree Origin	Noted Defects	ULE Rating	Retention Value	General Comments and Notes	Incursion and Impact	Recommendation
41	1	<i>Banksia serrata</i>	Old Man Banksia	6.0	6.0	0.40	0.49	4.80	2.45	Mature	Good	Average	Endemic		Long (>40 years)	Moderate	Street tree Fitzgerald Ave. Pruned for overhead powerlines.	Minor surface impacts expected for installation of new driveway to access basement. Driveway to be installed at or above existing levels. Electrical services are to be installed non-destructively to the east of this tree within the extent of the existing driveway using either hand digging, compressed air (air spade), water vacuum extraction or underbore techniques. Non-destructive works are to be undertaken with Project Arborist present.	Retain and Protect
42	1	<i>Banksia serrata</i>	Old Man Banksia	8.0	6.0	0.71	0.84	8.52	3.08	Mature	Good	Average	Endemic	Branch Tearouts, Major Wounding	Long (>40 years)	Moderate	Street tree Fitzgerald Ave. Major branch tearout to north. Asymmetric canopy to west.	Driveway to be constructed at or above existing levels. Pavement depth to be minimised and pavement extent to be modified to limit impacts within the TPA. Tree protection fencing to be maintained in place during construction works and only removed to complete final landscape works. Selective and incremental pruning may be required to be undertaken to a maximum height of 3.5m from driveway pavement level to the west of the tree. This area is not suitable for primary construction access. Project Consulting Arborist to be present to observe all works within the TPA of this tree. Minor incursion expected to the southern side of 10% for excavation to install a new substation, to construct the building and for basement driveway access works. Final substation location subject to authority approval. Should the substation remain in this location, the services connections are to be positioned to the far west of the driveway and installed using non-destructive methods (ie hand dig, vacuum extraction, etc). This is to avoid impacts to both trees T41 and T42.	Retain and Protect
43	1	<i>Banksia serrata</i>	Old Man Banksia	6.0	6.0	0.38	0.44	4.56	2.34	Mature	Good	Average	Endemic		Long (>40 years)	Moderate	Street tree Fitzgerald Ave. Asymmetric canopy to south. Canopy growth inhibited on northern side from Ficus. Ficus roots growing under tree.	Nil impacts expected	Retain and Protect
44	1	<i>Ficus rubiginosa</i>	Port Jackson Fig	8.0	10.0	0.78	0.85	9.36	3.09	Mature	Excellent	Excellent	Native		Long (>40 years)	High	Street tree Fitzgerald Ave. Surface roots visible around base of tree.	Minor incursion of 2% expected to the south western side of the tree for the installation of a new substation.	Retain and Protect
45	1	<i>Ficus rubiginosa</i>	Port Jackson Fig	9.0	7.0	0.57	0.59	6.84	2.65	Mature	Good	Average	Native	Tip Dieback	Long (>40 years)	Moderate	Street tree Fitzgerald Ave. Canopy pruned for powerline clearance to north and west. Surface roots visible at base of tree.	Nil impacts expected	Retain and Protect
46	1	<i>Banksia serrata</i>	Old Man Banksia	6.0	5.0	0.48	0.50	5.76	2.47	Mature	Good	Average	Endemic		Long (>40 years)	Moderate	Street tree Fitzgerald Ave. Ficus roots visible at base of tree. Canopy pruned on the southern side for powerline clearance.	Minor surface impacts are expected for the removal of the existing driveway pavements that pass through the designated TPA. Driveways are to be sensitively removed with Project Consulting Arborist present.	Retain and Protect
