CIDS & ODS Tree Impact Assessment Report

SWM3- Tree and Vegetation Management Work Part 2 Instruction

SMCSWSW8-JHL-WBK-EM-REP-000001

Document and Revision History

Document Details	
Title	CIDS & ODS Tree Impact Assessment Report
Client	Sydney Metro City & Southwest
Client reference no.	SMCSWSW8-JHL-WBK-EM-REP-000001
JHLOR JV contract no.	K44

Revisions

Revision	Date	Description	Prepared by	Reviewed by
00	27/06/25	Issued for review	TZ	LD
01	01/08/25	Update to include Arborist Report: 250723_SWM_Ineco_PS_Ad4 (Punchbowl to Bankstown)	LD	AK
02	22/08/25	Update to include Arborist Report: 250821_SWM_Ineco_PS_Ad5 (Campsie to Belmore)	TZ	LD
03	18/09/25	Update to include Arborist Report: 250917_SWM_Ineco_PS_Ad6.1 (Canterbury to Campsie) Update Arborist Report: 250912_SWM_Ineco_PS_Ad2.2 (Dulwich Hill to Hurlstone Park) to include new recommendations for Tree 148 and 155	TZ	AK
04	01/10/25	Update to include Arborist Report: 250917_SWM_Ineco_PS_Ad7 (Wiley Park to Punchbowl)	TZ	AK
05	20/10/25	Update to include Arborist Report: 251020_SWM_Ineco_PS_Ad8.1 (Sydenham Marrickville and Dulwich Hill)	TZ	AK
06	04/11/25	Update to include Arborist Report: 251103_SWM_Ineco_PS_Ad9 (Belmore to Lakemba)	TZ	AK
07	27/11/25	Update to Appendix A-Part A, Part E & Part F	TZ	AK

Management reviews

Review date	Details	Reviewed by

Controlled: NO Copy no.: Uncontrolled: YES

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1. Introduction

1.1 Purpose

This report has been produced to assess impacts to vegetation and detail the species and number of trees that will be removed as part of the Southwest Metro Conversion and Station Works Package Scope 3- Tree and Vegetation Management Work Part 2 Instruction (herein referred to as the SWM3 Project). The works are associated with the CIDS ODS scope of work. The instruction was issued to JHLORJV 20 May 2025.

The report has been written in accordance with the requirements of the *Sydney Metro City & Southwest - Sydenham to Bankstown Interim Tree Management Strategy* and *Sydney Metro City & Southwest - Sydenham to Bankstown - Instrument of Approval*, Condition of Approval E5.

This Tree Impact Assessment Report describes how JHLORJV propose to facilitate and undertake the tree trimming, tree pruning, tree removal and any required vegetation maintenance as detailed in the below scope of work.

a. Provide vegetation clearance 2 metres both sides and 2 metres above of UTO fence, ensuring no vegetation is touching the UTO fence to minimise nuisance alarms on CIDS ODS system. Scope to be undertaken across whole of corridor between Sydenham and Bankstown.

b. Provide tree and shrub removal as per upcoming scope of work supplied by CIDS/ODS Contractor on a loop-by-loop basis (total of 8 loops) to ensure CCTV line of sight is clear of vegetation to enable adequate footage of the UTO fence line to meet CIDS/ODS Contractor's requirements. The SWM3 Contractor is requested to continuously Maintain the clearance of vegetation as required under SWM3 Milestone 1.

1.2 Project Overview and Location

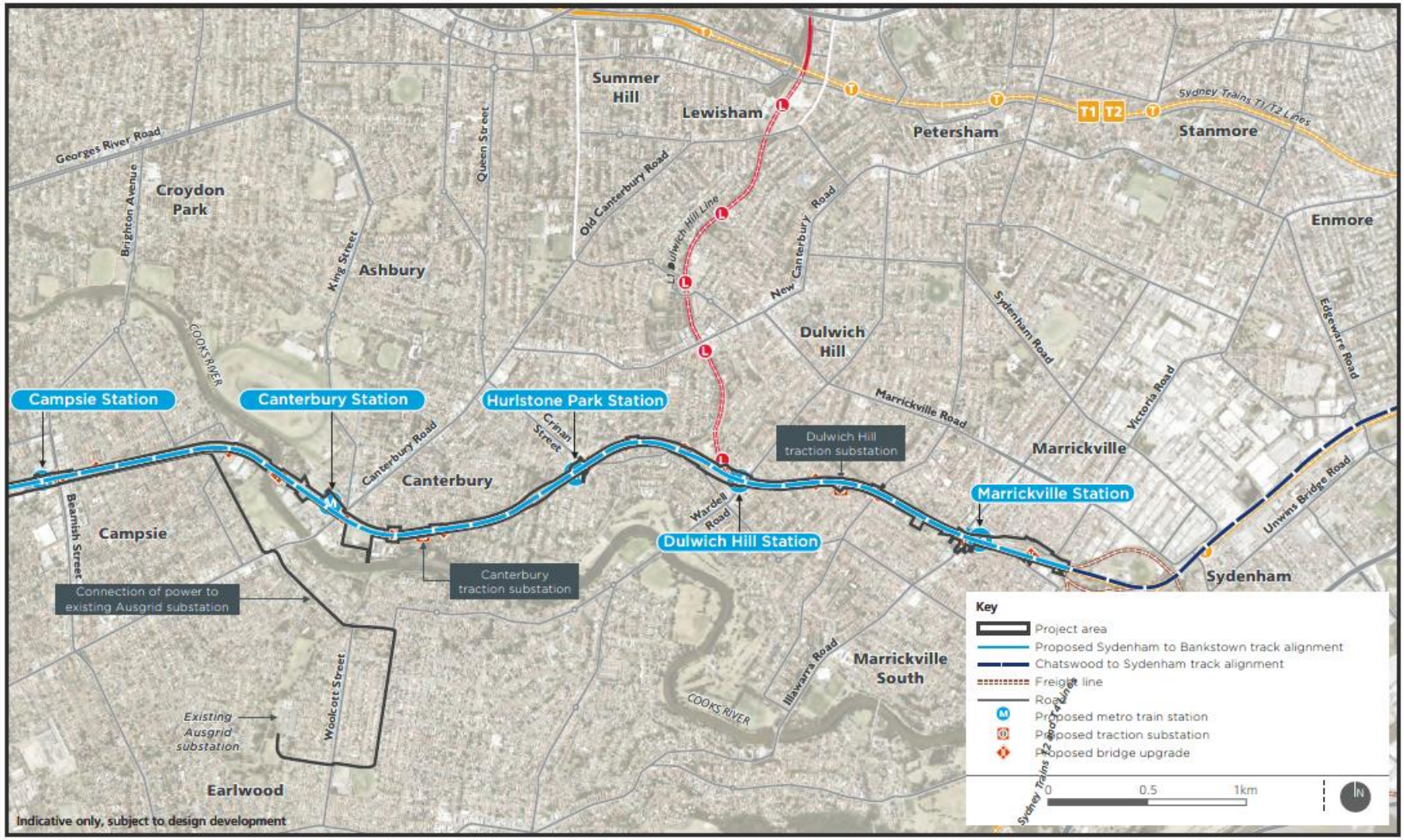
Sydney Metro City & Southwest is a new 30km metro line extending metro rail from the end of Sydney Metro Northwest at Chatswood under Sydney Harbour, through new CBD stations and southwest to Bankstown. It is due to open in 2024 with the capacity to run a metro train every two minutes each way through the centre of Sydney. The Sydney Metro City & Southwest comprises of two components;

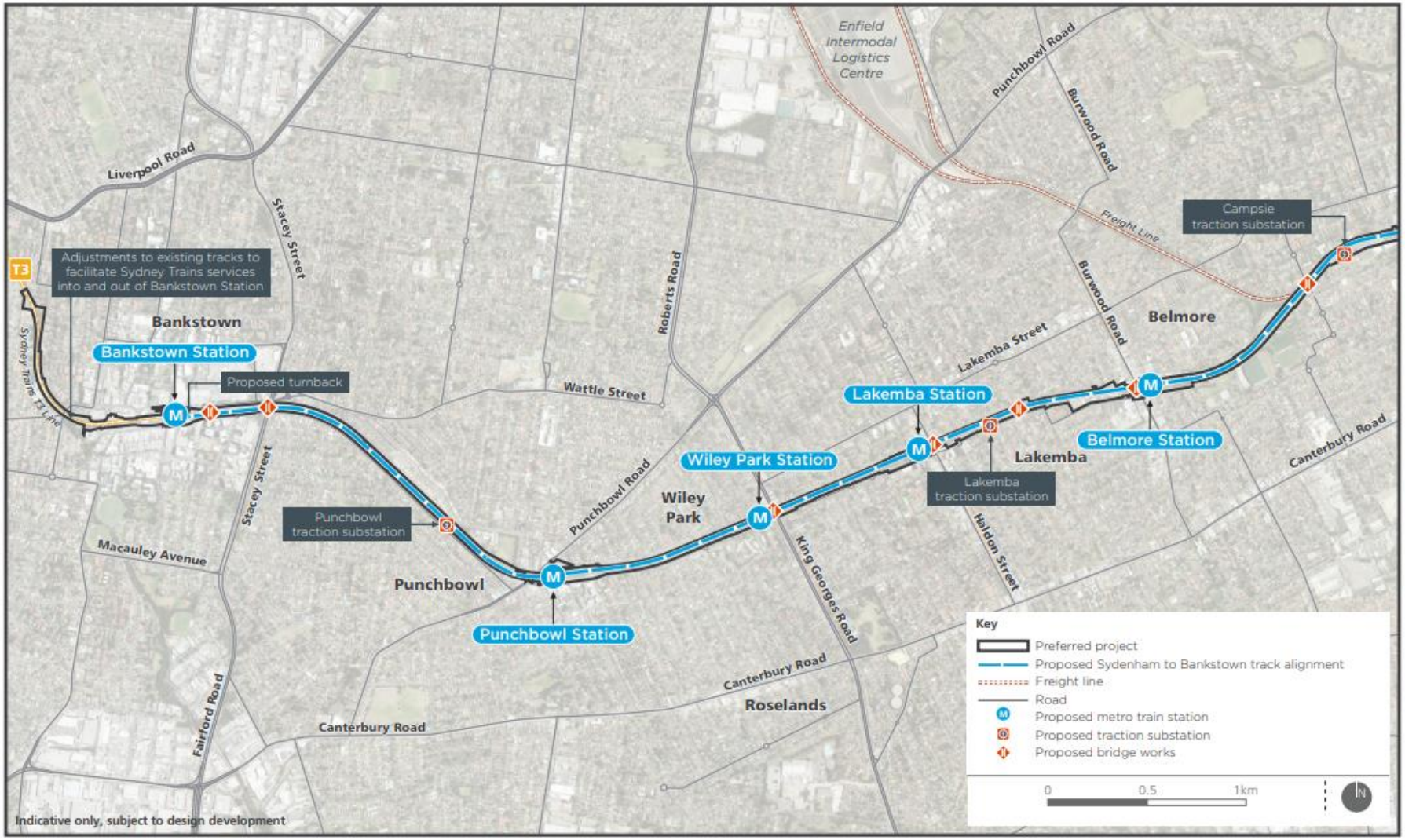
- Chatswood to Sydenham Project
- Sydenham to Bankstown (S2B) upgrade, now known as Southwest Metro

The S2B Works, referred to as "the Project" or 'the works" in this document, will be undertaken in accordance with the *Sydney Metro City & Southwest Sydenham to Bankstown Upgrade Instrument of Approval* (SSI_8256).

The S2B site is shown in Figure 1.

Figure 1 Site Layout




Enfield Intermodal Logistics Centre
Punchbowl Road
Burwood Road
Liverpool Road
Stacey Street
Roberts Road
Freight Line
Campsie traction substation
Adjustments to existing tracks to facilitate Sydney Trains services into and out of Bankstown Station
Bankstown
Bankstown Station
Sydney Trains T3 Line
Proposed turnback
Wattle Street
Lakemba Street
Belmore
Lakemba Station
Belmore Station
Lakemba
Canterbury Road
Wiley Park Station
Wiley Park
Lakemba traction substation
Punchbowl traction substation
Punchbowl
Macauley Avenue
Haldon Street
King Georges Road
Punchbowl Station
Canterbury Road
Roselands
Fairford Road
Canterbury Road
Indicative only, subject to design development
Key
Preferred project
Proposed Sydenham to Bankstown track alignment
Freight line
Road
Proposed metro train station
Proposed traction substation
Proposed bridge works
0
0.5
1km
N

1.3 Background

In accordance with the *Sydney Metro City & Southwest Sydenham to Bankstown Instrument of Approval* a tree is defined as "*Long lived woody perennial plant greater than (or usually greater than) 3 m in height with one or relatively few main stems or trunks*".

Condition of Approval E5 states "*The Proponent must commission an independent experienced and suitably qualified arborist, to prepare a comprehensive Tree Report(s) before removing any trees as detailed in the documents listed in Condition A1. The Tree Report may be prepared for the entire CSSI or separate reports may be prepared for individual areas where trees are required to be removed. The report(s) must identify the impacts of the CSSI on trees and vegetation within and adjacent to the Construction footprint. The report(s) must include:*

a) a description of the conditions of the tree(s) and its amenity and visual value;
b) consideration of all options to avoid tree removal, including relocation of services, redesign or relocation of ancillary components (such as substations, fencing etc.) and reduction of standard offsets to underground services; and
c) measures to avoid the removal of trees or minimise damage to existing trees and ensure the health and stability of those trees to be protected. This includes details of any proposed canopy or root pruning, root protection zone, excavation, site controls on waste disposal, vehicular access, storage of materials and protection of public utilities.

A copy of the report(s) must be submitted to the Planning Secretary before the removal or pruning of any trees, including those affected by site establishment Work. All recommendations of the report must be implemented by the Proponent, unless otherwise agreed by the Planning Secretary."

The ecological potential of the project site has been assessed under the Sydney Metro City & Southwest Sydenham to Bankstown Environmental Impact Statement (EIS). Section 22.2 of the EIS states "*The majority of the study area has been heavily modified by past and ongoing disturbances associated with urban development and the active rail corridor. Urban development, clearance, and ongoing maintenance of the rail corridor has resulted in fragmentation, a high level of disturbance, and degradation of vegetation communities.*

The majority of vegetation in the project area and surrounding study area comprises exotic or planted native species on highly modified landforms. There are small isolated patches of remnant or regrowth native vegetation in small portions of the study area associated with rail cuttings with less disturbed soil profiles.

Native vegetation and habitat within the project area is in medium to poor condition, and features impacts from existing maintenance activities, edge effects, weed infestation, and exotic pests."

The EIS also states "*There is relatively low native species richness within the study area, which confirms that the native vegetation has been extensively modified and is in moderate to poor condition.*

A total of 129 flora species from 40 families were recorded within the study area, comprising 63 native and 66 exotic species. Poaceae (grasses, 22 species, 11 native), Myrtaceae (flowering shrubs and trees, 20 species, 13 native), Fabaceae (23 species, 17 native), and Asteraceae (flowering herbs, 11 species, 2 native) were the most diverse families recorded. One threatened flora species (Downy Wattle) was recorded in the study area, outside the project area."

In regards to plant communities Section 22.2 of the EIS states "*two of the native plant communities identified conform to the following threatened ecological communities listed under the TSC Act:*

- *Sydney Turpentine Ironbark Forest in the Sydney Basin Bioregion (Sydney Turpentine Ironbark Forest)*

- *Shale Gravel Transition Forest in the Sydney Basin Bioregion (Shale Gravel Transition Forest).*

No threatened ecological communities listed under the EPBC Act are located in the study area."

It is noted that one threatened plant species was recorded in the vicinity of the EIS study area, however the species does not reside within the Project area. Downy Wattle (*Acacia pubescens*) was recorded near Punchbowl Station. The Downy Wattle will not be removed as part of these works and will be protected. The EIS states "*No listed threatened flora species were recorded in the project area. One threatened plant species Downy Wattle (Acacia pubescens) listed as vulnerable under the EPBC Act and TSC Act, was recorded in the study area. Around 650 stems are located near the project area as shown in Figure 22.1.*

The patches of stems recorded are located mainly in the vicinity of Punchbowl Station, with around two stems recorded in the rail corridor, and one stem in a Council reserve around 100 metres east of the Yagoona substation. The project has been designed to avoid impacting on the recorded locations of this species."

The *Sydney Metro City & Southwest Sydenham to Bankstown Upgrade – Submissions and Preferred Project Report* (SPIR) states "*It is expected that large areas of the planted native vegetation and exotic scrub and forest would not require removal for the corridor works, however this is subject to the detailed design of the proposed works, including fencing and the communications services route.*

This vegetation would potentially include trees that provide screening along the corridor for surrounding properties. The need to clear vegetation would be reviewed by the construction contractor/s and minimised wherever practicable."

The SPIR also states "*about 16.3 hectares of vegetation (not including vegetation classed as exotic grassland) may need to be removed, including*:

- *up to 7.3 hectares of planted native vegetation*
- *up to nine hectares of exotic scrub and forest*."

The SPIR does not specify where these areas of clearing are located as this was to be developed as part of detailed design. The SPIR also makes the exception that native vegetation that would require biodiversity offsets (specifically areas of 'Turpentine - Grey Ironbark open forest on shale', 'Degraded Turpentine - Grey Ironbark open forest on shale' and 'Broad-leaved Ironbark – Grey Box' and identified areas of the threatened species Downy Wattle located within the rail corridor between Punchbowl and Bankstown stations would be avoided. Furthermore, these areas represent the clearing to occur for both corridor and station precinct works from Sydenham to Bankstown under all work packages (refer to the *Sydney Metro City & Southwest Sydenham to Bankstown Upgrade Staging Report* for more information on the different packages under which the project has been staged). As such, minimisation of impacts is driven through the design and construction methodology. Refer to Section 4 for more information on minimisation of impacts through design and construction methodology. Refer to Section 5 for Mitigation Measures.

For the purpose of producing this report, the Arboricultural reports that form the appendices of this document have been divided on the following basis;

- Appendix A (Part A) – Addendum to Arboricultural Pruning Specification Report (Southwest Metro – Dulwich Hill to Hurlstone Park)
- Appendix A (Part B) – Addendum to Arboricultural Pruning Specification Report (Southwest Metro – Hurlstone Park to Canterbury)
- Appendix A (Part C) – Addendum to Arboricultural Pruning Specification Report (Southwest Metro – Lakemba to Wiley Park)

- Appendix A (Part D) – Addendum to Arboricultural Pruning Specification Report (Southwest Metro – Punchbowl to Bankstown)
- Appendix A (Part E) – Addendum to Arboricultural Pruning Specification Report (Southwest Metro – Campsie to Belmore)
- Appendix A (Part F) – Addendum to Arboricultural Pruning Specification Report (Southwest Metro – Canterbury to Campsie)
- Appendix A (Part G) – Addendum to Arboricultural Pruning Specification Report (Southwest Metro – Wiley Park to Punchbowl)
- Appendix A (Part H) – Addendum to Arboricultural Pruning Specification Report (Southwest Metro – Sydenham Marrickville and Dulwich Hill)
- Appendix A (Part I) – Addendum to Arboricultural Pruning Specification Report (Southwest Metro – Belmore to Lakemba)

It is noted that all of the tree impacts captured in the Arboricultural reports (Appendix A), prepared for UGL and are related to CIDS ODS system across whole of corridor between Sydenham and Bankstown.

2. Site Inspections

Alex Kurath, Consulting Arborist / Director of Urban Arbor, has attended site on numerous occasions. Please refer to inspection dates within the respective Arboricultural reports for details regarding inspection dates.

Urban Arbor have subsequently produced Arboricultural Reports to satisfy the Planning Approval conditions related to tree and vegetation removal. Copies of the reports are included in Appendix A as described above.

A curriculum vitae for Alex Kurath and Bryce Claassens (Consulting Arborist) is attached in Appendix B.

3. Inspection Results

The SWM3-CIDS & ODS Tree Impact Assessment Report have captured all trees within the Sydney Metro City & Southwest Sydenham to Bankstown Project Boundary, including both corridor and station precinct areas.

The results of the tree inspections can be found in:

Appendix A (Part A) – *Addendum to Arboricultural Pruning Specification Report (Southwest Metro – Dulwich Hill to Hurlstone Park), Appendix 2 - Tree Inspection Schedule*

Appendix A (Part B) – *Addendum to Arboricultural Pruning Specification Report (Southwest Metro – Hurlstone Park to Canterbury), Appendix 2 - Tree Inspection Schedule*

Appendix A (Part C) – *Addendum to Arboricultural Pruning Specification Report (Southwest Metro – Lakemba to Wiley Park), Appendix 2 - Tree Inspection Schedule*

Appendix A (Part D) – *Addendum to Arboricultural Pruning Specification Report (Southwest Metro – Punchbowl to Bankstown), Appendix 2 - Tree Inspection Schedule*

Appendix A (Part E) – *Addendum to Arboricultural Pruning Specification Report (Southwest Metro – Campsie to Belmore), Appendix 2 - Tree Inspection Schedule*

Appendix A (Part F) – *Addendum to Arboricultural Pruning Specification Report (Southwest Metro – Canterbury to Campsie), Appendix 2 - Tree Inspection Schedule*

Appendix A (Part G) – *Addendum to Arboricultural Pruning Specification Report (Southwest Metro – Wiley Park to Punchbowl), Appendix 2 - Tree Inspection Schedule*

Appendix A (Part H) – *Addendum to Arboricultural Pruning Specification Report (Southwest Metro – Sydenham Marrickville and Dulwich Hill), Appendix 2 - Tree Inspection Schedule*

Appendix A (Part I) – *Addendum to Arboricultural Pruning Specification Report (Southwest Metro –Belmore to Lakemba), Appendix 2 - Tree Inspection Schedule*

In accordance with the Arboricultural Reports a total of **102** standalone trees and **22** groups (or approximately **225** trees in total) will be removed as part of the works. In addition, **192** trees will be trimmed (excluding groups). Due to the subsurface and therefore unknown location of tree roots, all trees may be subject to root trimming where the arborist confirms that the trees health will be maintained following trimming. Where root trimming must occur and that trimming will impact the viability of the tree, the tree will be included within this tree report for removal prior to any removal works.

Overall clearance of vegetation has also been assessed. JHLORJV has estimated the area of planted native vegetation and exotic scrub and forest to be removed as part of SWM3-Instruction 2. Based on current calculations SWM3-Instruction 2 will require the removal of;

- Approximately **0.5748** hectares of planted native vegetation
  (Approximately 7.9% of 7.3 hectares of planted native vegetation removal limit)
- Approximately **0.1721** hectares of exotic scrub and forest.
  (Approximately 1.9% of 9 hectares of planted native vegetation removal limit)

Broad mapping within the EIS is likely to overstate impacts of clearing, as the broad mapping accounts for areas that may not be vegetated.

It is noted that the majority of the rail corridor in which SWM3 is located is vegetated with exotic grassland.

Total areas for removal is indicative only and is based off canopy spread values included within the Arboricultural reports. Noting that canopy spread is measured from the widest part of the tree the estimation does not take into account tree symmetry or overlapping of canopies.

4. Design Considerations (CoA E5b)

JHLORJV has been informed by Sydney Metro that the UGL design considerations (CoA E5b) to avoid tree removal have been met.

4.1 Considerations and Restrictions

It is noted that trees within the Project area may at times be trimmed or removed by Sydney Trains, other authorities or other Contractors. At times this may occur without JHLOR's knowledge. The tree count included within this report is based on impacts calculated for JHLOR's scope. The final tree removal number will be determined via the JHLOR SMC & BAC Tree and Vegetation Removal Register, refer to Section 5 of this report.

The Arboricultural Reports indicate that a number of trees outside of the Project Boundary are to be removed or trimmed as part of project works. Where a tree is to be removed outside of the Project Boundary JHLOR will obtain land owner's consent prior to the removal works. Where a tree branch from a tree outside of the project boundary overhangs within the project and is to be trimmed, JHLOR will inform the tree owner and will trim the tree to the nearest growth point in accordance with AS4373-2007, or, if the owner objects, to the project boundary. Where tree trimming is required outside the project boundary (e.g. at gates and local roads leaving to site gates) JHLOR will seek landowner's consent.

Sydney Metro has confirmed that pruning may occur to trees located in Threatened Ecological Community (*Degraded Turpentine - Grey Ironbark open forest on shale*). providing the pruning does not impact the overall health and longevity of the tree. Part of Tree Group G22 (*Acacia spp*) and Tree 2007 (*Melaleuca styphelioides*) forms part of a Threatened Ecological Community (*Degraded Turpentine - Grey Ironbark open forest on shale*). Alternative to removal must be explored for this tree group G22 and Minor Prune is approved for Tree 2007.

5. Mitigation Measures

JHLOR will implement a number of measures to ensure the correct vegetation and trees are removed and to mitigate the risk of damage to trees and vegetation that will remain. These mitigation measures include;

- Undertake all Protection Measures as identified within Appendix A of this Report
- Relevant Councils and the DPIE will be consulted in regards to replacement tree planting locations. Relevant Councils will be consulted in regards to appropriate sizes for replacement trees.
- A Vegetation Removal and Trimming Permit will be implemented
- All existing trees to be retained within the site area must be protected in accordance with Australian Standard AS 4970 'Tree protection in development sites' to avoid and minimise impacts
- All trees to be removed or trimmed will be appropriately demarcated
- Qualified and experienced tree loppers will be engaged to removed and trim trees
- Where works will occur in the vicinity of trees that are to remain intact, demarcation or barriers will be put in place around the tree at the extent of the structural root zone
- Access tracks will be clearly delineated and defined within the Environmental Control Maps
- Staff and workers to be educated on vegetation trimming and removal requirements
- A copy of the Tree Report must be submitted to the Secretary for information before the removal, damage and/or pruning of any trees, including those affected by the site establishment works.
- All recommendations of the Tree Report must be implemented by the Proponent, unless otherwise agreed by the Secretary.
- JHLOR will consult with the relevant Council in regards to the timing of removal of trees on council land, as required.
- JHLOR will consult with the relevant land owner's in regards to the trimming of branches that overhand into the rail corridor.
- Detailed design and construction planning would avoid direct impacts to vegetation mapped as threatened ecological communities or native plant community types, specifically Downy Wattle Turpentine - Grey Ironbark open forest on shale, Degraded Turpentine - Grey Ironbark open forest on shale and Broad-leaved Ironbark – Grey Box in accordance with REMM B1.
- Pre-clearing surveys and inspections for endangered and threatened flora and fauna species would be undertaken by qualified ecologists prior to any clearing occurring in accordance with REMM B2.

- Impacts to Downy Wattle Turpentine - Grey Ironbark open forest on shale, Degraded Turpentine - Grey Ironbark open forest on shale and Broad-leaved Ironbark – Grey Box would be avoided. The locations of these species and communities would be marked on plans, fenced on site, and avoided in accordance with REMM B4.
- Equipment storage and stockpiling would be restricted to identified compound sites and already cleared land in accordance with REMM B5.
- A trained ecologist would be present during the clearing of native vegetation or removal of potential fauna habitat to avoid impacts on resident fauna and to salvage habitat resources as far as is practicable in accordance with REMM B6.
- JHLOR will consult with relevant local stakeholders in regard to visual amenity impacts.
- Advise will be sought from an Arborist prior to substantial root trimming.

In addition, JHLOR will maintain a Tree and Vegetation Removal Register. The register will track which tree have been removed or trimmed (based on the number within the tree report) and the area of vegetation cleared as part of the works. The JHLOR Vegetation Removal and Trimming Permit will prompt the Environmental Manager (or delegate) to record these factors during the permit authorisation site inspection.

This report will be submitted to the Secretary for information prior to the removal, damage and/or pruning of any trees.

5.1 Tree Trimming Memorandum

The SWM3 scope of works and the interactions with trees across site is complex. Due to the constantly changing nature of construction, construction methodologies must change, leading to unexpected impacts. At times, changes to construction methodology may result in the requirement for the trimming of trees not previously assessed. In these instances, trimming would be required to maintain the health of the tree. To ensure all tree trimming is assessed and to mitigate delays to construction JHLOR will implement a Tree Trimming Memorandum (memo) Process.

The process will work as follows;

- All trees in the project area are to be given a number and the condition, amenity and visual value of the tree is to be included. This is to be included in the Appendix A Arboricultural Report.
- Where known at time of the initial submission, each tree to be trimmed should be included within an Arboricultural Report
- As works commence, any additional trees to be trimmed should be assessed by an arborist and should be captured under a memo for that tree. The memo would address if there are any changes to the aspects of the tree as a result of trimming – condition of the tree, amenity, visual value
- If a tree is to be removed it must be included in the Tree report as per CoA E5c)
- If a tree is to be trimmed but does not have a number under the Arboricultural report the Arboricultural report must be updated to include the tree and description of aspects
- The memo would be submitted to SM & ER for information prior to trimming

Appendix A (Part A) – Addendum to Arboricultural Pruning Specification Report (Southwest Metro – Dulwich Hill to Hurlstone Park)

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Addendum to Arboricultural Pruning Specification Report

Site Location: Southwest Metro – Dulwich Hill to Hurlstone Park

Prepared for:
UGL

Prepared by: Bryce Claassens and Alex Kurath
Date prepared: 7 November 2025
Ref: 251107_SWM_Ineco_PS_Ad2.3
Addendum: 2.3

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1. INTRODUCTION

1.1 Urban Arbor have been instructed to prepare an addendum to the previous Pruning Specification Report (18 November 2024) in relation to Corridor Intruder Detection System (CIDS) and Object Detection System (ODS) trouble spots. The report is to address trees within and adjacent to the rail corridor between Dulwich Hill Station and Hurlstone Park Station.

1.2 Documents and information provided to assist in preparing the report;

A) Arboricultural Pruning Specification Report, Urban Arbor, Ref:241118_SWM_Ineco_PS, Revision 2,18 November 2024.
B) CCTV LOS and Nuisance Alarm Register, Doc No. SMCSWIDS-UGL-1NL-TC-REG-000745, Revision B, 5 June 2025.

1.3 The site and tree inspections were carried out on 4 June 2025, 11 August 2025 and 23 October 2025 by Alex Kurath of Urban Arbor, in conjunction with representatives from UGL (Rares Pop), JHLORJV (Andre Kruise) and Sydney Metro. UGL advised the trees requiring pruning or removal to obtain camera visibility of fence lines.

1.4 Some trees included within this report were previously inspected between the dates of 6 January 2020 to 3 April 2020 by Bryce Claassens during the South West Metro Rail Corridor (SWMRC) and Station Precinct design works. Access was available to the subject site and adjoining public areas only. This report has been written by Bryce Claassens.

2. SCOPE OF THE REPORT

2.1 This report has been undertaken to meet the following objectives.

2.1.1 Conduct a walk-through assessment of the areas where trees (identified by UGL) are currently obstructing camera visibility, which require pruning or removal. The decision of pruning or removal of trees is subject to the agreement and approval of the stakeholders.

2.1.2 Conduct a visual assessment of significant trees not previously included in the Pruning Specification Report (dated 18 November 2024), located within areas identified by UGL. For the purpose of this report, a significant tree is a ‘Long lived woody perennial plant greater than (or usually greater than) 3 metres in height with one or relatively few main stems or trunks’.

2.1.3 Determine the trees estimated contribution years and remaining useful life expectancy and award the trees a retention value.

2.1.4 Provide pruning specifications for trees where required, in accordance with AS4373-2007.

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3. LIMITATIONS

3.1 The observations and recommendations are based on the site inspections identified in section 1 only. The findings of this report are based on the observations and site conditions at the time of inspection.

3.2 All of the observations were carried out from ground level. The accuracy of the assessment of the subject trees structural condition and health is limited to the visibility of the tree at the time of inspection.

3.3 The tree inspection was visual from ground level only. No soil or tissue testing was carried out as part of the tree inspection. None of the surrounding surfaces adjacent to trees were lifted or removed during the tree inspections.

3.4 Root decay can sometimes be present with no visual indication above ground. It is also impossible to know the extent of any root damage caused by mechanical damage such as underground root cutting during the installation of services without undertaking detailed root investigation. Any form of tree failure due to these activities is beyond the scope of this assessment.

3.5 The report reflects the subject tree(s) as found on the day of inspection. Any changes to the growing environment of the subject tree, or tree management works beyond those recommended in this report may alter the findings of the report. There is no warranty, expressed or implied, that problems or deficiencies relating to the subject tree, or subject site may not arise in the future.

3.6 Tree identification is based on accessible visual characteristics at the time of inspection. As key identifying features are not always available the accuracy of identification is not guaranteed. Where tree species is unknown, it is indicated with an *spp*.

3.7 Some trees included within this report have been located using a Trimble TDC100 hand held GNSS device by Urban Arbor Pty Ltd. Tree locations captured by the Trimble TDC100 are only accurate to within 1m - 3m. If an accurate location of these trees is required, a registered surveyor should locate the trees.

3.8 In some instances, multiple trees or groups of small trees have been identified as groups of trees within this report.

3.9 All diagrams, plans and photographs included in this report are visual aids only and are not to scale unless otherwise indicated.

3.10 Alteration of this report invalidates the entire report.

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4. METHODOLOGY

4.1 The following information was collected during the assessment of the subject tree(s).

4.1.1 Tree common name
4.1.2 Tree botanical name
4.1.3 Tree age class
4.1.4 DBH (Trunk/Stem diameter at breast height/1.4m) - millimetres.
4.1.5 DAB (Trunk diameter directly above the root buttress) – millimetres.
4.1.6 Estimated height - metres
4.1.7 Estimated crown spread (diameter of crown) - metres
4.1.8 Health
4.1.9 Structural condition
4.1.10 Amenity value
4.1.11 Estimated remaining contribution years (SULE)[1]
4.1.12 Retention value (Tree AZ)[2]
4.1.13 Notes/comments

4.2 An assessment of the trees condition was made using the visual tree assessment (VTA) model (Mattheck & Breloer, 1994).[3]

4.3 Tree diameter was measured using a DBH tape or in some cases estimated. Tree height and tree canopy spread was measured with a clinometer or in some cases estimated. All other measurements were estimations unless otherwise stated. The other tools used during the assessment were a nylon mallet, compass, camera and a steel probe.

4.4 All DBH measurements, tree protection zones, and structural root zones within Appendix 2 of this report were calculated in accordance with methods set out in AS4970 Protection of trees on development sites (2025).[4]

4.5 Details of how the observations in this report have been assessed are listed in the appendices.

[1] Barrell, J. (2001), *'SULE: Its use and status in the new millennium' in Management of Mature Trees proceedings of the 4th NAAA Workshop*, Sydney, 2001. Barrell.

[2] Barrell Tree Consultancy, *Tree AZ version 10.10-ANZ*, http://www.treeaz.com/.

[3] Mattheck, C. & Breloer, H., *The body language of trees - A handbook for failure analysis*, The Stationary Office, London, England (1994).

[4] Council Of Standards Australia, *AS4970 Protection of trees on development sites* (2025).

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5. SITE LOCATION AND BRIEF DESCRIPTION

5.1 The area covered in the site inspections is located within two Local Government Areas (LGA), including Inner West LGA and Canterbury Bankstown LGA. All trees within the Inner West LGA are subject to protection the Inner West Local Environmental Plan (LEP) 2022[5] and the Inner West Council Tree Management DCP 2023.[6] All trees within the Canterbury Bankstown LGA are subject to protection under the Canterbury Bankstown LEP 2023[7] and Canterbury Bankstown DCP 2023.[8]

6. AREAS ASSESSED

6.1 The areas assessed in this report have been identified by UGL in the CCTV LOS and Nuisance Alarm Register (dated 5 June 2025), which includes trees within and adjacent to the rail corridor between Dulwich Hill Station and Hurlstone Park Station.

7. TREE OBSERVATIONS

7.1 **Tree information:** Details of each individual tree assessed, including the observations taken during the site inspections, can be found in the tree inspection schedule in appendix 2. Each of the subject trees have been awarded a retention value based on the observations using the Tree AZ method. Tree AZ is used to identify higher value trees worthy of being a constraint to development and lower value trees that should generally not be a constraint to the development. The Tree AZ categories sheet (Barrell Tree Consultancy) has been included in appendix 3 to assist with understanding the retention values. The retention values that have been allocated to the subject trees in this report is not definitive and should only be used as a guideline.

8. ASSESSMENT OF TREE IMPACTS BY AREA

The trees included in the following sections have been identified by UGL as being subject to impacts from development works. All trees to be retained should be protected in accordance with AS4970-2025 *Protection of trees on development sites*. If there are any development works that have not been assessed and could potentially impact additional trees, the project arborist must assess the impact of the proposed works to the condition of the trees, determining the trees viability for retention.

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5 *Inner West Local Environmental Plan 2022*, https://www.legislation.nsw.gov.au/#/view/EPI/2011/645/full, accessed 11 June 2025.

6 *Inner West Tree Management Development Control Plan 2023*, https://www.innerwest.nsw.gov.au/live/information-for-residents/trees/trees-on-your-property-pruning-or-removing, accessed 11 June 2025.

7 *Canterbury Bankstown Local Environmental Plan 2023*, https://legislation.nsw.gov.au/view/html/inforce/current/epi-2023-0336, accessed 11 June 2025.

8 *Canterbury Bankstown Development Control Plan 2023*, https://www.cbcity.nsw.gov.au/development/planning-control-policies/canterbury-bankstown-development-control-plan-2023, accessed 11 June 2025.

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8.1 Dulwich Hill to Hurlstone Park (DTH_01 - DTH_05)

8.1.1 Five (5) trees and one (1) group of trees have been identified for removal in this area, including tree 147, 151, 152, 155, 162 and G2.

8.1.2 An additional fifteen (15) trees have been identified for canopy pruning in this area, including trees 103, 104, 105, 106, 117, 118, 119, 120, 121, 127, 130, 146, 148, 150 and 157. All canopy pruning must be completed in accordance with AS4373 *Pruning of amenity trees* (2007).

8.1.3 The details of the trees are summarised in the table below. Photographs of the trees are included in section 8.2.

Tree ID	Botanical Name	SULE	Retention Value	Height (m)	Canopy Spread (m) - radius	Native / Exotic	Prune / Remove
103	*Cinnamomum camphora*	2. Medium	A1	17	5	Exotic	Prune
104	*Cinnamomum camphora*	2. Medium	A1	16	7	Exotic	Prune
105	*Cinnamomum camphora*	2. Medium	A1	16	4	Exotic	Prune
106	*Cinnamomum camphora*	2. Medium	A1	16	6	Exotic	Prune
117	*Melaleuca bracteata*	1. Long	A1	6	2	Native	Prune
118	*Melaleuca bracteata*	1. Long	A1	6	2	Native	Prune
119	*Melia azedarach*	1. Long	A1	5	2	Native	Prune
120	*Melia azedarach*	1. Long	A1	5	2	Native	Prune
121	*Melia azedarach*	1. Long	A1	5	2	Native	Prune
127	*Melaleuca bracteata 'Revolution Gold'*	5. Small/Young	Z1	5	1	Native	Prune
130	*Eucalyptus microcorys*	1. Long	A1	17	8	Native	Prune
146	*Grevillea robusta*	3. Short	Z9	9	3	Native	Prune
147	*Olea europaea*	5. Small/Young	Z1	5	2	Exotic	Remove
148	*Grevillea robusta*	2. Medium	A2	10	4.5	Native	Prune
150	*Macadamia spp*	5. Small/Young	Z1	5	2	Native	Prune
151	*Ligustrum lucidum*	5. Small/Young	Z3	4	1	Exotic	Remove
152	*Persea gratissima*	5. Small/Young	Z1	4	2	Exotic	Remove
155	*Grevillea robusta*	5. Small/Young	Z1	7	2	Native	Remove
157	*Mangifera indica*	1. Long	A1	5	3	Exotic	Prune
162	*Pittosporum undulatum*	5. Small/Young	Z1	5	1.5	Native	Remove
G2	*Cinnamomum camphora*	5. Small/Young	Z3	9	2	Exotic	Remove

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8.2 **Photographs**

Image 1: Looking towards tree 117 to tree 121, showing the area of foliage requiring pruning. Pruning of branches up to 50mm in diameter is to provide a minimum of 2 metres clearance to all areas of the fence. Approximately 10% of the live foliage area will be removed from each tree. See Image 12 and 13 for more detailed pruning specifications for tree 117 and 118.

Image 2: Looking towards tree 127, showing the area of foliage requiring pruning. The low 130mm diameter branch towards the corridor is to be removed, and additional smaller branches towards the corridor that measure less than 30mm are to be removed. Approximately 30% of the live foliage area will be removed.

Image 3: Looking towards tree 130, showing the first order branch to the North recommended for pruning. The final pruning cut is estimated to be 230mm in diameter and at approximately 1.5m above ground level. Approximately 5% of the live foliage area will be removed.

Image 4: Looking towards tree 130, showing the three third order branches to the East recommended for pruning. The final pruning cuts are estimated to be 50-70mm in diameter and at approximately 3m above ground level. Less than 5% of the live foliage area will be removed.

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Image 5: Looking towards tree 146, showing the three branches to the Northeast, North and Northwest recommended for pruning. The final pruning cuts are estimated to be 130mm, 70mm and 40mm in diameter. Approximately 10% of the live foliage area will be removed.

Image 6: Looking towards tree 147. The tree is recommended for removal.

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Image 7: Looking towards tree 148, showing the four first order branches to the South and Southeast recommended for pruning. The final pruning cuts are estimated to range from 100-130mm in diameter. Approximately 15% of the live foliage area will be removed.

Image 8: Looking towards tree 148, showing two additional first order branches to the South to be removed. The final pruning cuts are estimated to range from 80-120mm in diameter. An additonal 5% of the live foliage area will be removed. The brances to be removed have been marked red.

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Image 9: Looking towards tree 150, showing the area of foliage requiring pruning. Pruning of branches up to 50mm in diameter is to provide a minimum of 2 metres clearance to all areas of the fence. Approximately 10-15% of the live foliage area will be removed from the tree.
Tree 151 and 152 are located behind tree 150 and are to be removed.

Image 10: Looking towards tree 155. The tree is recommended for removal.

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Image 11: Looking towards tree 157, showing the area of foliage requiring pruning. Pruning of branches up to 50mm in diameter is to provide a minimum of 2 meter clearance to all areas of the fence. Approximately 10% of the live foliage area will be removed from the tree.

Image 12: Looking towards tree 162 and G2. The trees are recommended for removal.

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Image 13: Looking towards tree 103, 104, 105 and 106. Canopy pruning is required. The smaller suckering regrowth measuring less than 50mm in diameter is to be pruned back to the chainwire boundary fence. Approximately 5-10% of the live foliage area of each tree will be removed. **Note – there is a bees nest in this location which should be treated prior to pruning works to ensure a safe working environment.**

Image 14: Looking towards tree 117. Canopy pruning is required to provide fence clearance. The primary stem to the Northwest is to be pruned at 1.5m above ground level. The final pruning cut will be 200mm in diameter. Approximately 30% of the live foliage area will be removed. This is considered significant canopy pruning, indicating the condition and useful life expectancy of the tree could be impacted, however, the pruning is a preferred option to whole tree removal.

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Image 15: Looking towards tree 118. Canopy pruning is required to provide fence clearance. The primary stem to the North is to be pruned at 1.5m above ground level. The final pruning cut will be 150mm in diameter. Approximately 15% of the live foliage area will be removed.

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9. CONCLUSIONS

9.1 **Table 2:** Summary of the trees requiring pruning or removal;

Impact	Reason	Category A	Category Z	TOTAL
		A	Z	
Trees recommended to be removed	Installation of services, line of sight for cameras	None	147, 151, 152, 155, 162 and G2 (5 trees & 1 group of trees)	**5 trees and 1 group of trees**
Trees requiring pruning	Installation of services, line of sight for cameras	103, 104, 105, 106, 117, 118, 119, 120, 121, 130, 148, 157 (12 trees)	127, 146, 150 (3 trees)	**15 trees**

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10. RECOMMENDATIONS

10.1 This report assesses trees that require pruning or removal for camera visibility works along the rail corridor. Seventeen (17) trees and one (1) group of trees have been identified and assessed in this report.

10.2 Five (5) trees and one (1) group of trees have been identified for removal in this area, including tree 147, 151, 152, 155, 162 and G2. See Table 2 for recommended tree removal by retention values.

10.3 The trees discussed above in section 10.2 have been recommended for removal due to excessive amounts of pruning required to achieve camera visibility, as discussed in section 1.3. It may be possible to retain/prune some of the trees recommended for removal based upon the final installation locations of cameras and their FOV. This will need to be determined by UGL and the project arborist.

10.4 An additional fifteen (15) trees have been identified for canopy pruning in this area, including trees 103, 104, 105, 106, 117, 118, 119, 120, 121, 127, 130, 146, 148, 150 and 157. All canopy pruning must be completed in accordance with AS4373 *Pruning of amenity trees* (2007).

10.5 All trees that require canopy pruning can be retained. All trees to be retained must be protected in accordance with AS4970-2025 *Protection of trees on development sites*.

10.6 This report does not provide approval for tree removal or pruning works. All recommendations in this report are subject to approval by the relevant authorities and/or tree owners.