47	1	<i>Ficus rubiginosa</i>	Port Jackson Fig	6.0	6.0	0.34	0.43	4.08	2.32	Mature	Good	Average	Native	Pest/Disease	Long (>40 years)	Moderate	Street tree Fitzgerald Ave. Surface roots visible at base of tree. Pest (Fig Psyllid) evident on leaves.	Nil impacts expected	Retain and Protect
48	1	<i>Banksia serrata</i>	Old Man Banksia	6.0	4.0	0.35	0.35	4.20	2.13	Mature	Fair	Poor	Endemic	Very Asymmetric Form	Long (>40 years)	Low	Street tree Fitzgerald Ave. Asymmetric canopy to the west.	Nil impacts expected	Retain and Protect
49	1	<i>Banksia serrata</i>	Old Man Banksia	4.0	2.0	0.16	0.23	2.00	1.79	Mature	Good	Average	Endemic	Epicormic Growth	Replaceable (Small/Young)	Low	Small street tree Fitzgerald Ave.	Nil impacts expected	Retain and Protect
50	1	<i>Xylosma senicosum</i>	Shiny Xylosma	8.0	8.0	0.43	0.42	5.16	2.30	Mature	Good	Average	Exotic	Co-dominant Stems	Medium (15-40 years)	Low		Within the proposed building works.	Remove
51	1	<i>Camellia sasanqua</i>	Camellia	6.0	4.0	0.12	0.18	2.00	1.61	Mature	Good	Average	Exotic		Long (>40 years)	Low		Within the proposed building works.	Remove
52	1	<i>Celtis sinensis</i>	Chinese Hackberry	8.0	6.0	0.19	0.20	2.28	1.68	Semi-mature	Fair	Average	Invasive	Co-dominant Stems, Inclusions	Remove (<5 years)	Nil / Remove		Within the proposed building works.	Remove
53	1	<i>Plumeria rubra</i>	Frangipani	6.0	6.0	0.09	0.11	2.00	1.31	Mature	Fair	Average	Exotic		Replaceable (Small/Young)	Low		Within the proposed building works.	Remove
54	1	<i>Camellia sasanqua</i>	Camellia	4.0	4.0	0.09	0.15	2.00	1.49	Mature	Fair	Average	Exotic		Long (>40 years)	Low		Within the proposed building works.	Remove
55	1	<i>Nerium oleander</i>	Oleander	6.0	6.0	0.35	0.50	4.20	2.47	Mature	Fair	Average	Exotic	Co-dominant Stems	Replaceable (Small/Young)	Nil / Remove	Multitrunked from base.	Within the proposed building works.	Remove
56	1	<i>Tibouchina lepidota</i>	Lasiandra	6.0	5.0	0.14	0.26	2.00	1.88	Mature	Fair	Average	Exotic		Medium (15-40 years)	Low		Within the proposed building works.	Remove
57	1	<i>Lagerstroemia indica</i>	Crepe Myrtle	6.0	6.0	0.15	0.35	2.00	2.13	Mature	Fair	Average	Exotic	Very Asymmetric Form	Long (>40 years)	Low	Asymmetric to north.	Within the proposed building works.	Remove
58	1	<i>Schefflera actinophylla</i>	Umbrella Tree	8.5	6.0	0.40	0.70	4.80	2.85	Mature	Good	Average	Exotic	Root Impacts	Medium (15-40 years)	Low	Major root system.	Within the proposed building works.	Remove
59	1	<i>Plumeria rubra</i>	Frangipani	8.0	6.0	0.17	0.22	2.04	1.75	Mature	Fair	Poor	Exotic		Replaceable (Small/Young)	Low		Within the proposed building works.	Remove
60	1	<i>Morus nigra</i>	Mulberry	8.0	6.0	0.25	0.30	3.00	2.00	Mature	Fair	Average	Exotic		Replaceable (Small/Young)	Nil / Remove		Within the proposed building works.	Remove
61	1	<i>Banksia integrifolia</i>	Coastal Banksia	8.0	6.0	0.18	0.23	2.16	1.79	Mature	Good	Average	Endemic		Long (>40 years)	Moderate		Within the proposed building works.	Remove
62	1	<i>Glochidion ferdinandii</i>	Cheese Tree	9.0	12.0	0.91	0.92	10.92	3.20	Mature	Good	Average	Endemic	Co-dominant Stems	Long (>40 years)	High	Large and endemic tree.	Within the proposed building works.	Remove
63	1	<i>Syagrus romanzoffiana</i>	Queen Palm	9.0	6.0	0.34	0.47	4.00	1.24	Mature	Fair	Average	Exotic		Long (>40 years)	Low		Within the proposed building works.	Remove