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12. LIST OF APPENDICES

The following are included in the appendices:

- Appendix 2 - Tree inspection schedule
- Appendix 3 - Definition of Methodology

Alex Kurath
8004 2802
sales@urbanarbor.com.au
Diploma of Arboriculture (AQF5)
Member of Arboriculture Australia
ISA Member (International Society of Arboriculture)

Bryce Claassens
Diploma of Arboriculture (AQF5)
Cert III Landscape Construction
Member Arboriculture Australia
Quantified Tree Risk Assessment (QTRA)
ISA Tree Risk Assessment Qualification (TRAQ)

Appendix 2 - Tree Inspection Schedule

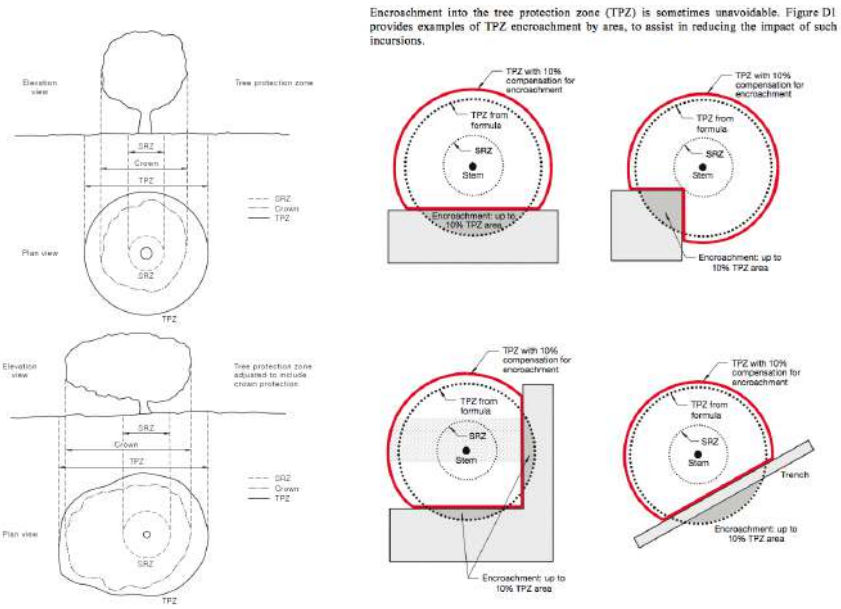
Tree ID	Common Name	Botanical Name	Age Class	Height (m)	Canopy Spread Radius (m)	Stem 1	Stem 2	Stem 3	Stem 4	Stem 5	DBH (mm)	DAB (mm)	Health	Structure	Amenity Value	SULE	Retention Value	TPZ Radius (m)	SRZ Radius (m)	Notes	Native or Exotic	Recommendations
103	Camphor Laurel	*Cinnamomum camphora*	Mature	17	5	1100					1100	1400	Good	Fair	Medium	2. Medium	A1	13.2	3.8	Canopy pruned for power lines.	Exotic	Prune
104	Camphor Laurel	*Cinnamomum camphora*	Mature	16	7	800					800	880	Good	Fair	Medium	2. Medium	A1	9.6	3.1	Canopy pruned for power lines.	Exotic	Prune
105	Camphor Laurel	*Cinnamomum camphora*	Mature	16	4	450					450	500	Good	Fair	Medium	2. Medium	A1	5.4	2.5	Canopy pruned for power lines.	Exotic	Prune
106	Camphor Laurel	*Cinnamomum camphora*	Mature	16	6	600					600	680	Good	Fair	Medium	2. Medium	A1	7.2	2.8	Canopy pruned for power lines. Cavity at base with bee hive.	Exotic	Prune
117	Black Tea-tree	*Melaleuca bracteata*	Semi-mature	6	2	200					200	220	Good	Good	Medium	1. Long	A1	2.4	1.8	Canopy extends into corridor.	Native	Prune
118	Black Tea-tree	*Melaleuca bracteata*	Semi-mature	6	2	180	180				255	300	Good	Good	Medium	1. Long	A1	3.1	2.0	Canopy extends into corridor.	Native	Prune
119	White Cedar	*Melia azedarach*	Semi-mature	5	2	190					190	210	Good	Good	Medium	1. Long	A1	2.3	1.7	Canopy extends into corridor.	Native	Prune
120	White Cedar	*Melia azedarach*	Semi-mature	5	2	170					170	190	Good	Good	Medium	1. Long	A1	2.0	1.6	Canopy extends into corridor.	Native	Prune
121	White Cedar	*Melia azedarach*	Semi-mature	5	2	190					190	210	Good	Good	Medium	1. Long	A1	2.3	1.7	Canopy extends into corridor.	Native	Prune
127	Honey Myrtle	*Melaleuca bracteata 'Revolution Gold'*	Semi-mature	5	1	150					150	160	Good	Good	Low	5. Small/Young	Z1	2.0	1.5	Canopy extends into corridor.	Native	Prune
130	Tallowood	*Eucalyptus microcorys*	Mature	17	8	980					980	1020	Good	Good	High	1. Long	A1	11.8	3.3	Canopy extends into corridor. Pruned for power lines.	Native	Prune
146	Silky Oak	*Grevillea robusta*	Mature	9	3	340					340	380	Good	Fair	Medium	3. Short	Z9	4.1	2.2	Located within corridor. Topped for power lines.	Native	Prune
147	Olive	*Olea europaea*	Mature	5	2	180	100				206	220	Good	Good	Low	5. Small/Young	Z1	2.5	1.8	Located within corridor.	Exotic	Remove
148	Silky Oak	*Grevillea robusta*	Mature	10	4.5	440					440	480	Fair	Fair	Medium	2. Medium	A2	5.3	2.4	Located within corridor. Low foliage density for species.	Native	Prune
150	Macadamia	*Macadamia spp*	Mature	5	2	160					160	180	Good	Good	Low	5. Small/Young	Z1	2.0	1.6	Located within corridor.	Native	Prune
151	Broad Leaved Privet	*Ligustrum lucidum*	Young	4	1	100					100	110	Good	Fair	Very Low	5. Small/Young	Z3	2.0	1.5	Located within corridor. Exempt species.	Exotic	Remove
152	Avocado	*Persea gratissima*	Mature	4	2	200					200	240	Good	Fair	Low	5. Small/Young	Z1	2.4	1.8	Located within corridor.	Exotic	Remove
155	Silky Oak	*Grevillea robusta*	Semi-mature	7	2	100	110				149	220	Good	Fair	Low	5. Small/Young	Z1	2.0	1.8	Located within corridor.	Native	Remove
157	Mango	*Mangifera indica*	Mature	5	3	240					240	260	Good	Good	Medium	1. Long	A1	2.9	1.9	Canopy extends into corridor.	Exotic	Prune
162	Sweet Pittosporum	*Pittosporum undulatum*	Semi-mature	5	1.5	120					120	140	Good	Fair	Low	5. Small/Young	Z1	2.0	1.5	Located within corridor.	Native	Remove
G2	Camphor Laurel	*Cinnamomum camphora*	Semi-mature	9	2	200					200	200	Good	Fair	Low	5. Small/Young	Z3	2.4	1.7	Located within corridor. Group of camphor laurel. Exempt species. Approximately 4 trees.	Exotic	Remove

Explanatory Notes

Tree Species - Common name followed by botanical name. Where species is unknown it is indicated with an *'spp'.*
Age Class - Over mature (OM), Mature (M), Early mature (EM), Semi mature (SM), Young (Y).
Diameter at Breast Height (DBH) - Measured with a DBH tape or estimated at approximately 1.4m above ground level.
Diameter Above root Buttresses (DAB): Measured with a DBH tape or estimated above root buttresses (DAB) for calculating the SRZ.
Height - Height from ground level to top of crown. All heights are estimated unless otherwise indicated.
Spread - Radius of crown at widest section. All tree spreads are estimated unless otherwise indicated.
Tree Protection Zone (TPZ) - DBH x 12. Measured in radius from the centre of the trunk. Rounded to nearest 0.1m. For monocots, the TPZ is set at 1 metre outside the crown projection.
Structural Root Zone (SRZ) - $(DAB \times 50)^{0.42} \times 0.64$. Measured in radius from the centre of the trunk. Rounded up to nearest 0.1m.
Health - Good/Fair/Poor/Dead
Structure - Good/Fair/Poor
Safe Useful Life Expectancy (SULE) - 1. Long (40+years), 2. Medium (15 - 40 years), 3. Short (5 - 15 years), 4. Remove (under 5 years), 5. Small/young.
Amenity Value - Very High/High/Medium/Low/Very Low.
Retention Value: Tree AZ, see appendix 3 for categories.

Appendix 3 - Further Information of Methodology

1. **Tree Protection Zone:** The tree protection zone (TPZ) is the principle means of protecting trees on development sites. The TPZ is a combination of the root area and crown area requiring protection. It is an area isolated from construction disturbance, so that the tree remains viable. The radius of the TPZ is calculated for each tree by multiplying its DBH x 12. The derived value is measured in radius from the centre of the stem/trunk at ground level. A TPZ should not be less than 2.0 metres nor greater than 15 metres (except where crown protection is required).
   It is commonly observed that tree roots will extend significant further than the indicative TPZ, however the TPZ is an area identified AS4970-2009 to be extent where root loss or disturbance will generally not impact the viability of the tree. The TPZ is identified as a restricted area to prevent damage to trees either above or below ground during a development. Where trees are intended to be retained proposed developments must provide an adequate TPZ around trees. The TPZ is set aside for the tree's root zone, trunk and crown and it is essential for the stability and longevity of the tree. The tree protection also incorporates the SRZ (see below for more information about the SRZ). I have calculated the TPZ of palms, other monocots, cycads and tree ferns at one metre outside the crown projection. See appendices for additional information about the TPZ including information about calculating the TPZ and examples of TPZ encroachment.
   Minor encroachment into TPZ: Sometimes encroachment into the TPZ is unavoidable. Encroachment includes but is not limited to activities such as excavation, compacted fill and machine trenching. Minor encroachment of up to 10% of the overall TPZ area is normally considered acceptable, providing there is space adjacent to the TPZ for the tree to compensate and the tree is displaying adequate vigour/health to tolerate changes to its growing environment.
   Major encroachment into TPZ: Where encroachment of more than 10% of the overall TPZ area is proposed the project Arborist must investigate and demonstrate that the tree will remain in a viable condition. In some cases, tree sensitive construction methods such as pier and beam footings, suspended slabs, or cantilevered sections, can be utilised to allow additional encroachment into the TPZ by bridging over roots and minimising root disturbance. Major encroachment is only possible if it can be undertaken without severing significant size roots, or if it can be demonstrated that significant roots will not be impacted.



2. **Structural Root Zone:** This is the area around the base of a tree required for the trees stability in the ground. An area larger than the SRZ always need to be maintained to preserve a viable tree as it will only have a minor effect on the trees vigour and health. There are several factors that determine the SRZ which include height, crown area, soil type and soil moisture. It can also be influenced by other factors such as natural or built structures. Generally work within the SRZ should be avoided.
   An indicative SRZ radius can be determined from the diameter of the trunk measured immediately above the root buttresses. Root investigation could provide more information about the extent of the SRZ. The following formula should be used to calculate the SRZ.
   SRZ radius = $(D \times 50)^{0.42} \times 0.64$ (D = Diameter above root buttress).

3. **Tree Age Class:** If can be difficult to determine the age of a tree without carrying out invasive tests that may damage the tree, so we have categorised there likely age class which is defined below;
   - Young/Newly planted: Young or recently planted tree.
   - Semi Mature: Up to 20% of the usual life expectancy for the species.
   - Early mature/Mature: Between 20%-80% of the usual life expectancy for the species.
   - Over mature: Over 80% of the usual life expectancy for the species.
   - Dead: Tree is dead or almost dead.

4. **Health/Physiological Condition:** Below are examples conditions used when assigning a category for tree health.

Category	Example condition	Summary
Good	• Crown has good foliage density for species. • Tree shows no or minimal signs of pathogens that are unlikely to have an effect on the health of the tree. • Tree is displaying good vigour and reactive growth development.	• The tree is in above average health and condition and no remedial works are required.
Fair	• The tree may be starting to dieback or have over 25% deadwood. • Tree may have slightly reduced crown density or thinning. • There may be some discolouration of foliage. • Average reactive growth development. • There may be early signs of pathogens which may further deteriorate the health of the tree. • There may be epicormic growth indicating increased levels of stress within the tree.	• The tree is in below average health and condition and may require remedial works to improve the trees health.
Poor	• The may be in decline, have extensive dieback or have over 30% deadwood. • The canopy may be sparse or the leaves may be unusually small for species. • Pathogens or pests are having a significant detrimental effect on the tree health.	• The tree is displaying low levels of health and removal or remedial works may be required.
Dead	• The tree is dead or almost dead.	• The tree should generally be removed.

5. **Structural Condition:** Below are examples conditions used when assigning a category for structural condition.

Category	Example condition	Summary
Good	• Branch unions appear to be strong with no sign of defects. • There are no significant cavities. • The tree is unlikely to fail in usual conditions. • The tree has a balanced crown shape and form.	• The tree is considered structurally good with well developed form.
Fair	• The tree may have minor structural defects within the structure of the crown that could potentially develop into more significant defects. • The tree may a cavity that is currently unlikely to fail but may deteriorate in the future. • The tree is an unbalanced shape or leans significantly. • The tree may have minor damage to its roots. • The root plate may have moved in the past but the tree has now compensated for this. • Branches may be rubbing or crossing.	• The identified defects are unlikely cause major failure. • Some branch failure may occur in usual conditions. • Remedial works can be undertaken to alleviate potential defects.
Poor	• The tree has significant structural defects. • Branch unions may be poor or weak. • The tree may have a cavity or cavities with excessive levels of decay that could cause catastrophic failure. • The tree may have root damage or is displaying signs of recent movement. • The tree crown may have poor weight distribution which could cause failure.	• The identified defects are likely to cause either partial or whole failure of the tree.

6. **Amenity Value:** To determine the amenity value of a tree we assess a number of different factors, which include but are not limited to the information below.
   - The visibility of the tree to adjacent sites.
   - The relationship between the tree and the site.
   - Whether the tree is protected by any statuary conditions.
   - The habitat value of the tree.
   - Whether the tree is considered a noxious weed species.

   The amenity value is rated using one of the following values.
   - Very High
   - High
   - Moderate
   - Low
   - Very Low

7. **Safe Useful Life Expectancy (SULE), (Barrel, 2001):** A trees safe useful life expectancy is determined by assessing a number of different factors including the health and vitality, estimated age in relation to expected life expectancy for the species, structural defects, and remedial works that could allow retention in the existing situation.

Category	Description
1. Long - Over 40 years	(a) Structurally sound trees located in positions that can accommodate future growth. (b) Trees that could be made suitable for retention in the long term by remedial tree care. (c) Trees of special significance for historical, commemorative or rarity reasons that would warrant extraordinary efforts to secure their long term retention.
2. Medium - 15 to 40 years	(a) Trees that may only live between 15 and 40 more years. (b) Trees that could live for more than 40 years but may be removed for safety or nuisance reasons. (c) Trees that could live for more than 40 years but may be removed to prevent interference with more suitable individuals or to provide space for new planting. (d) Trees that could be made suitable for retention in the medium term by remedial tree care.
3. Short - 5 to 15 years	(a) Trees that may only live between 5 and 15 more years. (b) Trees that could live for more than 15 years but may be removed for safety or nuisance reasons. (c) Trees that could live for more than 15 years but may be removed to prevent interference with more suitable individuals or to provide space for new planting. (d) Trees that require substantial remedial tree care and are only suitable for retention in the short term.
4. Remove - Under 5 years	(a) Dead, dying, suppressed or declining trees because of disease or inhospitable conditions. (b) Dangerous trees because of instability or recent loss of adjacent trees. (c) Dangerous trees because of structural defects including cavities, decay, included bark, wounds or poor form. (d) Damaged trees that are clearly not safe to retain. (e) Trees that could live for more than 5 years but may be removed to prevent interference with more suitable individuals or to provide space for new planting. (f) Trees that are damaging or may cause damage to existing structures within 5 years. (g) Trees that will become dangerous after removal of other trees for the reasons given in (a) to (f). (h) Trees in categories (a) to (g) that have a high wildlife habitat value and, with appropriate treatment, could be retained subject to regular review.
5. Small/Young	(a) Small trees less than 5m in height. (b) Young trees less than 15 years old but over 5m in height. (c) Formal hedges and trees intended for regular pruning to artificially control growth.

8. **Root investigations:** The root investigations should identify roots greater than 30mm in diameter that are located along the edge of the structures footprint or in the location of footings. Root investigations must be carried out using non-invasive methods (manual excavations). Any excavations for the root investigations must carried out manually to avoid damaging the roots during excavations. Manual excavation may include the use of a high-pressure air/air knife, or a combination of high-pressure water and a vacuum device. When hand excavating carefully work around roots retaining as many as possible. Take care to not fray, wound, or cause damage to any roots during excavations as this may cause decay or infection from pathogens. It is essential that exposed roots are kept moist and the excavation back filled as soon as possible. The root investigations should be carried out by a qualified Arborist minimum AQF3. Once roots are exposed, a visual assessment can be carried out by a consulting Arborist to evaluate the potential impact of the proposed root loss on the health and stability of the tree. A root map/report should be prepared identifying the findings of investigations, including photographs as supporting evidence in the report.

9. **Retention Value:** The system I have used to award the retention value is Tree AZ. Tree AZ is used to identify higher value trees worthy of being a constraint to development and lower value trees that should generally not be a constraint to the development. The table below provides a brief description of each category.

TreeAZ Categories (Version 10.04-ANZ)

CAUTION: TreeAZ assessments must be carried out by a competent person qualified and experienced in arboriculture. The following category descriptions are designed to be a brief field reference and are not intended to be self-explanatory. They must be read in conjunction with the most current explanations published at www.TreeAZ.com.

Category Z: Unimportant trees not worthy of being a material constraint

Local policy exemptions: Trees that are unsuitable for legal protection for local policy reasons including size, proximity and species	
Z1	Young or insignificant small trees, i.e. below the local size threshold for legal protection, etc
Z2	Too close to a building, i.e. exempt from legal protection because of proximity, etc
Z3	Species that cannot be protected for other reasons, i.e. scheduled noxious weeds, out of character in a setting of acknowledged importance, etc
High risk of death or failure: Trees that are likely to be removed within 10 years because of acute health issues or severe structural failure	
Z4	Dead, dying, diseased or declining
Z5	Severe damage and/or structural defects where a high risk of failure cannot be satisfactorily reduced by reasonable remedial care, i.e. cavities, decay, included bark, wounds, excessive imbalance, overgrown and vulnerable to adverse weather conditions, etc
Z6	Instability, i.e. poor anchorage, increased exposure, etc
Excessive nuisance: Trees that are likely to be removed within 10 years because of unacceptable impact on people	
Z7	Excessive, severe and intolerable inconvenience to the extent that a locally recognized court or tribunal would be likely to authorize removal, i.e. dominance, debris, interference, etc
Z8	Excessive, severe and intolerable damage to property to the extent that a locally recognized court or tribunal would be likely to authorize removal, i.e. severe structural damage to surfacing and buildings, etc
Good management: Trees that are likely to be removed within 10 years through responsible management of the tree population	
Z9	Severe damage and/or structural defects where a high risk of failure can be temporarily reduced by reasonable remedial care, i.e. cavities, decay, included bark, wounds, excessive imbalance, vulnerable to adverse weather conditions, etc
Z10	Poor condition or location with a low potential for recovery or improvement, i.e. dominated by adjacent trees or buildings, poor architectural framework, etc
Z11	Removal would benefit better adjacent trees, i.e. relieve physical interference, suppression, etc
Z12	Unacceptably expensive to retain, i.e. severe defects requiring excessive levels of maintenance, etc

NOTE: Z trees with a high risk of death/failure (Z4, Z5 & Z6) or causing severe inconvenience (Z7 & Z8) at the time of assessment and need an urgent risk assessment can be designated as ZZ. ZZ trees are likely to be unsuitable for retention and at the bottom of the categorization hierarchy. In contrast, although Z trees are not worthy of influencing new designs, urgent removal is not essential and they could be retained in the short term, if appropriate.

Category A: Important trees suitable for retention for more than 10 years and worthy of being a material constraint

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

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

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

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Glossary of Terms

Abiotic - Pertaining to non-living agents; e.g. environmental factors

Adventitious shoots - Shoots that develop other than from apical, axillary or dormant buds; see also 'epicormic'

Anchorage - The system whereby a tree is fixed within the soil, involving cohesion between roots and soil and the development of a branched system of roots which withstands wind and gravitational forces transmitted from the aerial parts of the tree

Bark - A term usually applied to all the tissues of a woody plant lying outside the vascular cambium, thus including the phloem, cortex and periderm; occasionally applied only to the periderm or the phellem

Branch:
• **Primary**. A first order branch arising from a stem
• **Lateral**. A second order branch, subordinate to a primary branch or stem and bearing sub-lateral branches
• **Sub-lateral**. A third order branch, subordinate to a lateral or primary branch, or stem and usually bearing only twigs

Branch collar - A visible swelling formed at the base of a branch whose diameter growth has been disproportionately slow compared to that of the parent stem; a term sometimes applied also to the pattern of growth of the cells of the parent stem around the branch base

Brown-rot - A type of wood decay in which cellulose is degraded, while lignin is only modified

Buckling - An irreversible deformation of a structure subjected to a bending load

Buttress zone - The region at the base of a tree where the major lateral roots join the stem, with buttress-like formations on the upper side of the junctions

Cambium - Layer of dividing cells producing xylem (woody) tissue internally and phloem (bark) tissue externally

Canker - A persistent lesion formed by the death of bark and cambium due to colonisation by fungi or bacteria

Compartmentalisation - The confinement of disease, decay or other dysfunction within an anatomically discrete region of plant tissue, due to passive and/or active defences operating at the boundaries of the affected region

Compressive loading - Mechanical loading which exerts a positive pressure; the opposite to tensile loading

Condition - An indication of the physiological condition of the tree. Where the term 'condition' is used in a report, it should not be taken as an indication of the stability of the tree

Crown/Canopy - The main foliage bearing section of the tree

Crown lifting - The removal of limbs and small branches to a specified height above ground level

Crown thinning - The removal of a proportion of secondary branch growth throughout the crown to produce an even density of foliage around a well-balanced branch structure

Crown reduction/shaping - A specified reduction in crown size whilst preserving, as far as possible, the natural tree shape

DAB (Diameter Above Buttress) - Trunk diameter measured above the root buttress

Defect - In relation to tree hazards, any feature of a tree which detracts from the uniform distribution of mechanical stress, or which makes the tree mechanically unsuited to its environment

Dieback - The death of parts of a woody plant, starting at shoot-tips or root-tips

Disease - A malfunction in or destruction of tissues within a living organism, usually excluding mechanical damage; in trees, usually caused by pathogenic micro-organisms

Dominance - In trees, the tendency for a leading shoot to grow faster or more vigorously than the lateral shoots; also the tendency of a tree to maintain a taller crown than its neighbours

Dormant bud - An axial bud which does not develop into a shoot until after the formation of two or more annual wood increments; many such buds persist through the life of a tree and develop only if stimulated to do so

Dysfunction - In woody tissues, the loss of physiological function, especially water conduction, in sapwood

DBH (Diameter at Breast Height) - Stem diameter measured at a height of 1.4 metres or the nearest measurable point. Where measurement at a height of 1.4 metres is not possible, another height may be specified

Deadwood - Branch or stem wood bearing no live tissues. Retention of deadwood provides valuable habitat for a wide range of species and seldom represents a threat to the health of the tree. Removal of deadwood can result in the ingress of decay to otherwise sound tissues and climbing operations to access deadwood can cause significant damage to a tree. Removal of deadwood is generally recommended only where it represents an unacceptable level of hazard

Epicormic shoot - A shoot having developed from a dormant or adventitious bud and not having developed from a first year shoot

Flush-cut - A pruning cut which removes part of the branch bark ridge and or branch-collar

Girdling root - A root which circles and constricts the stem or roots possibly causing death of phloem and/or cambial tissue

Habit - The overall growth characteristics, shape of the tree and branch structure

Hazard beam - An upwardly curved part of a tree in which strong internal stresses may occur without being reduced by adaptive growth; prone to longitudinal splitting

Incorporating extracts from Lonsdale, D. 1999. Principles of Tree Hazard Assessment. Her Majesty's Stationary Office, London

Heartwood/false-heartwood - The dead central wood that has become dysfunctional as part of the aging processes and being distinct from the sapwood

Heave - A term mainly applicable to a shrinkable clay soil which expands due to re-wetting after the felling of a tree which was previously extracting moisture from the deeper layers; also the lifting of pavements and other structures by root diameter expansion; also the lifting of one side of a wind-rocked root-plate

Included bark (ingrown bark) - Bark of adjacent parts of a tree (usually forks, acutely joined branches or basal flutes) which is in face-to-face contact

Lever arm - A mechanical term denoting the length of the lever represented by a structure that is free to move at one end, such as a tree or an individual branch

Lignin - The hard, cement-like constituent of wood cells; deposition of lignin within the matrix of cellulose microfibrils in the cell wall is termed Lignification

Lions tailing - A term applied to a branch of a tree that has few if any side-branches except at its end, and is thus liable to snap due to end- loading

Loading - A mechanical term describing the force acting on a structure from a particular source; e.g. the weight of the structure itself or wind pressure

Mycelium - The body of a fungus, consisting of branched filaments (hyphae)

Occlusion - The process whereby a wound is progressively closed by the formation of new wood and bark around it

Pathogen - A micro-organism which causes disease in another organism

Photosynthesis - The process whereby plants use light energy to split hydrogen from water molecules, and combine it with carbon dioxide to form the molecular building blocks for synthesizing carbohydrates and other biochemical products

Probability - A statistical measure of the likelihood that a particular event might occur

Pruning - The removal or cutting back of twigs or branches, sometimes applied to twigs or small branches only, but often used to describe most activities involving the cutting of trees or shrubs

Radial - In the plane or direction of the radius of a circular object such as a tree stem

Reactive Growth/Reaction Wood - Production of woody tissue in response to altered mechanical loading; often in response to internal defect or decay and associated strength loss (cf. adaptive growth)

Ring-barking - The removal of a ring of bark and phloem around the circumference of a stem or branch, normally resulting in an inability to transport photosynthetic assimilates below the area of damage. Almost inevitably results in the eventual death of the affected stem or branch above the damage

Root-collar - The transitional area between the stem/s and roots

Sapwood - Living xylem tissues

Soft-rot - A kind of wood decay in which a fungus degrades cellulose within the cell walls, without any general degradation of the wall as a whole

Stem/s - Principle above-ground structural component(s) of a tree that supports its branches

Stress - In plant physiology, a condition under which one or more physiological functions are not operating within their optimum range, for example due to lack of water, inadequate nutrition or extremes of temperature

SRZ (Structural Root Zone) - The area around the base of the tree required for the trees stability in the ground

Subsidence - In relation to soil or structures resting in or on soil, a sinking due to shrinkage when certain types of clay soil dry out, sometimes due to extraction of moisture by tree roots

Taper - In stems and branches, the degree of change in girth along a given length

Targets - In tree risk assessment (with slight misuse of normal meaning) persons or property or other things of value which might be harmed by mechanical failure of the tree or by objects falling from it

Topping - In arboriculture, the removal of the crown of a tree, or of a major proportion of it

Transpiration - The evaporation of moisture from the surface of a plant, especially via the stomata of leaves; it exerts a suction which draws water up from the roots and through the intervening xylem cells

TPZ (Tree Protection Zone) - A specified area above and below ground and at a given distance from the trunk set aside for the protection of a tree's roots and crown to provide for the viability and stability of a tree to be retained where it is potentially subject to damage by development

Understory - This layer consists of younger individuals of the dominant trees, together with smaller trees and shrubs which are adapted to grow under lower light conditions

Veteran tree - Tree that, by recognised criteria, shows features of biological, cultural or aesthetic value that are characteristic of, but not exclusive to, individuals surviving beyond the typical age range for the species concerned. These characteristics might typically include a large girth, signs of crown retrenchment and hollowing of the stem

Vigour - The expression of carbohydrate expenditure to growth (in trees)

White-rot - A range of kinds of wood decay in which lignin, usually together with cellulose and other wood constituents, is degraded

Wind exposure - The degree to which a tree or other object is exposed to wind, both in terms of duration and velocity

Wind pressure - The force exerted by a wind on a particular object

Windthrow - The blowing over of a tree at its roots

Incorporating extracts from Lonsdale, D. 1999. Principles of Tree Hazard Assessment. Her Majesty's Stationary Office, London

Appendix A (Part B) – Addendum to Arboricultural Pruning Specification Report (Southwest Metro – Hurlstone Park to Canterbury)

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Addendum to Arboricultural Pruning Specification Report

Site Location: Southwest Metro – Hurlstone Park to Canterbury

Prepared for:
UGL

Prepared by: Bryce Claassens and Alex Kurath
Date prepared: 11 June 2025
Ref: 250611_SWM_Ineco_PS_Ad3
Addendum: 3

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1. INTRODUCTION

1.1 Urban Arbor have been instructed to prepare an addendum to the previous Pruning Specification Report (18 November 2024) in relation to Corridor Intruder Detection System (CIDS) and Object Detection System (ODS) trouble spots. The report is to address trees within and adjacent to the rail corridor between Hurlstone Park Station and Canterbury Station.

1.2 Documents and information provided to assist in preparing the report;

A) Arboricultural Pruning Specification Report, Urban Arbor, Ref:241118_SWM_Ineco_PS, Revision 2,18 November 2024.

B) CCTV LOS and Nuisance Alarm Register, Doc No. SMCSWIDS-UGL-1NL-TC-REG-000745, Revision B, 5 June 2025.

1.3 The site and tree inspections were carried out on 4 June 2025 by Alex Kurath of Urban Arbor, in conjunction with representatives from UGL (Rares Pop), JHLORJV (Andre Kruize) and Sydney Metro. UGL advised the trees requiring pruning or removal to obtain camera visibility of fence lines.

1.4 Some trees included within this report were previously inspected between the dates of 6 January 2020 to 3 April 2020 by Bryce Claassens during the South West Metro Rail Corridor (SWMRC) and Station Precinct design works. Access was available to the subject site and adjoining public areas only. This report has been written by Bryce Claassens.

2. SCOPE OF THE REPORT

2.1 This report has been undertaken to meet the following objectives.

2.1.1 Conduct a walk-through assessment of the areas where trees (identified by UGL) are currently obstructing camera visibility, which require pruning or removal. The decision of pruning or removal of trees is subject to the agreement and approval of the stakeholders.

2.1.2 Conduct a visual assessment of significant trees not previously included in the Pruning Specification Report (dated 18 November 2024), located within areas identified by UGL. For the purpose of this report, a significant tree is a ‘Long lived woody perennial plant greater than (or usually greater than) 3 metres in height with one or relatively few main stems or trunks’.

2.1.3 Determine the trees estimated contribution years and remaining useful life expectancy and award the trees a retention value.

2.1.4 Provide pruning specifications for trees where required, in accordance with AS4373-2007.

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3. LIMITATIONS

3.1 The observations and recommendations are based on the site inspections identified in section 1 only. The findings of this report are based on the observations and site conditions at the time of inspection.

3.2 All of the observations were carried out from ground level. The accuracy of the assessment of the subject trees structural condition and health is limited to the visibility of the tree at the time of inspection.

3.3 The tree inspection was visual from ground level only. No soil or tissue testing was carried out as part of the tree inspection. None of the surrounding surfaces adjacent to trees were lifted or removed during the tree inspections.

3.4 Root decay can sometimes be present with no visual indication above ground. It is also impossible to know the extent of any root damage caused by mechanical damage such as underground root cutting during the installation of services without undertaking detailed root investigation. Any form of tree failure due to these activities is beyond the scope of this assessment.

3.5 The report reflects the subject tree(s) as found on the day of inspection. Any changes to the growing environment of the subject tree, or tree management works beyond those recommended in this report may alter the findings of the report. There is no warranty, expressed or implied, that problems or deficiencies relating to the subject tree, or subject site may not arise in the future.

3.6 Tree identification is based on accessible visual characteristics at the time of inspection. As key identifying features are not always available the accuracy of identification is not guaranteed. Where tree species is unknown, it is indicated with an *spp*.

3.7 Some trees included within this report have been located using a Trimble TDC100 hand held GNSS device by Urban Arbor Pty Ltd. Tree locations captured by the Trimble TDC100 are only accurate to within 1m - 3m. If an accurate location of these trees is required, a registered surveyor should locate the trees.

3.8 In some instances, multiple trees or groups of small trees have been identified as groups of trees within this report.

3.9 All diagrams, plans and photographs included in this report are visual aids only and are not to scale unless otherwise indicated.

3.10 Alteration of this report invalidates the entire report.

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4. METHODOLOGY

4.1 The following information was collected during the assessment of the subject tree(s).

4.1.1 Tree common name
4.1.2 Tree botanical name
4.1.3 Tree age class
4.1.4 DBH (Trunk/Stem diameter at breast height/1.4m) - millimetres.
4.1.5 DAB (Trunk diameter directly above the root buttress) – millimetres.
4.1.6 Estimated height - metres
4.1.7 Estimated crown spread (diameter of crown) - metres
4.1.8 Health
4.1.9 Structural condition
4.1.10 Amenity value
4.1.11 Estimated remaining contribution years (SULE)[1]
4.1.12 Retention value (Tree AZ)[2]
4.1.13 Notes/comments

4.2 An assessment of the trees condition was made using the visual tree assessment (VTA) model (Mattheck & Breloer, 1994).[3]

4.3 Tree diameter was measured using a DBH tape or in some cases estimated. Tree height and tree canopy spread was measured with a clinometer or in some cases estimated. All other measurements were estimations unless otherwise stated. The other tools used during the assessment were a nylon mallet, compass, camera and a steel probe.

4.4 All DBH measurements, tree protection zones, and structural root zones within Appendix 2 of this report were calculated in accordance with methods set out in AS4970 Protection of trees on development sites (2025).[4]

4.5 Details of how the observations in this report have been assessed are listed in the appendices.

[1] Barrell, J. (2001), *'SULE: Its use and status in the new millennium' in Management of Mature Trees proceedings of the 4th NAAA Workshop*, Sydney, 2001. Barrell.

[2] Barrell Tree Consultancy, *Tree AZ version 10.10-ANZ*, http://www.treeaz.com/.

[3] Mattheck, C. & Breloer, H., *The body language of trees - A handbook for failure analysis*, The Stationary Office, London, England (1994).

[4] Council Of Standards Australia, *AS4970 Protection of trees on development sites* (2025).

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5. SITE LOCATION AND BRIEF DESCRIPTION

5.1 The area covered in the site inspections is located within the Canterbury Bankstown LGA. All trees within the Canterbury Bankstown LGA are subject to protection under the Canterbury Bankstown LEP 2023[5] and Canterbury Bankstown DCP 2023.[6]

6. AREAS ASSESSED

6.1 The areas assessed in this report have been identified by UGL in the report CCTV LOS and Nuisance Alarm Register (dated 5 June 2025), which includes trees within and adjacent to the rail corridor between Hurlstone Park Station to Canterbury Station.

7. TREE OBSERVATIONS

7.1 **Tree information:** Details of each individual tree assessed, including the observations taken during the site inspections, can be found in the tree inspection schedule in appendix 2. Each of the subject trees have been awarded a retention value based on the observations using the Tree AZ method. Tree AZ is used to identify higher value trees worthy of being a constraint to development and lower value trees that should generally not be a constraint to the development. The Tree AZ categories sheet (Barrell Tree Consultancy) has been included in appendix 3 to assist with understanding the retention values. The retention values that have been allocated to the subject trees in this report is not definitive and should only be used as a guideline.

8. ASSESSMENT OF TREE IMPACTS BY AREA

8.1 The trees included in the following sections have been identified by UGL as being subject to impacts from development works. All trees to be retained should be protected in accordance with AS4970-2025 *Protection of trees on development sites*. If there are any development works that have not been assessed and could potentially impact additional trees, the project arborist must assess the impact of the proposed works to the condition of the trees, determining the trees viability for retention.

[5] *Canterbury Bankstown Local Environmental Plan 2023*, https://legislation.nsw.gov.au/view/html/inforce/current/epi-2023-0336, accessed 11 June 2025.

[6] *Canterbury Bankstown Development Control Plan 2023*, https://www.cbcity.nsw.gov.au/development/planning-control-policies/canterbury-bankstown-development-control-plan-2023, accessed 11 June 2025.

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8.2 Hurlstone Park to Canterbury (HTC_01 – HTC_05)

8.2.1 Three (3) trees and one (1) group of trees have been identified for removal in this area, including tree 780, 3703, 3704 and G5a.

8.2.2 One (1) tree has been identified for canopy pruning in this area, including tree 3705. All canopy pruning must be completed in accordance with AS4373 *Pruning of amenity trees* (2007).

8.2.3 The details of the trees are summarised in the table below. Photographs of the trees are included in section 8.3.

Tree ID	Botanical Name	SULE	Retention Value	Height (m)	Canopy Spread (m) - radius	Native / Exotic	Prune / Remove
780	*Acacia longifolia*	5. Small/Young	Z1	5	1	Native	Remove
3703	*Elaeocarpus reticulatus*	5. Small/Young	Z1	4	1	Native	Remove
3704	*Cinnamomum camphora*	5. Small/Young	Z1	5	2	Exotic	Remove
3705	*Eucalyptus haemastoma*	1. Long	A1	12	4	Native	Prune
G5a	*Acacia spp*	5. Small/Young	Z1	3	1	Native	Remove

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8.3 **Photographs**

Image 1: Looking towards tree 780. The tree is recommended for removal.

Image 2: Looking towards tree 3703. The tree is recommended for removal.

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Image 3: Looking towards tree 3704. The tree is recommended for removal.

Image 4: Looking towards tree 3705, showing the 130mm diameter second order branch to the North at 2.5m above ground level recommended for pruning. The removal of smaller branches measuring less tha 50mm in diameter will also be required to provide 2m clearance from the fence. Approximately 10% of the live foliage area will be removed.

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Image 5: Looking towards G5a. Trees that are located within 2m of the fence are recommended for removal.

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9. CONCLUSIONS

9.1 **Table 2:** Summary of the trees requiring pruning or removal;

Impact	Reason	Category A	Category Z	TOTAL
		A	Z	
Trees recommended to be removed	Installation of services, line of sight for cameras	None	780, 3703, 3704, G5a (3 trees & 1 group of trees)	**3 trees and 1 group of trees**
Trees requiring pruning	Installation of services, line of sight for cameras	3705 (1 tree)	None	**1 tree**

10. RECOMMENDATIONS

10.1 This report assesses trees that require pruning or removal for camera visibility works along the rail corridor. Four (4) trees and one (1) group of trees have been identified and assessed in this report.

10.2 Three (3) trees and one (1) group of trees have been identified for removal in this area, including tree 780, 3703, 3704 and G5a. See Table 2 for recommended tree removal by retention values.

10.3 The trees discussed above in section 10.2 have been recommended for removal due to excessive amounts of pruning required to achieve camera visibility, as discussed in section 1.3. It may be possible to retain/prune some of the trees recommended for removal based upon the final installation locations of cameras and their FOV. This will need to be determined by UGL and the project arborist.

10.4 One (1) tree has been identified for canopy pruning in this area, including tree 3705. All pruning works must be completed in accordance with AS4373-2007 *Pruning of Amenity Trees*.

10.5 All trees that require canopy pruning can be retained in a viable condition. All trees to be retained must be protected in accordance with AS4970-2025 *Protection of trees on development sites*.

10.6 This report does not provide approval for tree removal or pruning works. All recommendations in this report are subject to approval by the relevant authorities and/or tree owners.

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- *Canterbury Bankstown Local Environmental Plan 2023*, https://legislation.nsw.gov.au/view/html/inforce/current/epi-2023-0336
- *Canterbury Bankstown Development Control Plan 2023*, https://www.cbcity.nsw.gov.au/development/planning-control-policies/canterbury-bankstown-development-control-plan-2023

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12. LIST OF APPENDICES

The following are included in the appendices:

- Appendix 2 - Tree inspection schedule
- Appendix 3 - Definition of Methodology

Alex Kurath
8004 2802
sales@urbanarbor.com.au
Diploma of Arboriculture (AQF5)
Member of Arboriculture Australia
ISA Member (International Society of Arboriculture)

Bryce Claassens
Diploma of Arboriculture (AQF5)
Cert III Landscape Construction
Member Arboriculture Australia
Quantified Tree Risk Assessment (QTRA)
ISA Tree Risk Assessment Qualification (TRAQ)

Appendix 2 - Tree Inspection Schedule

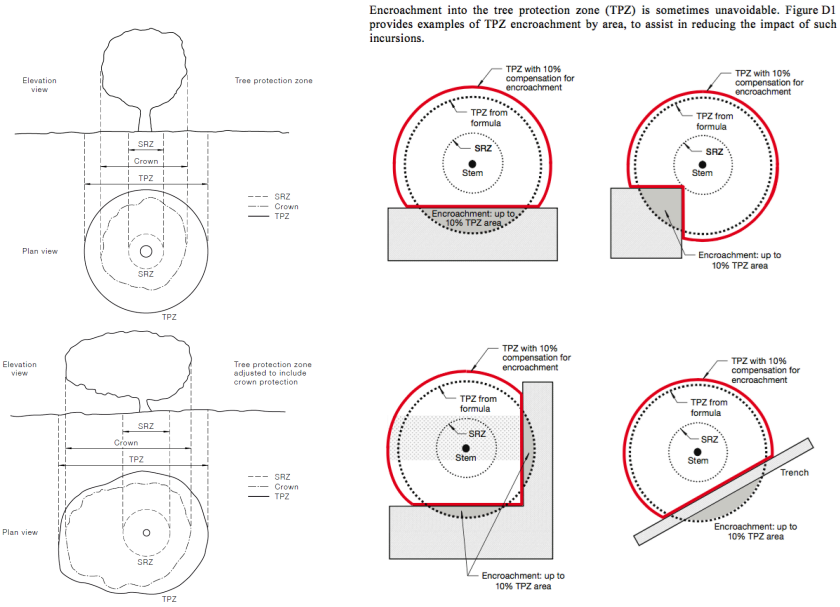
Tree ID	Common Name	Botanical Name	Age Class	Height (m)	Canopy Spread Radius (m)	Stem 1	Stem 2	Stem 3	Stem 4	Stem 5	DBH (mm)	DAB (mm)	Health	Structure	Amenity Value	SULE	Retention Value	TPZ Radius (m)	SRZ Radius (m)	Notes	Native or Exotic	Recommendations
780	Sydney Golden Wattle	*Acacia longifolia*	Semi-mature	5	1	120					120	180	Good	Fair	Low	5. Small/Young	Z1	2.0	1.6	Located within corridor.	Native	Remove
3703	Blueberry Ash	*Elaeocarpus reticulatus*	Young	4	1	60					60	80	Good	Good	Low	5. Small/Young	Z1	2.0	1.5	Recent planting.	Native	Remove
3704	Camphor Laurel	*Cinnamomum camphora*	Young	5	2	80	60	80	60	50	150	150	Good	Fair	Low	5. Small/Young	Z1	2.0	1.5	Suckering growth from previously removed tree stump.	Exotic	Remove
3705	Broad Leaved Scribbly Gum	*Eucalyptus haemastoma*	Mature	12	4	290					290	340	Good	Good	Medium	1. Long	A1	3.5	2.1	None.	Native	Prune
G5a	Wattle	*Acacia spp*	Young	3	1	80					80	100	Good	Fair	Low	5. Small/Young	Z1	2.0	1.5	Located within corridor. Group of wattles. Approximately 5 individuals.	Native	Remove

Explanatory Notes

Tree Species - Common name followed by botanical name. Where species is unknown it is indicated with an *'spp'*.
Age Class - Over mature (OM), Mature (M), Early mature (EM), Semi mature (SM), Young (Y).
Diameter at Breast Height (DBH) - Measured with a DBH tape or estimated at approximately 1.4m above ground level.
Diameter Above root Buttresses (DAB): Measured with a DBH tape or estimated above root buttresses (DAB) for calculating the SRZ.
Height - Height from ground level to top of crown. All heights are estimated unless otherwise indicated.
Spread - Radius of crown at widest section. All tree spreads are estimated unless otherwise indicated.
Tree Protection Zone (TPZ) - DBH x 12. Measured in radius from the centre of the trunk. Rounded to nearest 0.1m. For monocots, the TPZ is set at 1 metre outside the crown projection.
Structural Root Zone (SRZ) - $(DAB \times 50)^{0.42} \times 0.64$. Measured in radius from the centre of the trunk. Rounded up to nearest 0.1m.
Health - Good/Fair/Poor/Dead
Structure - Good/Fair/Poor
Safe Useful Life Expectancy (SULE) - 1. Long (40+years), 2. Medium (15 - 40 years), 3. Short (5 - 15 years), 4. Remove (under 5 years), 5. Small/young.
Amenity Value - Very High/High/Medium/Low/Very Low.
Retention Value: Tree AZ, see appendix 3 for categories.

Appendix 3 - Further Information of Methodology

1. **Tree Protection Zone:** The tree protection zone (TPZ) is the principle means of protecting trees on development sites. The TPZ is a combination of the root area and crown area requiring protection. It is an area isolated from construction disturbance, so that the tree remains viable. The radius of the TPZ is calculated for each tree by multiplying its DBH x 12. The derived value is measured in radius from the centre of the stem/trunk at ground level. A TPZ should not be less than 2.0 metres nor greater than 15 metres (except where crown protection is required).
It is commonly observed that tree roots will extend significant further than the indicative TPZ, however the TPZ is an area identified AS4970-2009 to be extent where root loss or disturbance will generally not impact the viability of the tree. The TPZ is identified as a restricted area to prevent damage to trees either above or below ground during a development. Where trees are intended to be retained proposed developments must provide an adequate TPZ around trees. The TPZ is set aside for the tree's root zone, trunk and crown and it is essential for the stability and longevity of the tree. The tree protection also incorporates the SRZ (see below for more information about the SRZ). I have calculated the TPZ of palms, other monocots, cycads and tree ferns at one metre outside the crown projection. See appendices for additional information about the TPZ including information about calculating the TPZ and examples of TPZ encroachment.
Minor encroachment into TPZ: Sometimes encroachment into the TPZ is unavoidable. Encroachment includes but is not limited to activities such as excavation, compacted fill and machine trenching. Minor encroachment of up to 10% of the overall TPZ area is normally considered acceptable, providing there is space adjacent to the TPZ for the tree to compensate and the tree is displaying adequate vigour/health to tolerate changes to its growing environment.
Major encroachment into TPZ: Where encroachment of more than 10% of the overall TPZ area is proposed the project Arborist must investigate and demonstrate that the tree will remain in a viable condition. In some cases, tree sensitive construction methods such as pier and beam footings, suspended slabs, or cantilevered sections, can be utilised to allow additional encroachment into the TPZ by bridging over roots and minimising root disturbance. Major encroachment is only possible if it can be undertaken without severing significant size roots, or if it can be demonstrated that significant roots will not be impacted.



2. **Structural Root Zone:** This is the area around the base of a tree required for the trees stability in the ground. An area larger than the SRZ always need to be maintained to preserve a viable tree as it will only have a minor effect on the trees vigour and health. There are several factors that determine the SRZ which include height, crown area, soil type and soil moisture. It can also be influenced by other factors such as natural or built structures. Generally work within the SRZ should be avoided.
An indicative SRZ radius can be determined from the diameter of the trunk measured immediately above the root buttresses. Root investigation could provide more information about the extent of the SRZ. The following formula should be used to calculate the SRZ.
SRZ radius = $(D \times 50)^{0.42} \times 0.64$ (D = Diameter above root buttress).

3. **Tree Age Class:** If can be difficult to determine the age of a tree without carrying out invasive tests that may damage the tree, so we have categorised there likely age class which is defined below;
    - Young/Newly planted: Young or recently planted tree.
    - Semi Mature: Up to 20% of the usual life expectancy for the species.
    - Early mature/Mature: Between 20%-80% of the usual life expectancy for the species.
    - Over mature: Over 80% of the usual life expectancy for the species.
    - Dead: Tree is dead or almost dead.

4. **Health/Physiological Condition:** Below are examples conditions used when assigning a category for tree health.

Category	Example condition	Summary
Good	• Crown has good foliage density for species. • Tree shows no or minimal signs of pathogens that are unlikely to have an effect on the health of the tree. • Tree is displaying good vigour and reactive growth development.	• The tree is in above average health and condition and no remedial works are required.
Fair	• The tree may be starting to dieback or have over 25% deadwood. • Tree may have slightly reduced crown density or thinning. • There may be some discolouration of foliage. • Average reactive growth development. • There may be early signs of pathogens which may further deteriorate the health of the tree. • There may be epicormic growth indicating increased levels of stress within the tree.	• The tree is in below average health and condition and may require remedial works to improve the trees health.
Poor	• The may be in decline, have extensive dieback or have over 30% deadwood. • The canopy may be sparse or the leaves may be unusually small for species. • Pathogens or pests are having a significant detrimental effect on the tree health.	• The tree is displaying low levels of health and removal or remedial works may be required.
Dead	• The tree is dead or almost dead.	• The tree should generally be removed.

5. **Structural Condition:** Below are examples conditions used when assigning a category for structural condition.

Category	Example condition	Summary
Good	• Branch unions appear to be strong with no sign of defects. • There are no significant cavities. • The tree is unlikely to fail in usual conditions. • The tree has a balanced crown shape and form.	• The tree is considered structurally good with well developed form.
Fair	• The tree may have minor structural defects within the structure of the crown that could potentially develop into more significant defects. • The tree may a cavity that is currently unlikely to fail but may deteriorate in the future. • The tree is an unbalanced shape or leans significantly. • The tree may have minor damage to its roots. • The root plate may have moved in the past but the tree has now compensated for this. • Branches may be rubbing or crossing.	• The identified defects are unlikely cause major failure. • Some branch failure may occur in usual conditions. • Remedial works can be undertaken to alleviate potential defects.
Poor	• The tree has significant structural defects. • Branch unions may be poor or weak. • The tree may have a cavity or cavities with excessive levels of decay that could cause catastrophic failure. • The tree may have root damage or is displaying signs of recent movement. • The tree crown may have poor weight distribution which could cause failure.	• The identified defects are likely to cause either partial or whole failure of the tree.

6. **Amenity Value:** To determine the amenity value of a tree we assess a number of different factors, which include but are not limited to the information below.
   - The visibility of the tree to adjacent sites.
   - The relationship between the tree and the site.
   - Whether the tree is protected by any statuary conditions.
   - The habitat value of the tree.
   - Whether the tree is considered a noxious weed species.

   The amenity value is rated using one of the following values.
   - Very High
   - High
   - Moderate
   - Low
   - Very Low

7. **Safe Useful Life Expectancy (SULE), (Barrel, 2001):** A trees safe useful life expectancy is determined by assessing a number of different factors including the health and vitality, estimated age in relation to expected life expectancy for the species, structural defects, and remedial works that could allow retention in the existing situation.

Category	Description
1. Long - Over 40 years	(a) Structurally sound trees located in positions that can accommodate future growth. (b) Trees that could be made suitable for retention in the long term by remedial tree care. (c) Trees of special significance for historical, commemorative or rarity reasons that would warrant extraordinary efforts to secure their long term retention.
2. Medium - 15 to 40 years	(a) Trees that may only live between 15 and 40 more years. (b) Trees that could live for more than 40 years but may be removed for safety or nuisance reasons. (c) Trees that could live for more than 40 years but may be removed to prevent interference with more suitable individuals or to provide space for new planting. (d) Trees that could be made suitable for retention in the medium term by remedial tree care.
3. Short - 5 to 15 years	(a) Trees that may only live between 5 and 15 more years. (b) Trees that could live for more than 15 years but may be removed for safety or nuisance reasons. (c) Trees that could live for more than 15 years but may be removed to prevent interference with more suitable individuals or to provide space for new planting. (d) Trees that require substantial remedial tree care and are only suitable for retention in the short term.
4. Remove - Under 5 years	(a) Dead, dying, suppressed or declining trees because of disease or inhospitable conditions. (b) Dangerous trees because of instability or recent loss of adjacent trees. (c) Dangerous trees because of structural defects including cavities, decay, included bark, wounds or poor form. (d) Damaged trees that are clearly not safe to retain. (e) Trees that could live for more than 5 years but may be removed to prevent interference with more suitable individuals or to provide space for new planting. (f) Trees that are damaging or may cause damage to existing structures within 5 years. (g) Trees that will become dangerous after removal of other trees for the reasons given in (a) to (f). (h) Trees in categories (a) to (g) that have a high wildlife habitat value and, with appropriate treatment, could be retained subject to regular review.
5. Small/Young	(a) Small trees less than 5m in height. (b) Young trees less than 15 years old but over 5m in height. (c) Formal hedges and trees intended for regular pruning to artificially control growth.

8. **Root investigations:** The root investigations should identify roots greater than 30mm in diameter that are located along the edge of the structures footprint or in the location of footings. Root investigations must be carried out using non-invasive methods (manual excavations). Any excavations for the root investigations must carried out manually to avoid damaging the roots during excavations. Manual excavation may include the use of a high-pressure air/air knife, or a combination of high-pressure water and a vacuum device. When hand excavating carefully work around roots retaining as many as possible. Take care to not fray, wound, or cause damage to any roots during excavations as this may cause decay or infection from pathogens. It is essential that exposed roots are kept moist and the excavation back filled as soon as possible. The root investigations should be carried out by a qualified Arborist minimum AQF3. Once roots are exposed, a visual assessment can be carried out by a consulting Arborist to evaluate the potential impact of the proposed root loss on the health and stability of the tree. A root map/report should be prepared identifying the findings of investigations, including photographs as supporting evidence in the report.

9. **Retention Value:** The system I have used to award the retention value is Tree AZ. Tree AZ is used to identify higher value trees worthy of being a constraint to development and lower value trees that should generally not be a constraint to the development. The table below provides a brief description of each category.

TreeAZ Categories (Version 10.04-ANZ)

CAUTION: TreeAZ assessments must be carried out by a competent person qualified and experienced in arboriculture. The following category descriptions are designed to be a brief field reference and are not intended to be self-explanatory. They must be read in conjunction with the most current explanations published at www.TreeAZ.com.

Category Z: Unimportant trees not worthy of being a material constraint

Local policy exemptions: Trees that are unsuitable for legal protection for local policy reasons including size, proximity and species	
Z1	Young or insignificant small trees, i.e. below the local size threshold for legal protection, etc
Z2	Too close to a building, i.e. exempt from legal protection because of proximity, etc
Z3	Species that cannot be protected for other reasons, i.e. scheduled noxious weeds, out of character in a setting of acknowledged importance, etc
High risk of death or failure: Trees that are likely to be removed within 10 years because of acute health issues or severe structural failure	
Z4	Dead, dying, diseased or declining
Z5	Severe damage and/or structural defects where a high risk of failure cannot be satisfactorily reduced by reasonable remedial care, i.e. cavities, decay, included bark, wounds, excessive imbalance, overgrown and vulnerable to adverse weather conditions, etc
Z6	Instability, i.e. poor anchorage, increased exposure, etc
Excessive nuisance: Trees that are likely to be removed within 10 years because of unacceptable impact on people	
Z7	Excessive, severe and intolerable inconvenience to the extent that a locally recognized court or tribunal would be likely to authorize removal, i.e. dominance, debris, interference, etc
Z8	Excessive, severe and intolerable damage to property to the extent that a locally recognized court or tribunal would be likely to authorize removal, i.e. severe structural damage to surfacing and buildings, etc
Good management: Trees that are likely to be removed within 10 years through responsible management of the tree population	
Z9	Severe damage and/or structural defects where a high risk of failure can be temporarily reduced by reasonable remedial care, i.e. cavities, decay, included bark, wounds, excessive imbalance, vulnerable to adverse weather conditions, etc
Z10	Poor condition or location with a low potential for recovery or improvement, i.e. dominated by adjacent trees or buildings, poor architectural framework, etc
Z11	Removal would benefit better adjacent trees, i.e. relieve physical interference, suppression, etc
Z12	Unacceptably expensive to retain, i.e. severe defects requiring excessive levels of maintenance, etc

NOTE: Z trees with a high risk of death/failure (Z4, Z5 & Z6) or causing severe inconvenience (Z7 & Z8) at the time of assessment and need an urgent risk assessment can be designated as ZZ. ZZ trees are likely to be unsuitable for retention and at the bottom of the categorization hierarchy. In contrast, although Z trees are not worthy of influencing new designs, urgent removal is not essential and they could be retained in the short term, if appropriate.

Category A: Important trees suitable for retention for more than 10 years and worthy of being a material constraint

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

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

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Glossary of Terms

Abiotic - Pertaining to non-living agents; e.g. environmental factors

Adventitious shoots - Shoots that develop other than from apical, axillary or dormant buds; see also 'epicormic'

Anchorage - The system whereby a tree is fixed within the soil, involving cohesion between roots and soil and the development of a branched system of roots which withstands wind and gravitational forces transmitted from the aerial parts of the tree

Bark - A term usually applied to all the tissues of a woody plant lying outside the vascular cambium, thus including the phloem, cortex and periderm; occasionally applied only to the periderm or the phellem

Branch:
• **Primary**. A first order branch arising from a stem
• **Lateral**. A second order branch, subordinate to a primary branch or stem and bearing sub-lateral branches
• **Sub-lateral**. A third order branch, subordinate to a lateral or primary branch, or stem and usually bearing only twigs

Branch collar - A visible swelling formed at the base of a branch whose diameter growth has been disproportionately slow compared to that of the parent stem; a term sometimes applied also to the pattern of growth of the cells of the parent stem around the branch base

Brown-rot - A type of wood decay in which cellulose is degraded, while lignin is only modified

Buckling - An irreversible deformation of a structure subjected to a bending load

Buttress zone - The region at the base of a tree where the major lateral roots join the stem, with buttress-like formations on the upper side of the junctions

Cambium - Layer of dividing cells producing xylem (woody) tissue internally and phloem (bark) tissue externally

Canker - A persistent lesion formed by the death of bark and cambium due to colonisation by fungi or bacteria

Compartmentalisation - The confinement of disease, decay or other dysfunction within an anatomically discrete region of plant tissue, due to passive and/or active defences operating at the boundaries of the affected region

Compressive loading - Mechanical loading which exerts a positive pressure; the opposite to tensile loading

Condition - An indication of the physiological condition of the tree. Where the term ‘condition’ is used in a report, it should not be taken as an indication of the stability of the tree

Crown/Canopy - The main foliage bearing section of the tree

Crown lifting - The removal of limbs and small branches to a specified height above ground level

Crown thinning - The removal of a proportion of secondary branch growth throughout the crown to produce an even density of foliage around a well-balanced branch structure

Crown reduction/shaping - A specified reduction in crown size whilst preserving, as far as possible, the natural tree shape

DAB (Diameter Above Buttress) - Trunk diameter measured above the root buttress

Defect - In relation to tree hazards, any feature of a tree which detracts from the uniform distribution of mechanical stress, or which makes the tree mechanically unsuited to its environment

Dieback - The death of parts of a woody plant, starting at shoot-tips or root-tips

Disease - A malfunction in or destruction of tissues within a living organism, usually excluding mechanical damage; in trees, usually caused by pathogenic micro-organisms

Dominance - In trees, the tendency for a leading shoot to grow faster or more vigorously than the lateral shoots; also the tendency of a tree to maintain a taller crown than its neighbours

Dormant bud - An axial bud which does not develop into a shoot until after the formation of two or more annual wood increments; many such buds persist through the life of a tree and develop only if stimulated to do so

Dysfunction - In woody tissues, the loss of physiological function, especially water conduction, in sapwood

DBH (Diameter at Breast Height) - Stem diameter measured at a height of 1.4 metres or the nearest measurable point. Where measurement at a height of 1.4 metres is not possible, another height may be specified

Deadwood - Branch or stem wood bearing no live tissues. Retention of deadwood provides valuable habitat for a wide range of species and seldom represents a threat to the health of the tree. Removal of deadwood can result in the ingress of decay to otherwise sound tissues and climbing operations to access deadwood can cause significant damage to a tree. Removal of deadwood is generally recommended only where it represents an unacceptable level of hazard

Epicormic shoot - A shoot having developed from a dormant or adventitious bud and not having developed from a first year shoot

Flush-cut - A pruning cut which removes part of the branch bark ridge and or branch-collar

Girdling root - A root which circles and constricts the stem or roots possibly causing death of phloem and/or cambial tissue

Habit - The overall growth characteristics, shape of the tree and branch structure

Hazard beam - An upwardly curved part of a tree in which strong internal stresses may occur without being reduced by adaptive growth; prone to longitudinal splitting

Incorporating extracts from Lonsdale, D. 1999. Principles of Tree Hazard Assessment. Her Majesty's Stationary Office, London

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Heartwood/false-heartwood - The dead central wood that has become dysfunctional as part of the aging processes and being distinct from the sapwood

Heave - A term mainly applicable to a shrinkable clay soil which expands due to re-wetting after the felling of a tree which was previously extracting moisture from the deeper layers; also the lifting of pavements and other structures by root diameter expansion; also the lifting of one side of a wind-rocked root-plate

Included bark (ingrown bark) - Bark of adjacent parts of a tree (usually forks, acutely joined branches or basal flutes) which is in face-to-face contact

Lever arm - A mechanical term denoting the length of the lever represented by a structure that is free to move at one end, such as a tree or an individual branch

Lignin - The hard, cement-like constituent of wood cells; deposition of lignin within the matrix of cellulose microfibrils in the cell wall is termed Lignification

Lions tailing - A term applied to a branch of a tree that has few if any side-branches except at its end, and is thus liable to snap due to end- loading

Loading - A mechanical term describing the force acting on a structure from a particular source; e.g. the weight of the structure itself or wind pressure

Mycelium - The body of a fungus, consisting of branched filaments (hyphae)

Occlusion - The process whereby a wound is progressively closed by the formation of new wood and bark around it

Pathogen - A micro-organism which causes disease in another organism

Photosynthesis - The process whereby plants use light energy to split hydrogen from water molecules, and combine it with carbon dioxide to form the molecular building blocks for synthesizing carbohydrates and other biochemical products

Probability - A statistical measure of the likelihood that a particular event might occur

Pruning - The removal or cutting back of twigs or branches, sometimes applied to twigs or small branches only, but often used to describe most activities involving the cutting of trees or shrubs

Radial - In the plane or direction of the radius of a circular object such as a tree stem

Reactive Growth/Reaction Wood - Production of woody tissue in response to altered mechanical loading; often in response to internal defect or decay and associated strength loss (cf. adaptive growth)

Ring-barking - The removal of a ring of bark and phloem around the circumference of a stem or branch, normally resulting in an inability to transport photosynthetic assimilates below the area of damage. Almost inevitably results in the eventual death of the affected stem or branch above the damage

Root-collar - The transitional area between the stem/s and roots

Sapwood - Living xylem tissues

Soft-rot - A kind of wood decay in which a fungus degrades cellulose within the cell walls, without any general degradation of the wall as a whole

Stem/s - Principle above-ground structural component(s) of a tree that supports its branches

Stress - In plant physiology, a condition under which one or more physiological functions are not operating within their optimum range, for example due to lack of water, inadequate nutrition or extremes of temperature

SRZ (Structural Root Zone) - The area around the base of the tree required for the trees stability in the ground

Subsidence - In relation to soil or structures resting in or on soil, a sinking due to shrinkage when certain types of clay soil dry out, sometimes due to extraction of moisture by tree roots

Taper - In stems and branches, the degree of change in girth along a given length

Targets - In tree risk assessment (with slight misuse of normal meaning) persons or property or other things of value which might be harmed by mechanical failure of the tree or by objects falling from it

Topping - In arboriculture, the removal of the crown of a tree, or of a major proportion of it

Transpiration - The evaporation of moisture from the surface of a plant, especially via the stomata of leaves; it exerts a suction which draws water up from the roots and through the intervening xylem cells

TPZ (Tree Protection Zone) - A specified area above and below ground and at a given distance from the trunk set aside for the protection of a tree's roots and crown to provide for the viability and stability of a tree to be retained where it is potentially subject to damage by development

Understory - This layer consists of younger individuals of the dominant trees, together with smaller trees and shrubs which are adapted to grow under lower light conditions

Veteran tree - Tree that, by recognised criteria, shows features of biological, cultural or aesthetic value that are characteristic of, but not exclusive to, individuals surviving beyond the typical age range for the species concerned. These characteristics might typically include a large girth, signs of crown retrenchment and hollowing of the stem

Vigour - The expression of carbohydrate expenditure to growth (in trees)

White-rot - A range of kinds of wood decay in which lignin, usually together with cellulose and other wood constituents, is degraded

Wind exposure - The degree to which a tree or other object is exposed to wind, both in terms of duration and velocity

Wind pressure - The force exerted by a wind on a particular object

Windthrow - The blowing over of a tree at its roots

Incorporating extracts from Lonsdale, D. 1999. Principles of Tree Hazard Assessment. Her Majesty's Stationary Office, London

Appendix A (Part C) – Addendum to Arboricultural Pruning Specification Report (Southwest Metro – Lakemba to Wiley Park)

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Addendum to Arboricultural Pruning Specification Report

Site Location: Southwest Metro - Lakemba to Wiley Park

Prepared for:
UGL

Prepared by: Bryce Claassens and Alex Kurath
Date prepared: 19 June 2025
Ref: 250619_SWM_Ineco_PS_Ad1.1
Addendum: 1.1

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1. INTRODUCTION

1.1 Urban Arbor have been instructed to prepare an addendum to the previous Pruning Specification Report (18 November 2024) in relation to Corridor Intruder Detection System (CIDS), Object Detection System (ODS) trouble spots and fence clearance. The report is to address trees within and adjacent to the rail corridor between Lakemba Station and Wiley Park Station.

1.2 Documents and information provided to assist in preparing the report;

A) Arboricultural Pruning Specification Report, Urban Arbor, Ref:241118_SWM_Ineco_PS, Revision 2,18 November 2024
B) CCTV LOS and Nuisance Alarm Register, Doc No. SMCSWIDS-UGL-1NL-TC-REG-000745, Revision B, 5 June 2025

1.3 The site and tree inspections were carried out on 13 May 202, 4 June 2025 and 13 June 2025 by Alex Kurath of Urban Arbor, in conjunction with representatives from UGL (Rares Pop), JHLORJV (Andre Kruise) and Sydney Metro. UGL advised the trees requiring pruning or removal to obtain camera visibility of fence lines and security fence clearance requirements.

1.4 Some trees included within this report were previously inspected between the dates of 6 January 2020 to 3 April 2020 by Bryce Claassens during the South West Metro Rail Corridor (SWMRC) and Station Precinct design works. Access was available to the subject site and adjoining public areas only. This report has been written by Bryce Claassens.

2. SCOPE OF THE REPORT

2.1 This report has been undertaken to meet the following objectives.

2.1.1 Conduct a walk-through assessment of the areas where trees (identified by UGL) are currently obstructing camera visibility or impacting fence clearance requirements, which require pruning or removal. The decision of pruning or removal of trees is subject to the agreement and approval of the stakeholders.

2.1.2 Conduct a visual assessment of significant trees not previously included in the Pruning Specification Report (dated 18 November 2024), located within areas identified by UGL. For the purpose of this report, a significant tree is a ‘Long lived woody perennial plant greater than (or usually greater than) 3 metres in height with one or relatively few main stems or trunks’.

2.1.3 Determine the trees estimated contribution years and remaining useful life expectancy and award the trees a retention value.

2.1.4 Provide pruning specifications for trees where required, in accordance with AS4373-2007.

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3. LIMITATIONS

3.1 The observations and recommendations are based on the site inspections identified in section 1 only. The findings of this report are based on the observations and site conditions at the time of inspection.

3.2 All of the observations were carried out from ground level. The accuracy of the assessment of the subject trees structural condition and health is limited to the visibility of the tree at the time of inspection.

3.3 The tree inspection was visual from ground level only. No soil or tissue testing was carried out as part of the tree inspection. None of the surrounding surfaces adjacent to trees were lifted or removed during the tree inspections.

3.4 Root decay can sometimes be present with no visual indication above ground. It is also impossible to know the extent of any root damage caused by mechanical damage such as underground root cutting during the installation of services without undertaking detailed root investigation. Any form of tree failure due to these activities is beyond the scope of this assessment.

3.5 The report reflects the subject tree(s) as found on the day of inspection. Any changes to the growing environment of the subject tree, or tree management works beyond those recommended in this report may alter the findings of the report. There is no warranty, expressed or implied, that problems or deficiencies relating to the subject tree, or subject site may not arise in the future.

3.6 Tree identification is based on accessible visual characteristics at the time of inspection. As key identifying features are not always available the accuracy of identification is not guaranteed. Where tree species is unknown, it is indicated with an *spp*.

3.7 Some trees included within this report have been located using a Trimble TDC100 hand held GNSS device by Urban Arbor Pty Ltd. Tree locations captured by the Trimble TDC100 are only accurate to within 1m - 3m. If an accurate location of these trees is required, a registered surveyor should locate the trees.

3.8 In some instances, multiple trees or groups of small trees have been identified as groups of trees within this report.

3.9 All diagrams, plans and photographs included in this report are visual aids only and are not to scale unless otherwise indicated.

3.10 Alteration of this report invalidates the entire report.

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4. METHODOLOGY

4.1 The following information was collected during the assessment of the subject tree(s).

4.1.1 Tree common name
4.1.2 Tree botanical name
4.1.3 Tree age class
4.1.4 DBH (Trunk/Stem diameter at breast height/1.4m) - millimetres.
4.1.5 DAB (Trunk diameter directly above the root buttress) – millimetres.
4.1.6 Estimated height - metres
4.1.7 Estimated crown spread (diameter of crown) - metres
4.1.8 Health
4.1.9 Structural condition
4.1.10 Amenity value
4.1.11 Estimated remaining contribution years (SULE)[1]
4.1.12 Retention value (Tree AZ)[2]
4.1.13 Notes/comments

4.2 An assessment of the trees condition was made using the visual tree assessment (VTA) model (Mattheck & Breloer, 1994).[3]

4.3 Tree diameter was measured using a DBH tape or in some cases estimated. Tree height and tree canopy spread was measured with a clinometer or in some cases estimated. All other measurements were estimations unless otherwise stated. The other tools used during the assessment were a nylon mallet, compass, camera and a steel probe.

4.4 All DBH measurements, tree protection zones, and structural root zones within Appendix 2 of this report were calculated in accordance with methods set out in AS4970 Protection of trees on development sites (2025).[4]

4.5 Details of how the observations in this report have been assessed are listed in the appendices.

[1] Barrell, J. (2001), *'SULE: Its use and status in the new millennium' in Management of Mature Trees proceedings of the 4th NAAA Workshop*, Sydney, 2001. Barrell.

[2] Barrell Tree Consultancy, *Tree AZ version 10.10-ANZ*, http://www.treeaz.com/.

[3] Mattheck, C. & Breloer, H., *The body language of trees - A handbook for failure analysis*, The Stationary Office, London, England (1994).

[4] Council Of Standards Australia, *AS4970 Protection of trees on development sites* (2025).

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5. SITE LOCATION AND BRIEF DESCRIPTION

5.1 The area covered in the site inspections is located within the Canterbury Bankstown LGA. All trees within the Canterbury Bankstown LGA are subject to protection under the Canterbury Bankstown LEP 2023[5] and Canterbury Bankstown DCP 2023.[6]

6. AREAS ASSESSED

6.1 The areas assessed in this report have been identified by UGL in the CCTV LOS and Nuisance Alarm Register (dated 4 June 2025), which includes trees within and adjacent to the rail corridor between Lakemba Station and Wiley Park Station.

7. TREE OBSERVATIONS

7.1 **Tree information:** Details of each individual tree assessed, including the observations taken during the site inspections, can be found in the tree inspection schedule in appendix 2. Each of the subject trees have been awarded a retention value based on the observations using the Tree AZ method. Tree AZ is used to identify higher value trees worthy of being a constraint to development and lower value trees that should generally not be a constraint to the development. The Tree AZ categories sheet (Barrell Tree Consultancy) has been included in appendix 3 to assist with understanding the retention values. The retention values that have been allocated to the subject trees in this report is not definitive and should only be used as a guideline.

8. ASSESSMENT OF TREE IMPACTS BY AREA

8.1 The trees included in the following sections have been identified by UGL as being subject to impacts from development works. All trees to be retained should be protected in accordance with AS4970-2025 *Protection of trees on development sites*. If there are any development works that have not been assessed and could potentially impact additional trees, the project arborist must assess the impact of the proposed works to the condition of the trees, determining the trees viability for retention.

[5] *Canterbury Bankstown Local Environmental Plan 2023*, https://legislation.nsw.gov.au/view/html/inforce/current/epi-2023-0336, accessed 10 June 2025.

[6] *Canterbury Bankstown Development Control Plan 2023*, https://www.cbcity.nsw.gov.au/development/planning-control-policies/canterbury-bankstown-development-control-plan-2023, accessed 10 June 2025.

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8.2 Lakemba to Wiley Park (LTW_01 – LTW_06) – obstructing camera visibility

8.2.1 Fifteen (15) trees and two (2) groups of trees have been identified for removal in this area, including tree 1072, 1073, 1998, 1999, G21, 2001, G22, 2040, 2071, 2088, 2089, 2090, 2098, 3522, 3701, 3702 and 3707.

8.2.2 An additional eight (8) trees have been identified for canopy pruning in this area, including trees 1019, 1025, 1067, 2007, 2094, 3521, 3700 and 3706. All canopy pruning must be completed in accordance with AS4373 *Pruning of amenity trees* (2007).

8.2.3 The details of the trees are summarised in the table below. Photographs of the trees are included in section 8.3.

Tree ID	Botanical Name	SULE	Retention Value	Height (m)	Canopy Spread (m) - radius	Native / Exotic	Prune / Remove
1019	*Acacia longifolia*	2. Medium	A1	5	2	Native	Prune
1025	*Lophostemon confertus*	1. Long	A1	10	4	Native	Prune
1067	*Melaleuca styphelioides*	1. Long	A1	9	6	Native	Prune
1072	*Acacia longifolia*	4. Remove	Z4	5	2	Native	Remove
1073	*Acacia longifolia*	2. Medium	A1	8	3	Native	Remove
1998	*Acacia longifolia*	5. Small/Young	Z1	5	1	Native	Remove
1999	*Acacia longifolia*	3. Short	Z4	6	2	Native	Remove
G21	*Acacia longifolia*	5. Small/Young	Z1	5	1	Native	Remove
2001	*Quercus robur*	2. Medium	A1	8	4	Exotic	Remove
2007	*Melaleuca styphelioides*	1. Long	A1	10	5	Native	Prune
G22	*Acacia spp*	5. Small/Young	Z1	5	1	Native	Remove
2040	*Acacia longifolia*	2. Medium	A1	5	2	Native	Remove
2071	*Tristaniopsis laurina*	2. Medium	A1	6	2	Native	Remove
2088	*Acacia longifolia*	4. Remove	Z4	8	3	Native	Remove
2089	*Acacia longifolia*	3. Short	Z9	7	2	Native	Remove
2090	*Acacia longifolia*	5. Small/Young	Z1	7	2	Native	Remove
2094	*Tristaniopsis laurina*	1. Long	A1	8	2	Native	Prune
2098	*Triadica sebifera*	2. Medium	A1	7	2	Exotic	Remove
3521	*Cotoneaster spp*	5. Small/Young	Z1	3	2	Exotic	Prune
3522	*Acacia longifolia*	5. Small/Young	Z1	4	2	Native	Remove
3700	*Olea europaea subsp. cuspidata*	1. Long	A1	8	4	Exotic	Prune
3701	*Bauhinia spp*	5. Small/Young	Z1	6	3	Exotic	Remove
3702	*Bauhinia spp*	5. Small/Young	Z1	4	2	Exotic	Remove
3706	*Triadica sebifera*	5. Small/Young	Z1	8	2.5	Exotic	Prune
3707	*Cinnamomum camphora*	5. Small/Young	Z1	4	1	Exotic	Remove

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8.3 **Photographs**

Image 1: Looking towards tree 3700, showing the area of foliage requiring pruning as identified in item 9 of the UGL Report. Pruning and removal of branches up to 50mm in diameter is to provide a minimum of 2 metres clearance to all areas of the fence. Approximately 10% of the live foliage area will be removed.

Image 2: Looking towards tree 2094, showing the area requiring pruning and removal of branches up to 50mm in diameter, to provide a minimum of 2 metres clearance to all areas of the fence. Approximately 10% of the live foliage area will be removed.

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Image 3: Looking towards tree 2098. The tree is recommended for removal due to extent of required canopy pruning, which would result in the removal of more than 30% of the live foliage area and impact the form of the tree.

Image 4: Looking towards tree 2088, 2089 and 2090. The trees have been recommended for removal.

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Image 5: Looking towards Tree 2071. The tree is recommended for removal due to extent of required canopy pruning, which would result in the removal of more than 30% of the live foliage area and impact the form of the tree.

Image 6: Looking towards tree 2040. The tree is recommended for removal.

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Image 7: Looking towards G22. Eight trees (marked with a red X) within the Eastern section of the group are recommended for removal. The remaining trees within the Western section of the group will require minor canopy pruning.

Image 8: Looking towards tree 2007, showing the primary branch to the North recommended for removal. The final pruning cut is estimated to be 200mm in diameter and at approximately 6m above ground level. Approximately 15% of the live foliage area will be removed.

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Image 9: Looking towards tree 3521. The tree is recommended for removal.

Image 10: Looking towards tree 3522 and 2001. The trees are recommended for removal.

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Image 11: Looking towards tree 1998,1999 and G21. The trees are recommended for removal.

Image 12: Looking towards tree 1073 and 1072. The trees are recommended for removal.

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Image 13: Looking towards tree 1067, showing the primary stem (180mm) to the Southeast recommended for pruning, and the first order branch (120mm) to the Southeast recommended for pruning. Approximately 15-20% of the live foliage area will be removed.

Image 14: Looking towards tree 3701 and 3702. The trees are recommended for removal.

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Image 15: Looking towards tree 1025, showing the first order branch (180mm) to the West recommended for pruning. Approximately 10% of the live foliage area will be removed.

Image 16: Looking towards tree 1019, showing the first order branch (120mm) to the West recommended for pruning. Approximately 5% of the live foliage area will be removed.

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Image 17: Looking towards tree 3706, showing the first order branch (100mm) to the West recommended for pruning. Less than 10% of the live foliage area will be removed.

Image 18: Looking towards tree 3707. The tree is recommended for removal.

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8.4 Lakemba to Wiley Park (LTW_01 – LTW_06) – impacting fence clearance

8.4.1 One (1) tree has been identified for removal in this area due to security fence requirements, including tree 1054.

8.4.2 An additional five (5) trees have been identified for canopy pruning in this area due to security fence requirements, including trees 987, 1026, 2060, 2068 and 3616. All canopy pruning must be completed in accordance with AS4373 *Pruning of amenity trees* (2007).

8.4.3 The details of the trees are summarised in the table below. Photographs of the trees are included in section 8.5.

Tree ID	Botanical Name	SULE	Retention Value	Height (m)	Canopy Spread (m) - radius	Native / Exotic	Prune / Remove
987	*Schinus molle*	1. Long	A1	16	6	Exotic	Prune
1026	*Cinnamomum camphora*	1. Long	Z3	6	3	Exotic	Prune
1054	*Populus nigra 'Italica'*	3. Short	Z3	9	2	Exotic	Remove
2060	*Eucalyptus scoparia*	4. Remove	Z4	9	3	Native	Prune
2068	*Eucalyptus scoparia*	2. Medium	Z3	9	3	Native	Prune
3616	*Pyrus calleryana*	2. Medium	A1	6	4	Exotic	Prune

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8.5 **Photographs**

Image 19: Looking towards tree 987, showing the recommended pruning for fence clearance. The 60mm diameter 4th order branch to the West at 6m is to be pruned. The 70mm 2nd order branches to the West at 3m are to be pruned. Less than 5% of the live foliage area will be removed.

Image 20: Looking towards tree 1026, showing the recommended pruning for fence clearance. The 70mm diameter 2nd order branch to the Northeast at 2.5m is to be pruned. Less than 5% of the live foliage area will be removed.

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Image 21: Looking towards tree 1054. The tree is recommended for removal for fence clearance requirements.

Image 22: Looking towards tree 2060, showing the recommended pruning for fence clearance. The 60mm diameter epicormic branches on the lower trunk growing towards the fence are to be pruned. Less than 10% of the live foliage area will be removed.

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Image 23: Looking towards tree 2068, showing the recommended pruning for fence clearance. The 80mm diameter 2nd order branch to the South at 4m is to be pruned. Less than 5% of the live foliage area will be removed.

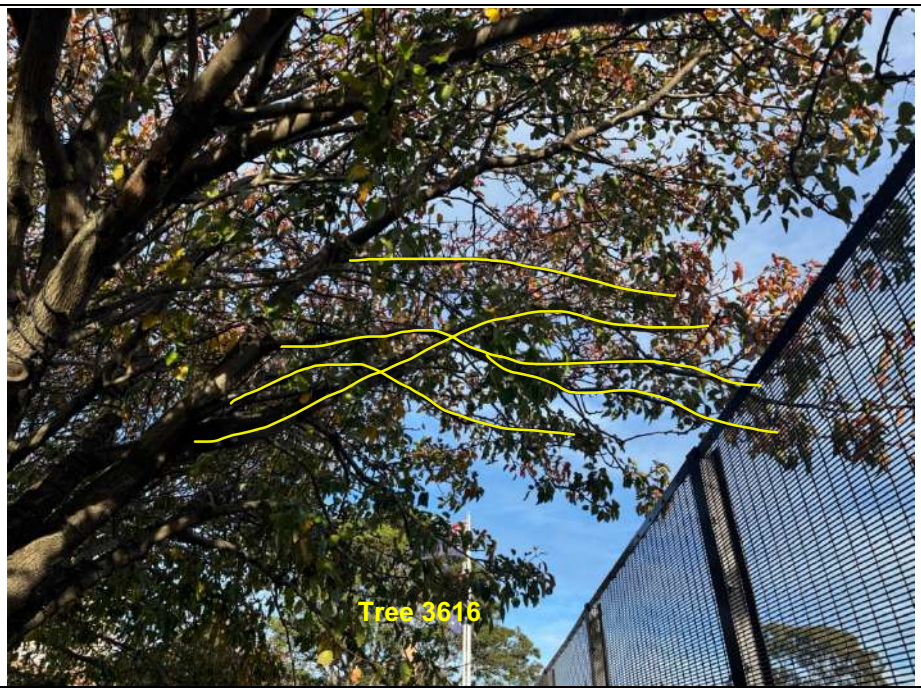

Image 24: Looking towards tree 3616, showing the recommended pruning for fence clearance. The 2nd and 3rd order branches to the North-Northeast at 3-5m are to be pruned. Approximately 5% of the live foliage area will be removed. Final pruning cuts must not exceed 140mm in diameter. See Image 25 below for additional pruning for tree 3616.

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Image 25: Looking towards tree 3616, showing the additional recommended pruning for fence clearance. The 2nd order branches to the Northeast at 3m are to be pruned. Approximately 5% of the live foliage area will be removed. Final pruning cuts must not exceed 140mm in diameter.

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9. CONCLUSIONS

9.1 **Table 2:** Summary of the trees requiring pruning or removal;

Impact	Reason	Category A	Category Z	TOTAL
		A	Z	
Trees recommended to be removed	Installation of services, line of sight for cameras, security fence clearance	1073, 2001, 2040, 2071, 2098 (5 trees)	1054, 1072, 1998, 1999, G21, G22, 2088, 2089, 2090, 3522, 3701, 3702, 3707 (11 trees & 2 groups of trees)	**16 trees and 2 groups of trees**
Trees requiring pruning	Installation of services, line of sight for cameras, security fence clearance	987, 1019, 1025, 1067, 2007, 2094, 3616, 3700 (8 trees)	1026, 2060, 2068, 3521, 3706 (5 trees)	**13 trees**

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10. RECOMMENDATIONS

10.1 This report assesses trees that require pruning or removal for camera visibility works and security fence clearance requirements along the rail corridor. Twenty-nine (29) trees and two (2) groups of trees have been identified and assessed in this report.

10.2 Sixteen (16) trees and two (2) groups of these trees have been identified for removal, including tree 1054, 1072, 1073, 1998, 1999, G21, 2001, G22, 2040, 2071, 2088, 2089, 2090, 2098, 3522, 3701, 3702 and 3707. See Table 2 for recommended tree removal by retention values.

10.3 The majority of the trees discussed above in section 10.2 have been recommended for removal due to excessive amounts of pruning required to achieve camera visibility, as discussed in section 1.3. It may be possible to retain/prune some of the trees recommended for removal based upon the final installation locations of cameras and their FOV. This will need to be determined by UGL and the project arborist.

10.4 Thirteen (13) trees have been identified for canopy pruning, including trees 987, 1019, 1025, 1026, 1067, 2007, 2060, 2068, 2094, 3521, 3616, 3700 and 3706. Refer to section 8.3 for photographs of the required canopy pruning and pruning specifications. All pruning works must be completed in accordance with AS4373-2007 *Pruning of Amenity Trees*.

10.5 All trees that require canopy pruning can be retained in a viable condition. All trees to be retained must be protected in accordance with AS4970-2025 *Protection of trees on development sites*.

10.6 This report does not provide approval for tree removal or pruning works. All recommendations in this report are subject to approval by the relevant authorities and/or tree owners.

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- Matheny, N. & Clark, J. R, *A technical guide to preservation of trees during land development*, International Society of Arboriculture, P.O Box 3029, Champaign, IL, USA (1998).
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- *Canterbury Bankstown Development Control Plan 2023*, https://www.cbcity.nsw.gov.au/development/planning-control-policies/canterbury-bankstown-development-control-plan-2023

12. LIST OF APPENDICES

The following are included in the appendices:

- Appendix 2 - Tree inspection schedule
- Appendix 3 - Definition of Methodology

Alex Kurath
8004 2802
sales@urbanarbor.com.au
Diploma of Arboriculture (AQF5)
Member of Arboriculture Australia
ISA Member (International Society of Arboriculture)

Bryce Claassens
Diploma of Arboriculture (AQF5)
Cert III Landscape Construction
Member Arboriculture Australia
Quantified Tree Risk Assessment (QTRA)
ISA Tree Risk Assessment Qualification (TRAQ)

Appendix 2 - Tree Inspection Schedule

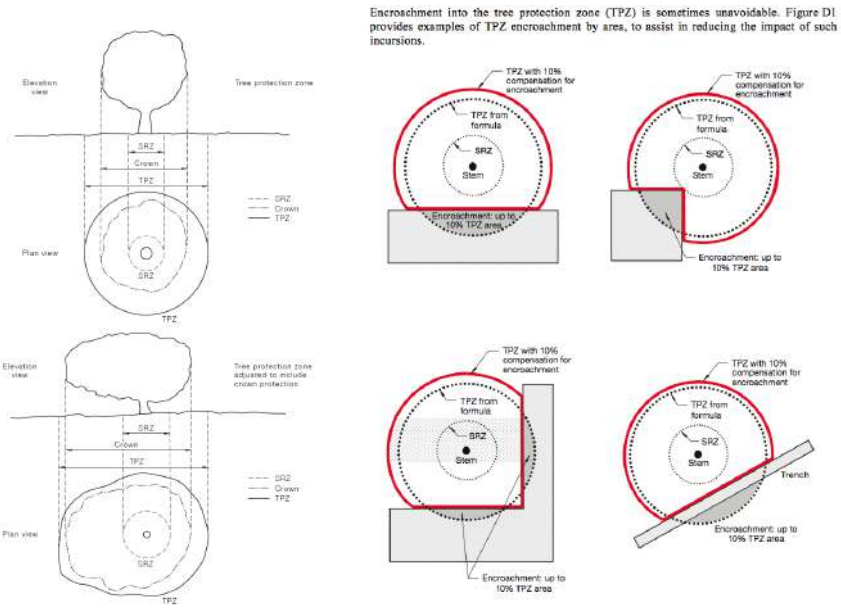
Tree ID	Common Name	Botanical Name	Age Class	Height (m)	Canopy Spread Radius (m)	Stem 1	Stem 2	Stem 3	Stem 4	Stem 5	DBH (mm)	DAB (mm)	Health	Structure	Amenity Value	SULE	Retention Value	TPZ Radius (m)	SRZ Radius (m)	Notes	Native or Exotic	Recommendations
987	Peppercorn Tree	*Schinus molle*	Mature	16	6	800					800	950	Good	Good	Medium	1. Long	A1	9.6	3.2	Located within corridor. DBH estimated.	Exotic	Prune
1019	Sydney Golden Wattle	*Acacia longifolia*	Mature	5	2	230					230	300	Good	Good	Medium	2. Medium	A1	2.8	2.0	Located within corridor. DBH estimated.	Native	Prune
1025	Queensland Brushbox	*Lophostemon confertus*	Mature	10	4	550					550	640	Good	Good	High	1. Long	A1	6.6	2.7	Located within nature strip.	Native	Prune
1026	Camphor Laurel	*Cinnamomum camphora*	Semi-mature	6	3	200	200				283	380	Good	Good	Low	1. Long	Z3	3.4	2.2	Located within nature strip. Exempt species.	Exotic	Prune
1054	Lombardy Poplar	*Populus nigra 'Italica'*	Semi-mature	9	2	270					270	310	Fair	Fair	Low	3. Short	Z3	3.2	2.0	Located on nature strip. Exempt species. Low foliage density for species.	Exotic	Remove
1067	Prickly Leaved Paperbark	*Melaleuca styphelioides*	Mature	9	6	500	400	300			707	1100	Good	Good	High	1. Long	A1	8.5	3.4	Located within corridor. DBH estimated.	Native	Prune
1072	Sydney Golden Wattle	*Acacia longifolia*	Mature	5	2	200					200	220	Poor	Fair	Low	4. Remove	Z4	2.4	1.8	Located within corridor. In decline.	Native	Remove
1073	Sydney Golden Wattle	*Acacia longifolia*	Mature	8	3	300					300	300	Good	Fair	Medium	2. Medium	A1	3.6	2.0	Located within corridor. Directly adjacent to toilet block.	Native	Remove
1998	Sydney Golden Wattle	*Acacia longifolia*	Semi-mature	5	1	120					120	140	Good	Fair	Low	5. Small/Young	Z1	2.0	1.5	Trunk lean.	Native	Remove
1999	Sydney Golden Wattle	*Acacia longifolia*	Mature	6	2	190					190	220	Fair	Fair	Low	3. Short	Z4	2.3	1.8	Early stages of decline.	Native	Remove
G21	Sydney Golden Wattle	*Acacia longifolia*	Semi-mature	5	1	100					100	120	Fair	Fair	Low	5. Small/Young	Z1	2.0	1.5	Group of approximately 13 trees.	Native	Remove
2001	Common Oak	*Quercus robur*	Mature	8	4	450					450	450	Good	Fair	Medium	2. Medium	A1	5.4	2.4	DBH measured at base.	Exotic	Remove
2007	Prickly Leaved Paperbark	*Melaleuca styphelioides*	Mature	10	5	1200					1200	1200	Good	Fair	High	1. Long	A1	14.4	3.6	Multi stem tree.	Native	Prune
G22	Wattle	*Acacia spp*	Semi-mature	5	1	100					100	150	Fair	Fair	Low	5. Small/Young	Z1	2.0	1.5	Group of approximately 80 trees. Overall condition of group is fair-poor.	Native	Remove
2040	Sydney Golden Wattle	*Acacia longifolia*	Mature	5	2	230					230	280	Good	Fair	Medium	2. Medium	A1	2.8	1.9	None.	Native	Remove
2060	Wallangarra White Gum	*Eucalyptus scoparia*	Mature	9	3	260					260	350	Poor	Fair	Medium	4. Remove	Z4	3.1	2.1	In advanced stages of decline. Fungal bracket (Phellinus spp) on north side of trunk at 2m.	Native	Prune
2068	Wallangarra White Gum	*Eucalyptus scoparia*	Semi-mature	9	3	270					270	330	Good	Fair	Low	2. Medium	Z3	3.2	2.1	Exempt species.	Native	Prune
2071	Water Gum	*Tristaniopsis laurina*	Mature	6	2	140	140	150			248	290	Good	Good	Medium	2. Medium	A1	3.0	2.0	None.	Native	Remove
2088	Sydney Golden Wattle	*Acacia longifolia*	Mature	8	3	120	150				192	250	Poor	Fair	Medium	4. Remove	Z4	2.3	1.8	Majority of crown is dead. Advanced stages of decline.	Native	Remove
2089	Sydney Golden Wattle	*Acacia longifolia*	Mature	7	2	200					200	220	Fair	Poor	Medium	3. Short	Z9	2.4	1.8	Topped for power line clearance.	Native	Remove
2090	Sydney Golden Wattle	*Acacia longifolia*	Semi-mature	7	2	120					120	150	Good	Fair	Low	5. Small/Young	Z1	2.0	1.5	None.	Native	Remove
2094	Water Gum	*Tristaniopsis laurina*	Mature	8	2	250	190				314	350	Good	Good	Medium	1. Long	A1	3.8	2.1	None.	Native	Prune
2098	Chinese Tallo	*Triadica sebifera*	Mature	7	2	240					240	320	Good	Good	Medium	2. Medium	A1	2.9	2.1	None.	Exotic	Remove
3521	Cotoneaster	*Cotoneaster spp*	Mature	3	2	150					150	160	Good	Good	Low	5. Small/Young	Z1	2.0	1.5	None.	Exotic	Prune
3522	Sydney Golden Wattle	*Acacia longifolia*	Semi-mature	4	2	130					130	140	Good	Good	Low	5. Small/Young	Z1	2.0	1.5	None.	Native	Remove
3616	Callery Pear	*Pyrus calleryana*	Mature	6	4	300					300	350	Good	Fair	Medium	2. Medium	A1	3.6	2.1	Included branch unions.	Exotic	Prune
3700	African Olive	*Olea europaea subsp. cuspidata*	Mature	8	4	150	140	240	170		359	410	Good	Good	Medium	1. Long	A1	4.3	2.3	Visually prominent in area.	Exotic	Prune
3701	Bauhinia	*Bauhinia spp*	Semi-mature	6	3	120	100	60	60		178	210	Good	Good	Low	5. Small/Young	Z1	2.1	1.7	None.	Exotic	Remove
3702	Bauhinia	*Bauhinia spp*	Young	4	2	80	60	60			117	130	Good	Good	Low	5. Small/Young	Z1	2.0	1.5	None.	Exotic	Remove
3706	Chinese Tallo	*Triadica sebifera*	Semi-mature	8	2.5	250					250	290	Good	Fair	Low	5. Small/Young	Z1	3.0	2.0	None.	Exotic	Prune
3707	Camphor Laurel	*Cinnamomum camphora*	Young	4	1.5	100					100	150	Good	Good	Low	5. Small/Young	Z3	2.0	1.5	Exempt species.	Exotic	Remove

Explanatory Notes

Tree Species - Common name followed by botanical name. Where species is unknown it is indicated with an *'spp'*.
Age Class - Over mature (OM), Mature (M), Early mature (EM), Semi mature (SM), Young (Y).
Diameter at Breast Height (DBH) - Measured with a DBH tape or estimated at approximately 1.4m above ground level.
Diameter Above root Buttresses (DAB): Measured with a DBH tape or estimated above root buttresses (DAB) for calculating the SRZ.
Height - Height from ground level to top of crown. All heights are estimated unless otherwise indicated.
Spread - Radius of crown at widest section. All tree spreads are estimated unless otherwise indicated.
Tree Protection Zone (TPZ) - DBH x 12. Measured in radius from the centre of the trunk. Rounded to nearest 0.1m. For monocots, the TPZ is set at 1 metre outside the crown projection.
Structural Root Zone (SRZ) - $(DAB \times 50)^{0.42} \times 0.64$. Measured in radius from the centre of the trunk. Rounded up to nearest 0.1m.
Health - Good/Fair/Poor/Dead
Structure - Good/Fair/Poor
Safe Useful Life Expectancy (SULE) - 1. Long (40+years), 2. Medium (15 - 40 years), 3. Short (5 - 15 years), 4. Remove (under 5 years), 5. Small/young.
Amenity Value - Very High/High/Medium/Low/Very Low.
Retention Value: Tree AZ, see appendix 3 for categories.