64	1	<i>Syagrus romanzoffiana</i>	Queen Palm	8.0	6.0	0.22	0.32	4.00	1.16	Mature	Fair	Average	Exotic		Long (>40 years)	Low		Within the proposed building works.	Remove
65	1	<i>Araucaria columnaris</i>	Cook Pine	12.0	6.0	0.60	0.75	7.20	2.93	Mature	Good	Excellent	Exotic		Long (>40 years)	High		Within the proposed building works.	Remove
66	1	<i>Cotoneaster glaucophyllus</i>	Cotoneaster	6.5	7.0	0.25	0.30	3.00	2.00	Mature	Fair	Average	Invasive		Remove (<5 years)	Nil / Remove	Extremely multi-trunked and sprawling shrub.	Within the proposed building works.	Remove
67	1	<i>Olea europaea subsp. africana</i>	African Olive	8.0	6.0	0.43	0.60	5.16	2.67	Mature	Fair	Poor	Invasive	Co-dominant Stems	Remove (<5 years)	Nil / Remove		Within the proposed building works.	Remove
68	1	<i>Fraxinus griffithii</i>	Griffith's Ash	8.0	6.0	0.15	0.15	2.00	1.49	Semi-mature	Fair	Poor	Exotic	Co-dominant Stems	Replaceable (Small/Young)	Nil / Remove		Within the proposed building works.	Remove
69	1	<i>Melia azedarach</i>	White Cedar	8.0	6.0	0.68	0.70	8.16	2.85	Mature	Good	Average	Native	Co-dominant Stems	Medium (15-40 years)	Moderate		Within the proposed building works.	Remove
70	2	<i>Acmena smithii</i>	Lilly Pilly	8.0	3.0	0.24	0.30	2.88	2.00	Mature	Good	Average	Native		Medium (15-40 years)	Low	Closely spaced group of two.	Within the proposed building works.	Remove
71	1	<i>Schefflera actinophylla</i>	Umbrella Tree	7.0	3.0	0.20	0.30	2.40	2.00	Mature	Good	Average	Exotic	Co-dominant Stems	Medium (15-40 years)	Low		Within the proposed building works.	Remove
72	1	<i>Nerium oleander</i>	Oleander	8.0	6.0	0.25	0.35	3.00	2.13	Mature	Fair	Average	Exotic		Replaceable (Small/Young)	Nil / Remove		Within the proposed building works.	Remove
73	1	<i>Dracaena marginata cv.</i>	Madagascar Dragon Tree	6.5	4.0	0.28	0.32	3.36	2.05	Mature	Good	Average	Exotic		Replaceable (Small/Young)	Low		Within the proposed building works.	Remove
74	1	<i>Cupressus macrocarpa cv.</i>	Monterey Cypress	9.5	6.0	0.72	0.97	8.64	3.27	Mature	Good	Average	Exotic		Medium (15-40 years)	Low	Excessively large and abnormal basal development.	Within the proposed building works.	Remove
75	1	<i>Plumeria rubra</i>	Frangipani	8.0	6.0	0.25	0.20	3.00	1.68	Mature	Good	Average	Exotic		Replaceable (Small/Young)	Low		Within the proposed building works.	Remove

Tree ID	Trees in Group	Tree Species	Common Name	Height (m)	Spread Average (m)	Trunk Diameter Breast Height (dbh) (m)	Trunk Diameter at base (dgl) (m)	Nominal TPZ radius (m) 12xdbh (AS 4970)	Nominal SRZ radius (m) (AS 4970)	Age Class	Current Vigour	Current Form	Tree Origin	Noted Defects	ULE Rating	Retention Value	General Comments and Notes	Incursion and Impact	Recommendation
76	1	<i>Ligustrum lucidum</i>	Broadleaf Privet	7.0	6.0	0.32	0.70	3.84	2.85	Mature	Good	Average	Weed		Remove (<5 years)	Nil / Remove		Within the proposed building works.	Remove
77	1	<i>Cupressus macrocarpa cv.</i>	Monterey Cypress	8.0	6.0	0.56	0.74	6.72	2.92	Dead	Dead	Average	Exotic	Tip Dieback, Decay-Major, Deadwood-Major	Remove (<5 years)	Nil / Remove	Standing dead tree.	Within the proposed building works.	Remove
78	1	<i>Nerium oleander</i>	Oleander	8.0	6.0	0.30	0.50	3.60	2.47	Mature	Fair	Poor	Exotic		Replaceable (Small/Young)	Nil / Remove	Covered in Tecomania capensis.	Within the proposed building works.	Remove