Appendix 3 - Further Information of Methodology

1. **Tree Protection Zone:** The tree protection zone (TPZ) is the principle means of protecting trees on development sites. The TPZ is a combination of the root area and crown area requiring protection. It is an area isolated from construction disturbance, so that the tree remains viable. The radius of the TPZ is calculated for each tree by multiplying its DBH x 12. The derived value is measured in radius from the centre of the stem/trunk at ground level. A TPZ should not be less than 2.0 metres nor greater than 15 metres (except where crown protection is required).
   It is commonly observed that tree roots will extend significant further than the indicative TPZ, however the TPZ is an area identified AS4970-2009 to be extent where root loss or disturbance will generally not impact the viability of the tree. The TPZ is identified as a restricted area to prevent damage to trees either above or below ground during a development. Where trees are intended to be retained proposed developments must provide an adequate TPZ around trees. The TPZ is set aside for the tree's root zone, trunk and crown and it is essential for the stability and longevity of the tree. The tree protection also incorporates the SRZ (see below for more information about the SRZ). I have calculated the TPZ of palms, other monocots, cycads and tree ferns at one metre outside the crown projection. See appendices for additional information about the TPZ including information about calculating the TPZ and examples of TPZ encroachment.
   Minor encroachment into TPZ: Sometimes encroachment into the TPZ is unavoidable. Encroachment includes but is not limited to activities such as excavation, compacted fill and machine trenching. Minor encroachment of up to 10% of the overall TPZ area is normally considered acceptable, providing there is space adjacent to the TPZ for the tree to compensate and the tree is displaying adequate vigour/health to tolerate changes to its growing environment.
   Major encroachment into TPZ: Where encroachment of more than 10% of the overall TPZ area is proposed the project Arborist must investigate and demonstrate that the tree will remain in a viable condition. In some cases, tree sensitive construction methods such as pier and beam footings, suspended slabs, or cantilevered sections, can be utilised to allow additional encroachment into the TPZ by bridging over roots and minimising root disturbance. Major encroachment is only possible if it can be undertaken without severing significant size roots, or if it can be demonstrated that significant roots will not be impacted.



2. **Structural Root Zone:** This is the area around the base of a tree required for the trees stability in the ground. An area larger than the SRZ always need to be maintained to preserve a viable tree as it will only have a minor effect on the trees vigour and health. There are several factors that determine the SRZ which include height, crown area, soil type and soil moisture. It can also be influenced by other factors such as natural or built structures. Generally work within the SRZ should be avoided.
   An indicative SRZ radius can be determined from the diameter of the trunk measured immediately above the root buttresses. Root investigation could provide more information about the extent of the SRZ. The following formula should be used to calculate the SRZ.
   SRZ radius = $(D \times 50)^{0.42} \times 0.64$ (D = Diameter above root buttress).

3. **Tree Age Class:** If can be difficult to determine the age of a tree without carrying out invasive tests that may damage the tree, so we have categorised there likely age class which is defined below;
   - Young/Newly planted: Young or recently planted tree.
   - Semi Mature: Up to 20% of the usual life expectancy for the species.
   - Early mature/Mature: Between 20%-80% of the usual life expectancy for the species.
   - Over mature: Over 80% of the usual life expectancy for the species.
   - Dead: Tree is dead or almost dead.

4. **Health/Physiological Condition:** Below are examples conditions used when assigning a category for tree health.

Category	Example condition	Summary
Good	• Crown has good foliage density for species. • Tree shows no or minimal signs of pathogens that are unlikely to have an effect on the health of the tree. • Tree is displaying good vigour and reactive growth development.	• The tree is in above average health and condition and no remedial works are required.
Fair	• The tree may be starting to dieback or have over 25% deadwood. • Tree may have slightly reduced crown density or thinning. • There may be some discolouration of foliage. • Average reactive growth development. • There may be early signs of pathogens which may further deteriorate the health of the tree. • There may be epicormic growth indicating increased levels of stress within the tree.	• The tree is in below average health and condition and may require remedial works to improve the trees health.
Poor	• The may be in decline, have extensive dieback or have over 30% deadwood. • The canopy may be sparse or the leaves may be unusually small for species. • Pathogens or pests are having a significant detrimental effect on the tree health.	• The tree is displaying low levels of health and removal or remedial works may be required.
Dead	• The tree is dead or almost dead.	• The tree should generally be removed.

5. **Structural Condition:** Below are examples conditions used when assigning a category for structural condition.

Category	Example condition	Summary
Good	• Branch unions appear to be strong with no sign of defects. • There are no significant cavities. • The tree is unlikely to fail in usual conditions. • The tree has a balanced crown shape and form.	• The tree is considered structurally good with well developed form.
Fair	• The tree may have minor structural defects within the structure of the crown that could potentially develop into more significant defects. • The tree may a cavity that is currently unlikely to fail but may deteriorate in the future. • The tree is an unbalanced shape or leans significantly. • The tree may have minor damage to its roots. • The root plate may have moved in the past but the tree has now compensated for this. • Branches may be rubbing or crossing.	• The identified defects are unlikely cause major failure. • Some branch failure may occur in usual conditions. • Remedial works can be undertaken to alleviate potential defects.
Poor	• The tree has significant structural defects. • Branch unions may be poor or weak. • The tree may have a cavity or cavities with excessive levels of decay that could cause catastrophic failure. • The tree may have root damage or is displaying signs of recent movement. • The tree crown may have poor weight distribution which could cause failure.	• The identified defects are likely to cause either partial or whole failure of the tree.

6. **Amenity Value:** To determine the amenity value of a tree we assess a number of different factors, which include but are not limited to the information below.
   - The visibility of the tree to adjacent sites.
   - The relationship between the tree and the site.
   - Whether the tree is protected by any statuary conditions.
   - The habitat value of the tree.
   - Whether the tree is considered a noxious weed species.

   The amenity value is rated using one of the following values.
   - Very High
   - High
   - Moderate
   - Low
   - Very Low

7. **Safe Useful Life Expectancy (SULE), (Barrel, 2001):** A trees safe useful life expectancy is determined by assessing a number of different factors including the health and vitality, estimated age in relation to expected life expectancy for the species, structural defects, and remedial works that could allow retention in the existing situation.

Category	Description
1. Long - Over 40 years	(a) Structurally sound trees located in positions that can accommodate future growth. (b) Trees that could be made suitable for retention in the long term by remedial tree care. (c) Trees of special significance for historical, commemorative or rarity reasons that would warrant extraordinary efforts to secure their long term retention.
2. Medium - 15 to 40 years	(a) Trees that may only live between 15 and 40 more years. (b) Trees that could live for more than 40 years but may be removed for safety or nuisance reasons. (c) Trees that could live for more than 40 years but may be removed to prevent interference with more suitable individuals or to provide space for new planting. (d) Trees that could be made suitable for retention in the medium term by remedial tree care.
3. Short - 5 to 15 years	(a) Trees that may only live between 5 and 15 more years. (b) Trees that could live for more than 15 years but may be removed for safety or nuisance reasons. (c) Trees that could live for more than 15 years but may be removed to prevent interference with more suitable individuals or to provide space for new planting. (d) Trees that require substantial remedial tree care and are only suitable for retention in the short term.
4. Remove - Under 5 years	(a) Dead, dying, suppressed or declining trees because of disease or inhospitable conditions. (b) Dangerous trees because of instability or recent loss of adjacent trees. (c) Dangerous trees because of structural defects including cavities, decay, included bark, wounds or poor form. (d) Damaged trees that are clearly not safe to retain. (e) Trees that could live for more than 5 years but may be removed to prevent interference with more suitable individuals or to provide space for new planting. (f) Trees that are damaging or may cause damage to existing structures within 5 years. (g) Trees that will become dangerous after removal of other trees for the reasons given in (a) to (f). (h) Trees in categories (a) to (g) that have a high wildlife habitat value and, with appropriate treatment, could be retained subject to regular review.
5. Small/Young	(a) Small trees less than 5m in height. (b) Young trees less than 15 years old but over 5m in height. (c) Formal hedges and trees intended for regular pruning to artificially control growth.

8. **Root investigations:** The root investigations should identify roots greater than 30mm in diameter that are located along the edge of the structures footprint or in the location of footings. Root investigations must be carried out using non-invasive methods (manual excavations). Any excavations for the root investigations must carried out manually to avoid damaging the roots during excavations. Manual excavation may include the use of a high-pressure air/air knife, or a combination of high-pressure water and a vacuum device. When hand excavating carefully work around roots retaining as many as possible. Take care to not fray, wound, or cause damage to any roots during excavations as this may cause decay or infection from pathogens. It is essential that exposed roots are kept moist and the excavation back filled as soon as possible. The root investigations should be carried out by a qualified Arborist minimum AQF3. Once roots are exposed, a visual assessment can be carried out by a consulting Arborist to evaluate the potential impact of the proposed root loss on the health and stability of the tree. A root map/report should be prepared identifying the findings of investigations, including photographs as supporting evidence in the report.

9. **Retention Value:** The system I have used to award the retention value is Tree AZ. Tree AZ is used to identify higher value trees worthy of being a constraint to development and lower value trees that should generally not be a constraint to the development. The table below provides a brief description of each category.

TreeAZ Categories (Version 10.04-ANZ)

CAUTION: TreeAZ assessments must be carried out by a competent person qualified and experienced in arboriculture. The following category descriptions are designed to be a brief field reference and are not intended to be self-explanatory. They must be read in conjunction with the most current explanations published at www.TreeAZ.com.

Category Z: Unimportant trees not worthy of being a material constraint

Local policy exemptions: Trees that are unsuitable for legal protection for local policy reasons including size, proximity and species	
Z1	Young or insignificant small trees, i.e. below the local size threshold for legal protection, etc
Z2	Too close to a building, i.e. exempt from legal protection because of proximity, etc
Z3	Species that cannot be protected for other reasons, i.e. scheduled noxious weeds, out of character in a setting of acknowledged importance, etc
High risk of death or failure: Trees that are likely to be removed within 10 years because of acute health issues or severe structural failure	
Z4	Dead, dying, diseased or declining
Z5	Severe damage and/or structural defects where a high risk of failure cannot be satisfactorily reduced by reasonable remedial care, i.e. cavities, decay, included bark, wounds, excessive imbalance, overgrown and vulnerable to adverse weather conditions, etc
Z6	Instability, i.e. poor anchorage, increased exposure, etc
Excessive nuisance: Trees that are likely to be removed within 10 years because of unacceptable impact on people	
Z7	Excessive, severe and intolerable inconvenience to the extent that a locally recognized court or tribunal would be likely to authorize removal, i.e. dominance, debris, interference, etc
Z8	Excessive, severe and intolerable damage to property to the extent that a locally recognized court or tribunal would be likely to authorize removal, i.e. severe structural damage to surfacing and buildings, etc
Good management: Trees that are likely to be removed within 10 years through responsible management of the tree population	
Z9	Severe damage and/or structural defects where a high risk of failure can be temporarily reduced by reasonable remedial care, i.e. cavities, decay, included bark, wounds, excessive imbalance, vulnerable to adverse weather conditions, etc
Z10	Poor condition or location with a low potential for recovery or improvement, i.e. dominated by adjacent trees or buildings, poor architectural framework, etc
Z11	Removal would benefit better adjacent trees, i.e. relieve physical interference, suppression, etc
Z12	Unacceptably expensive to retain, i.e. severe defects requiring excessive levels of maintenance, etc

NOTE: Z trees with a high risk of death/failure (Z4, Z5 & Z6) or causing severe inconvenience (Z7 & Z8) at the time of assessment and need an urgent risk assessment can be designated as ZZ. ZZ trees are likely to be unsuitable for retention and at the bottom of the categorization hierarchy. In contrast, although Z trees are not worthy of influencing new designs, urgent removal is not essential and they could be retained in the short term, if appropriate.

Category A: Important trees suitable for retention for more than 10 years and worthy of being a material constraint

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

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

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

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Glossary of Terms

Abiotic - Pertaining to non-living agents; e.g. environmental factors

Adventitious shoots - Shoots that develop other than from apical, axillary or dormant buds; see also 'epicormic'

Anchorage - The system whereby a tree is fixed within the soil, involving cohesion between roots and soil and the development of a branched system of roots which withstands wind and gravitational forces transmitted from the aerial parts of the tree

Bark - A term usually applied to all the tissues of a woody plant lying outside the vascular cambium, thus including the phloem, cortex and periderm; occasionally applied only to the periderm or the phellem

Branch:
• **Primary**. A first order branch arising from a stem
• **Lateral**. A second order branch, subordinate to a primary branch or stem and bearing sub-lateral branches
• **Sub-lateral**. A third order branch, subordinate to a lateral or primary branch, or stem and usually bearing only twigs

Branch collar - A visible swelling formed at the base of a branch whose diameter growth has been disproportionately slow compared to that of the parent stem; a term sometimes applied also to the pattern of growth of the cells of the parent stem around the branch base

Brown-rot - A type of wood decay in which cellulose is degraded, while lignin is only modified

Buckling - An irreversible deformation of a structure subjected to a bending load

Buttress zone - The region at the base of a tree where the major lateral roots join the stem, with buttress-like formations on the upper side of the junctions

Cambium - Layer of dividing cells producing xylem (woody) tissue internally and phloem (bark) tissue externally

Canker - A persistent lesion formed by the death of bark and cambium due to colonisation by fungi or bacteria

Compartmentalisation - The confinement of disease, decay or other dysfunction within an anatomically discrete region of plant tissue, due to passive and/or active defences operating at the boundaries of the affected region

Compressive loading - Mechanical loading which exerts a positive pressure; the opposite to tensile loading

Condition - An indication of the physiological condition of the tree. Where the term 'condition' is used in a report, it should not be taken as an indication of the stability of the tree

Crown/Canopy - The main foliage bearing section of the tree

Crown lifting - The removal of limbs and small branches to a specified height above ground level

Crown thinning - The removal of a proportion of secondary branch growth throughout the crown to produce an even density of foliage around a well-balanced branch structure

Crown reduction/shaping - A specified reduction in crown size whilst preserving, as far as possible, the natural tree shape

DAB (Diameter Above Buttress) - Trunk diameter measured above the root buttress

Defect - In relation to tree hazards, any feature of a tree which detracts from the uniform distribution of mechanical stress, or which makes the tree mechanically unsuited to its environment

Dieback - The death of parts of a woody plant, starting at shoot-tips or root-tips

Disease - A malfunction in or destruction of tissues within a living organism, usually excluding mechanical damage; in trees, usually caused by pathogenic micro-organisms

Dominance - In trees, the tendency for a leading shoot to grow faster or more vigorously than the lateral shoots; also the tendency of a tree to maintain a taller crown than its neighbours

Dormant bud - An axial bud which does not develop into a shoot until after the formation of two or more annual wood increments; many such buds persist through the life of a tree and develop only if stimulated to do so

Dysfunction - In woody tissues, the loss of physiological function, especially water conduction, in sapwood

DBH (Diameter at Breast Height) - Stem diameter measured at a height of 1.4 metres or the nearest measurable point. Where measurement at a height of 1.4 metres is not possible, another height may be specified

Deadwood - Branch or stem wood bearing no live tissues. Retention of deadwood provides valuable habitat for a wide range of species and seldom represents a threat to the health of the tree. Removal of deadwood can result in the ingress of decay to otherwise sound tissues and climbing operations to access deadwood can cause significant damage to a tree. Removal of deadwood is generally recommended only where it represents an unacceptable level of hazard

Epicormic shoot - A shoot having developed from a dormant or adventitious bud and not having developed from a first year shoot

Flush-cut - A pruning cut which removes part of the branch bark ridge and or branch-collar

Girdling root - A root which circles and constricts the stem or roots possibly causing death of phloem and/or cambial tissue

Habit - The overall growth characteristics, shape of the tree and branch structure

Hazard beam - An upwardly curved part of a tree in which strong internal stresses may occur without being reduced by adaptive growth; prone to longitudinal splitting

Incorporating extracts from Lonsdale, D. 1999. Principles of Tree Hazard Assessment. Her Majesty's Stationary Office, London

Heartwood/false-heartwood - The dead central wood that has become dysfunctional as part of the aging processes and being distinct from the sapwood

Heave - A term mainly applicable to a shrinkable clay soil which expands due to re-wetting after the felling of a tree which was previously extracting moisture from the deeper layers; also the lifting of pavements and other structures by root diameter expansion; also the lifting of one side of a wind-rocked root-plate

Included bark (ingrown bark) - Bark of adjacent parts of a tree (usually forks, acutely joined branches or basal flutes) which is in face-to-face contact

Lever arm - A mechanical term denoting the length of the lever represented by a structure that is free to move at one end, such as a tree or an individual branch

Lignin - The hard, cement-like constituent of wood cells; deposition of lignin within the matrix of cellulose microfibrils in the cell wall is termed Lignification

Lions tailing - A term applied to a branch of a tree that has few if any side-branches except at its end, and is thus liable to snap due to end- loading

Loading - A mechanical term describing the force acting on a structure from a particular source; e.g. the weight of the structure itself or wind pressure

Mycelium - The body of a fungus, consisting of branched filaments (hyphae)

Occlusion - The process whereby a wound is progressively closed by the formation of new wood and bark around it

Pathogen - A micro-organism which causes disease in another organism

Photosynthesis - The process whereby plants use light energy to split hydrogen from water molecules, and combine it with carbon dioxide to form the molecular building blocks for synthesizing carbohydrates and other biochemical products

Probability - A statistical measure of the likelihood that a particular event might occur

Pruning - The removal or cutting back of twigs or branches, sometimes applied to twigs or small branches only, but often used to describe most activities involving the cutting of trees or shrubs

Radial - In the plane or direction of the radius of a circular object such as a tree stem

Reactive Growth/Reaction Wood - Production of woody tissue in response to altered mechanical loading; often in response to internal defect or decay and associated strength loss (cf. adaptive growth)

Ring-barking - The removal of a ring of bark and phloem around the circumference of a stem or branch, normally resulting in an inability to transport photosynthetic assimilates below the area of damage. Almost inevitably results in the eventual death of the affected stem or branch above the damage

Root-collar - The transitional area between the stem/s and roots

Sapwood - Living xylem tissues

Soft-rot - A kind of wood decay in which a fungus degrades cellulose within the cell walls, without any general degradation of the wall as a whole

Stem/s - Principle above-ground structural component(s) of a tree that supports its branches

Stress - In plant physiology, a condition under which one or more physiological functions are not operating within their optimum range, for example due to lack of water, inadequate nutrition or extremes of temperature

SRZ (Structural Root Zone) - The area around the base of the tree required for the trees stability in the ground

Subsidence - In relation to soil or structures resting in or on soil, a sinking due to shrinkage when certain types of clay soil dry out, sometimes due to extraction of moisture by tree roots

Taper - In stems and branches, the degree of change in girth along a given length

Targets - In tree risk assessment (with slight misuse of normal meaning) persons or property or other things of value which might be harmed by mechanical failure of the tree or by objects falling from it

Topping - In arboriculture, the removal of the crown of a tree, or of a major proportion of it

Transpiration - The evaporation of moisture from the surface of a plant, especially via the stomata of leaves; it exerts a suction which draws water up from the roots and through the intervening xylem cells

TPZ (Tree Protection Zone) - A specified area above and below ground and at a given distance from the trunk set aside for the protection of a tree's roots and crown to provide for the viability and stability of a tree to be retained where it is potentially subject to damage by development

Understory - This layer consists of younger individuals of the dominant trees, together with smaller trees and shrubs which are adapted to grow under lower light conditions

Veteran tree - Tree that, by recognised criteria, shows features of biological, cultural or aesthetic value that are characteristic of, but not exclusive to, individuals surviving beyond the typical age range for the species concerned. These characteristics might typically include a large girth, signs of crown retrenchment and hollowing of the stem

Vigour - The expression of carbohydrate expenditure to growth (in trees)

White-rot - A range of kinds of wood decay in which lignin, usually together with cellulose and other wood constituents, is degraded

Wind exposure - The degree to which a tree or other object is exposed to wind, both in terms of duration and velocity

Wind pressure - The force exerted by a wind on a particular object

Windthrow - The blowing over of a tree at its roots

Incorporating extracts from Lonsdale, D. 1999. Principles of Tree Hazard Assessment. Her Majesty's Stationary Office, London

Appendix A (Part D) – Addendum to Arboricultural Pruning Specification Report (Southwest Metro – Punchbowl to Bankstown)

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Addendum to Arboricultural Pruning Specification Report

Site Location: Southwest Metro – Punchbowl to Bankstown

Prepared for:
UGL

Prepared by: Bryce Claassens and Alex Kurath
Date prepared: 23 July 2025
Ref: 250723_SWM_Ineco_PS_Ad4
Addendum: 4

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1. INTRODUCTION

1.1 Urban Arbor have been instructed to prepare an addendum to the previous Pruning Specification Report (18 November 2024) in relation to Corridor Intruder Detection System (CIDS) and Object Detection System (ODS) trouble spots. The report is to address trees within and adjacent to the rail corridor between Punchbowl Station and Bankstown Station.

1.2 Documents and information provided to assist in preparing the report;

A) Arboricultural Pruning Specification Report, Urban Arbor, Ref:241118_SWM_Ineco_PS, Revision 2,18 November 2024.
B) CCTV LOS and Nuisance Alarm Register, Doc No. SMCSWIDS-UGL-1NL-TC-REG-000745, Revision B13, 19 July 2025.

1.3 The site and tree inspections were carried out on 9 July 2025 by Alex Kurath of Urban Arbor, in conjunction with representatives from UGL (Rares Pop), JHLORJV (Andre Kruize) and Sydney Metro. UGL advised the trees requiring pruning or removal to obtain camera visibility of fence lines.

1.4 Some trees included within this report were previously inspected between the dates of 6 January 2020 to 3 April 2020 by Bryce Claassens during the South West Metro Rail Corridor (SWMRC) and Station Precinct design works. Access was available to the subject site and adjoining public areas only. This report has been written by Bryce Claassens.

2. SCOPE OF THE REPORT

2.1 This report has been undertaken to meet the following objectives.

2.1.1 Conduct a walk-through assessment of the areas where trees (identified by UGL) are currently obstructing camera visibility, which require pruning or removal. The decision of pruning or removal of trees is subject to the agreement and approval of the stakeholders.

2.1.2 Conduct a visual assessment of significant trees not previously included in the Pruning Specification Report (dated 18 November 2024), located within areas identified by UGL. For the purpose of this report, a significant tree is a ‘Long lived woody perennial plant greater than (or usually greater than) 3 metres in height with one or relatively few main stems or trunks’.

2.1.3 Determine the trees estimated contribution years and remaining useful life expectancy and award the trees a retention value.

2.1.4 Provide pruning specifications for trees where required, in accordance with AS4373-2007.

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3. LIMITATIONS

3.1 The observations and recommendations are based on the site inspections identified in section 1 only. The findings of this report are based on the observations and site conditions at the time of inspection.

3.2 All of the observations were carried out from ground level. The accuracy of the assessment of the subject trees structural condition and health is limited to the visibility of the tree at the time of inspection.

3.3 The tree inspection was visual from ground level only. No soil or tissue testing was carried out as part of the tree inspection. None of the surrounding surfaces adjacent to trees were lifted or removed during the tree inspections.

3.4 Root decay can sometimes be present with no visual indication above ground. It is also impossible to know the extent of any root damage caused by mechanical damage such as underground root cutting during the installation of services without undertaking detailed root investigation. Any form of tree failure due to these activities is beyond the scope of this assessment.

3.5 The report reflects the subject tree(s) as found on the day of inspection. Any changes to the growing environment of the subject tree, or tree management works beyond those recommended in this report may alter the findings of the report. There is no warranty, expressed or implied, that problems or deficiencies relating to the subject tree, or subject site may not arise in the future.

3.6 Tree identification is based on accessible visual characteristics at the time of inspection. As key identifying features are not always available the accuracy of identification is not guaranteed. Where tree species is unknown, it is indicated with an *spp*.

3.7 Some trees included within this report have been located using a Trimble TDC100 hand held GNSS device by Urban Arbor Pty Ltd. Tree locations captured by the Trimble TDC100 are only accurate to within 1m - 3m. If an accurate location of these trees is required, a registered surveyor should locate the trees.

3.8 In some instances, multiple trees or groups of small trees have been identified as groups of trees within this report.

3.9 All diagrams, plans and photographs included in this report are visual aids only and are not to scale unless otherwise indicated.

3.10 Alteration of this report invalidates the entire report.

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4. METHODOLOGY

4.1 The following information was collected during the assessment of the subject tree(s).

- 4.1.1 Tree common name
- 4.1.2 Tree botanical name
- 4.1.3 Tree age class
- 4.1.4 DSH (Trunk/Stem diameter at breast height/1.4m) - millimetres.
- 4.1.5 DAB (Trunk diameter directly above the root buttress) – millimetres.
- 4.1.6 Estimated height - metres
- 4.1.7 Estimated crown spread (diameter of crown) - metres
- 4.1.8 Health
- 4.1.9 Structural condition
- 4.1.10 Amenity value
- 4.1.11 Estimated remaining contribution years (SULE)[1]
- 4.1.12 Retention value (Tree AZ)[2]
- 4.1.13 Notes/comments

4.2 An assessment of the trees condition was made using the visual tree assessment (VTA) model (Mattheck & Breloer, 1994).[3]

4.3 Tree diameter was measured using a DSH tape or in some cases estimated. Tree height and tree canopy spread was measured with a clinometer or in some cases estimated. All other measurements were estimations unless otherwise stated. The other tools used during the assessment were a nylon mallet, compass, camera and a steel probe.

4.4 All DSH measurements, notional root zones, and structural root zones within Appendix 2 of this report were calculated in accordance with methods set out in AS4970 Protection of trees on development sites (2025).[4]

4.5 Details of how the observations in this report have been assessed are listed in the appendices.

[1] Barrell, J. (2001), *'SULE: Its use and status in the new millennium' in Management of Mature Trees proceedings of the 4th NAAA Workshop*, Sydney, 2001. Barrell.

[2] Barrell Tree Consultancy, *Tree AZ version 10.10-ANZ*, http://www.treeaz.com/.

[3] Mattheck, C. & Breloer, H., *The body language of trees - A handbook for failure analysis*, The Stationary Office, London, England (1994).

[4] Council Of Standards Australia, *AS4970 Protection of trees on development sites* (2025).

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5. SITE LOCATION AND BRIEF DESCRIPTION

5.1 The area covered in the site inspections is located within the Canterbury Bankstown LGA. All trees within the Canterbury Bankstown LGA are subject to protection under the Canterbury Bankstown LEP 2023[5] and Canterbury Bankstown DCP 2023.[6]

6. AREAS ASSESSED

6.1 The areas assessed in this report have been identified by UGL in the report CCTV LOS and Nuisance Alarm Register (dated 19 July 2025), which includes trees within and adjacent to the rail corridor between Punchbowl Station and Bankstown Station.

7. TREE OBSERVATIONS

7.1 **Tree information:** Details of each individual tree assessed, including the observations taken during the site inspections, can be found in the tree inspection schedule in appendix 2. Each of the subject trees have been awarded a retention value based on the observations using the Tree AZ method. Tree AZ is used to identify higher value trees worthy of being a constraint to development and lower value trees that should generally not be a constraint to the development. The Tree AZ categories sheet (Barrell Tree Consultancy) has been included in appendix 3 to assist with understanding the retention values. The retention values that have been allocated to the subject trees in this report is not definitive and should only be used as a guideline.

8. ASSESSMENT OF TREE IMPACTS BY AREA

8.1 The trees included in the following sections have been identified by UGL as being subject to impacts from development works. All trees to be retained should be protected in accordance with AS4970-2025 *Protection of trees on development sites*. If there are any development works that have not been assessed and could potentially impact additional trees, the project arborist must assess the impact of the proposed works to the condition of the trees, determining the trees viability for retention.

[5] *Canterbury Bankstown Local Environmental Plan 2023*, https://legislation.nsw.gov.au/view/html/inforce/current/epi-2023-0336, accessed 11 June 2025.

[6] *Canterbury Bankstown Development Control Plan 2023*, https://www.cbcity.nsw.gov.au/development/planning-control-policies/canterbury-bankstown-development-control-plan-2023, accessed 11 June 2025.

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8.2 Punchbowl to Bankstown (PTB_01 – PTB_09)

8.2.1 Seventeen (17) trees and three (3) groups of trees have been identified for removal in this area, including tree 1524, 1732, 1736, 1737, 1738, 1739, 1799, 1801, 1812, 1835, 1904, 1905, 1907, 3710, 3711, 3712, 3713, G1.18, G1.20 and G31.

8.2.2 Sixty-eight (68) trees and three (3) groups of trees have been identified for canopy pruning in this area, including tree 1351, 1352, 1357, 1370, 1372, 1376, 1382, 1386, 1390, 1395, 1396, 1398, 1399, 1400, 1404, 1405, 1410, 1411, 1414, 1415, 1417, 1418, 1419, 1421, 1492, 1493, 1494, 1496, 1500, 1512, 1515, 1517, 1522, 1767, 1807, 1808, 1809, 1810, 1811, 1813, 1814, 1815, 1816, 1817, 1818, 1819, 1820, 1821, 1822, 1823, 1824, 1825, 1826, 1827, 1828, 1829, 1830, 1831, 1832, 1833, 1834, 1836, 1837, 1838, 1914, 3377, 3490, 3496, G17, G30 and G32. All canopy pruning must be completed in accordance with AS4373 *Pruning of amenity trees* (2007).

8.2.3 The details of the trees are summarised in the table below. Photographs of the trees are included in section 8.3.

Tree ID	Botanical Name	SULE	Retention Value	Height (m)	Canopy Spread (m) - radius	Native / Exotic	Prune / Remove
1351	*Eucalyptus microcorys*	2. Medium	A1	9	2	Native	Prune
1352	*Eucalyptus microcorys*	1. Long	A1	9	2	Native	Prune
1357	*Eucalyptus microcorys*	1. Long	A1	11	4	Native	Prune
1370	*Eucalyptus microcorys*	5. Small/Young	Z1	7	2	Native	Prune
1372	*Eucalyptus microcorys*	1. Long	A1	12	3	Native	Prune
1376	*Eucalyptus microcorys*	5. Small/Young	Z1	9	2	Native	Prune
1382	*Eucalyptus microcorys*	1. Long	A1	9	2	Native	Prune
1386	*Eucalyptus racemosa*	1. Long	A1	13	7	Native	Prune
1390	*Eucalyptus microcorys*	1. Long	A1	9	3	Native	Prune
1395	*Lophostemon confertus*	3. Short	Z10	7	3	Native	Prune
1396	*Eucalyptus microcorys*	2. Medium	A1	12	4	Native	Prune
1398	*Eucalyptus microcorys*	1. Long	A1	10	3	Native	Prune
1399	*Eucalyptus microcorys*	1. Long	A1	15	2	Native	Prune
1400	*Eucalyptus microcorys*	1. Long	A1	12	4	Native	Prune
1404	*Eucalyptus microcorys*	1. Long	A1	9	2	Native	Prune
1405	*Eucalyptus microcorys*	5. Small/Young	Z1	7	2	Native	Prune
1410	*Eucalyptus microcorys*	5. Small/Young	Z1	7	2	Native	Prune
1411	*Eucalyptus microcorys*	5. Small/Young	Z1	9	2	Native	Prune
1414	*Eucalyptus microcorys*	1. Long	A1	8	2	Native	Prune
1415	*Eucalyptus microcorys*	5. Small/Young	Z1	7	2	Native	Prune
1417	*Eucalyptus microcorys*	5. Small/Young	Z1	7	1	Native	Prune
1418	*Eucalyptus microcorys*	2. Medium	A1	8	2	Native	Prune
1419	*Eucalyptus globulus*	1. Long	A1	9	6	Native	Prune
1421	*Eucalyptus microcorys*	1. Long	A1	12	3	Native	Prune
1492	*Eucalyptus microcorys*	1. Long	A1	19	7	Native	Prune

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Tree ID	Botanical Name	SULE	Retention Value	Height (m)	Canopy Spread (m) - radius	Native / Exotic	Prune / Remove
1493	*Eucalyptus microcorys*	5. Small/Young	Z1	5	2	Native	Prune
1494	*Eucalyptus microcorys*	1. Long	A1	10	2	Native	Prune
1496	*Eucalyptus microcorys*	5. Small/Young	Z1	6	2	Native	Prune
1500	*Eucalyptus microcorys*	5. Small/Young	Z1	6	2	Native	Prune
1512	*Eucalyptus microcorys*	1. Long	A1	22	6	Native	Prune
1515	*Eucalyptus microcorys*	1. Long	A1	18	6	Native	Prune
1517	*Eucalyptus microcorys*	1. Long	A1	19	5	Native	Prune
1522	*Eucalyptus microcorys*	1. Long	A1	17	5	Native	Prune
1524	*Cinnamomum camphora*	3. Short	Z3	8	4	Exotic	Remove
1732	*Eucalyptus spp*	3. Short	Z10	6	2	Native	Remove
1736	*Eucalyptus spp*	3. Short	Z10	5	2	Native	Remove
1737	*Eucalyptus spp*	4. Remove	Z5	5	2	Native	Remove
1738	*Eucalyptus spp*	4. Remove	Z5	6	2	Native	Remove
1739	*Eucalyptus spp*	3. Short	Z10	8	2	Native	Remove
1767	*Eucalyptus robusta*	2. Medium	A1	12	9	Native	Prune
1799	*Acacia longifolia*	3. Short	Z4	5	2	Native	Remove
1801	*Acacia longifolia*	5. Small/Young	Z1	6	1	Native	Remove
1807	*Acacia longifolia*	2. Medium	A1	8	1	Native	Prune
1808	*Acacia longifolia*	5. Small/Young	Z1	5	1	Native	Prune
1809	*Acacia longifolia*	5. Small/Young	Z1	6	1	Native	Prune
1810	*Acacia longifolia*	3. Short	Z4	8	1	Native	Prune
1811	*Acacia longifolia*	5. Small/Young	Z1	5	1	Native	Prune
1812	*Acacia longifolia*	5. Small/Young	Z1	5	1	Native	Remove
1813	*Acacia longifolia*	2. Medium	A1	7	1	Native	Prune
1814	*Acacia longifolia*	3. Short	Z4	7	2	Native	Prune
1815	*Acacia longifolia*	5. Small/Young	Z4	6	2	Native	Prune
1816	*Cinnamomum camphora*	3. Short	Z3	7	2	Exotic	Prune
1817	*Cinnamomum camphora*	3. Short	Z3	6	2	Exotic	Prune
1818	*Acacia longifolia*	3. Short	Z4	8	2	Native	Prune
1819	*Cinnamomum camphora*	3. Short	Z3	7	2	Exotic	Prune
1820	*Acacia longifolia*	2. Medium	A1	8	3	Native	Prune
1821	*Cinnamomum camphora*	3. Short	Z3	7	2	Exotic	Prune
1822	*Acacia longifolia*	5. Small/Young	Z1	6	1	Native	Prune
1823	*Acacia longifolia*	5. Small/Young	Z1	9	2	Native	Prune
1824	*Acacia longifolia*	5. Small/Young	Z1	5	1	Native	Prune
1825	*Acacia longifolia*	5. Small/Young	Z1	5	1	Native	Prune
1826	*Cinnamomum camphora*	5. Small/Young	Z3	5	1	Exotic	Prune
1827	*Acacia longifolia*	5. Small/Young	Z1	6	2	Native	Prune
1828	*Acacia longifolia*	3. Short	Z4	7	2	Native	Prune

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Tree ID	Botanical Name	SULE	Retention Value	Height (m)	Canopy Spread (m) - radius	Native / Exotic	Prune / Remove
1829	*Cinnamomum camphora*	5. Small/Young	Z3	8	2	Exotic	Prune
1830	*Acacia longifolia*	5. Small/Young	Z1	6	1	Native	Prune
1831	*Acacia longifolia*	4. Remove	Z4	6	1	Native	Prune
1832	*Acacia longifolia*	5. Small/Young	Z1	6	2	Native	Prune
1833	*Acacia longifolia*	5. Small/Young	Z1	5	1	Native	Prune
1834	*Acacia longifolia*	5. Small/Young	Z1	6	1	Native	Prune
1835	*Acacia longifolia*	3. Short	Z4	6	2	Native	Remove
1836	*Acacia longifolia*	5. Small/Young	Z1	9	1	Native	Prune
1837	*Acacia longifolia*	2. Medium	A1	6	2	Native	Prune
1838	*Acacia longifolia*	2. Medium	A1	8	3	Native	Prune
1904	*Acacia longifolia*	5. Small/Young	Z1	5	1	Native	Remove
1905	*Acacia longifolia*	3. Short	Z4	5	2	Native	Remove
1907	*Acacia longifolia*	3. Short	Z4	5	2	Native	Remove
1914	*Eucalyptus saligna*	2. Medium	A1	25	6	Native	Prune
3377	*Melaleuca bracteata 'Revolution Gold'*	2. Medium	A1	7	3	Native	Prune
3490	*Acacia prominens*	5. Small/Young	Z1	4	1.5	Native	Prune
3496	*Acacia saligna*	2. Medium	A1	8	3	Native	Prune
3710	*Tristaniopsis laurina*	5. Small/Young	Z1	4	3	Native	Remove
3711	*Acacia longifolia*	5. Small/Young	Z1	6	4	Native	Remove
3712	*Acacia longifolia*	4. Remove	Z5	4	2	Native	Remove
3713	*Acacia longifolia*	5. Small/Young	Z1	4	2	Native	Remove
G1.18	*Acacia longifolia*	5. Small/Young	Z1	6	2	Native	Remove
G1.20	*Casuarina glauca*	5. Small/Young	Z1	6	1	Native	Remove
G17	*Acacia longifolia*	5. Small/Young	Z1	6	2	Native	Prune
G30	*Acacia longifolia*	5. Small/Young	Z1	6	2.5	Native	Prune
G31	*Acacia longifolia*	5. Small/Young	Z1	6	2.5	Native	Remove
G32	*Tecoma spp*	5. Small/Young	Z1	8	4	Exotic	Prune

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8.3 **Photographs**

Image 1: Looking towards G1.20. The Eastern most tree is to be removed (circled red). The remaining trees require pruning to provide 2m clearance from the fence. Maximum finished cut diameters must not exceed 50mm. The pruning will result in the removal of less than 10% of the live foliage area of each tree.

Image 2: Looking towards tree 3710. The tree is recommended for removal.

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Image 3: Looking towards tree 3377. Canopy pruning is required to provide 2m clearance from the fence. Maximum finished cut diameters must not exceed 50mm. The pruning will result in the removal of less than 10% of the live foliage area of the tree. The branches to be removed have been marked yellow.

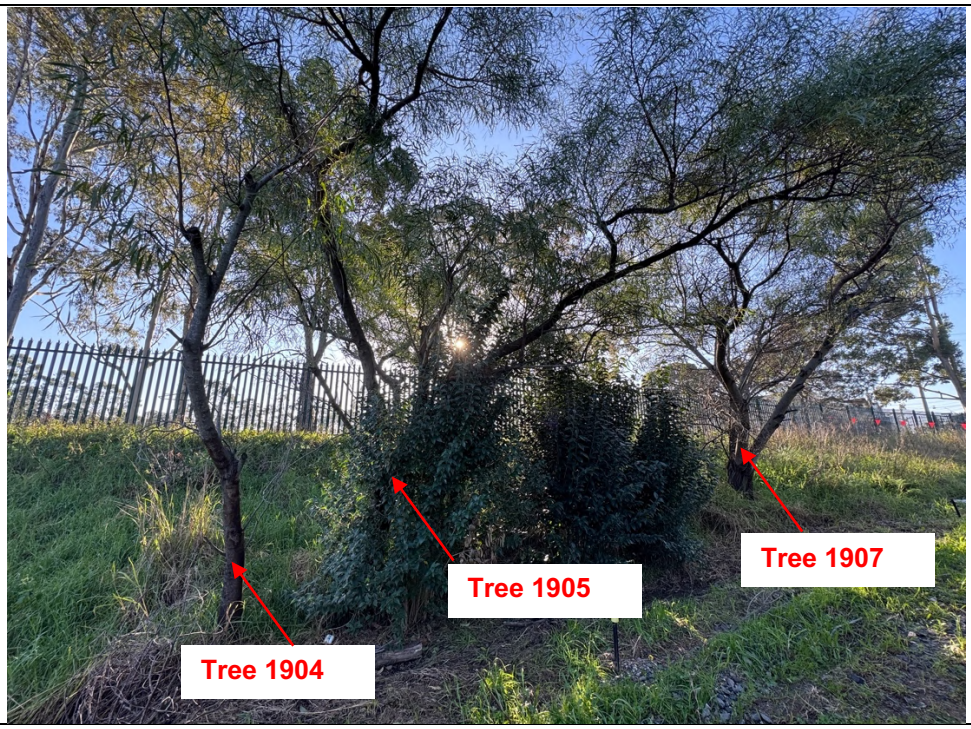

Image 4: Looking towards tree 1904, 1905 and 1907. The trees are recommended for removal.

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Image 5: Looking towards G30. Canopy pruning is required to provide 2m clearance from the fence. Maximum finished cut diameters must not exceed 50mm. The pruning will result in the removal of approximately 20% of the live foliage area of each tree, which is considered signfcaint, but a preferred option to whole tree removal. An approximate area of the pruning has been shaded yellow.

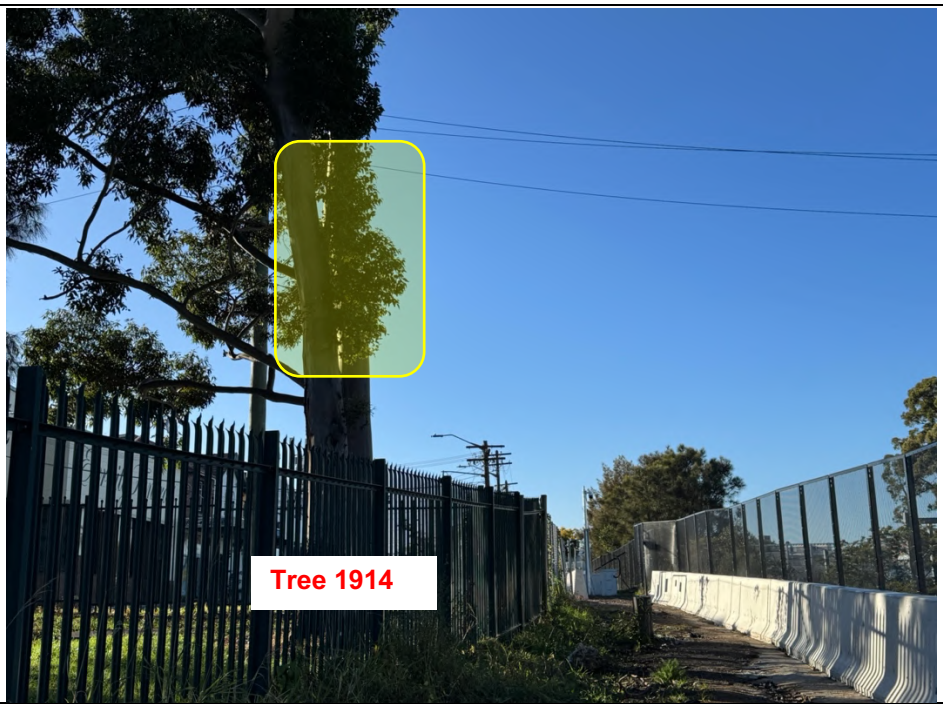

Image 6: Looking towards tree 1914. The removal of the epicormic regrowth (circled yellow) is required. The pruning will result in the removal of less than 10% of the live foliage area of the tree. An approximate area of the pruning has been shaded yellow.

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Image 7: Looking towards tree 3711. The tree is recommended for removal.

Image 8: Looking towards G31. The trees are recommended for removal.

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Image 9: Looking towards G17. Canopy pruning is required to provide 3m clearance from the fence, and up to sky clearance. Maximum finished cut diameters must not exceed 50mm. The pruning will result in the removal of approximately 20% of the live foliage area of each tree, which is considered significant, but a preferred option to whole tree removal. An approximate area of the pruning has been shaded yellow.

Image 10: Looking towards tree 1835. The tree is recommended for removal.

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Image 11: Looking towards tree 1807 - 1838. Canopy pruning is required to provide 3m clearance from the fence, and up to sky clearance. Maximum finished cut diameters must not exceed 50mm. The pruning will result in the removal of approximately 20% of the live foliage area of each tree, which is considered significant, but a preferred option to whole tree removal. An approximate area of the pruning has been shaded yellow.

Image 12: Looking towards tree 1812. The tree is recommended for removal to provide solar panel accessibility.

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Image 13: Looking towards tree 1801. The tree is recommended for removal.

Image 14: Looking towards tree 1799. The tree is recommended for removal.

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Image 15: Looking towards G1.18. The trees are recommended for removal.

Image 16: Looking towards tree 1767. Canopy pruning is required to provide 2m clearance from the fence. The lowest primary branch to the South at 3m is to be removed. The finished cut diameter is estimated to be 160mm. The pruning will result in the removal of less than 10% of the live foliage area of the tree. The branch to be removed has been marked yellow.

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Image 17: Looking towards tree 1732, 1736, 1737, 1738 and 1739. The trees are recommended for removal.

Image 18: Looking towards tree 1524. The tree is recommended for removal.

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Image 19: Looking towards tree 1522. Canopy pruning is required to provide 2m clearance from the fence. The second order branch to the North at 4m is to be removed. The finished cut diameter is estimated to be 70mm. The pruning will result in the removal of less than 5% of the live foliage area of the tree. The branch to be removed has been marked yellow.

Image 20: Looking towards tree 1517. Canopy pruning is required to provide unobstructed visibility of the fence. The three primary branches to the North are to be removed. The maximum finished cut diameter is estimated to be 140mm. The total pruning (specified in Image 20 and 21) will result in the removal of approximately 20% of the live foliage area of the tree. The branches to be removed have been marked yellow.

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Image 21: Looking towards tree 1517. Additional higher branches above the fence will also require pruning to suitbale growth points, with maximum finished cut diameters of 50mm. The total pruning (specified in Image 20 and 21) will result in the removal of approximately 20% of the live foliage area of the tree. The area of higher branches to be pruned has been shaded yellow.

Image 22: Looking towards tree 1515. Canopy pruning is required to provide unobstructed visibility of the fence. The first order branch (200mm diameter at 2.5m) and the second order branch (120mm diameter at 7m) to the North are to be removed. The total pruning (specified in Image 22, 23 and 24) will result in the removal of approximately 20% of the live foliage area of the tree. The branches to be removed have been marked yellow.

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Image 23: Looking towards tree 1515. Canopy pruning is required to provide unobstructed visibility of the fence. The second order branch (140mm diameter at 4m), the first order branch (140mm diameter at 5m) and the first order branch (80mm diameter at 6m) to the Northeast are to be removed. The total pruning (specified in Image 22, 23 and 24) will result in the removal of approximately 20% of the live foliage area of the tree. The branches to be removed have been marked yellow.

Image 24: Looking towards tree 1515. Additional higher branches above the fence will also require pruning to suitbale growth points, with maximum finished cut diameters of 50mm. The total pruning (specified in Image 22, 23 and 24) will result in the removal of approximately 20% of the live foliage area of the tree. The area of higher branches to be pruned has been shaded yellow.

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Image 25: Looking towards tree 1512. Canopy pruning is required to provide unobstructed visibility of the fence. The first order branch (120mm diameter at 4m to the Northwest), the second order branch (140mm diameter at 9m to the North) and the second order branch (130mm diameter at 10m to the Northeast) are to be removed. The total pruning (specified in Image 25 and 26) will result in the removal of approximately 20% of the live foliage area of the tree. The branches to be removed have been marked yellow.

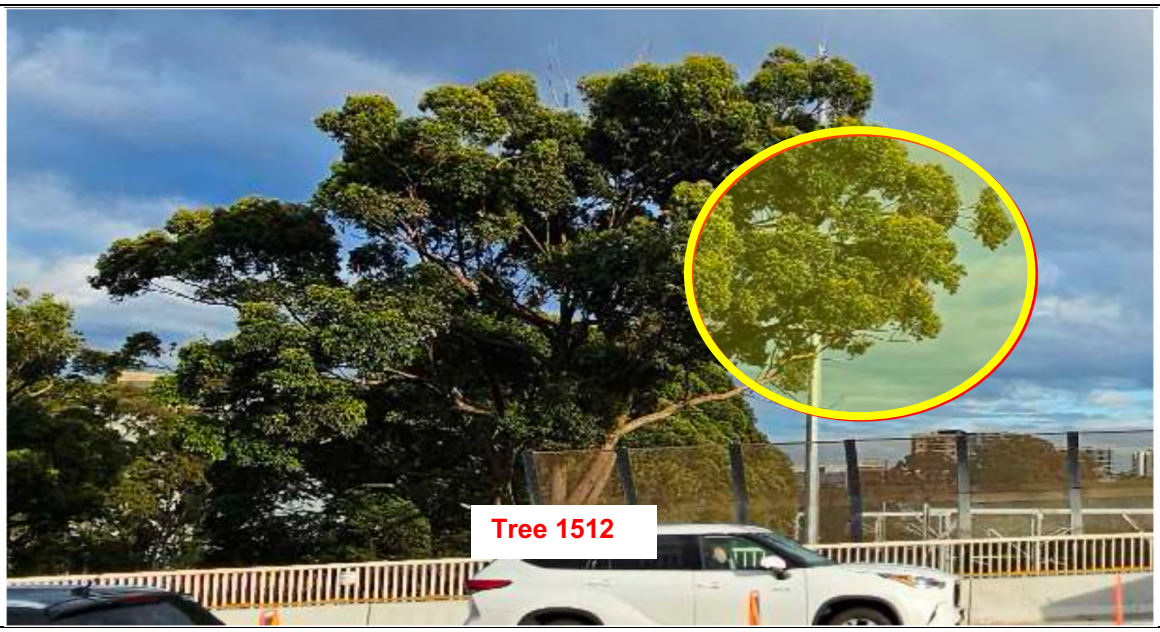

Image 26: Looking towards tree 1512. Additional higher branches also require pruning to provide unobstructed visibility to the bridge, with maximum finished cut diameters of 50mm. The total pruning (specified in Image 25 and 26) will result in the removal of approximately 20% of the live foliage area of the tree. The area of higher branches to be pruned has been shaded yellow.

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Image 27: Looking towards tree 1492. Canopy pruning is required to provide unobstructed visibility of the fence. The second order branch (130mm diameter at 3m to the North) is to be removed. The pruning will result in the removal of approximately 10% of the live foliage area of the tree. The branch to be removed has been marked yellow.

Image 28: Looking towards tree 1493, 1494, 1496 and 1500. Canopy pruning is required to provide 2m clearance from the fence. Maximum finished cut diameters must not exceed 50mm. The pruning will result in the removal of less than 10% of the live foliage area of each tree. An approxiamte area of the pruning has been shaded yellow.

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Image 29: Looking towards tree 1386. Canopy pruning is required to provide unobstructed visibility of the fence. The first order branch (300mm diameter at 2m to the North) and the stub from previous pruning (280mm diameter at 2.5m to the North) are to be removed. The pruning will result in the removal of approximately 10% of the live foliage area of the tree. The branches to be removed have been marked yellow.

Image 30: Looking towards tree 1357, 1370, 1372, 1376, 1382, 1390, 1395, 1396, 1398, 1399, 1400, 1404, 1405, 1410, 1411, 1414, 1415, 1417, 1418, 1419, 1421, 3490 and 3496. Canopy pruning is required to provide 2m clearance from the fence and 5m clearance from the ground. Maximum finished cut diameters must not exceed 150mm. The pruning will result in the removal of up to 20% of the live foliage area of each tree, which is considered significant, but a preferred option to whole tree removal. An approximate area of the pruning has been shaded yellow.

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Image 31: Looking towards tree 3712. The tree is recommended for removal.

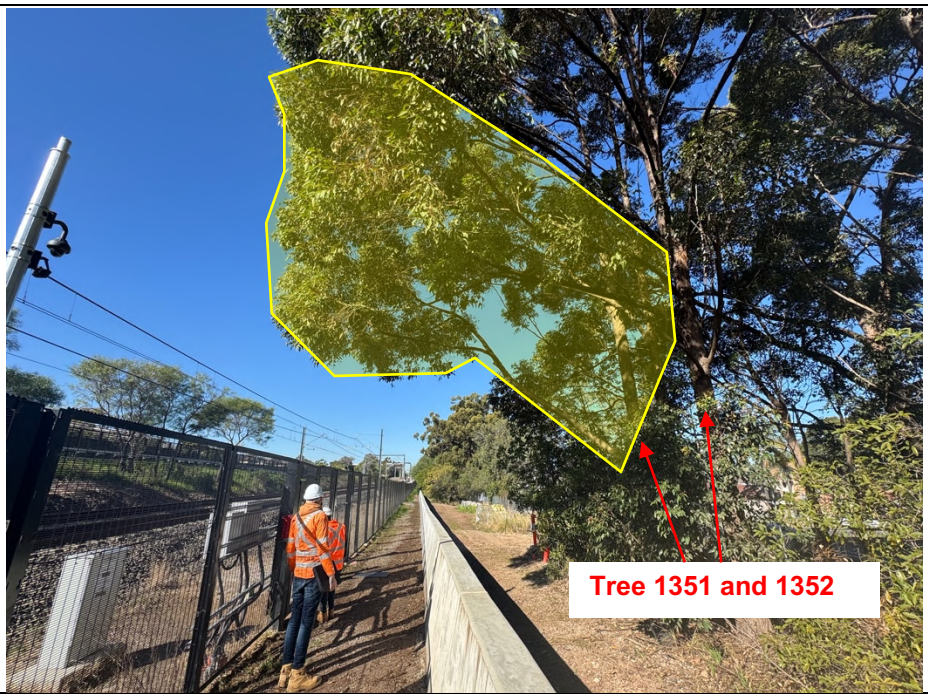

Image 32: Looking towards tree 1351 and 1352. Canopy pruning is required to provide unobstructed visibility of the fence. The first order branches up to 4m above ground height and extending to the North are to be removed. Finsihed cut diameters must not exceed 100mm. The pruning will result in the removal of approximately 10-15% of the live foliage area of each tree. An approximate area of branches to be removed has been shaded yellow.

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Image 33: Looking towards tree 3713. The tree is recommended for removal.

Image 34: Looking towards tree G32. Canopy pruning is required to provide 2m clearance from the fence. Maximum finished cut diameters must not exceed 50mm. The pruning will result in the removal of up to 20% of the live foliage area of each tree within the group, which is considered significant, but a preferred option to whole tree removal. An approximate area of the pruning has been shaded yellow.

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9. CONCLUSIONS

9.1 **Table 2:** Summary of the trees requiring pruning or removal;

Impact	Reason	Category A	Category Z	TOTAL
		A	Z	
Trees recommended to be removed	Installation of services, line of sight for cameras, solar panel accessibility	None	1524, 1732, 1736, 1737, 1738, 1739, 1799, 1801, 1812, 1835, 1904, 1905, 1907, 3710, 3711, 3712, 3713, G1.18, G1.20 and G31 (17 trees & 3 groups of trees)	**17 trees and 3 group of trees**
Trees requiring pruning	Installation of services, line of sight for cameras	1351, 1352, 1357, 1372, 1382, 1386, 1390, 1396, 1398, 1399, 1400, 1404, 1414, 1418, 1419, 1421, 1492, 1494, 1512, 1515, 1517, 1522, 1767, 1807, 1813, 1820, 1837, 1838, 1914, 3377, 3496 (31 trees)	1370, 1376, 1395, 1405, 1410, 1411, 1415, 1417, 1493, 1496, 1500, 1808, 1809, 1810, 1811, 1814, 1815, 1816, 1817, 1818, 1819, 1821, 1822, 1823, 1824, 1825, 1826, 1827, 1828, 1829, 1830, 1831, 1832, 1833, 1834, 1836, 3490, G17, G30, G32 (37 trees & 3 groups of trees)	**68 trees and 3 group of trees**

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10. RECOMMENDATIONS

10.1 This report assesses trees that require pruning or removal for camera visibility works along the rail corridor. Eighty-five (85) trees and six (6) groups of trees have been identified and assessed in this report.

10.2 Seventeen (17) trees and three (3) groups of trees have been identified for removal in this area, including tree 1524, 1732, 1736, 1737, 1738, 1739, 1799, 1801, 1812, 1835, 1904, 1905, 1907, 3710, 3711, 3712, 3713, G1.18, G1.20 and G31. See Table 2 for recommended tree removal by retention values.

10.3 The trees discussed above in section 10.2 have been recommended for removal due to excessive amounts of pruning required to achieve camera visibility, as discussed in section 1.3. It may be possible to retain/prune some of the trees recommended for removal based upon the final installation locations of cameras and their FOV. This will need to be determined by UGL and the project arborist.

10.4 Sixty-eight (68) trees and three (3) groups of trees have been identified for canopy pruning in this area, including tree 1351, 1352, 1357, 1370, 1372, 1376, 1382, 1386, 1390, 1395, 1396, 1398, 1399, 1400, 1404, 1405, 1410, 1411, 1414, 1415, 1417, 1418, 1419, 1421, 1492, 1493, 1494, 1496, 1500, 1512, 1515, 1517, 1522, 1767, 1807, 1808, 1809, 1810, 1811, 1813, 1814, 1815, 1816, 1817, 1818, 1819, 1820, 1821, 1822, 1823, 1824, 1825, 1826, 1827, 1828, 1829, 1830, 1831, 1832, 1833, 1834, 1836, 1837, 1838, 1914, 3377, 3490, 3496, G17, G30 and G32. All canopy pruning must be completed in accordance with AS4373 *Pruning of amenity trees* (2007).

10.5 All trees that require canopy pruning can be retained in a viable condition. All trees to be retained must be protected in accordance with AS4970-2025 *Protection of trees on development sites*.

10.6 This report does not provide approval for tree removal or pruning works. All recommendations in this report are subject to approval by the relevant authorities and/or tree owners.

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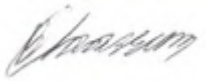
12. LIST OF APPENDICES

The following are included in the appendices:

- Appendix 2 - Tree inspection schedule
- Appendix 3 - Definition of Methodology

Alex Kurath
8004 2802
sales@urbanarbor.com.au
Diploma of Arboriculture (AQF5)
Member of Arboriculture Australia
ISA Member (International Society of Arboriculture)



Bryce Claassens
Diploma of Arboriculture (AQF5)
Cert III Landscape Construction
Member Arboriculture Australia
Quantified Tree Risk Assessment (QTRA)
ISA Tree Risk Assessment Qualification (TRAQ)

Appendix 2 - Tree Inspection Schedule

Tree ID	Common Name	Botanical Name	Age Class	Height (m)	Canopy Spread Radius (m)	Stem 1	Stem 2	Stem 3	Stem 4	Stem 5	DSH (mm)	DAB (mm)	Health	Structure	Amenity Value	SULE	Retention Value	NRZ Radius (m)	SRZ Radius (m)	Notes	Native or Exotic	Recommendations
1351	Tallowood	*Eucalyptus microcorys*	Semi-mature	9	2	160	140				213	300	Good	Fair	Medium	2. Medium	A1	2.6	2.0	Co-dominant stems.	Native	Prune
1352	Tallowood	*Eucalyptus microcorys*	Semi-mature	9	2	180					180	220	Good	Good	Medium	1. Long	A1	2.2	1.8	None.	Native	Prune
1357	Tallowood	*Eucalyptus microcorys*	Mature	11	4	400					400	450	Good	Good	High	1. Long	A1	4.8	2.4	None.	Native	Prune
1370	Tallowood	*Eucalyptus microcorys*	Semi-mature	7	2	170					170	200	Good	Good	Low	5. Small/Young	Z1	2.0	1.7	None.	Native	Prune
1372	Tallowood	*Eucalyptus microcorys*	Mature	12	3	270					270	330	Good	Good	Medium	1. Long	A1	3.2	2.1	None.	Native	Prune
1376	Tallowood	*Eucalyptus microcorys*	Semi-mature	9	2	170					170	230	Good	Fair	Low	5. Small/Young	Z1	2.0	1.8	None.	Native	Prune
1382	Tallowood	*Eucalyptus microcorys*	Semi-mature	9	2	190					190	230	Good	Good	Medium	1. Long	A1	2.3	1.8	None.	Native	Prune
1386	Hard Leaved Scribbly Gum	*Eucalyptus racemosa*	Mature	13	7	550	550				778	1000	Good	Good	Very High	1. Long	A1	9.3	3.3	Located within corridor.	Native	Prune
1390	Tallowood	*Eucalyptus microcorys*	Semi-mature	9	3	180					180	220	Good	Good	Medium	1. Long	A1	2.2	1.8	Located within corridor.	Native	Prune
1395	Queensland Brushbox	*Lophostemon confertus*	Mature	7	3	280					280	350	Fair	Fair	Medium	3. Short	Z10	3.4	2.1	Suppressed by adjacent trees. Poor form with a low potential for recovery.	Native	Prune
1396	Tallowood	*Eucalyptus microcorys*	Mature	12	4	300	280				410	550	Good	Fair	High	2. Medium	A1	4.9	2.6	Co-dominant stems with tight union.	Native	Prune
1398	Tallowood	*Eucalyptus microcorys*	Semi-mature	10	3	250					250	280	Good	Good	Medium	1. Long	A1	3.0	1.9	None.	Native	Prune
1399	Tallowood	*Eucalyptus microcorys*	Semi-mature	15	2	220					220	280	Good	Good	Medium	1. Long	A1	2.6	1.9	None.	Native	Prune
1400	Tallowood	*Eucalyptus microcorys*	Mature	12	4	260	200				328	420	Good	Good	High	1. Long	A1	3.9	2.3	None.	Native	Prune
1404	Tallowood	*Eucalyptus microcorys*	Semi-mature	9	2	110	110	110			191	400	Good	Fair	Medium	1. Long	A1	2.3	2.3	Multi stem tree.	Native	Prune
1405	Tallowood	*Eucalyptus microcorys*	Mature	7	2	130					130	180	Good	Good	Low	5. Small/Young	Z1	2.0	1.6	None.	Native	Prune
1410	Tallowood	*Eucalyptus microcorys*	Semi-mature	7	2	160					160	220	Good	Good	Low	5. Small/Young	Z1	2.0	1.8	None.	Native	Prune
1411	Tallowood	*Eucalyptus microcorys*	Semi-mature	9	2	160					160	220	Good	Good	Low	5. Small/Young	Z1	2.0	1.8	None.	Native	Prune
1414	Tallowood	*Eucalyptus microcorys*	Semi-mature	8	2	180					180	250	Good	Good	Medium	1. Long	A1	2.2	1.8	None.	Native	Prune
1415	Tallowood	*Eucalyptus microcorys*	Semi-mature	7	2	150					150	180	Good	Good	Low	5. Small/Young	Z1	2.0	1.6	None.	Native	Prune
1417	Tallowood	*Eucalyptus microcorys*	Semi-mature	7	1	110					110	160	Good	Good	Low	5. Small/Young	Z1	2.0	1.5	None.	Native	Prune
1418	Tallowood	*Eucalyptus microcorys*	Mature	8	2	110	100	110			185	400	Good	Fair	Medium	2. Medium	A1	2.2	2.3	Multi stem.	Native	Prune
1419	Tasmainian Blue Gum	*Eucalyptus globulus*	Mature	9	6	620					620	750	Good	Good	High	1. Long	A1	7.4	2.9	None.	Native	Prune
1421	Tallowood	*Eucalyptus microcorys*	Mature	12	3	290					290	340	Good	Good	Medium	1. Long	A1	3.5	2.1	None.	Native	Prune
1492	Tallowood	*Eucalyptus microcorys*	Mature	19	7	670					670	850	Good	Good	High	1. Long	A1	8.0	3.1	Canopy extends into corridor.	Native	Prune
1493	Tallowood	*Eucalyptus microcorys*	Semi-mature	5	2	150					150	200	Good	Good	Low	5. Small/Young	Z1	2.0	1.7	Located adjacent to fence.	Native	Prune
1494	Tallowood	*Eucalyptus microcorys*	Semi-mature	10	2	320					320	400	Good	Fair	Medium	1. Long	A1	3.8	2.3	Located directly adjacent to fence.	Native	Prune
1496	Tallowood	*Eucalyptus microcorys*	Young	6	2	110					110	180	Good	Good	Low	5. Small/Young	Z1	2.0	1.6	None.	Native	Prune
1500	Tallowood	*Eucalyptus microcorys*	Semi-mature	6	2	160					160	200	Good	Fair	Low	5. Small/Young	Z1	2.0	1.7	None.	Native	Prune
1512	Tallowood	*Eucalyptus microcorys*	Mature	22	6	550					550	600	Good	Good	High	1. Long	A1	6.6	2.7	Canopy extends into corridor.	Native	Prune
1515	Tallowood	*Eucalyptus microcorys*	Mature	18	6	550					550	650	Good	Good	High	1. Long	A1	6.6	2.8	Canopy extends into corridor.	Native	Prune
1517	Tallowood	*Eucalyptus microcorys*	Mature	19	5	480					480	550	Good	Good	High	1. Long	A1	5.8	2.6	Canopy extends into corridor.	Native	Prune
1522	Tallowood	*Eucalyptus microcorys*	Mature	17	5	440					440	520	Good	Good	High	1. Long	A1	5.3	2.5	None.	Native	Prune
1524	Camphor Laurel	*Cinnamomum camphora*	Mature	8	4	650					650	800	Fair	Fair	Low	3. Short	Z3	7.8	3.0	Located adjacent to fence. Exempt species.	Exotic	Remove
1732	Eucalypt	*Eucalyptus spp*	Semi-mature	6	2	260					260	300	Good	Fair	Medium	3. Short	Z10	3.1	2.0	Topped for power line clearance.	Native	Remove
1736	Eucalypt	*Eucalyptus spp*	Mature	5	2	240					240	290	Good	Fair	Medium	3. Short	Z10	2.9	2.0	None.	Native	Remove
1737	Eucalypt	*Eucalyptus spp*	Mature	5	2	350	180				394	500	Fair	Poor	Medium	4. Remove	Z5	4.7	2.5	Topped.	Native	Remove
1738	Eucalypt	*Eucalyptus spp*	Semi-mature	6	2	150	150				212	300	Fair	Poor	Medium	4. Remove	Z5	2.5	2.0	Topped.	Native	Remove
1739	Eucalypt	*Eucalyptus spp*	Mature	8	2	270					270	300	Good	Fair	Medium	3. Short	Z10	3.2	2.0	Pruned for power line clearance.	Native	Remove
1767	Swamp Mahogany	*Eucalyptus robusta*	Mature	12	9	950					950	1100	Good	Fair	Very High	2. Medium	A1	11.4	3.4	Pruned for power line clearance.	Native	Prune
1799	Sydney Golden Wattle	*Acacia longifolia*	Mature	5	2	120	150	80	70		220	240	Fair	Fair	Low	3. Short	Z4	2.6	1.8	Early stages of decline.	Native	Remove
1801	Sydney Golden Wattle	*Acacia longifolia*	Young	6	1	110					110	140	Good	Fair	Low	5. Small/Young	Z1	2.0	1.5	None.	Native	Remove
1807	Sydney Golden Wattle	*Acacia longifolia*	Mature	8	1	160					160	180	Good	Fair	Medium	2. Medium	A1	2.0	1.6	None.	Native	Prune
1808	Sydney Golden Wattle	*Acacia longifolia*	Semi-mature	5	1	110					110	150	Good	Fair	Low	5. Small/Young	Z1	2.0	1.5	None.	Native	Prune
1809	Sydney Golden Wattle	*Acacia longifolia*	Young	6	1	100					100	150	Good	Fair	Low	5. Small/Young	Z1	2.0	1.5	None.	Native	Prune
1810	Sydney Golden Wattle	*Acacia longifolia*	Semi-mature	8	1	150					150	180	Fair	Fair	Low	3. Short	Z4	2.0	1.6	In early stages of decline.	Native	Prune
1811	Sydney Golden Wattle	*Acacia longifolia*	Semi-mature	5	1	150					150	180	Good	Good	Low	5. Small/Young	Z1	2.0	1.6	None.	Native	Prune
1812	Sydney Golden Wattle	*Acacia longifolia*	Semi-mature	5	1	120					120	160	Good	Fair	Low	5. Small/Young	Z1	2.0	1.5	None.	Native	Remove
1813	Sydney Golden Wattle	*Acacia longifolia*	Mature	7	1	210					210	250	Fair	Fair	Medium	2. Medium	A1	2.5	1.8	In advanced stages of decline.	Native	Prune
1814	Sydney Golden Wattle	*Acacia longifolia*	Semi-mature	7	2	180					180	210	Fair	Fair	Low	3. Short	Z4	2.2	1.7	In decline.	Native	Prune
1815	Sydney Golden Wattle	*Acacia longifolia*	Semi-mature	6	2	80	130				153	200	Fair	Fair	Low	5. Small/Young	Z4	2.0	1.7	In decline.	Native	Prune
1816	Camphor Laurel	*Cinnamomum camphora*	Semi-mature	7	2	300					300	300	Good	Fair	Low	3. Short	Z3	3.6	2.0	Exempt species.	Exotic	Prune
1817	Camphor Laurel	*Cinnamomum camphora*	Semi-mature	6	2	300					300	300	Good	Fair	Low	3. Short	Z3	3.6	2.0	Exempt species.	Exotic	Prune
1818	Sydney Golden Wattle	*Acacia longifolia*	Mature	8	2	240					240	260	Fair	Fair	Medium	3. Short	Z4	2.9	1.9	In decline.	Native	Prune
1819	Camphor Laurel	*Cinnamomum camphora*	Semi-mature	7	2	250					250	250	Good	Fair	Low	3. Short	Z3	3.0	1.8	Exempt species.	Exotic	Prune
1820	Sydney Golden Wattle	*Acacia longifolia*	Mature	8	3	220	200				297	380	Good	Fair	Medium	2. Medium	A1	3.6	2.2	None.	Native	Prune
1821	Camphor Laurel	*Cinnamomum camphora*	Semi-mature	7	2	300					300	300	Good	Fair	Low	3. Short	Z3	3.6	2.0	Exempt species.	Exotic	Prune
1822	Sydney Golden Wattle	*Acacia longifolia*	Semi-mature	6	1	160					160	180	Good	Fair	Low	5. Small/Young	Z1	2.0	1.6	None.	Native	Prune
1823	Sydney Golden Wattle	*Acacia longifolia*	Semi-mature	9	2	170					170	240	Good	Fair	Low	5. Small/Young	Z1	2.0	1.8	None.	Native	Prune
1824	Sydney Golden Wattle	*Acacia longifolia*	Semi-mature	5	1	120					120	150	Good	Fair	Low	5. Small/Young	Z1	2.0	1.5	None.	Native	Prune
1825	Sydney Golden Wattle	*Acacia longifolia*	Semi-mature	5	1	120					120	150	Good	Fair	Low	5. Small/Young	Z1	2.0	1.5	None.	Native	Prune
1826	Camphor Laurel	*Cinnamomum camphora*	Semi-mature	5	1	100	110				149	200	Good	Fair	Low	5. Small/Young	Z3	2.0	1.7	Exempt species.	Exotic	Prune
1827	Sydney Golden Wattle	*Acacia longifolia*	Mature	6	2	200					200	250	Good	Fair	Low	5. Small/Young	Z1	2.4	1.8	None.	Native	Prune
1828	Sydney Golden Wattle	*Acacia longifolia*	Mature	7	2	200					200	230	Fair	Fair	Low	3. Short	Z4	2.4	1.8	In decline.	Native	Prune
1829	Camphor Laurel	*Cinnamomum camphora*	Semi-mature	8	2	400					400	400	Good	Fair	Low	5. Small/Young	Z3	4.8	2.3	Exempt species.	Exotic	Prune
1830	Sydney Golden Wattle	*Acacia longifolia*	Semi-mature	6	1	130					130	160	Good	Fair	Low	5. Small/Young	Z1	2.0	1.5	None.	Native	Prune
1831	Sydney Golden Wattle	*Acacia longifolia*	Semi-mature	6	1	110					110	150	Poor	Fair	Low	4. Remove	Z4	2.0	1.5	Advanced stages of decline.	Native	Prune
1832	Sydney Golden Wattle	*Acacia longifolia*	Semi-mature	6	2	200					200	240	Good	Fair	Low	5. Small/Young	Z1	2.4	1.8	None.	Native	Prune
1833	Sydney Golden Wattle	*Acacia longifolia*	Semi-mature	5	1	120					120	150	Good	Fair	Low	5. Small/Young	Z1	2.0	1.5	None.	Native	Prune
1834	Sydney Golden Wattle	*Acacia longifolia*	Semi-mature	6	1	140					140	230	Good	Fair	Low	5. Small/Young	Z1	2.0	1.8	None.	Native	Prune
1835	Sydney Golden Wattle	*Acacia longifolia*	Mature	6	2	230					230	260	Fair	Fair	Medium	3. Short	Z4	2.8	1.9	In decline.	Native	Remove
1836	Sydney Golden Wattle	*Acacia longifolia*	Semi-mature	9	1	130					130	160	Good	Fair	Low	5. Small/Young	Z1	2.0	1.5	None.	Native	Prune
1837	Sydney Golden Wattle	*Acacia longifolia*	Mature	6	2	200					200	260	Good	Good	Medium	2. Medium	A1	2.4	1.9	None.	Native	Prune
1838	Sydney Golden Wattle	*Acacia longifolia*	Mature	8	3	400					400	460	Good	Good	Medium	2. Medium	A1	4.8	2.4	None.	Native	Prune
1904	Sydney Golden Wattle	*Acacia longifolia*	Young	5	1	110					110	160	Good	Good	Low	5. Small/Young	Z1	2.0	1.5	None.	Native	Remove
1905	Sydney Golden Wattle	*Acacia longifolia*	Mature	5	2	120	160				200	230	Fair	Fair	Low	3. Short	Z4	2.4	1.8	In decline.	Native	Remove
1907	Sydney Golden Wattle	*Acacia longifolia*	Mature	5	2	200	120	110			258	300	Fair	Fair	Medium	3. Short	Z4	3.1	2.0	In decline.	Native	Remove
1914	Sydney Blue Gum	*Eucalyptus saligna*	Mature	25	6	550					550	650	Good	Fair	High	2. Medium	A1	6.6	2.8	Asymmetric crown shape due to power line clearance.	Native	Prune
3377	Honey Myrtle	*Melaleuca bracteata 'Revolution Gold'*	Mature	7	3	300	280				410	450	Good	Fair	Medium	2. Medium	A1	4.9	2.4	Co-dominant stems.	Native	Prune
3490	Golden Rain Wattle	*Acacia prominens*	Young	4	1.5	120					120	120	Good	Fair	Low	5. Small/Young	Z1	2.0	1.5	Prune	Native	Prune
3496	Golden Wreath Wattle	*Acacia saligna*	Mature	8	3	280					280	280	Good	Fair	Medium	2. Medium	A1	3.4	1.9	Co-dominant stems with tight union. DBH measured near base. Prune	Native	Prune
3710	Water Gum	*Tristaniopsis laurina*	Mature	4	3	110	140	100			204	240	Fair	Good	Low	5. Small/Young	Z1	2.5	1.8	Located on nature strip. Significant borer damage on lower trunk with 30% live cambium	Native	Remove
3711	Sydney Golden Wattle	*Acacia longifolia*	Mature	6	4	180	160				241	250	Good	Good	Low	5. Small/Young	Z1	2.9	1.8	Twin stemmed at base.	Native	Remove
3712	Sydney Golden Wattle	*Acacia longifolia*	Semi-mature	4	2	80					80	100	Good	Poor	Low	4. Remove	Z5	2.0	1.5	Split at base.	Native	Remove

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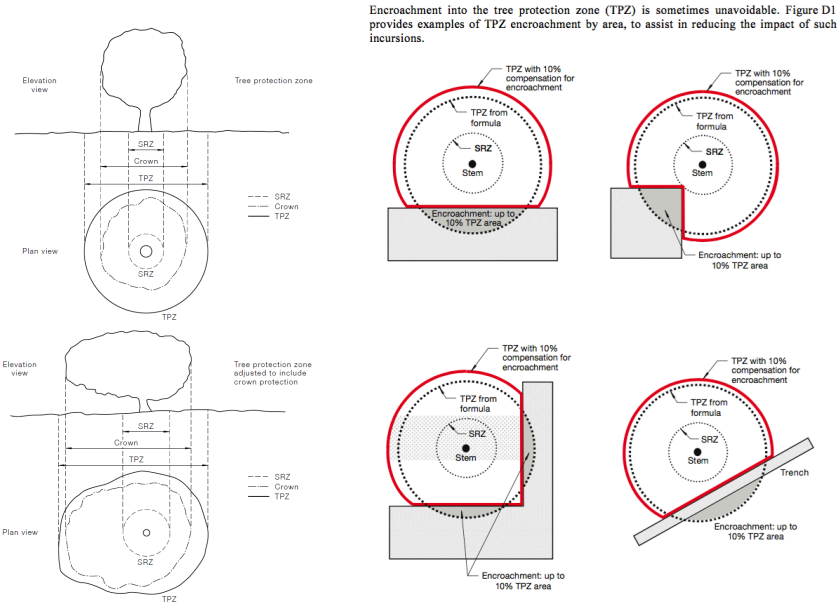
Tree ID	Common Name	Botanical Name	Age Class	Height (m)	Canopy Spread Radius (m)	Stem 1	Stem 2	Stem 3	Stem 4	Stem 5	DSH (mm)	DAB (mm)	Health	Structure	Amenity Value	SULE	Retention Value	NRZ Radius (m)	SRZ Radius (m)	Notes	Native or Exotic	Recommendations
1351	Tallowood	*Eucalyptus microcorys*	Semi-mature	9	2	160	140				213	300	Good	Fair	Medium	2. Medium	A1	2.6	2.0	Co-dominant stems.	Native	Prune
1352	Tallowood	*Eucalyptus microcorys*	Semi-mature	9	2	180					180	220	Good	Good	Medium	1. Long	A1	2.2	1.8	None.	Native	Prune
1357	Tallowood	*Eucalyptus microcorys*	Mature	11	4	400					400	450	Good	Good	High	1. Long	A1	4.8	2.4	None.	Native	Prune
1370	Tallowood	*Eucalyptus microcorys*	Semi-mature	7	2	170					170	200	Good	Good	Low	5. Small/Young	Z1	2.0	1.7	None.	Native	Prune
1372	Tallowood	*Eucalyptus microcorys*	Mature	12	3	270					270	330	Good	Good	Medium	1. Long	A1	3.2	2.1	None.	Native	Prune
1376	Tallowood	*Eucalyptus microcorys*	Semi-mature	9	2	170					170	230	Good	Fair	Low	5. Small/Young	Z1	2.0	1.8	None.	Native	Prune
1382	Tallowood	*Eucalyptus microcorys*	Semi-mature	9	2	190					190	230	Good	Good	Medium	1. Long	A1	2.3	1.8	None.	Native	Prune
1386	Hard Leaved Scribbly Gum	*Eucalyptus racemosa*	Mature	13	7	550	550				778	1000	Good	Good	Very High	1. Long	A1	9.3	3.3	Located within corridor.	Native	Prune
1390	Tallowood	*Eucalyptus microcorys*	Semi-mature	9	3	180					180	220	Good	Good	Medium	1. Long	A1	2.2	1.8	Located within corridor.	Native	Prune
1395	Queensland Brushbox	*Lophostemon confertus*	Mature	7	3	280					280	350	Fair	Fair	Medium	3. Short	Z10	3.4	2.1	Suppressed by adjacent trees. Poor form with a low potential for recovery.	Native	Prune
1396	Tallowood	*Eucalyptus microcorys*	Mature	12	4	300	280				410	550	Good	Fair	High	2. Medium	A1	4.9	2.6	Co-dominant stems with tight union.	Native	Prune
1398	Tallowood	*Eucalyptus microcorys*	Semi-mature	10	3	250					250	280	Good	Good	Medium	1. Long	A1	3.0	1.9	None.	Native	Prune
1399	Tallowood	*Eucalyptus microcorys*	Semi-mature	15	2	220					220	280	Good	Good	Medium	1. Long	A1	2.6	1.9	None.	Native	Prune
1400	Tallowood	*Eucalyptus microcorys*	Mature	12	4	260	200				328	420	Good	Good	High	1. Long	A1	3.9	2.3	None.	Native	Prune
1404	Tallowood	*Eucalyptus microcorys*	Semi-mature	9	2	110	110	110			191	400	Good	Fair	Medium	1. Long	A1	2.3	2.3	Multi stem tree.	Native	Prune
1405	Tallowood	*Eucalyptus microcorys*	Mature	7	2	130					130	180	Good	Good	Low	5. Small/Young	Z1	2.0	1.6	None.	Native	Prune
1410	Tallowood	*Eucalyptus microcorys*	Semi-mature	7	2	160					160	220	Good	Good	Low	5. Small/Young	Z1	2.0	1.8	None.	Native	Prune
1411	Tallowood	*Eucalyptus microcorys*	Semi-mature	9	2	160					160	220	Good	Good	Low	5. Small/Young	Z1	2.0	1.8	None.	Native	Prune
1414	Tallowood	*Eucalyptus microcorys*	Semi-mature	8	2	180					180	250	Good	Good	Medium	1. Long	A1	2.2	1.8	None.	Native	Prune
1415	Tallowood	*Eucalyptus microcorys*	Semi-mature	7	2	150					150	180	Good	Good	Low	5. Small/Young	Z1	2.0	1.6	None.	Native	Prune
1417	Tallowood	*Eucalyptus microcorys*	Semi-mature	7	1	110					110	160	Good	Good	Low	5. Small/Young	Z1	2.0	1.5	None.	Native	Prune
1418	Tallowood	*Eucalyptus microcorys*	Mature	8	2	110	100	110			185	400	Good	Fair	Medium	2. Medium	A1	2.2	2.3	Multi stem.	Native	Prune
1419	Tasmainian Blue Gum	*Eucalyptus globulus*	Mature	9	6	620					620	750	Good	Good	High	1. Long	A1	7.4	2.9	None.	Native	Prune
1421	Tallowood	*Eucalyptus microcorys*	Mature	12	3	290					290	340	Good	Good	Medium	1. Long	A1	3.5	2.1	None.	Native	Prune
1492	Tallowood	*Eucalyptus microcorys*	Mature	19	7	670					670	850	Good	Good	High	1. Long	A1	8.0	3.1	Canopy extends into corridor.	Native	Prune
1493	Tallowood	*Eucalyptus microcorys*	Semi-mature	5	2	150					150	200	Good	Good	Low	5. Small/Young	Z1	2.0	1.7	Located adjacent to fence.	Native	Prune
1494	Tallowood	*Eucalyptus microcorys*	Semi-mature	10	2	320					320	400	Good	Fair	Medium	1. Long	A1	3.8	2.3	Located directly adjacent to fence.	Native	Prune
1496	Tallowood	*Eucalyptus microcorys*	Young	6	2	110					110	180	Good	Good	Low	5. Small/Young	Z1	2.0	1.6	None.	Native	Prune
1500	Tallowood	*Eucalyptus microcorys*	Semi-mature	6	2	160					160	200	Good	Fair	Low	5. Small/Young	Z1	2.0	1.7	None.	Native	Prune
1512	Tallowood	*Eucalyptus microcorys*	Mature	22	6	550					550	600	Good	Good	High	1. Long	A1	6.6	2.7	Canopy extends into corridor.	Native	Prune
1515	Tallowood	*Eucalyptus microcorys*	Mature	18	6	550					550	650	Good	Good	High	1. Long	A1	6.6	2.8	Canopy extends into corridor.	Native	Prune
1517	Tallowood	*Eucalyptus microcorys*	Mature	19	5	480					480	550	Good	Good	High	1. Long	A1	5.8	2.6	Canopy extends into corridor.	Native	Prune
1522	Tallowood	*Eucalyptus microcorys*	Mature	17	5	440					440	520	Good	Good	High	1. Long	A1	5.3	2.5	None.	Native	Prune
1524	Camphor Laurel	*Cinnamomum camphora*	Mature	8	4	650					650	800	Fair	Fair	Low	3. Short	Z3	7.8	3.0	Located adjacent to fence. Exempt species.	Exotic	Remove
1732	Eucalypt	*Eucalyptus spp*	Semi-mature	6	2	260					260	300	Good	Fair	Medium	3. Short	Z10	3.1	2.0	Topped for power line clearance.	Native	Remove
1736	Eucalypt	*Eucalyptus spp*	Mature	5	2	240					240	290	Good	Fair	Medium	3. Short	Z10	2.9	2.0	None.	Native	Remove
1737	Eucalypt	*Eucalyptus spp*	Mature	5	2	350	180				394	500	Fair	Poor	Medium	4. Remove	Z5	4.7	2.5	Topped.	Native	Remove
1738	Eucalypt	*Eucalyptus spp*	Semi-mature	6	2	150	150				212	300	Fair	Poor	Medium	4. Remove	Z5	2.5	2.0	Topped.	Native	Remove
1739	Eucalypt	*Eucalyptus spp*	Mature	8	2	270					270	300	Good	Fair	Medium	3. Short	Z10	3.2	2.0	Pruned for power line clearance.	Native	Remove
1767	Swamp Mahogany	*Eucalyptus robusta*	Mature	12	9	950					950	1100	Good	Fair	Very High	2. Medium	A1	11.4	3.4	Pruned for power line clearance.	Native	Prune
1799	Sydney Golden Wattle	*Acacia longifolia*	Mature	5	2	120	150	80	70		220	240	Fair	Fair	Low	3. Short	Z4	2.6	1.8	Early stages of decline.	Native	Remove
1801	Sydney Golden Wattle	*Acacia longifolia*	Young	6	1	110					110	140	Good	Fair	Low	5. Small/Young	Z1	2.0	1.5	None.	Native	Remove
1807	Sydney Golden Wattle	*Acacia longifolia*	Mature	8	1	160					160	180	Good	Fair	Medium	2. Medium	A1	2.0	1.6	None.	Native	Prune
1808	Sydney Golden Wattle	*Acacia longifolia*	Semi-mature	5	1	110					110	150	Good	Fair	Low	5. Small/Young	Z1	2.0	1.5	None.	Native	Prune
1809	Sydney Golden Wattle	*Acacia longifolia*	Young	6	1	100					100	150	Good	Fair	Low	5. Small/Young	Z1	2.0	1.5	None.	Native	Prune
1810	Sydney Golden Wattle	*Acacia longifolia*	Semi-mature	8	1	150					150	180	Fair	Fair	Low	3. Short	Z4	2.0	1.6	In early stages of decline.	Native	Prune
1811	Sydney Golden Wattle	*Acacia longifolia*	Semi-mature	5	1	150					150	180	Good	Good	Low	5. Small/Young	Z1	2.0	1.6	None.	Native	Prune
1812	Sydney Golden Wattle	*Acacia longifolia*	Semi-mature	5	1	120					120	160	Good	Fair	Low	5. Small/Young	Z1	2.0	1.5	None.	Native	Remove
1813	Sydney Golden Wattle	*Acacia longifolia*	Mature	7	1	210					210	250	Fair	Fair	Medium	2. Medium	A1	2.5	1.8	In advanced stages of decline.	Native	Prune
1814	Sydney Golden Wattle	*Acacia longifolia*	Semi-mature	7	2	180					180	210	Fair	Fair	Low	3. Short	Z4	2.2	1.7	In decline.	Native	Prune
1815	Sydney Golden Wattle	*Acacia longifolia*	Semi-mature	6	2	80	130				153	200	Fair	Fair	Low	5. Small/Young	Z4	2.0	1.7	In decline.	Native	Prune
1816	Camphor Laurel	*Cinnamomum camphora*	Semi-mature	7	2	300					300	300	Good	Fair	Low	3. Short	Z3	3.6	2.0	Exempt species.	Exotic	Prune
1817	Camphor Laurel	*Cinnamomum camphora*	Semi-mature	6	2	300					300	300	Good	Fair	Low	3. Short	Z3	3.6	2.0	Exempt species.	Exotic	Prune
1818	Sydney Golden Wattle	*Acacia longifolia*	Mature	8	2	240					240	260	Fair	Fair	Medium	3. Short	Z4	2.9	1.9	In decline.	Native	Prune
1819	Camphor Laurel	*Cinnamomum camphora*	Semi-mature	7	2	250					250	250	Good	Fair	Low	3. Short	Z3	3.0	1.8	Exempt species.	Exotic	Prune
1820	Sydney Golden Wattle	*Acacia longifolia*	Mature	8	3	220	200				297	380	Good	Fair	Medium	2. Medium	A1	3.6	2.2	None.	Native	Prune
1821	Camphor Laurel	*Cinnamomum camphora*	Semi-mature	7	2	300					300	300	Good	Fair	Low	3. Short	Z3	3.6	2.0	Exempt species.	Exotic	Prune
1822	Sydney Golden Wattle	*Acacia longifolia*	Semi-mature	6	1	160					160	180	Good	Fair	Low	5. Small/Young	Z1	2.0	1.6	None.	Native	Prune
3713	Sydney Golden Wattle	*Acacia longifolia*	Semi-mature	4	2	80					80	100	Good	Fair	Low	5. Small/Young	Z1	2.0	1.5	None.	Native	Remove
G1.18	Sydney Golden Wattle	*Acacia longifolia*	Semi-mature	6	2	100					100	130	Good	Good	Low	5. Small/Young	Z1	2.0	1.5	Group of approximately 80 trees on rail embankment.	Native	Remove
G1.20	Swamp Oak	*Casuarina glauca*	Young	6	1	60	70	50			105	120	Good	Fair	Low	5. Small/Young	Z1	2.0	1.5	Group of 7 trees	Native	Remove
G17	Sydney Golden Wattle	*Acacia longifolia*	Semi-mature	6	2	100					100	150	Good	Fair	Low	5. Small/Young	Z1	2.0	1.5	Group of approximately 150 small trees.	Native	Prune
G30	Sydney Golden Wattle	*Acacia longifolia*	Mature	6	2.5	120	120				170	180	Good	Good	Low	5. Small/Young	Z1	2.0	1.6	Group of 8 trees	Native	Prune
G31	Sydney Golden Wattle	*Acacia longifolia*	Semi-mature	6	2.5	130	100				164	150	Good	Good	Low	5. Small/Young	Z1	2.0	1.5	Group of 11 trees	Native	Remove
G32	Tecoma	*Tecoma spp*	Semi-mature	8	4	160					160	180	Good	Fair	Low	5. Small/Young	Z1	2.0	1.6	Group of trees adjacent to fence. Approximately 10 trees.	Exotic	Prune

Explanatory Notes

Tree Species - Common name followed by botanical name. Where species is unknown it is indicated with an *'spp'*.
Age Class - Over mature (OM), Mature (M), Early mature (EM), Semi mature (SM), Young (Y).
Diameter at Standard Height (DSH) - Measured with a diameter tape or estimated at approximately 1.4m above ground level.
Diameter Above root Buttresses (DAB): Measured with a diameter tape or estimated above root buttresses (DAB) for calculating the SRZ.
Height - Height from ground level to top of crown. All heights are estimated unless otherwise indicated.
Spread - Radius of crown at widest section. All tree spreads are estimated unless otherwise indicated.
Notional Root Zone (NRZ) - DSH x 12. Measured in radius from the centre of the trunk. Rounded to nearest 0.1m. For monocots, the NRZ is set at 1 metre outside the crown projection.
Structural Root Zone (SRZ) - (DAB x 50) $^{0.42}$ x 0.64. Measured in radius from the centre of the trunk. Rounded up to nearest 0.1m.
Health - Good/Fair/Poor/Dead
Structure - Good/Fair/Poor
Safe Useful Life Expectancy (SULE) - 1. Long (40+years), 2. Medium (15 - 40 years), 3. Short (5 - 15 years), 4. Remove (under 5 years), 5. Small/young.
Amenity Value - Very High/High/Medium/Low/Very Low.
Retention Value: Tree AZ, see appendix 3 for categories.