79	1	<i>Lagerstroemia indica</i>	Crepe Myrtle	8.0	6.0	0.19	0.35	2.28	2.13	Mature	Good	Average	Exotic	Co-dominant Stems	Long (>40 years)	Low		Within the proposed building works.	Remove
80	1	<i>Ficus benjamina</i>	Weeping Fig	8.0	7.0	0.24	0.24	2.88	1.82	Mature	Good	Average	Native		Replaceable (Small/Young)	Low		Within the proposed building works.	Remove
81	1	<i>Schefflera actinophylla</i>	Umbrella Tree	8.0	5.0	0.39	0.49	4.68	2.45	Mature	Good	Average	Exotic	Co-dominant Stems	Medium (15-40 years)	Low		Within the proposed building works.	Remove
82	1	<i>Banksia ericifolia</i>	Heath-leaved Banksia	8.0	6.0	0.21	0.31	2.52	2.02	Over-mature	Poor	Poor	Endemic	Deadwood-Minor, Decay-Minor, Very Asymmetric Form	Replaceable (Small/Young)	Nil / Remove		Within the proposed building works.	Remove
83	1	<i>Plumeria rubra</i>	Frangipani	8.0	5.0	0.13	0.15	2.00	1.49	Mature	Fair	Average	Exotic		Replaceable (Small/Young)	Low		Within the proposed building works.	Remove
84	1	<i>Eucalyptus botryoides</i>	Bangalay	8.0	6.0	0.34	0.36	4.08	2.15	Mature	Good	Average	Endemic	Branch Tearouts, Epicormic Growth	Long (>40 years)	Moderate		Within the proposed building works.	Remove
85	1	<i>Syagrus romanzoffiana</i>	Queen Palm	8.0	6.0	0.23	0.27	4.00	1.14	Mature	Good	Average	Exotic		Long (>40 years)	Low		Within the proposed building works.	Remove
86	1	<i>Eucalyptus botryoides</i>	Bangalay	9.5	8.0	0.39	0.44	4.68	2.34	Mature	Good	Poor	Endemic	Epicormic Growth	Long (>40 years)	Low	Heavily pruned for overhead powerline clearance. Poorly positioned	Within the proposed building works.	Remove
87	1	<i>Buckinghamia celsissima</i>	Ivory Curl Tree	9.0	3.0	0.13	0.15	2.00	1.49	Mature	Good	Average	Native	Epicormic Growth	Medium (15-40 years)	Low		Within the proposed building works.	Remove
88	1	<i>Robinia pseudacacia 'Frisia'</i>	Golden Robinia	10.0	5.0	0.25	0.33	3.00	2.08	Mature	Fair	Average	Exotic	Co-dominant Stems, Inclusions	Medium (15-40 years)	Low		Within the proposed building works.	Remove
89	1	<i>Eucalyptus camaldulensis?</i>	River Red Gum	12.0	6.0	0.25	0.28	3.00	1.94	Semi-mature	Good	Excellent	Native		Long (>40 years)	Moderate		Within the proposed building works.	Remove
90	1	<i>Eucalyptus robusta</i>	Swamp Mahogany	11.0	7.0	0.42	0.52	5.04	2.51	Mature	Good	Average	Endemic		Long (>40 years)	High		Within the proposed building works.	Remove
91	1	<i>Eucalyptus haemastoma</i>	Scribbly Gum	7.5	6.0	0.22	0.25	2.64	1.85	Mature	Good	Poor	Endemic	Epicormic Growth, Lean-Minor, Very Asymmetric Form	Long (>40 years)	Low	Asymmetric to west. Extensive possum scatch marks on trunk. Epicormic growth at base.	Within the proposed building works.	Remove
92	1	<i>Archontophoenix alexandrae</i>	Alexandra Palm	8.0	6.0	0.30	0.70	4.00	1.35	Mature	Good	Excellent	Exotic		Long (>40 years)	Moderate	Attractive twin trunked specimen. Could be transplanted and re-used on site.	Transplantable.	Remove
93	1	<i>Angophora leiocarpa?</i>	Rusty Gum	9.0	3.0	0.19	0.19	2.28	1.65	Mature	Fair	Suppressed	Native	Poor Taper	Medium (15-40 years)	Low	Very small and narrow foliage. Believed to be non-endemic species of Angophora.	Within the proposed building works.	Remove
94	1	<i>Archontophoenix cunninghamiana</i>	Bangalow Palm	6.0	4.0	0.22	0.50	3.00	1.25	Mature	Fair	Average	Native		Long (>40 years)	Moderate	Twin-trunked specimen. Could be transplanted and re-used on site.	Transplantable.	Remove
95	1	<i>Eucalyptus racemosa</i>	Narrow-leaved Scribbly Gum	14.0	9.0	0.36	0.38	4.32	2.20	Mature	Good	Average	Native		Long (>40 years)	Moderate	Appears to be non-endemic variety based on available fruit identification.	Within the proposed building works.	Remove
96	1	<i>Chamaecyparis obtusa cv.</i>	Hinoki Cypress	8.0	6.0	0.15	0.18	2.00	1.61	Mature	Fair	Average	Exotic		Medium (15-40 years)	Low		Within the proposed building works.	Remove
97	1	<i>Eucalyptus saligna</i>	Sydney Blue Gum	12.0	10.0	0.45	0.55	5.40	2.57	Mature	Fair	Poor	Native	Deadwood-Major, Pest/Disease, Major Wounding	Medium (15-40 years)	Low	Extensive borer blaze and dysfunction at 3.0m to main trunk and branch.	Within the proposed building works.	Remove
98	1	<i>Eucalyptus robusta</i>	Swamp Mahogany	8.0	6.0	0.13	0.16	2.00	1.53	Semi-mature	Fair	Poor	Endemic	Very Asymmetric Form, Lean-Minor	Long (>40 years)	Low	Very asymmetric to southwest.	Within the proposed building works.	Remove
99	1	<i>Eucalyptus robusta</i>	Swamp Mahogany	11.0	7.0	0.32	0.40	3.84	2.25	Mature	Good	Average	Endemic		Long (>40 years)	Moderate		Within the proposed building works.	Remove
100	1	<i>Eucalyptus haemastoma</i>	Scribbly Gum	11.0	12.0	0.42	0.47	5.04	2.41	Mature	Good	Poor	Endemic	Lean-Major, Very Asymmetric Form	Long (>40 years)	Moderate	Very close to building. Major lean and asymmetry to south but otherwise good condition.	Within the proposed building works.	Remove
101	1	<i>Callistemon viminalis cv.</i>	Weeping Bottlebrush	8.5	6.0	0.19	0.25	2.28	1.85	Mature	Fair	Average	Native	Co-dominant Stems	Medium (15-40 years)	Low		Within the proposed building works.	Remove
102	1	<i>Robinia pseudacacia 'Frisia'</i>	Golden Robinia	9.0	7.0	0.16	0.16	2.00	1.53	Mature	Fair	Average	Exotic	Co-dominant Stems, Inclusions	Medium (15-40 years)	Low		Within the proposed building works.	Remove
103	1	<i>Araucaria columnaris</i>	Cook Pine	9.5	5.0	0.20	0.24	2.40	1.82	Mature	Good	Poor	Exotic	Very Asymmetric Form, Lean-Minor	Long (>40 years)	Low	Generally poor form for the species. Minor lean and asymmetry to south-west.	Within the proposed building works.	Remove
104	1	<i>Schefflera actinophylla</i>	Umbrella Tree	8.0	5.0	0.14	0.28	2.00	1.94	Mature	Fair	Average	Exotic	Co-dominant Stems	Medium (15-40 years)	Low		Within the proposed building works.	Remove
105	1	<i>Olea europaea subsp. africana</i>	African Olive	6.5	5.0	0.10	0.15	2.00	1.49	Mature	Fair	Average	Invasive		Remove (<5 years)	Nil / Remove		Within the proposed building works.	Remove
106	1	<i>Schefflera actinophylla</i>	Umbrella Tree	7.0	5.0	0.20	0.28	2.40	1.94	Mature	Good	Average	Exotic	Co-dominant Stems	Medium (15-40 years)	Low		Within the proposed building works.	Remove
107	1	<i>Morus nigra</i>	Mulberry	10.5	6.0	0.20	0.34	2.40	2.10	Mature	Fair	Average	Exotic	Very Asymmetric Form, Co-dominant Stems, Inclusions, Decay-Minor	Replaceable (Small/Young)	Nil / Remove	Asymmetric to west.	Within the proposed building works.	Remove
108	1	<i>Liquidambar styraciflua</i>	Liquidambar	11.5	5.0	0.25	0.20	3.00	1.68	Mature	Fair	Average	Exotic	Very Asymmetric Form, Epicormic Growth	Medium (15-40 years)	Low	Asymmetric to south.	Within the proposed building works.	Remove
109	1	<i>Liquidambar styraciflua</i>	Liquidambar	12.0	4.0	0.31	0.33	3.72	2.08	Mature	Fair	Suppressed	Exotic	Poor Taper, Co-dominant Stems	Medium (15-40 years)	Low		Within the proposed building works.	Remove