Appendix 3 - Further Information of Methodology

1. **Tree Protection Zone:** The tree protection zone (TPZ) is the principle means of protecting trees on development sites. The TPZ is a combination of the root area and crown area requiring protection. It is an area isolated from construction disturbance, so that the tree remains viable. The radius of the TPZ is calculated for each tree by multiplying its DBH x 12. The derived value is measured in radius from the centre of the stem/trunk at ground level. A TPZ should not be less than 2.0 metres nor greater than 15 metres (except where crown protection is required).
It is commonly observed that tree roots will extend significant further than the indicative TPZ, however the TPZ is an area identified AS4970-2009 to be extent where root loss or disturbance will generally not impact the viability of the tree. The TPZ is identified as a restricted area to prevent damage to trees either above or below ground during a development. Where trees are intended to be retained proposed developments must provide an adequate TPZ around trees. The TPZ is set aside for the tree's root zone, trunk and crown and it is essential for the stability and longevity of the tree. The tree protection also incorporates the SRZ (see below for more information about the SRZ). I have calculated the TPZ of palms, other monocots, cycads and tree ferns at one metre outside the crown projection. See appendices for additional information about the TPZ including information about calculating the TPZ and examples of TPZ encroachment.
Minor encroachment into TPZ: Sometimes encroachment into the TPZ is unavoidable. Encroachment includes but is not limited to activities such as excavation, compacted fill and machine trenching. Minor encroachment of up to 10% of the overall TPZ area is normally considered acceptable, providing there is space adjacent to the TPZ for the tree to compensate and the tree is displaying adequate vigour/health to tolerate changes to its growing environment.
Major encroachment into TPZ: Where encroachment of more than 10% of the overall TPZ area is proposed the project Arborist must investigate and demonstrate that the tree will remain in a viable condition. In some cases, tree sensitive construction methods such as pier and beam footings, suspended slabs, or cantilevered sections, can be utilised to allow additional encroachment into the TPZ by bridging over roots and minimising root disturbance. Major encroachment is only possible if it can be undertaken without severing significant size roots, or if it can be demonstrated that significant roots will not be impacted.



2. **Structural Root Zone:** This is the area around the base of a tree required for the trees stability in the ground. An area larger than the SRZ always need to be maintained to preserve a viable tree as it will only have a minor effect on the trees vigour and health. There are several factors that determine the SRZ which include height, crown area, soil type and soil moisture. It can also be influenced by other factors such as natural or built structures. Generally work within the SRZ should be avoided.
An indicative SRZ radius can be determined from the diameter of the trunk measured immediately above the root buttresses. Root investigation could provide more information about the extent of the SRZ. The following formula should be used to calculate the SRZ.
SRZ radius = $(D \times 50)^{0.42} \times 0.64$ (D = Diameter above root buttress).

3. **Tree Age Class:** If can be difficult to determine the age of a tree without carrying out invasive tests that may damage the tree, so we have categorised there likely age class which is defined below;
    - Young/Newly planted: Young or recently planted tree.
    - Semi Mature: Up to 20% of the usual life expectancy for the species.
    - Early mature/Mature: Between 20%-80% of the usual life expectancy for the species.
    - Over mature: Over 80% of the usual life expectancy for the species.
    - Dead: Tree is dead or almost dead.

4. **Health/Physiological Condition:** Below are examples conditions used when assigning a category for tree health.

Category	Example condition	Summary
Good	• Crown has good foliage density for species. • Tree shows no or minimal signs of pathogens that are unlikely to have an effect on the health of the tree. • Tree is displaying good vigour and reactive growth development.	• The tree is in above average health and condition and no remedial works are required.
Fair	• The tree may be starting to dieback or have over 25% deadwood. • Tree may have slightly reduced crown density or thinning. • There may be some discolouration of foliage. • Average reactive growth development. • There may be early signs of pathogens which may further deteriorate the health of the tree. • There may be epicormic growth indicating increased levels of stress within the tree.	• The tree is in below average health and condition and may require remedial works to improve the trees health.
Poor	• The may be in decline, have extensive dieback or have over 30% deadwood. • The canopy may be sparse or the leaves may be unusually small for species. • Pathogens or pests are having a significant detrimental effect on the tree health.	• The tree is displaying low levels of health and removal or remedial works may be required.
Dead	• The tree is dead or almost dead.	• The tree should generally be removed.

5. **Structural Condition:** Below are examples conditions used when assigning a category for structural condition.

Category	Example condition	Summary
Good	• Branch unions appear to be strong with no sign of defects. • There are no significant cavities. • The tree is unlikely to fail in usual conditions. • The tree has a balanced crown shape and form.	• The tree is considered structurally good with well developed form.
Fair	• The tree may have minor structural defects within the structure of the crown that could potentially develop into more significant defects. • The tree may a cavity that is currently unlikely to fail but may deteriorate in the future. • The tree is an unbalanced shape or leans significantly. • The tree may have minor damage to its roots. • The root plate may have moved in the past but the tree has now compensated for this. • Branches may be rubbing or crossing.	• The identified defects are unlikely cause major failure. • Some branch failure may occur in usual conditions. • Remedial works can be undertaken to alleviate potential defects.
Poor	• The tree has significant structural defects. • Branch unions may be poor or weak. • The tree may have a cavity or cavities with excessive levels of decay that could cause catastrophic failure. • The tree may have root damage or is displaying signs of recent movement. • The tree crown may have poor weight distribution which could cause failure.	• The identified defects are likely to cause either partial or whole failure of the tree.

6. **Amenity Value:** To determine the amenity value of a tree we assess a number of different factors, which include but are not limited to the information below.
   - The visibility of the tree to adjacent sites.
   - The relationship between the tree and the site.
   - Whether the tree is protected by any statuary conditions.
   - The habitat value of the tree.
   - Whether the tree is considered a noxious weed species.

   The amenity value is rated using one of the following values.
   - Very High
   - High
   - Moderate
   - Low
   - Very Low

7. **Safe Useful Life Expectancy (SULE), (Barrel, 2001):** A trees safe useful life expectancy is determined by assessing a number of different factors including the health and vitality, estimated age in relation to expected life expectancy for the species, structural defects, and remedial works that could allow retention in the existing situation.

Category	Description
1. Long - Over 40 years	(a) Structurally sound trees located in positions that can accommodate future growth. (b) Trees that could be made suitable for retention in the long term by remedial tree care. (c) Trees of special significance for historical, commemorative or rarity reasons that would warrant extraordinary efforts to secure their long term retention.
2. Medium - 15 to 40 years	(a) Trees that may only live between 15 and 40 more years. (b) Trees that could live for more than 40 years but may be removed for safety or nuisance reasons. (c) Trees that could live for more than 40 years but may be removed to prevent interference with more suitable individuals or to provide space for new planting. (d) Trees that could be made suitable for retention in the medium term by remedial tree care.
3. Short - 5 to 15 years	(a) Trees that may only live between 5 and 15 more years. (b) Trees that could live for more than 15 years but may be removed for safety or nuisance reasons. (c) Trees that could live for more than 15 years but may be removed to prevent interference with more suitable individuals or to provide space for new planting. (d) Trees that require substantial remedial tree care and are only suitable for retention in the short term.
4. Remove - Under 5 years	(a) Dead, dying, suppressed or declining trees because of disease or inhospitable conditions. (b) Dangerous trees because of instability or recent loss of adjacent trees. (c) Dangerous trees because of structural defects including cavities, decay, included bark, wounds or poor form. (d) Damaged trees that are clearly not safe to retain. (e) Trees that could live for more than 5 years but may be removed to prevent interference with more suitable individuals or to provide space for new planting. (f) Trees that are damaging or may cause damage to existing structures within 5 years. (g) Trees that will become dangerous after removal of other trees for the reasons given in (a) to (f). (h) Trees in categories (a) to (g) that have a high wildlife habitat value and, with appropriate treatment, could be retained subject to regular review.
5. Small/Young	(a) Small trees less than 5m in height. (b) Young trees less than 15 years old but over 5m in height. (c) Formal hedges and trees intended for regular pruning to artificially control growth.

8. **Root investigations:** The root investigations should identify roots greater than 30mm in diameter that are located along the edge of the structures footprint or in the location of footings. Root investigations must be carried out using non-invasive methods (manual excavations). Any excavations for the root investigations must carried out manually to avoid damaging the roots during excavations. Manual excavation may include the use of a high-pressure air/air knife, or a combination of high-pressure water and a vacuum device. When hand excavating carefully work around roots retaining as many as possible. Take care to not fray, wound, or cause damage to any roots during excavations as this may cause decay or infection from pathogens. It is essential that exposed roots are kept moist and the excavation back filled as soon as possible. The root investigations should be carried out by a qualified Arborist minimum AQF3. Once roots are exposed, a visual assessment can be carried out by a consulting Arborist to evaluate the potential impact of the proposed root loss on the health and stability of the tree. A root map/report should be prepared identifying the findings of investigations, including photographs as supporting evidence in the report.

9. **Retention Value:** The system I have used to award the retention value is Tree AZ. Tree AZ is used to identify higher value trees worthy of being a constraint to development and lower value trees that should generally not be a constraint to the development. The table below provides a brief description of each category.

TreeAZ Categories (Version 10.04-ANZ)

CAUTION: TreeAZ assessments must be carried out by a competent person qualified and experienced in arboriculture. The following category descriptions are designed to be a brief field reference and are not intended to be self-explanatory. They must be read in conjunction with the most current explanations published at www.TreeAZ.com.

Category Z: Unimportant trees not worthy of being a material constraint

Local policy exemptions: Trees that are unsuitable for legal protection for local policy reasons including size, proximity and species	
Z1	Young or insignificant small trees, i.e. below the local size threshold for legal protection, etc
Z2	Too close to a building, i.e. exempt from legal protection because of proximity, etc
Z3	Species that cannot be protected for other reasons, i.e. scheduled noxious weeds, out of character in a setting of acknowledged importance, etc
High risk of death or failure: Trees that are likely to be removed within 10 years because of acute health issues or severe structural failure	
Z4	Dead, dying, diseased or declining
Z5	Severe damage and/or structural defects where a high risk of failure cannot be satisfactorily reduced by reasonable remedial care, i.e. cavities, decay, included bark, wounds, excessive imbalance, overgrown and vulnerable to adverse weather conditions, etc
Z6	Instability, i.e. poor anchorage, increased exposure, etc
Excessive nuisance: Trees that are likely to be removed within 10 years because of unacceptable impact on people	
Z7	Excessive, severe and intolerable inconvenience to the extent that a locally recognized court or tribunal would be likely to authorize removal, i.e. dominance, debris, interference, etc
Z8	Excessive, severe and intolerable damage to property to the extent that a locally recognized court or tribunal would be likely to authorize removal, i.e. severe structural damage to surfacing and buildings, etc
Good management: Trees that are likely to be removed within 10 years through responsible management of the tree population	
Z9	Severe damage and/or structural defects where a high risk of failure can be temporarily reduced by reasonable remedial care, i.e. cavities, decay, included bark, wounds, excessive imbalance, vulnerable to adverse weather conditions, etc
Z10	Poor condition or location with a low potential for recovery or improvement, i.e. dominated by adjacent trees or buildings, poor architectural framework, etc
Z11	Removal would benefit better adjacent trees, i.e. relieve physical interference, suppression, etc
Z12	Unacceptably expensive to retain, i.e. severe defects requiring excessive levels of maintenance, etc

NOTE: Z trees with a high risk of death/failure (Z4, Z5 & Z6) or causing severe inconvenience (Z7 & Z8) at the time of assessment and need an urgent risk assessment can be designated as ZZ. ZZ trees are likely to be unsuitable for retention and at the bottom of the categorization hierarchy. In contrast, although Z trees are not worthy of influencing new designs, urgent removal is not essential and they could be retained in the short term, if appropriate.

Category A: Important trees suitable for retention for more than 10 years and worthy of being a material constraint

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

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

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

URBAN ARBOR
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Glossary of Terms

Abiotic - Pertaining to non-living agents; e.g. environmental factors

Adventitious shoots - Shoots that develop other than from apical, axillary or dormant buds; see also 'epicormic'

Anchorage - The system whereby a tree is fixed within the soil, involving cohesion between roots and soil and the development of a branched system of roots which withstands wind and gravitational forces transmitted from the aerial parts of the tree

Bark - A term usually applied to all the tissues of a woody plant lying outside the vascular cambium, thus including the phloem, cortex and periderm; occasionally applied only to the periderm or the phellem

Branch:
• **Primary**. A first order branch arising from a stem
• **Lateral**. A second order branch, subordinate to a primary branch or stem and bearing sub-lateral branches
• **Sub-lateral**. A third order branch, subordinate to a lateral or primary branch, or stem and usually bearing only twigs

Branch collar - A visible swelling formed at the base of a branch whose diameter growth has been disproportionately slow compared to that of the parent stem; a term sometimes applied also to the pattern of growth of the cells of the parent stem around the branch base

Brown-rot - A type of wood decay in which cellulose is degraded, while lignin is only modified

Buckling - An irreversible deformation of a structure subjected to a bending load

Buttress zone - The region at the base of a tree where the major lateral roots join the stem, with buttress-like formations on the upper side of the junctions

Cambium - Layer of dividing cells producing xylem (woody) tissue internally and phloem (bark) tissue externally

Canker - A persistent lesion formed by the death of bark and cambium due to colonisation by fungi or bacteria

Compartmentalisation - The confinement of disease, decay or other dysfunction within an anatomically discrete region of plant tissue, due to passive and/or active defences operating at the boundaries of the affected region

Compressive loading - Mechanical loading which exerts a positive pressure; the opposite to tensile loading

Condition - An indication of the physiological condition of the tree. Where the term ‘condition’ is used in a report, it should not be taken as an indication of the stability of the tree

Crown/Canopy - The main foliage bearing section of the tree

Crown lifting - The removal of limbs and small branches to a specified height above ground level

Crown thinning - The removal of a proportion of secondary branch growth throughout the crown to produce an even density of foliage around a well-balanced branch structure

Crown reduction/shaping - A specified reduction in crown size whilst preserving, as far as possible, the natural tree shape

DAB (Diameter Above Buttress) - Trunk diameter measured above the root buttress

Defect - In relation to tree hazards, any feature of a tree which detracts from the uniform distribution of mechanical stress, or which makes the tree mechanically unsuited to its environment

Dieback - The death of parts of a woody plant, starting at shoot-tips or root-tips

Disease - A malfunction in or destruction of tissues within a living organism, usually excluding mechanical damage; in trees, usually caused by pathogenic micro-organisms

Dominance - In trees, the tendency for a leading shoot to grow faster or more vigorously than the lateral shoots; also the tendency of a tree to maintain a taller crown than its neighbours

Dormant bud - An axial bud which does not develop into a shoot until after the formation of two or more annual wood increments; many such buds persist through the life of a tree and develop only if stimulated to do so

Dysfunction - In woody tissues, the loss of physiological function, especially water conduction, in sapwood

DBH (Diameter at Breast Height) - Stem diameter measured at a height of 1.4 metres or the nearest measurable point. Where measurement at a height of 1.4 metres is not possible, another height may be specified

Deadwood - Branch or stem wood bearing no live tissues. Retention of deadwood provides valuable habitat for a wide range of species and seldom represents a threat to the health of the tree. Removal of deadwood can result in the ingress of decay to otherwise sound tissues and climbing operations to access deadwood can cause significant damage to a tree. Removal of deadwood is generally recommended only where it represents an unacceptable level of hazard

Epicormic shoot - A shoot having developed from a dormant or adventitious bud and not having developed from a first year shoot

Flush-cut - A pruning cut which removes part of the branch bark ridge and or branch-collar

Girdling root - A root which circles and constricts the stem or roots possibly causing death of phloem and/or cambial tissue

Habit - The overall growth characteristics, shape of the tree and branch structure

Hazard beam - An upwardly curved part of a tree in which strong internal stresses may occur without being reduced by adaptive growth; prone to longitudinal splitting

Incorporating extracts from Lonsdale, D. 1999. Principles of Tree Hazard Assessment. Her Majesty's Stationary Office, London

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Heartwood/false-heartwood - The dead central wood that has become dysfunctional as part of the aging processes and being distinct from the sapwood

Heave - A term mainly applicable to a shrinkable clay soil which expands due to re-wetting after the felling of a tree which was previously extracting moisture from the deeper layers; also the lifting of pavements and other structures by root diameter expansion; also the lifting of one side of a wind-rocked root-plate

Included bark (ingrown bark) - Bark of adjacent parts of a tree (usually forks, acutely joined branches or basal flutes) which is in face-to-face contact

Lever arm - A mechanical term denoting the length of the lever represented by a structure that is free to move at one end, such as a tree or an individual branch

Lignin - The hard, cement-like constituent of wood cells; deposition of lignin within the matrix of cellulose microfibrils in the cell wall is termed Lignification

Lions tailing - A term applied to a branch of a tree that has few if any side-branches except at its end, and is thus liable to snap due to end- loading

Loading - A mechanical term describing the force acting on a structure from a particular source; e.g. the weight of the structure itself or wind pressure

Mycelium - The body of a fungus, consisting of branched filaments (hyphae)

Occlusion - The process whereby a wound is progressively closed by the formation of new wood and bark around it

Pathogen - A micro-organism which causes disease in another organism

Photosynthesis - The process whereby plants use light energy to split hydrogen from water molecules, and combine it with carbon dioxide to form the molecular building blocks for synthesizing carbohydrates and other biochemical products

Probability - A statistical measure of the likelihood that a particular event might occur

Pruning - The removal or cutting back of twigs or branches, sometimes applied to twigs or small branches only, but often used to describe most activities involving the cutting of trees or shrubs

Radial - In the plane or direction of the radius of a circular object such as a tree stem

Reactive Growth/Reaction Wood - Production of woody tissue in response to altered mechanical loading; often in response to internal defect or decay and associated strength loss (cf. adaptive growth)

Ring-barking - The removal of a ring of bark and phloem around the circumference of a stem or branch, normally resulting in an inability to transport photosynthetic assimilates below the area of damage. Almost inevitably results in the eventual death of the affected stem or branch above the damage

Root-collar - The transitional area between the stem/s and roots

Sapwood - Living xylem tissues

Soft-rot - A kind of wood decay in which a fungus degrades cellulose within the cell walls, without any general degradation of the wall as a whole

Stem/s - Principle above-ground structural component(s) of a tree that supports its branches

Stress - In plant physiology, a condition under which one or more physiological functions are not operating within their optimum range, for example due to lack of water, inadequate nutrition or extremes of temperature

SRZ (Structural Root Zone) - The area around the base of the tree required for the trees stability in the ground

Subsidence - In relation to soil or structures resting in or on soil, a sinking due to shrinkage when certain types of clay soil dry out, sometimes due to extraction of moisture by tree roots

Taper - In stems and branches, the degree of change in girth along a given length

Targets - In tree risk assessment (with slight misuse of normal meaning) persons or property or other things of value which might be harmed by mechanical failure of the tree or by objects falling from it

Topping - In arboriculture, the removal of the crown of a tree, or of a major proportion of it

Transpiration - The evaporation of moisture from the surface of a plant, especially via the stomata of leaves; it exerts a suction which draws water up from the roots and through the intervening xylem cells

TPZ (Tree Protection Zone) - A specified area above and below ground and at a given distance from the trunk set aside for the protection of a tree's roots and crown to provide for the viability and stability of a tree to be retained where it is potentially subject to damage by development

Understory - This layer consists of younger individuals of the dominant trees, together with smaller trees and shrubs which are adapted to grow under lower light conditions

Veteran tree - Tree that, by recognised criteria, shows features of biological, cultural or aesthetic value that are characteristic of, but not exclusive to, individuals surviving beyond the typical age range for the species concerned. These characteristics might typically include a large girth, signs of crown retrenchment and hollowing of the stem

Vigour - The expression of carbohydrate expenditure to growth (in trees)

White-rot - A range of kinds of wood decay in which lignin, usually together with cellulose and other wood constituents, is degraded

Wind exposure - The degree to which a tree or other object is exposed to wind, both in terms of duration and velocity

Wind pressure - The force exerted by a wind on a particular object

Windthrow - The blowing over of a tree at its roots

Incorporating extracts from Lonsdale, D. 1999. Principles of Tree Hazard Assessment. Her Majesty's Stationary Office, London

Appendix A (Part E) – Addendum to Arboricultural Pruning Specification Report (Southwest Metro –Campsie to Belmore)

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Addendum to Arboricultural Pruning Specification Report

Site Location: Southwest Metro – Campsie to Belmore

Prepared for:
UGL

Prepared by: Bryce Claassens and Alex Kurath
Date prepared: 10 November 2025
Ref: 251110_SWM_Ineco_PS_Ad5.1
Addendum: 5.1

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1. INTRODUCTION

1.1 Urban Arbor have been instructed to prepare an addendum to the previous Pruning Specification Report (18 November 2024) in relation to Corridor Intruder Detection System (CIDS) and Object Detection System (ODS) trouble spots. The report is to address trees within and adjacent to the rail corridor between Campsie Station and Belmore Station.

1.2 Documents and information provided to assist in preparing the report;

A) Arboricultural Pruning Specification Report, Urban Arbor, Ref:241118_SWM_Ineco_PS, Revision 2,18 November 2024.
B) CCTV LOS and Nuisance Alarm Register, Doc No. SMCSWIDS-UGL-1NL-TC-REG-000745, Revision B18, 14 August 2025.

1.3 The site and tree inspections were carried out on 11 August 2025 and 23 October 2025 by Alex Kurath of Urban Arbor, in conjunction with representatives from UGL (Rares Pop), JHLORJV (Andre Kruize) and Sydney Metro. UGL advised the trees requiring pruning or removal to obtain camera visibility of fence lines.

1.4 Some trees included within this report were previously inspected between the dates of 6 January 2020 to 3 April 2020 by Bryce Claassens during the South West Metro Rail Corridor (SWMRC) and Station Precinct design works. Access was available to the subject site and adjoining public areas only. This report has been written by Bryce Claassens.

2. SCOPE OF THE REPORT

2.1 This report has been undertaken to meet the following objectives.

2.1.1 Conduct a walk-through assessment of the areas where trees (identified by UGL) are currently obstructing camera visibility, which require pruning or removal. The decision of pruning or removal of trees is subject to the agreement and approval of the stakeholders.

2.1.2 Conduct a visual assessment of significant trees not previously included in the Pruning Specification Report (dated 18 November 2024), located within areas identified by UGL. For the purpose of this report, a significant tree is a ‘Long lived woody perennial plant greater than (or usually greater than) 3 metres in height with one or relatively few main stems or trunks’.

2.1.3 Determine the trees estimated contribution years and remaining useful life expectancy and award the trees a retention value.

2.1.4 Provide pruning specifications for trees where required, in accordance with AS4373-2007.

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3. LIMITATIONS

3.1 The observations and recommendations are based on the site inspections identified in section 1 only. The findings of this report are based on the observations and site conditions at the time of inspection.

3.2 All of the observations were carried out from ground level. The accuracy of the assessment of the subject trees structural condition and health is limited to the visibility of the tree at the time of inspection.

3.3 The tree inspection was visual from ground level only. No soil or tissue testing was carried out as part of the tree inspection. None of the surrounding surfaces adjacent to trees were lifted or removed during the tree inspections.

3.4 Root decay can sometimes be present with no visual indication above ground. It is also impossible to know the extent of any root damage caused by mechanical damage such as underground root cutting during the installation of services without undertaking detailed root investigation. Any form of tree failure due to these activities is beyond the scope of this assessment.

3.5 The report reflects the subject tree(s) as found on the day of inspection. Any changes to the growing environment of the subject tree, or tree management works beyond those recommended in this report may alter the findings of the report. There is no warranty, expressed or implied, that problems or deficiencies relating to the subject tree, or subject site may not arise in the future.

3.6 Tree identification is based on accessible visual characteristics at the time of inspection. As key identifying features are not always available the accuracy of identification is not guaranteed. Where tree species is unknown, it is indicated with an *spp*.

3.7 Some trees included within this report have been located using a Trimble TDC100 hand held GNSS device by Urban Arbor Pty Ltd. Tree locations captured by the Trimble TDC100 are only accurate to within 1m - 3m. If an accurate location of these trees is required, a registered surveyor should locate the trees.

3.8 In some instances, multiple trees or groups of small trees have been identified as groups of trees within this report.

3.9 All diagrams, plans and photographs included in this report are visual aids only and are not to scale unless otherwise indicated.

3.10 Alteration of this report invalidates the entire report.

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4. METHODOLOGY

4.1 The following information was collected during the assessment of the subject tree(s).

- 4.1.1 Tree common name
- 4.1.2 Tree botanical name
- 4.1.3 Tree age class
- 4.1.4 DSH (Trunk/Stem diameter at breast height/1.4m) - millimetres.
- 4.1.5 DAB (Trunk diameter directly above the root buttress) – millimetres.
- 4.1.6 Estimated height - metres
- 4.1.7 Estimated crown spread (diameter of crown) - metres
- 4.1.8 Health
- 4.1.9 Structural condition
- 4.1.10 Amenity value
- 4.1.11 Estimated remaining contribution years (SULE)[1]
- 4.1.12 Retention value (Tree AZ)[2]
- 4.1.13 Notes/comments

4.2 An assessment of the trees condition was made using the visual tree assessment (VTA) model (Mattheck & Breloer, 1994).[3]

4.3 Tree diameter was measured using a DSH tape or in some cases estimated. Tree height and tree canopy spread was measured with a clinometer or in some cases estimated. All other measurements were estimations unless otherwise stated. The other tools used during the assessment were a nylon mallet, compass, camera and a steel probe.

4.4 All DSH measurements, notional root zones, and structural root zones within Appendix 2 of this report were calculated in accordance with methods set out in AS4970 Protection of trees on development sites (2025).[4]

4.5 Details of how the observations in this report have been assessed are listed in the appendices.

[1] Barrell, J. (2001), *'SULE: Its use and status in the new millennium' in Management of Mature Trees proceedings of the 4th NAAA Workshop*, Sydney, 2001. Barrell.

[2] Barrell Tree Consultancy, *Tree AZ version 10.10-ANZ*, http://www.treeaz.com/.

[3] Mattheck, C. & Breloer, H., *The body language of trees - A handbook for failure analysis*, The Stationary Office, London, England (1994).

[4] Council Of Standards Australia, *AS4970 Protection of trees on development sites* (2025).

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5. SITE LOCATION AND BRIEF DESCRIPTION

5.1 The area covered in the site inspections is located within the Canterbury Bankstown LGA. All trees within the Canterbury Bankstown LGA are subject to protection under the Canterbury Bankstown LEP 2023[5] and Canterbury Bankstown DCP 2023.[6]

6. AREAS ASSESSED

6.1 The areas assessed in this report have been identified by UGL in the report CCTV LOS and Nuisance Alarm Register (dated 14 August 2025), which includes trees within and adjacent to the rail corridor between Campsie Station and Belmore Station.

7. TREE OBSERVATIONS

7.1 **Tree information:** Details of each individual tree assessed, including the observations taken during the site inspections, can be found in the tree inspection schedule in appendix 2. Each of the subject trees have been awarded a retention value based on the observations using the Tree AZ method. Tree AZ is used to identify higher value trees worthy of being a constraint to development and lower value trees that should generally not be a constraint to the development. The Tree AZ categories sheet (Barrell Tree Consultancy) has been included in appendix 3 to assist with understanding the retention values. The retention values that have been allocated to the subject trees in this report is not definitive and should only be used as a guideline.

8. ASSESSMENT OF TREE IMPACTS BY AREA

8.1 The trees included in the following sections have been identified by UGL as being subject to impacts from development works. All trees to be retained should be protected in accordance with AS4970-2025 *Protection of trees on development sites*. If there are any development works that have not been assessed and could potentially impact additional trees, the project arborist must assess the impact of the proposed works to the condition of the trees, determining the trees viability for retention.

[5] *Canterbury Bankstown Local Environmental Plan 2023*, https://legislation.nsw.gov.au/view/html/inforce/current/epi-2023-0336, accessed 21 August 2025.

[6] *Canterbury Bankstown Development Control Plan 2023*, https://www.cbcity.nsw.gov.au/development/planning-control-policies/canterbury-bankstown-development-control-plan-2023, accessed 21 August 2025.

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8.2 Campsie to Belmore (CTB_01 – CTB_08)

8.2.1 Twenty-two (22) trees and four (4) groups of trees have been identified for removal in this area, including tree 523, 539, 655, 830, 2288, 2306, 2307, 2308, 2313, 2316, 2320, 2321, 2328, 3565, 3566, 3567, 3618, 3730, 3731, 3732, 3735, 3773, G1.22, G1.23, G1.24, and G41.

8.2.2 Eleven (11) trees and one (1) group of trees have been identified for canopy pruning in this area, including tree 540, 2267, 2270, 2273, 2287, 2293, 2303, 2310, 2326, 3734, 3736 and G40. All canopy pruning must be completed in accordance with AS4373 *Pruning of amenity trees* (2007).

8.2.3 The details of the trees are summarised in the table below. Photographs of the trees are included in section 8.3.

Tree ID	Botanical Name	SULE	Retention Value	Height (m)	Canopy Spread (m) - radius	Native / Exotic	Prune / Remove
523	*Eucalyptus microcorys*	3. Short	Z9	9	3.5	Native	Remove
539	*Acacia longifolia*	5. Small/Young	Z1	4	1	Native	Remove
540	*Acacia longifolia*	5. Small/Young	Z1	4	1	Native	Prune
655	*Cinnamomum camphora*	2. Medium	A1	11	5	Exotic	Remove
830	*Acacia longifolia*	5. Small/Young	Z1	5	2	Native	Remove
2267	*Afrocarpus falcatus*	1. Long	A1	8	4	Exotic	Prune
2270	*Eucalyptus spp*	5. Small/Young	Z1	6	2	Native	Prune
2273	*Eucalyptus robusta*	4. Remove	Z5	9	2	Native	Prune
2287	*Acacia longifolia*	2. Medium	A1	8	2	Native	Prune
2288	*Acacia longifolia*	4. Remove	Z4	5	2	Native	Remove
2293	*Acacia parramattensis*	2. Medium	A1	7	3	Native	Prune
2303	*Callistemon viminalis*	1. Long	A1	8	4	Native	Prune
2306	*Callistemon viminalis*	1. Long	A1	9	3	Native	Remove
2307	*Callistemon viminalis*	2. Medium	A1	8	2	Native	Remove
2308	*Callistemon viminalis*	1. Long	A1	8	3	Native	Remove
2310	*Brachychiton populneus*	1. Long	A1	6	4	Native	Prune
2313	*Pittosporum undulatum*	3. Short	Z10	6	2	Native	Remove
2316	*Platanus x hispanica*	3. Short	Z10	8	2	Exotic	Remove
2320	*Ligustrum lucidum*	5. Small/Young	Z3	5	1	Exotic	Remove
2321	*Jacaranda mimosifolia*	5. Small/Young	Z1	6	2	Exotic	Remove
2326	*Acacia longifolia*	5. Small/Young	Z1	5	2	Native	Prune
2328	*Acacia longifolia*	5. Small/Young	Z1	2	1	Native	Remove
3565	*Robinia pseudoacacia 'Frisia'*	5. Small/Young	Z1	5	2	Exotic	Remove
3566	*Robinia pseudoacacia 'Frisia'*	5. Small/Young	Z1	5	2	Exotic	Remove
3567	*Robinia pseudoacacia 'Frisia'*	5. Small/Young	Z3	4	1.5	Exotic	Remove

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Tree ID	Botanical Name	SULE	Retention Value	Height (m)	Canopy Spread (m) - radius	Native / Exotic	Prune / Remove
3618	*Celtis spp*	5. Small/Young	Z3	4	2	Exotic	Remove
3730	*Tristaniopsis laurina 'Luscious'*	5. Small/Young	Z1	4	2	Native	Remove
3731	*Acacia longifolia*	5. Small/Young	Z1	5	2	Native	Remove
3732	*Unknown species*	5. Small/Young	Z1	4	1.5	Native	Remove
3734	*Acacia longifolia*	5. Small/Young	Z1	5	2	Native	Prune
3735	*Olea europaea subsp. cuspidata*	5. Small/Young	Z1	6	2	Exotic	Remove
3736	*Cinnamomum camphora*	1. Long	A1	12	6	Exotic	Prune
3773	*Melaleuca spp*	5. Small/Young	Z1	4	1	Native	Remove
G1.22	*Acacia spp*	3. Short	Z1	4	2	Native	Remove
G1.23	*Acacia implexa*	5. Small/Young	Z10	7	2	Native	Remove
G1.24	*Acacia spp*	5. Small/Young	Z1	3	1.5	Native	Remove
G40	*Acacia parramattensis*	5. Small/Young	Z1	5	3	Native	Prune
G41	*Acacia parramattensis*	5. Small/Young	Z1	5	3	Native	Remove

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8.3 **Photographs**

Image 1: Looking towards tree 523. The tree is recommended for removal.

Image 2: Looking towards tree 3730. The tree is recommended for removal.

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Image 3: Looking towards tree 539. The tree is recommended for removal.

Image 4: Looking towards tree 540. Canopy pruning is required to provide 2m clearance from the fence. The 60mm diameter first order branch over the fence is to be pruned at approximately 1m above ground level. The pruning will result in the removal of 5% of the live foliage area of the tree. The branch to be removed has been marked yellow.

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Image 5: Looking towards G40. Group of approcimately 10 trees. Canopy pruning is required to provide 2m clearance from the fence. Maximum finished cut diameters must not exceed 50mm. The pruning will result in the removal of approximately 5% of the live foliage area of each tree. An approximate area of the pruning has been shaded yellow.

Image 6: Looking towards G41. Group of approximately 20 trees recommended for removal. See Image 7 below for a close up of 5 trees at the Western end of the group.

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Image 7: Looking towards G41. Showing a close up of 5 small trees at the Western end of the G41 on Lilian Lane near Moreton St Bridge..

Image 8: Looking towards tree 830 and 3731. The trees are recommended for removal.

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Image 9: Looking towards G1.22. Group of approximately 15 trees recommended for removal.

Image 10: Looking towards G1.23. Group of approximately 25 trees recommended for removal.

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Image 11: Looking towards G1.24. Group of approximately 20 trees recommended for removal.

Image 12: Looking towards tree 3618. The tree is recommended for removal

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Image 13: Looking towards tree 3565, 3566 and 3567. The trees are recommended for removal.

Image 14: Looking towards tree 655. The tree is recommended for removal.

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Image 15: Looking towards tree 3732. The tree is recommended for removal.

Image 16: Looking towards tree 2267. Canopy pruning is required to provide 2m clearance from the fence. The three first order branches to the South (max finished cut diameter of 140mm) and the smaller branches measuring less than 50mm in diameter to the South are to be pruned. The pruning will result in the removal of approximately 10% of the live foliage area of the tree. The branches to be removed have been marked yellow.

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Image 17: Looking towards tree 2270. Canopy pruning is required to provide 2m clearance from the fence. The two first order branches to the Southwest (max finished cut diameter of 60mm) are to be pruned. The pruning will result in the removal of approximately 5% of the live foliage area of the tree. The branches to be removed have been marked yellow. Also showing tree 3773 which is recommended for removal.

Image 18: Looking towards tree 2273. Canopy pruning is required to provide 2m clearance from the fence. The smaller branches to the Southwest (max finished cut diameter of 70mm) are to be pruned. The pruning will result in the removal of approximately 5% of the live foliage area of the tree. The approximate area of pruning has been marked yellow.

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Image 19: Looking towards tree 2287. Canopy pruning is required to provide 2m clearance from the fence. The two first order branches to the South (160mm) and Southeast (70mm) are to be pruned. The pruning will result in the removal of approximately 20-30% of the live foliage area of the tree. The pruning is considered signficant, but a preferred option to whole tree removal. The branches to be pruned have been marked yellow.

Image 20: Looking towards tree 2288. The tree is recommended for removal.

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Image 21: Looking towards tree 2293. Canopy pruning is required to provide 2m clearance from the fence. The first order branch to the South (finished cut diameter of 180mm) is to be removed. The pruning will result in the removal of approximately 15% of the live foliage area of the tree. The branch to be removed has been marked yellow.

Image 22: Looking towards tree 3734. Canopy pruning is required to provide 3m clearance from the fence. Smaller branches measuring less than 50mm in diameter are to be pruned. The pruning will result in the removal of approximately 15% of the live foliage area of the tree. The approximate area of the pruning has been marked yellow.

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Image 23: Looking towards tree 2303. Canopy pruning is required to provide 2m clearance from the fence. The three second order branches to the South (max finished cut diameter of 130mm) are to be pruned. The pruning will result in the removal of approximately 15% of the live foliage area of the tree. The branches to be removed have been marked yellow.

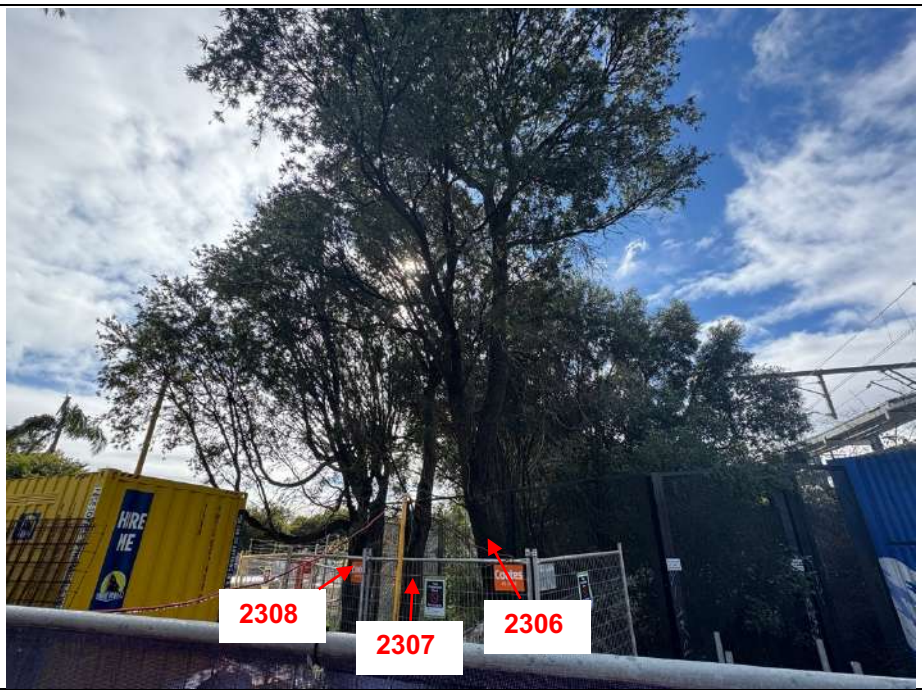

Image 24: Looking towards tree 2306, 2307 and 2308. The trees are recommended for removal.

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Image 25: Looking towards tree 2320, 2321 and 3735. The trees are recommended for removal.

Image 26: Looking towards tree 2316. The tree is recommended for removal.

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Image 27: Looking towards tree 2313. The tree is recommended for removal.

Image 28: Looking towards tree 2310. Canopy pruning is required to provide 2m clearance from the fence. Smaller branches measuring less than 80mm in diameter are to be pruned. The pruning will result in the removal of approximately 10% of the live foliage area of the tree. The approximate area of the pruning has been marked yellow.

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Image 29: Looking towards tree 3736. Canopy pruning is required to provide 2m clearance from the fence. The four second order brances (max finsihed cut diameter of 120mm) are to be pruned. The pruning will result in the removal of approximately 5% of the live foliage area of the tree. The approximate area of the pruning has been marked yellow.