110	1	<i>Liquidambar styraciflua</i>	Liquidambar	12.0	4.0	0.41	0.50	4.92	2.47	Mature	Fair	Average	Exotic	Co-dominant Stems	Medium (15-40 years)	Low		Within the proposed building works.	Remove
111	1	<i>Olea europaea subsp. africana</i>	African Olive	7.0	9.0	0.48	0.88	5.76	3.14	Mature	Good	Average	Invasive	Co-dominant Stems, Epicormic Growth	Remove (<5 years)	Nil / Remove		Within the proposed building works.	Remove
112	1	<i>Cinnamomum camphora</i>	Camphor Laurel	12.0	8.0	0.79	1.10	9.48	3.44	Dead	Dead	Average	Invasive	Co-dominant Stems	Remove (<5 years)	Nil / Remove	Standing dead tree.	Within the proposed building works.	Remove
113	1	<i>Cinnamomum camphora</i>	Camphor Laurel	12.5	10.0	0.56	0.76	6.72	2.95	Mature	Fair	Average	Invasive	Deadwood-Minor	Remove (<5 years)	Nil / Remove	Lareg Ivy growing within canopy. Invasive species, should be removed.	Within the proposed building works.	Remove
114	2	<i>Morus nigra</i>	Mulberry	7.5	4.0	0.25	0.35	3.00	2.13	Mature	Fair	Poor	Exotic		Replaceable (Small/Young)	Nil / Remove	Group of two. Extremely multi-trunked from base. Limited value, should be removed.	Within the proposed building works.	Remove
115	1	<i>Ligustrum lucidum</i>	Broadleaf Privet	8.0	6.0	0.14	0.40	2.00	2.25	Mature	Fair	Average	Weed		Remove (<5 years)	Nil / Remove	Invasive weed.	Within the proposed building works.	Remove
116	1	<i>Schefflera actinophylla</i>	Umbrella Tree	8.0	6.0	0.28	0.30	3.36	2.00	Mature	Good	Poor	Exotic	Lean-Major, Very Asymmetric Form	Medium (15-40 years)	Low	Very asymmetric to west.	Within the proposed building works.	Remove
117	1	<i>Schefflera actinophylla</i>	Umbrella Tree	9.5	6.0	0.36	0.40	4.32	2.25	Mature	Fair	Average	Exotic		Medium (15-40 years)	Low		Within the proposed building works.	Remove
118	1	<i>Adenanthos sericea</i>	Woolly bush	6.0	4.0	0.18	0.20	2.16	1.68	Mature	Fair	Average	Native	Tip Dieback	Short (5-15 years)	Low		Within the proposed building works.	Remove
119	1	<i>Acmena smithii</i>	Lilly Pilly	3.0	2.0	0.14	0.22	2.00	1.75	Mature	Fair	Poor	Native	Epicormic Growth	Short (5-15 years)	Nil / Remove	Severely pruned and partially failed.	Within the proposed building works.	Remove
120	1	<i>Acmena smithii</i>	Lilly Pilly	8.0	3.0	0.09	0.12	2.00	1.36	Mature	Fair	Average	Native		Medium (15-40 years)	Low		Within the proposed building works.	Remove
121	1	<i>Acmena smithii</i>	Lilly Pilly	8.5	5.0	0.12	0.21	2.00	1.72	Mature	Good	Average	Native	Co-dominant Stems	Medium (15-40 years)	Low		Within the proposed building works.	Remove
122	1	<i>Glochidion ferdinandi</i>	Cheese Tree	7.0	5.0	0.18	0.17	2.16	1.57	Mature	Good	Average	Endemic		Replaceable (Small/Young)	Low		Within the proposed building works.	Remove
123	1	<i>Duranta erecta</i>	Golden Dewdrop	6.0	5.0	0.16	0.15	2.00	1.49	Mature	Poor	Average	Exotic	Co-dominant Stems	Replaceable (Small/Young)	Low	Large shrub.	Within the proposed building works.	Remove
124	1	<i>Archontophoenix alexandrae</i>	Alexandra Palm	6.0	5.0	0.19	0.24	3.50	1.12	Mature	Good	Average	Exotic		Long (>40 years)	Low	Could be transplanted and re-used on site.	Within the proposed building works.	Remove
125	1	<i>Glochidion ferdinandi</i>	Cheese Tree	7.0	7.0	0.27	0.33	3.24	2.08	Mature	Good	Average	Endemic	Co-dominant Stems	Long (>40 years)	Moderate	Extremely multi-trunked from base but otherwise good tree.	Within the proposed building works.	Remove