Image 30: Looking towards tree 2326 and 2328. Canopy pruning is required for tree 2326 to provide 3m clearance from the fence. The smaller brances measuring less than 50mm are to be pruned. The pruning will result in the removal of approximately 5% of the live foliage area of tree 2326. The approximate area of the pruning has been marked yellow. Tree 2328 is recommended for removal.

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9. CONCLUSIONS

9.1 **Table 2:** Summary of the trees requiring pruning or removal;

Impact	Reason	Category A	Category Z	TOTAL
		A	Z	
Trees recommended to be removed	Installation of services, line of sight for cameras, solar panel accessibility	655, 2306, 2307, 2308 (Four trees)	523, 539, 830, 2288, 2313, 2316, 2320, 2321, 2328, 3565, 3566, 3567, 3618, 3730, 3731, 3732, 3735, 3773, G1.22, G1.23, G1.24, G41 (Eighteen trees & four groups of trees)	**22 trees and 4 group of trees**
Trees requiring pruning	Installation of services, line of sight for cameras	2267, 2287, 2293, 2303, 2310, 3736 (Six trees)	540, 2270, 2273, 2326, 3734, G40 (Five trees & one group of trees)	**11 trees & 1 group of trees**

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10. RECOMMENDATIONS

10.1 This report assesses trees that require pruning or removal for camera visibility works along the rail corridor. Thirty-one (31) trees and five (5) groups of trees have been identified and assessed in this report.

10.2 Twenty-two (22) trees and four (4) groups of trees have been identified for removal in this area, including tree 523, 539, 655, 830, 2288, 2306, 2307, 2308, 2313, 2316, 2320, 2321, 2328, 3565, 3566, 3567, 3618, 3730, 3731, 3732, 3735, 3773, G1.22, G1.23, G1.24, and G41.

10.3 The trees discussed above in section 10.2 have been recommended for removal due to excessive amounts of pruning required to achieve camera visibility, as discussed in section 1.3. It may be possible to retain/prune some of the trees recommended for removal based upon the final installation locations of cameras and their FOV. This will need to be determined by UGL and the project arborist.

10.4 Eleven (11) trees and one (1) group of trees have been identified for canopy pruning in this area, including tree 540, 2267, 2270, 2273, 2287, 2293, 2303, 2310, 2326, 3734, 3736 and G40. All canopy pruning must be completed in accordance with AS4373 *Pruning of amenity trees* (2007).

10.5 All trees that require canopy pruning can be retained in a viable condition. All trees to be retained must be protected in accordance with AS4970-2025 *Protection of trees on development sites*.

10.6 This report does not provide approval for tree removal or pruning works. All recommendations in this report are subject to approval by the relevant authorities and/or tree owners.

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12. LIST OF APPENDICES

The following are included in the appendices:

- Appendix 2 - Tree inspection schedule
- Appendix 3 - Definition of Methodology

Alex Kurath
8004 2802
sales@urbanarbor.com.au
Diploma of Arboriculture (AQF5)
Member of Arboriculture Australia
ISA Member (International Society of Arboriculture)

Bryce Claassens
Diploma of Arboriculture (AQF5)
Cert III Landscape Construction
Member Arboriculture Australia
Quantified Tree Risk Assessment (QTRA)
ISA Tree Risk Assessment Qualification (TRAQ)

Appendix 2 - Tree Inspection Schedule

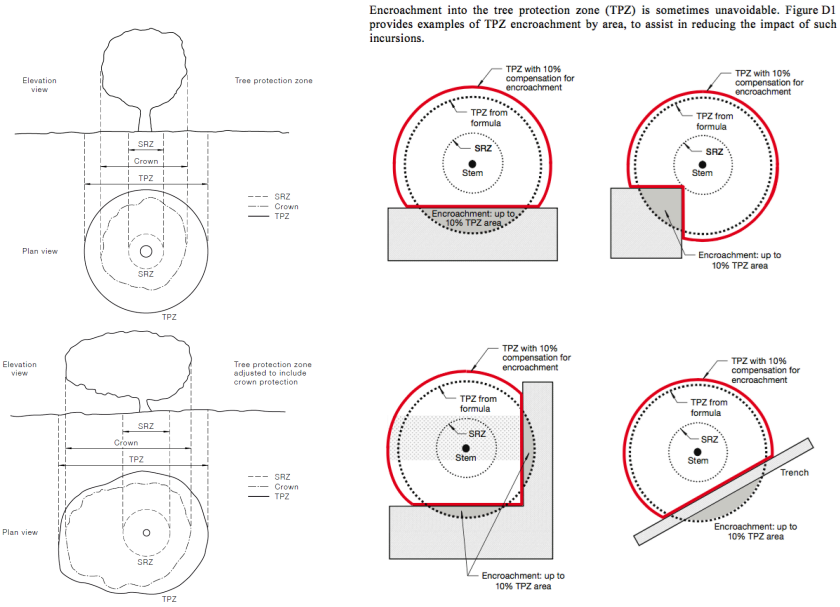
Tree ID	Common Name	Botanical Name	Age Class	Height (m)	Canopy Spread Radius (m)	Stem 1	Stem 2	Stem 3	Stem 4	Stem 5	DSH (mm)	DAB (mm)	Health	Structure	Amenity Value	SULE	Retention Value	NRZ Radius (m)	SRZ Radius (m)	Notes	Native or Exotic	Recommendations
523	Tallowood	*Eucalyptus microcorys*	Mature	9	3.5	320					320	350	Good	Fair	Medium	3. Short	Z9	3.8	2.1	Located within corridor. Loss of central leader.	Native	Remove
539	Sydney Golden Wattle	*Acacia longifolia*	Mature	4	1	150					150	180	Good	Fair	Low	5. Small/Young	Z1	2.0	1.6	Located within corridor.	Native	Remove
540	Sydney Golden Wattle	*Acacia longifolia*	Mature	4	1	150					150	160	Good	Good	Low	5. Small/Young	Z1	2.0	1.5	Located within corridor.	Native	Prune
655	Camphor Laurel	*Cinnamomum camphora*	Mature	11	5	500					500	580	Good	Fair	Medium	2. Medium	A1	6.0	2.6	Located within corridor. DBH estimated.	Exotic	Remove
830	Sydney Golden Wattle	*Acacia longifolia*	Mature	5	2	220					220	270	Good	Good	Low	5. Small/Young	Z1	2.6	1.9	Located within corridor. Culvert restricting root growth patterns.	Native	Remove
2267	Plum Fruited Yew	*Afrocarpus falcatus*	Mature	8	4	500					500	500	Good	Good	Medium	1. Long	A1	6.0	2.5	None.	Exotic	Prune
2270	Eucalypt	*Eucalyptus spp*	Semi-mature	6	2	110	110				156	300	Good	Fair	Low	5. Small/Young	Z1	2.0	2.0	Regrowth from stump.	Native	Prune
2273	Swamp Mahogany	*Eucalyptus robusta*	Semi-mature	9	2	500					500	500	Good	Poor	Medium	4. Remove	Z5	6.0	2.5	Regrowth from stump.	Native	Prune
2287	Sydney Golden Wattle	*Acacia longifolia*	Mature	8	2	200	120				233	350	Good	Fair	Medium	2. Medium	A1	2.8	2.1	DBH estimated.	Native	Prune
2288	Sydney Golden Wattle	*Acacia longifolia*	Mature	5	2	150	150				212	300	Poor	Poor	Low	4. Remove	Z4	2.5	2.0	In advanced stages of decline.	Native	Remove
2293	Parramatta Wattle	*Acacia parramattensis*	Mature	7	3	300					300	300	Good	Good	Medium	2. Medium	A1	3.6	2.0	DBH estimated.	Native	Prune
2303	Weeping Bottlebrush	*Callistemon viminalis*	Mature	8	4	300	370				476	640	Good	Good	Medium	1. Long	A1	5.7	2.7	None.	Native	Prune
2306	Weeping Bottlebrush	*Callistemon viminalis*	Mature	9	3	350					350	400	Good	Good	High	1. Long	A1	4.2	2.3	None.	Native	Remove
2307	Weeping Bottlebrush	*Callistemon viminalis*	Mature	8	2	300					300	350	Good	Fair	Medium	2. Medium	A1	3.6	2.1	Branch failure in crown.	Native	Remove
2308	Weeping Bottlebrush	*Callistemon viminalis*	Mature	8	3	430					430	480	Good	Good	High	1. Long	A1	5.2	2.4	None.	Native	Remove
2310	Kurrajong	*Brachychiton populneus*	Mature	6	4	470					470	560	Good	Good	High	1. Long	A1	5.6	2.6	None.	Native	Prune
2313	Sweet Pittosporum	*Pittosporum undulatum*	Mature	6	2	200	150				250	400	Good	Fair	Medium	3. Short	Z10	3.0	2.3	Suppressed by adjacent trees.	Native	Remove
2316	London Plane	*Platanus x hispanica*	Semi-mature	8	2	120	100				156	300	Good	Fair	Medium	3. Short	Z10	2.0	2.0	Suppressed by adjacent trees. DBH estimated.	Exotic	Remove
2320	Broad Leaved Privet	*Ligustrum lucidum*	Semi-mature	5	1	200					200	200	Good	Fair	Very Low	5. Small/Young	Z3	2.4	1.7	Exempt species.	Exotic	Remove
2321	Blue Jacaranda	*Jacaranda mimosifolia*	Semi-mature	6	2	300					300	300	Good	Fair	Low	5. Small/Young	Z1	3.6	2.0	Multi stem.	Exotic	Remove
2326	Sydney Golden Wattle	*Acacia longifolia*	Semi-mature	5	2	200					200	200	Good	Fair	Low	5. Small/Young	Z1	2.4	1.7	DBH estimated.	Native	Prune
2328	Sydney Golden Wattle	*Acacia longifolia*	Semi-mature	2	1	150					150	180	Good	Fair	Low	5. Small/Young	Z1	2.0	1.6	None.	Native	Remove
3565	Golden Robinia	*Robinia pseudoacacia 'Frisia'*	Young	5	2	100					100	120	Good	Good	Low	5. Small/Young	Z1	2.0	1.5	None.	Exotic	Remove
3566	Golden Robinia	*Robinia pseudoacacia 'Frisia'*	Young	5	2	100					100	120	Good	Good	Low	5. Small/Young	Z1	2.0	1.5	None.	Exotic	Remove
3567	Golden Robinia	*Robinia pseudoacacia 'Frisia'*	Young	4	1.5	80					80	100	Good	Good	Low	5. Small/Young	Z3	2.0	1.5	None.	Exotic	Remove
3618	Hackberry	*Celtis spp*	Young	4	2	60	60	50	60		115	120	Good	Fair	Low	5. Small/Young	Z3	2.0	1.5	Weed species.	Exotic	Remove
3730	Luscious Watergum	*Tristaniopsis laurina 'Luscious'*	Semi-mature	4	2	100					100	120	Good	Good	Low	5. Small/Young	Z1	2.0	1.5	None.	Native	Remove
3731	Sydney Golden Wattle	*Acacia longifolia*	Semi-mature	5	2	100	90				135	130	Good	Good	Low	5. Small/Young	Z1	2.0	1.5	None.	Native	Remove
3732	Unknown species	*Unknown species*	Semi-mature	4	1.5	60					60	80	Good	Good	Low	5. Small/Young	Z1	2.0	1.5	None.	Native	Remove
3734	Sydney Golden Wattle	*Acacia longifolia*	Semi-mature	5	2	160					160	200	Good	Good	Low	5. Small/Young	Z1	2.0	1.7	None.	Native	Prune
3735	African Olive	*Olea europaea subsp. cuspidata*	Semi-mature	6	2	60	60				85	120	Good	Fair	Low	5. Small/Young	Z1	2.0	1.5	None.	Exotic	Remove
3736	Camphor Laurel	*Cinnamomum camphora*	Mature	12	6	300	270	400			568	600	Good	Good	Medium	1. Long	A1	6.8	2.7	None.	Exotic	Prune
3773	Paperbark	*Melaleuca spp*	Young	4	1	50					50	70	Good	Good	Low	5. Small/Young	Z1	2.0	1.5	None.	Native	Remove
G1.22	Wattle	*Acacia spp*	Young	4	2	80	60				100	120	Good	Fair	Low	3. Short	Z1	2.0	1.5	Group of 15 trees of varying condition between fence and track.	Native	Remove
G1.23	Hickory Wattle	*Acacia implexa*	Semi-mature	7	2	200					200	180	Good	Fair	Low	5. Small/Young	Z10	2.4	1.6	Row of 25 trees up to 200mm in diameter. Asymmetric canopy due to overhead power lines. Set back from fence by approximately 2-2.5m.	Native	Remove
G1.24	Wattle	*Acacia spp*	Semi-mature	3	1.5	80					80	100	Good	Good	Low	5. Small/Young	Z1	2.0	1.5	Group of 15-20 small Acacias within 2m of proposed fence alignment. Ranging in height from 3-4m.	Native	Remove
G40	Parramatta Wattle	*Acacia parramattensis*	Semi-mature	5	3	100	90	100			168	120	Good	Good	Low	5. Small/Young	Z1	2.0	1.5	Group of approximately 10 trees.	Native	Prune
G41	Parramatta Wattle	*Acacia parramattensis*	Semi-mature	5	3	120					120	140	Good	Good	Low	5. Small/Young	Z1	2.0	1.5	Group of approximately 20 trees, with some eucalyptus saplings.	Native	Remove

Explanatory Notes

Tree Species - Common name followed by botanical name. Where species is unknown it is indicated with an '*spp*'.
Age Class - Over mature (OM), Mature (M), Early mature (EM), Semi mature (SM), Young (Y).
Diameter at Standard Height (DSH) - Measured with a diameter tape or estimated at approximately 1.4m above ground level.
Diameter Above root Buttresses (DAB): Measured with a diameter tape or estimated above root buttresses (DAB) for calculating the SRZ.
Height - Height from ground level to top of crown. All heights are estimated unless otherwise indicated.
Spread - Radius of crown at widest section. All tree spreads are estimated unless otherwise indicated.
Notional Root Zone (NRZ) - DSH x 12. Measured in radius from the centre of the trunk. Rounded to nearest 0.1m. For monocots, the NRZ is set at 1 metre outside the crown projection.
Structural Root Zone (SRZ) - (DAB x 50) $^{0.42}$ x 0.64. Measured in radius from the centre of the trunk. Rounded up to nearest 0.1m.
Health - Good/Fair/Poor/Dead
Structure - Good/Fair/Poor
Safe Useful Life Expectancy (SULE) - 1. Long (40+years), 2. Medium (15 - 40 years), 3. Short (5 - 15 years), 4. Remove (under 5 years), 5. Small/young.
Amenity Value - Very High/High/Medium/Low/Very Low.
Retention Value: Tree AZ, see appendix 3 for categories.

Appendix 3 - Further Information of Methodology

1. **Tree Protection Zone:** The tree protection zone (TPZ) is the principle means of protecting trees on development sites. The TPZ is a combination of the root area and crown area requiring protection. It is an area isolated from construction disturbance, so that the tree remains viable. The radius of the TPZ is calculated for each tree by multiplying its DBH x 12. The derived value is measured in radius from the centre of the stem/trunk at ground level. A TPZ should not be less than 2.0 metres nor greater than 15 metres (except where crown protection is required).
It is commonly observed that tree roots will extend significant further than the indicative TPZ, however the TPZ is an area identified AS4970-2009 to be extent where root loss or disturbance will generally not impact the viability of the tree. The TPZ is identified as a restricted area to prevent damage to trees either above or below ground during a development. Where trees are intended to be retained proposed developments must provide an adequate TPZ around trees. The TPZ is set aside for the tree's root zone, trunk and crown and it is essential for the stability and longevity of the tree. The tree protection also incorporates the SRZ (see below for more information about the SRZ). I have calculated the TPZ of palms, other monocots, cycads and tree ferns at one metre outside the crown projection. See appendices for additional information about the TPZ including information about calculating the TPZ and examples of TPZ encroachment.
Minor encroachment into TPZ: Sometimes encroachment into the TPZ is unavoidable. Encroachment includes but is not limited to activities such as excavation, compacted fill and machine trenching. Minor encroachment of up to 10% of the overall TPZ area is normally considered acceptable, providing there is space adjacent to the TPZ for the tree to compensate and the tree is displaying adequate vigour/health to tolerate changes to its growing environment.
Major encroachment into TPZ: Where encroachment of more than 10% of the overall TPZ area is proposed the project Arborist must investigate and demonstrate that the tree will remain in a viable condition. In some cases, tree sensitive construction methods such as pier and beam footings, suspended slabs, or cantilevered sections, can be utilised to allow additional encroachment into the TPZ by bridging over roots and minimising root disturbance. Major encroachment is only possible if it can be undertaken without severing significant size roots, or if it can be demonstrated that significant roots will not be impacted.



2. **Structural Root Zone:** This is the area around the base of a tree required for the trees stability in the ground. An area larger than the SRZ always need to be maintained to preserve a viable tree as it will only have a minor effect on the trees vigour and health. There are several factors that determine the SRZ which include height, crown area, soil type and soil moisture. It can also be influenced by other factors such as natural or built structures. Generally work within the SRZ should be avoided.
An indicative SRZ radius can be determined from the diameter of the trunk measured immediately above the root buttresses. Root investigation could provide more information about the extent of the SRZ. The following formula should be used to calculate the SRZ.
SRZ radius = $(D \times 50)^{0.42} \times 0.64$ (D = Diameter above root buttress).

3. **Tree Age Class:** If can be difficult to determine the age of a tree without carrying out invasive tests that may damage the tree, so we have categorised there likely age class which is defined below;
    - Young/Newly planted: Young or recently planted tree.
    - Semi Mature: Up to 20% of the usual life expectancy for the species.
    - Early mature/Mature: Between 20%-80% of the usual life expectancy for the species.
    - Over mature: Over 80% of the usual life expectancy for the species.
    - Dead: Tree is dead or almost dead.

4. **Health/Physiological Condition:** Below are examples conditions used when assigning a category for tree health.

Category	Example condition	Summary
Good	• Crown has good foliage density for species. • Tree shows no or minimal signs of pathogens that are unlikely to have an effect on the health of the tree. • Tree is displaying good vigour and reactive growth development.	• The tree is in above average health and condition and no remedial works are required.
Fair	• The tree may be starting to dieback or have over 25% deadwood. • Tree may have slightly reduced crown density or thinning. • There may be some discolouration of foliage. • Average reactive growth development. • There may be early signs of pathogens which may further deteriorate the health of the tree. • There may be epicormic growth indicating increased levels of stress within the tree.	• The tree is in below average health and condition and may require remedial works to improve the trees health.
Poor	• The may be in decline, have extensive dieback or have over 30% deadwood. • The canopy may be sparse or the leaves may be unusually small for species. • Pathogens or pests are having a significant detrimental effect on the tree health.	• The tree is displaying low levels of health and removal or remedial works may be required.
Dead	• The tree is dead or almost dead.	• The tree should generally be removed.

5. **Structural Condition:** Below are examples conditions used when assigning a category for structural condition.

Category	Example condition	Summary
Good	• Branch unions appear to be strong with no sign of defects. • There are no significant cavities. • The tree is unlikely to fail in usual conditions. • The tree has a balanced crown shape and form.	• The tree is considered structurally good with well developed form.
Fair	• The tree may have minor structural defects within the structure of the crown that could potentially develop into more significant defects. • The tree may a cavity that is currently unlikely to fail but may deteriorate in the future. • The tree is an unbalanced shape or leans significantly. • The tree may have minor damage to its roots. • The root plate may have moved in the past but the tree has now compensated for this. • Branches may be rubbing or crossing.	• The identified defects are unlikely cause major failure. • Some branch failure may occur in usual conditions. • Remedial works can be undertaken to alleviate potential defects.
Poor	• The tree has significant structural defects. • Branch unions may be poor or weak. • The tree may have a cavity or cavities with excessive levels of decay that could cause catastrophic failure. • The tree may have root damage or is displaying signs of recent movement. • The tree crown may have poor weight distribution which could cause failure.	• The identified defects are likely to cause either partial or whole failure of the tree.

6. **Amenity Value:** To determine the amenity value of a tree we assess a number of different factors, which include but are not limited to the information below.
   - The visibility of the tree to adjacent sites.
   - The relationship between the tree and the site.
   - Whether the tree is protected by any statuary conditions.
   - The habitat value of the tree.
   - Whether the tree is considered a noxious weed species.

   The amenity value is rated using one of the following values.
   - Very High
   - High
   - Moderate
   - Low
   - Very Low

7. **Safe Useful Life Expectancy (SULE), (Barrel, 2001):** A trees safe useful life expectancy is determined by assessing a number of different factors including the health and vitality, estimated age in relation to expected life expectancy for the species, structural defects, and remedial works that could allow retention in the existing situation.

Category	Description
1. Long - Over 40 years	(a) Structurally sound trees located in positions that can accommodate future growth. (b) Trees that could be made suitable for retention in the long term by remedial tree care. (c) Trees of special significance for historical, commemorative or rarity reasons that would warrant extraordinary efforts to secure their long term retention.
2. Medium - 15 to 40 years	(a) Trees that may only live between 15 and 40 more years. (b) Trees that could live for more than 40 years but may be removed for safety or nuisance reasons. (c) Trees that could live for more than 40 years but may be removed to prevent interference with more suitable individuals or to provide space for new planting. (d) Trees that could be made suitable for retention in the medium term by remedial tree care.
3. Short - 5 to 15 years	(a) Trees that may only live between 5 and 15 more years. (b) Trees that could live for more than 15 years but may be removed for safety or nuisance reasons. (c) Trees that could live for more than 15 years but may be removed to prevent interference with more suitable individuals or to provide space for new planting. (d) Trees that require substantial remedial tree care and are only suitable for retention in the short term.
4. Remove - Under 5 years	(a) Dead, dying, suppressed or declining trees because of disease or inhospitable conditions. (b) Dangerous trees because of instability or recent loss of adjacent trees. (c) Dangerous trees because of structural defects including cavities, decay, included bark, wounds or poor form. (d) Damaged trees that are clearly not safe to retain. (e) Trees that could live for more than 5 years but may be removed to prevent interference with more suitable individuals or to provide space for new planting. (f) Trees that are damaging or may cause damage to existing structures within 5 years. (g) Trees that will become dangerous after removal of other trees for the reasons given in (a) to (f). (h) Trees in categories (a) to (g) that have a high wildlife habitat value and, with appropriate treatment, could be retained subject to regular review.
5. Small/Young	(a) Small trees less than 5m in height. (b) Young trees less than 15 years old but over 5m in height. (c) Formal hedges and trees intended for regular pruning to artificially control growth.

8. **Root investigations:** The root investigations should identify roots greater than 30mm in diameter that are located along the edge of the structures footprint or in the location of footings. Root investigations must be carried out using non-invasive methods (manual excavations). Any excavations for the root investigations must carried out manually to avoid damaging the roots during excavations. Manual excavation may include the use of a high-pressure air/air knife, or a combination of high-pressure water and a vacuum device. When hand excavating carefully work around roots retaining as many as possible. Take care to not fray, wound, or cause damage to any roots during excavations as this may cause decay or infection from pathogens. It is essential that exposed roots are kept moist and the excavation back filled as soon as possible. The root investigations should be carried out by a qualified Arborist minimum AQF3. Once roots are exposed, a visual assessment can be carried out by a consulting Arborist to evaluate the potential impact of the proposed root loss on the health and stability of the tree. A root map/report should be prepared identifying the findings of investigations, including photographs as supporting evidence in the report.

9. **Retention Value:** The system I have used to award the retention value is Tree AZ. Tree AZ is used to identify higher value trees worthy of being a constraint to development and lower value trees that should generally not be a constraint to the development. The table below provides a brief description of each category.

TreeAZ Categories (Version 10.04-ANZ)

CAUTION: TreeAZ assessments must be carried out by a competent person qualified and experienced in arboriculture. The following category descriptions are designed to be a brief field reference and are not intended to be self-explanatory. They must be read in conjunction with the most current explanations published at www.TreeAZ.com.

Category Z: Unimportant trees not worthy of being a material constraint

Local policy exemptions: Trees that are unsuitable for legal protection for local policy reasons including size, proximity and species	
Z1	Young or insignificant small trees, i.e. below the local size threshold for legal protection, etc
Z2	Too close to a building, i.e. exempt from legal protection because of proximity, etc
Z3	Species that cannot be protected for other reasons, i.e. scheduled noxious weeds, out of character in a setting of acknowledged importance, etc
High risk of death or failure: Trees that are likely to be removed within 10 years because of acute health issues or severe structural failure	
Z4	Dead, dying, diseased or declining
Z5	Severe damage and/or structural defects where a high risk of failure cannot be satisfactorily reduced by reasonable remedial care, i.e. cavities, decay, included bark, wounds, excessive imbalance, overgrown and vulnerable to adverse weather conditions, etc
Z6	Instability, i.e. poor anchorage, increased exposure, etc
Excessive nuisance: Trees that are likely to be removed within 10 years because of unacceptable impact on people	
Z7	Excessive, severe and intolerable inconvenience to the extent that a locally recognized court or tribunal would be likely to authorize removal, i.e. dominance, debris, interference, etc
Z8	Excessive, severe and intolerable damage to property to the extent that a locally recognized court or tribunal would be likely to authorize removal, i.e. severe structural damage to surfacing and buildings, etc
Good management: Trees that are likely to be removed within 10 years through responsible management of the tree population	
Z9	Severe damage and/or structural defects where a high risk of failure can be temporarily reduced by reasonable remedial care, i.e. cavities, decay, included bark, wounds, excessive imbalance, vulnerable to adverse weather conditions, etc
Z10	Poor condition or location with a low potential for recovery or improvement, i.e. dominated by adjacent trees or buildings, poor architectural framework, etc
Z11	Removal would benefit better adjacent trees, i.e. relieve physical interference, suppression, etc
Z12	Unacceptably expensive to retain, i.e. severe defects requiring excessive levels of maintenance, etc

NOTE: Z trees with a high risk of death/failure (Z4, Z5 & Z6) or causing severe inconvenience (Z7 & Z8) at the time of assessment and need an urgent risk assessment can be designated as ZZ. ZZ trees are likely to be unsuitable for retention and at the bottom of the categorization hierarchy. In contrast, although Z trees are not worthy of influencing new designs, urgent removal is not essential and they could be retained in the short term, if appropriate.

Category A: Important trees suitable for retention for more than 10 years and worthy of being a material constraint

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

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

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URBAN ARBOR
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Glossary of Terms

Abiotic - Pertaining to non-living agents; e.g. environmental factors

Adventitious shoots - Shoots that develop other than from apical, axillary or dormant buds; see also 'epicormic'

Anchorage - The system whereby a tree is fixed within the soil, involving cohesion between roots and soil and the development of a branched system of roots which withstands wind and gravitational forces transmitted from the aerial parts of the tree

Bark - A term usually applied to all the tissues of a woody plant lying outside the vascular cambium, thus including the phloem, cortex and periderm; occasionally applied only to the periderm or the phellem

Branch:
• **Primary**. A first order branch arising from a stem
• **Lateral**. A second order branch, subordinate to a primary branch or stem and bearing sub-lateral branches
• **Sub-lateral**. A third order branch, subordinate to a lateral or primary branch, or stem and usually bearing only twigs

Branch collar - A visible swelling formed at the base of a branch whose diameter growth has been disproportionately slow compared to that of the parent stem; a term sometimes applied also to the pattern of growth of the cells of the parent stem around the branch base

Brown-rot - A type of wood decay in which cellulose is degraded, while lignin is only modified

Buckling - An irreversible deformation of a structure subjected to a bending load

Buttress zone - The region at the base of a tree where the major lateral roots join the stem, with buttress-like formations on the upper side of the junctions

Cambium - Layer of dividing cells producing xylem (woody) tissue internally and phloem (bark) tissue externally

Canker - A persistent lesion formed by the death of bark and cambium due to colonisation by fungi or bacteria

Compartmentalisation - The confinement of disease, decay or other dysfunction within an anatomically discrete region of plant tissue, due to passive and/or active defences operating at the boundaries of the affected region

Compressive loading - Mechanical loading which exerts a positive pressure; the opposite to tensile loading

Condition - An indication of the physiological condition of the tree. Where the term ‘condition’ is used in a report, it should not be taken as an indication of the stability of the tree

Crown/Canopy - The main foliage bearing section of the tree

Crown lifting - The removal of limbs and small branches to a specified height above ground level

Crown thinning - The removal of a proportion of secondary branch growth throughout the crown to produce an even density of foliage around a well-balanced branch structure

Crown reduction/shaping - A specified reduction in crown size whilst preserving, as far as possible, the natural tree shape

DAB (Diameter Above Buttress) - Trunk diameter measured above the root buttress

Defect - In relation to tree hazards, any feature of a tree which detracts from the uniform distribution of mechanical stress, or which makes the tree mechanically unsuited to its environment

Dieback - The death of parts of a woody plant, starting at shoot-tips or root-tips

Disease - A malfunction in or destruction of tissues within a living organism, usually excluding mechanical damage; in trees, usually caused by pathogenic micro-organisms

Dominance - In trees, the tendency for a leading shoot to grow faster or more vigorously than the lateral shoots; also the tendency of a tree to maintain a taller crown than its neighbours

Dormant bud - An axial bud which does not develop into a shoot until after the formation of two or more annual wood increments; many such buds persist through the life of a tree and develop only if stimulated to do so

Dysfunction - In woody tissues, the loss of physiological function, especially water conduction, in sapwood

DBH (Diameter at Breast Height) - Stem diameter measured at a height of 1.4 metres or the nearest measurable point. Where measurement at a height of 1.4 metres is not possible, another height may be specified

Deadwood - Branch or stem wood bearing no live tissues. Retention of deadwood provides valuable habitat for a wide range of species and seldom represents a threat to the health of the tree. Removal of deadwood can result in the ingress of decay to otherwise sound tissues and climbing operations to access deadwood can cause significant damage to a tree. Removal of deadwood is generally recommended only where it represents an unacceptable level of hazard

Epicormic shoot - A shoot having developed from a dormant or adventitious bud and not having developed from a first year shoot

Flush-cut - A pruning cut which removes part of the branch bark ridge and or branch-collar

Girdling root - A root which circles and constricts the stem or roots possibly causing death of phloem and/or cambial tissue

Habit - The overall growth characteristics, shape of the tree and branch structure

Hazard beam - An upwardly curved part of a tree in which strong internal stresses may occur without being reduced by adaptive growth; prone to longitudinal splitting

Incorporating extracts from Lonsdale, D. 1999. Principles of Tree Hazard Assessment. Her Majesty's Stationary Office, London

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Heartwood/false-heartwood - The dead central wood that has become dysfunctional as part of the aging processes and being distinct from the sapwood

Heave - A term mainly applicable to a shrinkable clay soil which expands due to re-wetting after the felling of a tree which was previously extracting moisture from the deeper layers; also the lifting of pavements and other structures by root diameter expansion; also the lifting of one side of a wind-rocked root-plate

Included bark (ingrown bark) - Bark of adjacent parts of a tree (usually forks, acutely joined branches or basal flutes) which is in face-to-face contact

Lever arm - A mechanical term denoting the length of the lever represented by a structure that is free to move at one end, such as a tree or an individual branch

Lignin - The hard, cement-like constituent of wood cells; deposition of lignin within the matrix of cellulose microfibrils in the cell wall is termed Lignification

Lions tailing - A term applied to a branch of a tree that has few if any side-branches except at its end, and is thus liable to snap due to end- loading

Loading - A mechanical term describing the force acting on a structure from a particular source; e.g. the weight of the structure itself or wind pressure

Mycelium - The body of a fungus, consisting of branched filaments (hyphae)

Occlusion - The process whereby a wound is progressively closed by the formation of new wood and bark around it

Pathogen - A micro-organism which causes disease in another organism

Photosynthesis - The process whereby plants use light energy to split hydrogen from water molecules, and combine it with carbon dioxide to form the molecular building blocks for synthesizing carbohydrates and other biochemical products

Probability - A statistical measure of the likelihood that a particular event might occur

Pruning - The removal or cutting back of twigs or branches, sometimes applied to twigs or small branches only, but often used to describe most activities involving the cutting of trees or shrubs

Radial - In the plane or direction of the radius of a circular object such as a tree stem

Reactive Growth/Reaction Wood - Production of woody tissue in response to altered mechanical loading; often in response to internal defect or decay and associated strength loss (cf. adaptive growth)

Ring-barking - The removal of a ring of bark and phloem around the circumference of a stem or branch, normally resulting in an inability to transport photosynthetic assimilates below the area of damage. Almost inevitably results in the eventual death of the affected stem or branch above the damage

Root-collar - The transitional area between the stem/s and roots

Sapwood - Living xylem tissues

Soft-rot - A kind of wood decay in which a fungus degrades cellulose within the cell walls, without any general degradation of the wall as a whole

Stem/s - Principle above-ground structural component(s) of a tree that supports its branches

Stress - In plant physiology, a condition under which one or more physiological functions are not operating within their optimum range, for example due to lack of water, inadequate nutrition or extremes of temperature

SRZ (Structural Root Zone) - The area around the base of the tree required for the trees stability in the ground

Subsidence - In relation to soil or structures resting in or on soil, a sinking due to shrinkage when certain types of clay soil dry out, sometimes due to extraction of moisture by tree roots

Taper - In stems and branches, the degree of change in girth along a given length

Targets - In tree risk assessment (with slight misuse of normal meaning) persons or property or other things of value which might be harmed by mechanical failure of the tree or by objects falling from it

Topping - In arboriculture, the removal of the crown of a tree, or of a major proportion of it

Transpiration - The evaporation of moisture from the surface of a plant, especially via the stomata of leaves; it exerts a suction which draws water up from the roots and through the intervening xylem cells

TPZ (Tree Protection Zone) - A specified area above and below ground and at a given distance from the trunk set aside for the protection of a tree's roots and crown to provide for the viability and stability of a tree to be retained where it is potentially subject to damage by development

Understory - This layer consists of younger individuals of the dominant trees, together with smaller trees and shrubs which are adapted to grow under lower light conditions

Veteran tree - Tree that, by recognised criteria, shows features of biological, cultural or aesthetic value that are characteristic of, but not exclusive to, individuals surviving beyond the typical age range for the species concerned. These characteristics might typically include a large girth, signs of crown retrenchment and hollowing of the stem

Vigour - The expression of carbohydrate expenditure to growth (in trees)

White-rot - A range of kinds of wood decay in which lignin, usually together with cellulose and other wood constituents, is degraded

Wind exposure - The degree to which a tree or other object is exposed to wind, both in terms of duration and velocity

Wind pressure - The force exerted by a wind on a particular object

Windthrow - The blowing over of a tree at its roots

Incorporating extracts from Lonsdale, D. 1999. Principles of Tree Hazard Assessment. Her Majesty's Stationary Office, London

Appendix A (Part F) – Addendum to Arboricultural Pruning Specification Report (Southwest Metro –Canterbury to Campsie)

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Addendum to Arboricultural Pruning Specification Report

Site Location: Southwest Metro – Canterbury to Campsie

Prepared for:
UGL

Prepared by: Bryce Claassens and Alex Kurath
Date prepared: 7 November 2025
Ref: 251107_SWM_Ineco_PS_Ad6.2
Addendum: 6.2

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1. INTRODUCTION

1.1 Urban Arbor have been instructed to prepare an addendum to the previous Pruning Specification Report (18 November 2024) in relation to Corridor Intruder Detection System (CIDS) and Object Detection System (ODS) trouble spots. The report is to address trees within and adjacent to the rail corridor between Canterbury Station to Campsie Station.

1.2 Documents and information provided to assist in preparing the report;

A) Arboricultural Pruning Specification Report, Urban Arbor, Ref:241118_SWM_Ineco_PS, Revision 2,18 November 2024.
B) CCTV LOS and Nuisance Alarm Register, Doc No. SMCSWIDS-UGL-1NL-TC-REG-000745, Revision B19, 26 August 2025.

1.3 The site and tree inspections were carried out on 5 September 2025 and 23 October 2025 by Alex Kurath of Urban Arbor, in conjunction with representatives from UGL (Rares Pop), JHLORJV (Andre Kruize) and Sydney Metro. UGL advised the trees requiring pruning or removal to obtain camera visibility of fence lines.

1.4 Some trees included within this report were previously inspected between the dates of 6 January 2020 to 3 April 2020 by Bryce Claassens during the South West Metro Rail Corridor (SWMRC) and Station Precinct design works. Access was available to the subject site and adjoining public areas only. This report has been written by Bryce Claassens.

2. SCOPE OF THE REPORT

2.1 This report has been undertaken to meet the following objectives.

2.1.1 Conduct a walk-through assessment of the areas where trees (identified by UGL) are currently obstructing camera visibility, which require pruning or removal. The decision of pruning or removal of trees is subject to the agreement and approval of the stakeholders.

2.1.2 Conduct a visual assessment of significant trees not previously included in the Pruning Specification Report (dated 18 November 2024), located within areas identified by UGL. For the purpose of this report, a significant tree is a ‘Long lived woody perennial plant greater than (or usually greater than) 3 metres in height with one or relatively few main stems or trunks’.

2.1.3 Determine the trees estimated contribution years and remaining useful life expectancy and award the trees a retention value.

2.1.4 Provide pruning specifications for trees where required, in accordance with AS4373-2007.

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3. LIMITATIONS

3.1 The observations and recommendations are based on the site inspections identified in section 1 only. The findings of this report are based on the observations and site conditions at the time of inspection.

3.2 All of the observations were carried out from ground level. The accuracy of the assessment of the subject trees structural condition and health is limited to the visibility of the tree at the time of inspection.

3.3 The tree inspection was visual from ground level only. No soil or tissue testing was carried out as part of the tree inspection. None of the surrounding surfaces adjacent to trees were lifted or removed during the tree inspections.

3.4 Root decay can sometimes be present with no visual indication above ground. It is also impossible to know the extent of any root damage caused by mechanical damage such as underground root cutting during the installation of services without undertaking detailed root investigation. Any form of tree failure due to these activities is beyond the scope of this assessment.

3.5 The report reflects the subject tree(s) as found on the day of inspection. Any changes to the growing environment of the subject tree, or tree management works beyond those recommended in this report may alter the findings of the report. There is no warranty, expressed or implied, that problems or deficiencies relating to the subject tree, or subject site may not arise in the future.

3.6 Tree identification is based on accessible visual characteristics at the time of inspection. As key identifying features are not always available the accuracy of identification is not guaranteed. Where tree species is unknown, it is indicated with an *spp*.

3.7 Some trees included within this report have been located using a Trimble TDC100 hand held GNSS device by Urban Arbor Pty Ltd. Tree locations captured by the Trimble TDC100 are only accurate to within 1m - 3m. If an accurate location of these trees is required, a registered surveyor should locate the trees.

3.8 In some instances, multiple trees or groups of small trees have been identified as groups of trees within this report.

3.9 All diagrams, plans and photographs included in this report are visual aids only and are not to scale unless otherwise indicated.

3.10 Alteration of this report invalidates the entire report.

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4. METHODOLOGY

4.1 The following information was collected during the assessment of the subject tree(s).

- 4.1.1 Tree common name
- 4.1.2 Tree botanical name
- 4.1.3 Tree age class
- 4.1.4 DSH (Trunk/Stem diameter at breast height/1.4m) - millimetres.
- 4.1.5 DAB (Trunk diameter directly above the root buttress) – millimetres.
- 4.1.6 Estimated height - metres
- 4.1.7 Estimated crown spread (diameter of crown) - metres
- 4.1.8 Health
- 4.1.9 Structural condition
- 4.1.10 Amenity value
- 4.1.11 Estimated remaining contribution years (SULE)[1]
- 4.1.12 Retention value (Tree AZ)[2]
- 4.1.13 Notes/comments

4.2 An assessment of the trees condition was made using the visual tree assessment (VTA) model (Mattheck & Breloer, 1994).[3]

4.3 Tree diameter was measured using a DSH tape or in some cases estimated. Tree height and tree canopy spread was measured with a clinometer or in some cases estimated. All other measurements were estimations unless otherwise stated. The other tools used during the assessment were a nylon mallet, compass, camera and a steel probe.

4.4 All DSH measurements, notional root zones, and structural root zones within Appendix 2 of this report were calculated in accordance with methods set out in AS4970 Protection of trees on development sites (2025).[4]

4.5 Details of how the observations in this report have been assessed are listed in the appendices.

[1] Barrell, J. (2001), *'SULE: Its use and status in the new millennium' in Management of Mature Trees proceedings of the 4th NAAA Workshop*, Sydney, 2001. Barrell.

[2] Barrell Tree Consultancy, *Tree AZ version 10.10-ANZ*, http://www.treeaz.com/.

[3] Mattheck, C. & Breloer, H., *The body language of trees - A handbook for failure analysis*, The Stationary Office, London, England (1994).

[4] Council Of Standards Australia, *AS4970 Protection of trees on development sites* (2025).

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5. SITE LOCATION AND BRIEF DESCRIPTION

5.1 The area covered in the site inspections is located within the Canterbury Bankstown LGA. All trees within the Canterbury Bankstown LGA are subject to protection under the Canterbury Bankstown LEP 2023[5] and Canterbury Bankstown DCP 2023.[6]

6. AREAS ASSESSED

6.1 The areas assessed in this report have been identified by UGL in the report CCTV LOS and Nuisance Alarm Register (dated 26 August 2025), which includes trees within and adjacent to the rail corridor between Canterbury Station to Campsie Station.

7. TREE OBSERVATIONS

7.1 **Tree information:** Details of each individual tree assessed, including the observations taken during the site inspections, can be found in the tree inspection schedule in appendix 2. Each of the subject trees have been awarded a retention value based on the observations using the Tree AZ method. Tree AZ is used to identify higher value trees worthy of being a constraint to development and lower value trees that should generally not be a constraint to the development. The Tree AZ categories sheet (Barrell Tree Consultancy) has been included in appendix 3 to assist with understanding the retention values. The retention values that have been allocated to the subject trees in this report is not definitive and should only be used as a guideline.

8. ASSESSMENT OF TREE IMPACTS BY AREA

8.1 The trees included in the following sections have been identified by UGL as being subject to impacts from development works. All trees to be retained should be protected in accordance with AS4970-2025 *Protection of trees on development sites*. If there are any development works that have not been assessed and could potentially impact additional trees, the project arborist must assess the impact of the proposed works to the condition of the trees, determining the trees viability for retention.

[5] *Canterbury Bankstown Local Environmental Plan 2023*, https://legislation.nsw.gov.au/view/html/inforce/current/epi-2023-0336, accessed 21 August 2025.

[6] *Canterbury Bankstown Development Control Plan 2023*, https://www.cbcity.nsw.gov.au/development/planning-control-policies/canterbury-bankstown-development-control-plan-2023, accessed 21 August 2025.

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8.2 Canterbury to Campsie (CTB_02 – CTB_09)

8.2.1 Ten (10) trees and five (5) groups of trees have been identified for removal in this area, including tree 503, 506, 509, 510, 3592, 3740, 3741, 3742, 3743, 3744, G50, G51, G52, G54 and G85.

8.2.2 Four (4) trees and one (1) group of trees have been identified for canopy pruning in this area, including tree 415, 422, 521, 522 and G53. All canopy pruning must be completed in accordance with AS4373 *Pruning of amenity trees* (2007).

8.2.3 The details of the trees are summarised in the table below. Photographs of the trees are included in section 8.3.

Tree ID	Botanical Name	SULE	Retention Value	Height (m)	Canopy Spread (m) - radius	Native / Exotic	Prune / Remove
415	*Melaleuca quinquenervia*	3. Short	Z10	5	4	Native	Prune
422	*Melaleuca quinquenervia*	3. Short	Z10	5	3	Native	Prune
503	*Casuarina spp*	1. Long	A1	8	2	Native	Remove
506	*Acacia parramattensis*	4. Remove	Z4	5	1.5	Native	Remove
509	*Acacia spp*	4. Remove	Z4	6	2	Native	Remove
510	*Acacia parramattensis*	2. Medium	A1	7	2	Native	Remove
521	*Leptospermum petersonii*	2. Medium	A2	5	2	Native	Prune
522	*Grevillea robusta*	1. Long	A1	10	4	Native	Prune
3592	*Acacia parramattensis*	5. Small/Young	Z1	6	2	Native	Remove
3740	*Acacia parramattensis*	5. Small/Young	Z10	5	3	Native	Remove
3741	*Acacia parramattensis*	5. Small/Young	Z1	6	3	Native	Remove
3742	*Liquidambar styraciflua*	5. Small/Young	Z1	7	2	Exotic	Remove
3743	*Acacia longifolia*	5. Small/Young	Z1	6	2	Native	Remove
3744	*Acacia longifolia*	5. Small/Young	Z1	5	2	Native	Remove
G50	*Mixed species*	5. Small/Young	Z1	6	2	Native	Remove
G51	*Casuarina cunninghamiana*	5. Small/Young	Z1	5	2	Native	Remove
G52	*Acacia longifolia*	5. Small/Young	Z1	4	2	Native	Remove
G53	*Acacia longifolia*	5. Small/Young	Z1	6	3	Native	Prune
G54	*Acacia longifolia*	5. Small/Young	Z1	6	3	Native	Remove
G85	*Mixed species*	5. Small/Young	Z1	6	2	Native	Remove

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8.3 **Photographs**

Image 1: Looking towards tree 522. Canopy pruning is required to provide clearance from the fence. The four lowest first order branches to the North are to be pruned. Finished cut diameters will range from 60 – 100mm. The pruning will result in the removal of 5% of the live foliage area of the tree. The branches to be removed have been marked yellow.