126	1	<i>Melaleuca linariifolia</i>	Flax Leaved Paperbark	8.0	5.0	0.29	0.34	3.48	2.10	Mature	Fair	Average	Native		Short (5-15 years)	Low		Within the proposed building works.	Remove
127	1	<i>Cupressus macrocarpa cv.</i>	Monterey Cypress	9.0	7.0	0.45	0.38	5.40	2.20	Mature	Good	Poor	Exotic	Major Wounding	Medium (15-40 years)	Low	Generally poor form and significantly under pruned.	Within the proposed building works.	Remove
128	1	<i>Araucaria heterophylla</i>	Norfolk Island Pine	10.0	9.0	0.46	0.52	5.52	2.51	Mature	Excellent	Excellent	Exotic		Long (>40 years)	Moderate	Early mature specimen with good vigour and form.	Within the proposed building works.	Remove
129	1	<i>Archontophoenix alexandrae</i>	Alexandra Palm	9.0	6.0	0.29	0.40	4.00	1.20	Mature	Good	Average	Exotic		Long (>40 years)	Moderate	Could be transplanted and re-used on site.	Transplantable.	Remove
130	1	<i>Persea gratissima</i>	Avocado	6.5	3.0	0.14	0.14	2.00	1.45	Mature	Fair	Average	Exotic		Replaceable (Small/Young)	Low		Within the proposed building works.	Remove

Tree ID	Trees in Group	Tree Species	Common Name	Height (m)	Spread Average (m)	Trunk Diameter Breast Height (dbh) (m)	Trunk Diameter at base (dgl) (m)	Nominal TPZ radius (m) 12xdbh (AS 4970)	Nominal SRZ radius (m) (AS 4970)	Age Class	Current Vigour	Current Form	Tree Origin	Noted Defects	ULE Rating	Retention Value	General Comments and Notes	Incursion and Impact	Recommendation
131	1	<i>Persia gratissima</i>	Avocado	9.0	6.0	0.26	0.36	3.12	2.15	Mature	Fair	Average	Exotic		Long (>40 years)	Low		Within the proposed building works.	Remove
132	1	<i>Eucalyptus robusta</i>	Swamp Mahogany	8.5	5.0	0.16	0.24	2.00	1.82	Mature	Good	Excellent	Endemic		Long (>40 years)	Moderate	Street tree Fitzgerald Ave.	Minor surface impacts are expected for the removal of the existing driveway pavements that pass through the designated TPA. Driveways are to be sensitively removed with Project Consulting Arborist present.	Retain and Protect
133	1	<i>Eucalyptus haemastoma</i>	Scribbly Gum	8.0	8.0	0.35	0.41	4.20	2.28	Mature	Good	Average	Endemic	Epicormic Growth	Long (>40 years)	Moderate	Street tree Fitzgerald Ave. Canopy pruned for powerline clearance.	Minor surface impacts are expected for the removal of the existing driveway pavements that pass through the designated TPA. Driveways are to be sensitively removed with Project Consulting Arborist present.	Retain and Protect
134	1	<i>Corymbia maculata</i>	Spotted Gum	12.5	7.0	0.52	0.55	6.24	2.57	Mature	Fair	Average	Native	Co-dominant Stems, Bulges, Inclusions	Long (>40 years)	Moderate	Street tree Fitzgerald Ave. Fused branch at 2.5m. Bulging and indication of potential inclusion weakness at main fork.	Minor surface impacts are expected for the removal of the existing driveway pavements that pass through the designated TPA. Driveways are to be sensitively removed with Project Consulting Arborist present.	Retain and Protect
135	1	<i>Magnolia grandiflora</i>	American Bull Bay Magnolia	4.0	2.5	0.06	0.11	2.00	1.31	Mature	Good	Average	Exotic		Replaceable (Small/Young)	Low	Small street tree Fitzgerald Ave.	Nil impacts expected	Retain and Protect
136	1	<i>Eucalyptus robusta</i>	Swamp Mahogany	11.0	10.0	0.58	0.64	6.96	2.74	Mature	Fair	Average	Endemic	Epicormic Growth, Root Impacts	Long (>40 years)	Moderate	Street tree Fitzgerald Ave. Canopy pruned for powerline clearance, valley pruned.	Major incursion of 18% expected to the southern side of the tree to allow for stormwater connection/installation. Project Consulting Arborist to be present to observe all works within the TPA of this tree. Minor surface impacts are expected for the removal of the existing driveway pavements that pass through the designated TPA. Driveways are to be sensitively removed with Project Consulting Arborist present.	Retain and Protect
137	1	<i>Ficus rubiginosa</i>	Port Jackson Fig	9.5	10.0	0.58	0.74	6.96	2.92	Mature	Fair	Average	Native	Pest/Disease, Co-dominant Stems, Inclusions, Decay-Minor	Long (>40 years)	Moderate	Street tree Fitzgerald Ave. Canopy pruned for powerline clearance, valley pruned. Fig Psylid evident.	Minor incursion of 8% expected to the southern side of the tree to allow for stormwater connection/installation. Project Consulting Arborist to be present to observe all works within the TPA of this tree. Minor surface impacts expected for installation of new driveway to access basement. Driveway to be installed at or above existing levels. Minor surface impacts are expected for the removal of the existing driveway pavements that pass through the designated TPA. Driveways are to be sensitively removed with Project Consulting Arborist present.	Retain and Protect
138	1	<i>Photinia x fraseri 'Robusta'</i>	Photinia	3.0	3.0	0.10	0.15	2.00	1.49	Mature	Good	Average	Exotic		Long (>40 years)	Moderate	Street tree Fitzgerald Ave.	Nil impacts expected	Retain and Protect
139	1	<i>Ficus rubiginosa</i>	Port Jackson Fig	8.0	10.0	0.63	0.63	7.56	2.73	Mature	Good	Average	Native	Root Impacts	Long (>40 years)	Moderate	Street tree Fitzgerald Ave. Canopy pruned for powerline clearance to south side. Extensive surface roots evident.	Minor incursion of 8% expected to the southern side of the tree to allow for stormwater connection/installation. Project Consulting Arborist to be present to observe all works within the TPA of this tree. Minor surface impacts are expected for the removal of the existing driveway pavements that pass through the designated TPA. Driveways are to be sensitively removed with Project Consulting Arborist present.	Retain and Protect
140	1	<i>Ficus microcarpa var. hillii</i>	Hills Weeping Fig	18.5	18.0	1.61	1.75	15.00	4.19	Mature	Good	Excellent	Native	Co-dominant Stems, Inclusions, Lean-Minor	Long (>40 years)	High	Very large and prominent Street tree Fitzgerald Ave. Inner canopy pruned for powerline clearance to south side. Extensive surface roots evident.	Building has been appropriately set back to avoid conflicts with existing tree canopy and to minimise root zone incursion. Incursion considered minor (9.4%) for excavation to construct the building. Shore piling is to be utilised for the construction of the building when passing the southern side of this tree to retain the existing soil levels and avoid battering into the Tree Protection Area. Tree protection area to be filled with 300-400mm depth of sandy soil to protect existing above ground buttressing roots. Proposed landscape pathways are to be sensitively installed above the imported sandy soils to avoid conflicts with the existing roots. Project Consulting Arborist to be present to observe all works within the TPA of this tree.	Retain and Protect
141	1	<i>Ficus rubiginosa</i>	Port Jackson Fig	4.5	6.0	0.27	0.27	3.24	1.91	Mature	Good	Average	Native		Long (>40 years)	Moderate	Street tree Fitzgerald Ave. Surface roots evident.	Nil impacts expected	Retain and Protect