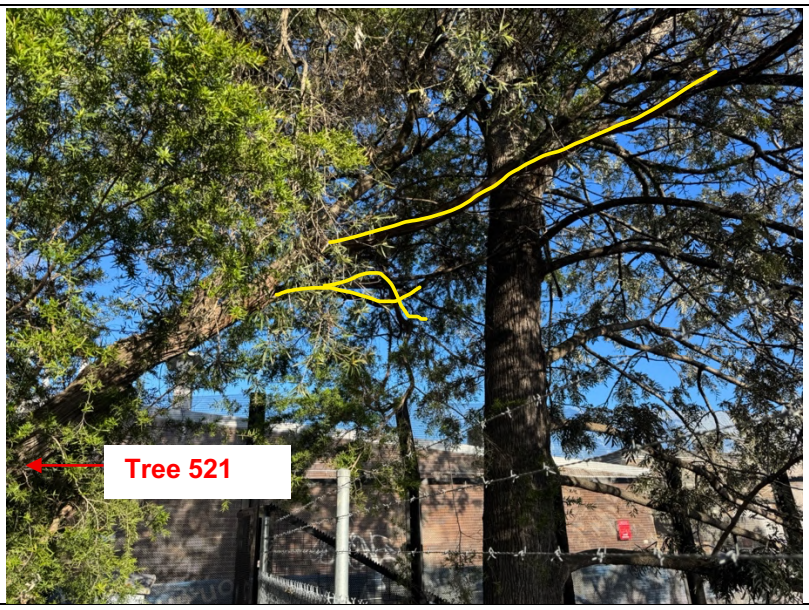

Image 2: Looking towards tree 521. Canopy pruning is required to provide clearance from the fence. The two second order branches to the North are to be pruned. Finished cut diameters will range from 80 – 100mm. The pruning will result in the removal of 20% of the live foliage area of the tree. The branches to be removed have been marked yellow.

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Image 3: Looking towards tree 503. The tree is recommended for removal

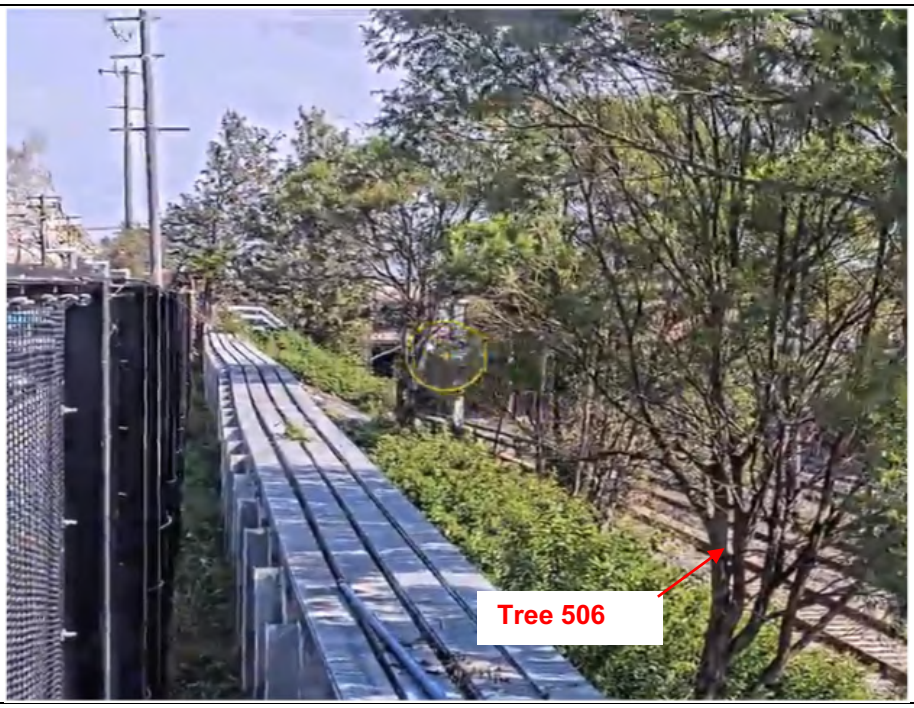

Image 4: Looking towards tree 506. The tree is recommended for removal

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Image 5: Looking towards tree 3592, 3740 and 3741. The trees are recommended for removal.

Image 6: Looking towards tree 509 and 510. The trees are recommended for removal.

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Image 7: Looking towards tree 3742. Tree 3742 is suckering regrowth from an old stump. The regrowth is recommended for removal.

Image 8: Looking towards G50. Group of approximately 6 trees recommended for removal.

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Image 9: Looking towards tree 422. Canopy pruning is required to provide 2m clearance from the fence. Smaller branches measuring less than 50mm in diameter are to be pruned. The pruning will result in the removal of approximately 5-10% of the live foliage area of the tree. The approximate area of the pruning has been marked yellow.

Image 10: Looking towards tree 422. Canopy pruning is required to provide 2m clearance from the fence. The 150mm second order branch to the North at 2.5m is to be removed. Smaller branches measuring less than 50mm in diameter are also to be pruned. The pruning will result in the removal of approximately 5-10% of the live foliage area of the tree. The approximate area of the pruning has been marked yellow.

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Image 11: Looking the Eastern most trees within G51. Approximately 13 trees are recommended for removal in total. Smaller shrubs that do not meet the defintiion of trees are also to be removed.

Image 12: Looking the Western most trees within G51. Approximately 13 trees are recommended for removal in total. Smaller shrubs that do not meet the defintiion of trees are also to be removed.

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Image 13: Looking towards G52. Group of approximately 5 trees recommended for removal.

Image 14: Looking towards tree 3743. The tree is recommended for removal. The smaller shrubs to the West (outlined red) that do not meet the definition of a tree are also to be removed.

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Image 15: Looking towards tree 3743. The tree is recommended for removal. Also showing G53 Looking towards Group 53, which is a group of approximately 20 trees recommended for pruning. Smaller branches measuring less than 50mm in diameter are to be pruned. The pruning will result in the removal of less than 10% of the live foliage area of each tree within the group. The approximate area of the pruning for G53 has been marked yellow.

Image 16: Looking towards G54. Group of approximately 12 trees recommended for removal.

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Image 17: Looking towards G85. Group of approximately 4 trees recommended for removal.

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9. CONCLUSIONS

9.1 **Table 2:** Summary of the trees requiring pruning or removal;

Impact	Reason	Category A	Category Z	TOTAL
		A	Z	
Trees recommended to be removed	Installation of services, line of sight for cameras, solar panel accessibility	503, 510 (Two trees)	506, 509, 3592, 3740, 3741, 3742, 3743, 3744, G50, G51, G52, G54, G85 (Eight trees & five groups of trees)	**10 trees and 5 group of trees**
Trees requiring pruning	Installation of services, line of sight for cameras	521, 522 (Two trees)	415, 422, G53 (Two trees and one group of trees)	**4 trees & 1 group of trees**

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10. RECOMMENDATIONS

10.1 This report assesses trees that require pruning or removal for camera visibility works along the rail corridor. Fourteen (14) trees and five (5) groups of trees have been identified and assessed in this report.

10.2 Ten (10) trees and five (5) groups of trees have been identified for removal in this area, including tree 503, 506, 509, 510, 3592, 3740, 3741, 3742, 3743, 3744, G50, G51, G52, G54 and G85.

10.3 The trees discussed above in section 10.2 have been recommended for removal due to excessive amounts of pruning required to achieve camera visibility, as discussed in section 1.3. It may be possible to retain/prune some of the trees recommended for removal based upon the final installation locations of cameras and their FOV. This will need to be determined by UGL and the project arborist.

10.4 Four (4) trees and one (1) group of trees have been identified for canopy pruning in this area, including tree 415, 422, 521, 522 and G53. All canopy pruning must be completed in accordance with AS4373 *Pruning of amenity trees* (2007).

10.5 All trees that require canopy pruning can be retained in a viable condition. All trees to be retained must be protected in accordance with AS4970-2025 *Protection of trees on development sites*.

10.6 This report does not provide approval for tree removal or pruning works. All recommendations in this report are subject to approval by the relevant authorities and/or tree owners.

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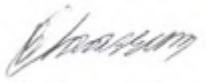
12. LIST OF APPENDICES

The following are included in the appendices:

- Appendix 2 - Tree inspection schedule
- Appendix 3 - Definition of Methodology

Alex Kurath
8004 2802
sales@urbanarbor.com.au
Diploma of Arboriculture (AQF5)
Member of Arboriculture Australia
ISA Member (International Society of Arboriculture)



Bryce Claassens
Diploma of Arboriculture (AQF5)
Cert III Landscape Construction
Member Arboriculture Australia
Quantified Tree Risk Assessment (QTRA)
ISA Tree Risk Assessment Qualification (TRAQ)

Appendix 2 - Tree Inspection Schedule

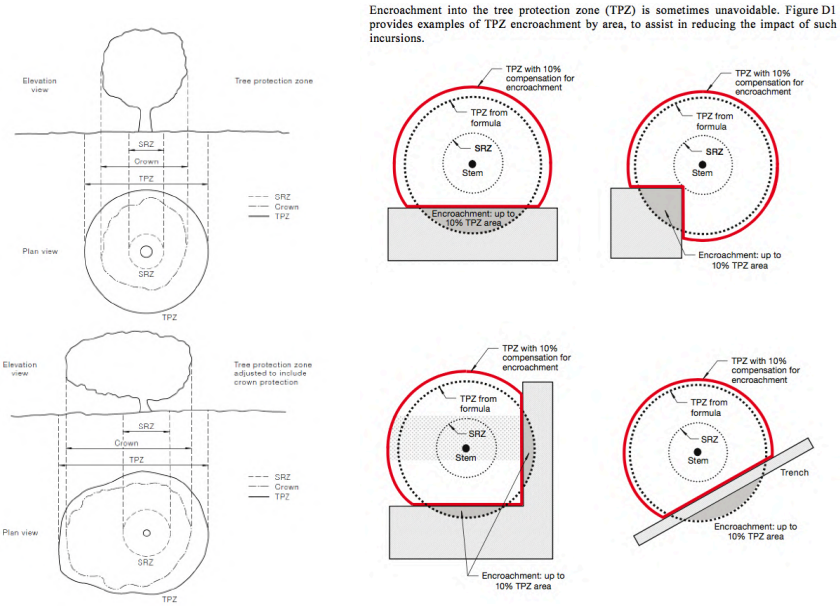
Tree ID	Common Name	Botanical Name	Age Class	Height (m)	Canopy Spread Radius (m)	Stem 1	Stem 2	Stem 3	Stem 4	Stem 5	DSH (mm)	DAB (mm)	Health	Structure	Amenity Value	SULE	Retention Value	NRZ Radius (m)	SRZ Radius (m)	Notes	Native or Exotic	Recommendations
415	Broad Leaved Paperbark	*Melaleuca quinquenervia*	Mature	5	4	800					800	840	Good	Fair	High	3. Short	Z10	9.6	3.1	Located within nature strip. Topped for power lines.	Native	Prune
422	Broad Leaved Paperbark	*Melaleuca quinquenervia*	Mature	5	3	450					450	480	Good	Fair	Medium	3. Short	Z10	5.4	2.4	Located within nature strip. Topped for power lines.	Native	Prune
503	She Oak	*Casuarina spp*	Mature	8	2	220					220	250	Good	Good	Medium	1. Long	A1	2.6	1.8	Located within corridor.	Native	Remove
506	Parramatta Wattle	*Acacia parramattensis*	Mature	5	1.5	100					100	120	Poor	Fair	Very Low	4. Remove	Z4	2.0	1.5	Located within corridor. In advanced stages of decline.	Native	Remove
509	Wattle	*Acacia spp*	Dead	6	2	280					280	300	Dead	Poor	Low	4. Remove	Z4	3.4	2.0	Dead tree	Native	Remove
510	Parramatta Wattle	*Acacia parramattensis*	Mature	7	2	180					180	200	Good	Good	Medium	2. Medium	A1	2.2	1.7	Located within corridor.	Native	Remove
521	Lemon Scented Tea Tree	*Leptospermum petersonii*	Mature	5	2	340					340	360	Good	Fair	Medium	2. Medium	A2	4.1	2.2	Located within nature strip. Trunk lean. Suppressed by adjacent tree.	Native	Prune
522	Silky Oak	*Grevillea robusta*	Mature	10	4	450					450	480	Good	Good	Medium	1. Long	A1	5.4	2.4	Located within nature strip. Canopy extends into corridor.	Native	Prune
3592	Parramatta Wattle	*Acacia parramattensis*	Young	6	2	100	60				117	140	Good	Good	Low	5. Small/Young	Z1	2.0	1.5	None.	Native	Remove
3740	Parramatta Wattle	*Acacia parramattensis*	Young	5	3	100					100	120	Good	Fair	Low	5. Small/Young	Z10	2.0	1.5	Central stem failure.	Native	Remove
3741	Parramatta Wattle	*Acacia parramattensis*	Semi-mature	6	3	100	120	80			175	200	Good	Fair	Low	5. Small/Young	Z1	2.1	1.7	None.	Native	Remove
3742	Sweetgum	*Liquidambar styraciflua*	Young	7	2	80	100	100			162	180	Good	Good	Low	5. Small/Young	Z1	2.0	1.6	Multiple suckers growing in a group.	Exotic	Remove
3743	Sydney Golden Wattle	*Acacia longifolia*	Semi-mature	6	2	120	100	100			185	220	Good	Fair	Low	5. Small/Young	Z1	2.2	1.8	None.	Native	Remove
3744	Sydney Golden Wattle	*Acacia longifolia*	Young	5	2	100					100	150	Good	Good	Low	5. Small/Young	Z1	2.0	1.5	None.	Native	Remove
G50	Mixed species	*Mixed species*	Young	6	2	80					80	120	Good	Good	Low	5. Small/Young	Z1	2.0	1.5	Mixed group of 6 trees. Wattle at Eastern end to remain.	Native	Remove
G51	River She Oak	*Casuarina cunninghamiana*	Young	5	2	100					100	120	Good	Good	Low	5. Small/Young	Z1	2.0	1.5	Group of 13 small trees. Others trees are below size threshold.	Native	Remove
G52	Sydney Golden Wattle	*Acacia longifolia*	Young	4	2	80					80	100	Good	Good	Low	5. Small/Young	Z1	2.0	1.5	Group of 5 trees. Other trees below size threshold.	Native	Remove
G53	Sydney Golden Wattle	*Acacia longifolia*	Semi-mature	6	3	120	100				156	180	Good	Good	Low	5. Small/Young	Z1	2.0	1.6	Group of approximately 20 trees.	Native	Prune
G54	Sydney Golden Wattle	*Acacia longifolia*	Semi-mature	6	3	100	80				128	150	Good	Good	Low	5. Small/Young	Z1	2.0	1.5	Group of approximately 12 trees	Native	Remove
G85	Mixed species	*Mixed species*	Semi-mature	6	2	80	60				100	120	Good	Good	Low	5. Small/Young	Z1	2.0	1.5	Group of four trees of mixed species, in corridor closest to the Cooks river	Native	Remove

Explanatory Notes

Tree Species - Common name followed by botanical name. Where species is unknown it is indicated with an *'spp'*.
Age Class - Over mature (OM), Mature (M), Early mature (EM), Semi mature (SM), Young (Y).
Diameter at Standard Height (DSH) - Measured with a diameter tape or estimated at approximately 1.4m above ground level.
Diameter Above root Buttresses (DAB): Measured with a diameter tape or estimated above root buttresses (DAB) for calculating the SRZ.
Height - Height from ground level to top of crown. All heights are estimated unless otherwise indicated.
Spread - Radius of crown at widest section. All tree spreads are estimated unless otherwise indicated.
Notional Root Zone (NRZ) - DSH x 12. Measured in radius from the centre of the trunk. Rounded to nearest 0.1m. For monocots, the NRZ is set at 1 metre outside the crown projection.
Structural Root Zone (SRZ) - $(DAB \times 50)^{0.42} \times 0.64$. Measured in radius from the centre of the trunk. Rounded up to nearest 0.1m.
Health - Good/Fair/Poor/Dead
Structure - Good/Fair/Poor
Safe Useful Life Expectancy (SULE) - 1. Long (40+years), 2. Medium (15 - 40 years), 3. Short (5 - 15 years), 4. Remove (under 5 years), 5. Small/young.
Amenity Value - Very High/High/Medium/Low/Very Low.
Retention Value: Tree AZ, see appendix 3 for categories.

Appendix 3 - Further Information of Methodology

1. **Tree Protection Zone:** The tree protection zone (TPZ) is the principle means of protecting trees on development sites. The TPZ is a combination of the root area and crown area requiring protection. It is an area isolated from construction disturbance, so that the tree remains viable. The radius of the TPZ is calculated for each tree by multiplying its DBH x 12. The derived value is measured in radius from the centre of the stem/trunk at ground level. A TPZ should not be less than 2.0 metres nor greater than 15 metres (except where crown protection is required).
   It is commonly observed that tree roots will extend significant further than the indicative TPZ, however the TPZ is an area identified AS4970-2009 to be extent where root loss or disturbance will generally not impact the viability of the tree. The TPZ is identified as a restricted area to prevent damage to trees either above or below ground during a development. Where trees are intended to be retained proposed developments must provide an adequate TPZ around trees. The TPZ is set aside for the tree's root zone, trunk and crown and it is essential for the stability and longevity of the tree. The tree protection also incorporates the SRZ (see below for more information about the SRZ). I have calculated the TPZ of palms, other monocots, cycads and tree ferns at one metre outside the crown projection. See appendices for additional information about the TPZ including information about calculating the TPZ and examples of TPZ encroachment.
   Minor encroachment into TPZ: Sometimes encroachment into the TPZ is unavoidable. Encroachment includes but is not limited to activities such as excavation, compacted fill and machine trenching. Minor encroachment of up to 10% of the overall TPZ area is normally considered acceptable, providing there is space adjacent to the TPZ for the tree to compensate and the tree is displaying adequate vigour/health to tolerate changes to its growing environment.
   Major encroachment into TPZ: Where encroachment of more than 10% of the overall TPZ area is proposed the project Arborist must investigate and demonstrate that the tree will remain in a viable condition. In some cases, tree sensitive construction methods such as pier and beam footings, suspended slabs, or cantilevered sections, can be utilised to allow additional encroachment into the TPZ by bridging over roots and minimising root disturbance. Major encroachment is only possible if it can be undertaken without severing significant size roots, or if it can be demonstrated that significant roots will not be impacted.



2. **Structural Root Zone:** This is the area around the base of a tree required for the trees stability in the ground. An area larger than the SRZ always need to be maintained to preserve a viable tree as it will only have a minor effect on the trees vigour and health. There are several factors that determine the SRZ which include height, crown area, soil type and soil moisture. It can also be influenced by other factors such as natural or built structures. Generally work within the SRZ should be avoided.
   An indicative SRZ radius can be determined from the diameter of the trunk measured immediately above the root buttresses. Root investigation could provide more information about the extent of the SRZ. The following formula should be used to calculate the SRZ.
   SRZ radius = $(D \times 50)^{0.42} \times 0.64$ (D = Diameter above root buttress).

3. **Tree Age Class:** If can be difficult to determine the age of a tree without carrying out invasive tests that may damage the tree, so we have categorised there likely age class which is defined below;
   - Young/Newly planted: Young or recently planted tree.
   - Semi Mature: Up to 20% of the usual life expectancy for the species.
   - Early mature/Mature: Between 20%-80% of the usual life expectancy for the species.
   - Over mature: Over 80% of the usual life expectancy for the species.
   - Dead: Tree is dead or almost dead.

4. **Health/Physiological Condition:** Below are examples conditions used when assigning a category for tree health.

Category	Example condition	Summary
Good	• Crown has good foliage density for species. • Tree shows no or minimal signs of pathogens that are unlikely to have an effect on the health of the tree. • Tree is displaying good vigour and reactive growth development.	• The tree is in above average health and condition and no remedial works are required.
Fair	• The tree may be starting to dieback or have over 25% deadwood. • Tree may have slightly reduced crown density or thinning. • There may be some discolouration of foliage. • Average reactive growth development. • There may be early signs of pathogens which may further deteriorate the health of the tree. • There may be epicormic growth indicating increased levels of stress within the tree.	• The tree is in below average health and condition and may require remedial works to improve the trees health.
Poor	• The may be in decline, have extensive dieback or have over 30% deadwood. • The canopy may be sparse or the leaves may be unusually small for species. • Pathogens or pests are having a significant detrimental effect on the tree health.	• The tree is displaying low levels of health and removal or remedial works may be required.
Dead	• The tree is dead or almost dead.	• The tree should generally be removed.

5. **Structural Condition:** Below are examples conditions used when assigning a category for structural condition.

Category	Example condition	Summary
Good	• Branch unions appear to be strong with no sign of defects. • There are no significant cavities. • The tree is unlikely to fail in usual conditions. • The tree has a balanced crown shape and form.	• The tree is considered structurally good with well developed form.
Fair	• The tree may have minor structural defects within the structure of the crown that could potentially develop into more significant defects. • The tree may a cavity that is currently unlikely to fail but may deteriorate in the future. • The tree is an unbalanced shape or leans significantly. • The tree may have minor damage to its roots. • The root plate may have moved in the past but the tree has now compensated for this. • Branches may be rubbing or crossing.	• The identified defects are unlikely cause major failure. • Some branch failure may occur in usual conditions. • Remedial works can be undertaken to alleviate potential defects.
Poor	• The tree has significant structural defects. • Branch unions may be poor or weak. • The tree may have a cavity or cavities with excessive levels of decay that could cause catastrophic failure. • The tree may have root damage or is displaying signs of recent movement. • The tree crown may have poor weight distribution which could cause failure.	• The identified defects are likely to cause either partial or whole failure of the tree.

6. **Amenity Value:** To determine the amenity value of a tree we assess a number of different factors, which include but are not limited to the information below.
   - The visibility of the tree to adjacent sites.
   - The relationship between the tree and the site.
   - Whether the tree is protected by any statuary conditions.
   - The habitat value of the tree.
   - Whether the tree is considered a noxious weed species.

   The amenity value is rated using one of the following values.
   - Very High
   - High
   - Moderate
   - Low
   - Very Low

7. **Safe Useful Life Expectancy (SULE), (Barrel, 2001):** A trees safe useful life expectancy is determined by assessing a number of different factors including the health and vitality, estimated age in relation to expected life expectancy for the species, structural defects, and remedial works that could allow retention in the existing situation.

Category	Description
1. Long - Over 40 years	(a) Structurally sound trees located in positions that can accommodate future growth. (b) Trees that could be made suitable for retention in the long term by remedial tree care. (c) Trees of special significance for historical, commemorative or rarity reasons that would warrant extraordinary efforts to secure their long term retention.
2. Medium - 15 to 40 years	(a) Trees that may only live between 15 and 40 more years. (b) Trees that could live for more than 40 years but may be removed for safety or nuisance reasons. (c) Trees that could live for more than 40 years but may be removed to prevent interference with more suitable individuals or to provide space for new planting. (d) Trees that could be made suitable for retention in the medium term by remedial tree care.
3. Short - 5 to 15 years	(a) Trees that may only live between 5 and 15 more years. (b) Trees that could live for more than 15 years but may be removed for safety or nuisance reasons. (c) Trees that could live for more than 15 years but may be removed to prevent interference with more suitable individuals or to provide space for new planting. (d) Trees that require substantial remedial tree care and are only suitable for retention in the short term.
4. Remove - Under 5 years	(a) Dead, dying, suppressed or declining trees because of disease or inhospitable conditions. (b) Dangerous trees because of instability or recent loss of adjacent trees. (c) Dangerous trees because of structural defects including cavities, decay, included bark, wounds or poor form. (d) Damaged trees that are clearly not safe to retain. (e) Trees that could live for more than 5 years but may be removed to prevent interference with more suitable individuals or to provide space for new planting. (f) Trees that are damaging or may cause damage to existing structures within 5 years. (g) Trees that will become dangerous after removal of other trees for the reasons given in (a) to (f). (h) Trees in categories (a) to (g) that have a high wildlife habitat value and, with appropriate treatment, could be retained subject to regular review.
5. Small/Young	(a) Small trees less than 5m in height. (b) Young trees less than 15 years old but over 5m in height. (c) Formal hedges and trees intended for regular pruning to artificially control growth.

8. **Root investigations:** The root investigations should identify roots greater than 30mm in diameter that are located along the edge of the structures footprint or in the location of footings. Root investigations must be carried out using non-invasive methods (manual excavations). Any excavations for the root investigations must carried out manually to avoid damaging the roots during excavations. Manual excavation may include the use of a high-pressure air/air knife, or a combination of high-pressure water and a vacuum device. When hand excavating carefully work around roots retaining as many as possible. Take care to not fray, wound, or cause damage to any roots during excavations as this may cause decay or infection from pathogens. It is essential that exposed roots are kept moist and the excavation back filled as soon as possible. The root investigations should be carried out by a qualified Arborist minimum AQF3. Once roots are exposed, a visual assessment can be carried out by a consulting Arborist to evaluate the potential impact of the proposed root loss on the health and stability of the tree. A root map/report should be prepared identifying the findings of investigations, including photographs as supporting evidence in the report.

9. **Retention Value:** The system I have used to award the retention value is Tree AZ. Tree AZ is used to identify higher value trees worthy of being a constraint to development and lower value trees that should generally not be a constraint to the development. The table below provides a brief description of each category.

TreeAZ Categories (Version 10.04-ANZ)

CAUTION: TreeAZ assessments must be carried out by a competent person qualified and experienced in arboriculture. The following category descriptions are designed to be a brief field reference and are not intended to be self-explanatory. They must be read in conjunction with the most current explanations published at www.TreeAZ.com.

Category Z: Unimportant trees not worthy of being a material constraint

Local policy exemptions: Trees that are unsuitable for legal protection for local policy reasons including size, proximity and species	
Z1	Young or insignificant small trees, i.e. below the local size threshold for legal protection, etc
Z2	Too close to a building, i.e. exempt from legal protection because of proximity, etc
Z3	Species that cannot be protected for other reasons, i.e. scheduled noxious weeds, out of character in a setting of acknowledged importance, etc
High risk of death or failure: Trees that are likely to be removed within 10 years because of acute health issues or severe structural failure	
Z4	Dead, dying, diseased or declining
Z5	Severe damage and/or structural defects where a high risk of failure cannot be satisfactorily reduced by reasonable remedial care, i.e. cavities, decay, included bark, wounds, excessive imbalance, overgrown and vulnerable to adverse weather conditions, etc
Z6	Instability, i.e. poor anchorage, increased exposure, etc
Excessive nuisance: Trees that are likely to be removed within 10 years because of unacceptable impact on people	
Z7	Excessive, severe and intolerable inconvenience to the extent that a locally recognized court or tribunal would be likely to authorize removal, i.e. dominance, debris, interference, etc
Z8	Excessive, severe and intolerable damage to property to the extent that a locally recognized court or tribunal would be likely to authorize removal, i.e. severe structural damage to surfacing and buildings, etc
Good management: Trees that are likely to be removed within 10 years through responsible management of the tree population	
Z9	Severe damage and/or structural defects where a high risk of failure can be temporarily reduced by reasonable remedial care, i.e. cavities, decay, included bark, wounds, excessive imbalance, vulnerable to adverse weather conditions, etc
Z10	Poor condition or location with a low potential for recovery or improvement, i.e. dominated by adjacent trees or buildings, poor architectural framework, etc
Z11	Removal would benefit better adjacent trees, i.e. relieve physical interference, suppression, etc
Z12	Unacceptably expensive to retain, i.e. severe defects requiring excessive levels of maintenance, etc

NOTE: Z trees with a high risk of death/failure (Z4, Z5 & Z6) or causing severe inconvenience (Z7 & Z8) at the time of assessment and need an urgent risk assessment can be designated as ZZ. ZZ trees are likely to be unsuitable for retention and at the bottom of the categorization hierarchy. In contrast, although Z trees are not worthy of influencing new designs, urgent removal is not essential and they could be retained in the short term, if appropriate.

Category A: Important trees suitable for retention for more than 10 years and worthy of being a material constraint

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

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

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

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Glossary of Terms

Abiotic - Pertaining to non-living agents; e.g. environmental factors

Adventitious shoots - Shoots that develop other than from apical, axillary or dormant buds; see also 'epicormic'

Anchorage - The system whereby a tree is fixed within the soil, involving cohesion between roots and soil and the development of a branched system of roots which withstands wind and gravitational forces transmitted from the aerial parts of the tree

Bark - A term usually applied to all the tissues of a woody plant lying outside the vascular cambium, thus including the phloem, cortex and periderm; occasionally applied only to the periderm or the phellem

Branch:
• **Primary**. A first order branch arising from a stem
• **Lateral**. A second order branch, subordinate to a primary branch or stem and bearing sub-lateral branches
• **Sub-lateral**. A third order branch, subordinate to a lateral or primary branch, or stem and usually bearing only twigs

Branch collar - A visible swelling formed at the base of a branch whose diameter growth has been disproportionately slow compared to that of the parent stem; a term sometimes applied also to the pattern of growth of the cells of the parent stem around the branch base

Brown-rot - A type of wood decay in which cellulose is degraded, while lignin is only modified

Buckling - An irreversible deformation of a structure subjected to a bending load

Buttress zone - The region at the base of a tree where the major lateral roots join the stem, with buttress-like formations on the upper side of the junctions

Cambium - Layer of dividing cells producing xylem (woody) tissue internally and phloem (bark) tissue externally

Canker - A persistent lesion formed by the death of bark and cambium due to colonisation by fungi or bacteria

Compartmentalisation - The confinement of disease, decay or other dysfunction within an anatomically discrete region of plant tissue, due to passive and/or active defences operating at the boundaries of the affected region

Compressive loading - Mechanical loading which exerts a positive pressure; the opposite to tensile loading

Condition - An indication of the physiological condition of the tree. Where the term ‘condition’ is used in a report, it should not be taken as an indication of the stability of the tree

Crown/Canopy - The main foliage bearing section of the tree

Crown lifting - The removal of limbs and small branches to a specified height above ground level

Crown thinning - The removal of a proportion of secondary branch growth throughout the crown to produce an even density of foliage around a well-balanced branch structure

Crown reduction/shaping - A specified reduction in crown size whilst preserving, as far as possible, the natural tree shape

DAB (Diameter Above Buttress) - Trunk diameter measured above the root buttress

Defect - In relation to tree hazards, any feature of a tree which detracts from the uniform distribution of mechanical stress, or which makes the tree mechanically unsuited to its environment

Dieback - The death of parts of a woody plant, starting at shoot-tips or root-tips

Disease - A malfunction in or destruction of tissues within a living organism, usually excluding mechanical damage; in trees, usually caused by pathogenic micro-organisms

Dominance - In trees, the tendency for a leading shoot to grow faster or more vigorously than the lateral shoots; also the tendency of a tree to maintain a taller crown than its neighbours

Dormant bud - An axial bud which does not develop into a shoot until after the formation of two or more annual wood increments; many such buds persist through the life of a tree and develop only if stimulated to do so

Dysfunction - In woody tissues, the loss of physiological function, especially water conduction, in sapwood

DBH (Diameter at Breast Height) - Stem diameter measured at a height of 1.4 metres or the nearest measurable point. Where measurement at a height of 1.4 metres is not possible, another height may be specified

Deadwood - Branch or stem wood bearing no live tissues. Retention of deadwood provides valuable habitat for a wide range of species and seldom represents a threat to the health of the tree. Removal of deadwood can result in the ingress of decay to otherwise sound tissues and climbing operations to access deadwood can cause significant damage to a tree. Removal of deadwood is generally recommended only where it represents an unacceptable level of hazard

Epicormic shoot - A shoot having developed from a dormant or adventitious bud and not having developed from a first year shoot

Flush-cut - A pruning cut which removes part of the branch bark ridge and or branch-collar

Girdling root - A root which circles and constricts the stem or roots possibly causing death of phloem and/or cambial tissue

Habit - The overall growth characteristics, shape of the tree and branch structure

Hazard beam - An upwardly curved part of a tree in which strong internal stresses may occur without being reduced by adaptive growth; prone to longitudinal splitting

Incorporating extracts from Lonsdale, D. 1999. Principles of Tree Hazard Assessment. Her Majesty's Stationary Office, London

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Heartwood/false-heartwood - The dead central wood that has become dysfunctional as part of the aging processes and being distinct from the sapwood

Heave - A term mainly applicable to a shrinkable clay soil which expands due to re-wetting after the felling of a tree which was previously extracting moisture from the deeper layers; also the lifting of pavements and other structures by root diameter expansion; also the lifting of one side of a wind-rocked root-plate

Included bark (ingrown bark) - Bark of adjacent parts of a tree (usually forks, acutely joined branches or basal flutes) which is in face-to-face contact

Lever arm - A mechanical term denoting the length of the lever represented by a structure that is free to move at one end, such as a tree or an individual branch

Lignin - The hard, cement-like constituent of wood cells; deposition of lignin within the matrix of cellulose microfibrils in the cell wall is termed Lignification

Lions tailing - A term applied to a branch of a tree that has few if any side-branches except at its end, and is thus liable to snap due to end- loading

Loading - A mechanical term describing the force acting on a structure from a particular source; e.g. the weight of the structure itself or wind pressure

Mycelium - The body of a fungus, consisting of branched filaments (hyphae)

Occlusion - The process whereby a wound is progressively closed by the formation of new wood and bark around it

Pathogen - A micro-organism which causes disease in another organism

Photosynthesis - The process whereby plants use light energy to split hydrogen from water molecules, and combine it with carbon dioxide to form the molecular building blocks for synthesizing carbohydrates and other biochemical products

Probability - A statistical measure of the likelihood that a particular event might occur

Pruning - The removal or cutting back of twigs or branches, sometimes applied to twigs or small branches only, but often used to describe most activities involving the cutting of trees or shrubs

Radial - In the plane or direction of the radius of a circular object such as a tree stem

Reactive Growth/Reaction Wood - Production of woody tissue in response to altered mechanical loading; often in response to internal defect or decay and associated strength loss (cf. adaptive growth)

Ring-barking - The removal of a ring of bark and phloem around the circumference of a stem or branch, normally resulting in an inability to transport photosynthetic assimilates below the area of damage. Almost inevitably results in the eventual death of the affected stem or branch above the damage

Root-collar - The transitional area between the stem/s and roots

Sapwood - Living xylem tissues

Soft-rot - A kind of wood decay in which a fungus degrades cellulose within the cell walls, without any general degradation of the wall as a whole

Stem/s - Principle above-ground structural component(s) of a tree that supports its branches

Stress - In plant physiology, a condition under which one or more physiological functions are not operating within their optimum range, for example due to lack of water, inadequate nutrition or extremes of temperature

SRZ (Structural Root Zone) - The area around the base of the tree required for the trees stability in the ground

Subsidence - In relation to soil or structures resting in or on soil, a sinking due to shrinkage when certain types of clay soil dry out, sometimes due to extraction of moisture by tree roots

Taper - In stems and branches, the degree of change in girth along a given length

Targets - In tree risk assessment (with slight misuse of normal meaning) persons or property or other things of value which might be harmed by mechanical failure of the tree or by objects falling from it

Topping - In arboriculture, the removal of the crown of a tree, or of a major proportion of it

Transpiration - The evaporation of moisture from the surface of a plant, especially via the stomata of leaves; it exerts a suction which draws water up from the roots and through the intervening xylem cells

TPZ (Tree Protection Zone) - A specified area above and below ground and at a given distance from the trunk set aside for the protection of a tree's roots and crown to provide for the viability and stability of a tree to be retained where it is potentially subject to damage by development

Understory - This layer consists of younger individuals of the dominant trees, together with smaller trees and shrubs which are adapted to grow under lower light conditions

Veteran tree - Tree that, by recognised criteria, shows features of biological, cultural or aesthetic value that are characteristic of, but not exclusive to, individuals surviving beyond the typical age range for the species concerned. These characteristics might typically include a large girth, signs of crown retrenchment and hollowing of the stem

Vigour - The expression of carbohydrate expenditure to growth (in trees)

White-rot - A range of kinds of wood decay in which lignin, usually together with cellulose and other wood constituents, is degraded

Wind exposure - The degree to which a tree or other object is exposed to wind, both in terms of duration and velocity

Wind pressure - The force exerted by a wind on a particular object

Windthrow - The blowing over of a tree at its roots

Incorporating extracts from Lonsdale, D. 1999. Principles of Tree Hazard Assessment. Her Majesty's Stationary Office, London

Appendix A (Part G) – Addendum to Arboricultural Pruning Specification Report (Southwest Metro –Wiley Park to Punchbowl)

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Addendum to Arboricultural Pruning Specification Report

Site Location: Southwest Metro – Wiley Park to Punchbowl

Prepared for:
UGL

Prepared by: Bryce Claassens and Alex Kurath
Date prepared: 29 September 2025
Ref: 250917_SWM_Ineco_PS_Ad7
Addendum: 7

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1. INTRODUCTION

1.1 Urban Arbor have been instructed to prepare an addendum to the previous Pruning Specification Report (18 November 2024) in relation to Corridor Intruder Detection System (CIDS) and Object Detection System (ODS) trouble spots. The report is to address trees within and adjacent to the rail corridor between Wiley Park Station to Punchbowl Station.

1.2 Documents and information provided to assist in preparing the report;

A) Arboricultural Pruning Specification Report, Urban Arbor, Ref:241118_SWM_Ineco_PS, Revision 2,18 November 2024.
B) CCTV LOS and Nuisance Alarm Register, Doc No. SMCSWIDS-UGL-1NL-TC-REG-000745, Revision B, 16 September 2025.

1.3 The site and tree inspections were carried out on 23 September 2025 by Alex Kurath of Urban Arbor, in conjunction with representatives from UGL (Rares Pop), JHLORJV (Andre Kruize) and Sydney Metro. UGL advised the trees requiring pruning or removal to obtain camera visibility of fence lines.

1.4 Some trees included within this report were previously inspected between the dates of 6 January 2020 to 3 April 2020 by Bryce Claassens during the South West Metro Rail Corridor (SWMRC) and Station Precinct design works. Access was available to the subject site and adjoining public areas only. This report has been written by Bryce Claassens.

2. SCOPE OF THE REPORT

2.1 This report has been undertaken to meet the following objectives.

2.1.1 Conduct a walk-through assessment of the areas where trees (identified by UGL) are currently obstructing camera visibility, which require pruning or removal. The decision of pruning or removal of trees is subject to the agreement and approval of the stakeholders.

2.1.2 Conduct a visual assessment of significant trees not previously included in the Pruning Specification Report (dated 18 November 2024), located within areas identified by UGL. For the purpose of this report, a significant tree is a ‘Long lived woody perennial plant greater than (or usually greater than) 3 metres in height with one or relatively few main stems or trunks’.

2.1.3 Determine the trees estimated contribution years and remaining useful life expectancy and award the trees a retention value.

2.1.4 Provide pruning specifications for trees where required, in accordance with AS4373-2007.

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3. LIMITATIONS

3.1 The observations and recommendations are based on the site inspections identified in section 1 only. The findings of this report are based on the observations and site conditions at the time of inspection.

3.2 All of the observations were carried out from ground level. The accuracy of the assessment of the subject trees structural condition and health is limited to the visibility of the tree at the time of inspection.

3.3 The tree inspection was visual from ground level only. No soil or tissue testing was carried out as part of the tree inspection. None of the surrounding surfaces adjacent to trees were lifted or removed during the tree inspections.

3.4 Root decay can sometimes be present with no visual indication above ground. It is also impossible to know the extent of any root damage caused by mechanical damage such as underground root cutting during the installation of services without undertaking detailed root investigation. Any form of tree failure due to these activities is beyond the scope of this assessment.

3.5 The report reflects the subject tree(s) as found on the day of inspection. Any changes to the growing environment of the subject tree, or tree management works beyond those recommended in this report may alter the findings of the report. There is no warranty, expressed or implied, that problems or deficiencies relating to the subject tree, or subject site may not arise in the future.

3.6 Tree identification is based on accessible visual characteristics at the time of inspection. As key identifying features are not always available the accuracy of identification is not guaranteed. Where tree species is unknown, it is indicated with an *spp*.

3.7 Some trees included within this report have been located using a Trimble TDC100 hand held GNSS device by Urban Arbor Pty Ltd. Tree locations captured by the Trimble TDC100 are only accurate to within 1m - 3m. If an accurate location of these trees is required, a registered surveyor should locate the trees.

3.8 In some instances, multiple trees or groups of small trees have been identified as groups of trees within this report.

3.9 All diagrams, plans and photographs included in this report are visual aids only and are not to scale unless otherwise indicated.

3.10 Alteration of this report invalidates the entire report.

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4. METHODOLOGY

4.1 The following information was collected during the assessment of the subject tree(s).

- 4.1.1 Tree common name
- 4.1.2 Tree botanical name
- 4.1.3 Tree age class
- 4.1.4 DSH (Trunk/Stem diameter at breast height/1.4m) - millimetres.
- 4.1.5 DAB (Trunk diameter directly above the root buttress) – millimetres.
- 4.1.6 Estimated height - metres
- 4.1.7 Estimated crown spread (diameter of crown) - metres
- 4.1.8 Health
- 4.1.9 Structural condition
- 4.1.10 Amenity value
- 4.1.11 Estimated remaining contribution years (SULE)[1]
- 4.1.12 Retention value (Tree AZ)[2]
- 4.1.13 Notes/comments

4.2 An assessment of the trees condition was made using the visual tree assessment (VTA) model (Mattheck & Breloer, 1994).[3]

4.3 Tree diameter was measured using a DSH tape or in some cases estimated. Tree height and tree canopy spread was measured with a clinometer or in some cases estimated. All other measurements were estimations unless otherwise stated. The other tools used during the assessment were a nylon mallet, compass, camera and a steel probe.

4.4 All DSH measurements, notional root zones, and structural root zones within Appendix 2 of this report were calculated in accordance with methods set out in AS4970 Protection of trees on development sites (2025).[4]

4.5 Details of how the observations in this report have been assessed are listed in the appendices.

[1] Barrell, J. (2001), *'SULE: Its use and status in the new millennium' in Management of Mature Trees proceedings of the 4th NAAA Workshop*, Sydney, 2001. Barrell.

[2] Barrell Tree Consultancy, *Tree AZ version 10.10-ANZ*, http://www.treeaz.com/.

[3] Mattheck, C. & Breloer, H., *The body language of trees - A handbook for failure analysis*, The Stationary Office, London, England (1994).

[4] Council Of Standards Australia, *AS4970 Protection of trees on development sites* (2025).

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5. SITE LOCATION AND BRIEF DESCRIPTION

5.1 The area covered in the site inspections is located within the Canterbury Bankstown LGA. All trees within the Canterbury Bankstown LGA are subject to protection under the Canterbury Bankstown LEP 2023[5] and Canterbury Bankstown DCP 2023.[6]

6. AREAS ASSESSED

6.1 The areas assessed in this report have been identified by UGL in the report CCTV LOS and Nuisance Alarm Register (dated 16 September 2025), which includes trees within and adjacent to the rail corridor between Wiley Park Station to Punchbowl Station.

7. TREE OBSERVATIONS

7.1 **Tree information:** Details of each individual tree assessed, including the observations taken during the site inspections, can be found in the tree inspection schedule in appendix 2. Each of the subject trees have been awarded a retention value based on the observations using the Tree AZ method. Tree AZ is used to identify higher value trees worthy of being a constraint to development and lower value trees that should generally not be a constraint to the development. The Tree AZ categories sheet (Barrell Tree Consultancy) has been included in appendix 3 to assist with understanding the retention values. The retention values that have been allocated to the subject trees in this report is not definitive and should only be used as a guideline.

8. ASSESSMENT OF TREE IMPACTS BY AREA

8.1 The trees included in the following sections have been identified by UGL as being subject to impacts from development works. All trees to be retained should be protected in accordance with AS4970-2025 *Protection of trees on development sites*. If there are any development works that have not been assessed and could potentially impact additional trees, the project arborist must assess the impact of the proposed works to the condition of the trees, determining the trees viability for retention.

[5] *Canterbury Bankstown Local Environmental Plan 2023*, https://legislation.nsw.gov.au/view/html/inforce/current/epi-2023-0336, accessed 21 August 2025.

[6] *Canterbury Bankstown Development Control Plan 2023*, https://www.cbcity.nsw.gov.au/development/planning-control-policies/canterbury-bankstown-development-control-plan-2023, accessed 21 August 2025.

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8.2 Wiley Park to Punchbowl (WTP_01 – WTP_07)

8.2.1 Eighteen (18) trees and one (1) group of trees have been identified for removal in this area, including tree 727, 737, 738, 739, 1951, 1963, 1965, 1967, 1969, 1974, 1978, 3367, 3368, 3369, 3370, 3372, 3750, 3751 and G3366.

8.2.2 Twenty-six (26) trees and two (2) groups of trees have been identified for canopy pruning in this area, including tree 719, 722, 726, 1128, 1939, 1947, 1954, 1959, 1971, 1973, 3333, 3334, 3335, 3336, 3337, 3338, 3339, 3340, 3341, 3342, 3343, 3344, 3345, 3583, 3600, 3752, G18 and G60. All canopy pruning must be completed in accordance with AS4373 *Pruning of amenity trees* (2007).

8.2.3 The details of the trees are summarised in the table below. Photographs of the trees are included in section 8.3.

Tree ID	Botanical Name	SULE	Retention Value	Height (m)	Canopy Spread (m) - radius	Native / Exotic	Prune / Remove
719	*Quercus robur*	2. Medium	A1	8	4	Exotic	Prune
722	*Corymbia maculata*	1. Long	A1	22	5	Native	Prune
726	*Lophostemon confertus*	1. Long	A1	7	4	Native	Prune
727	*Corymbia citriodora*	3. Short	Z10	9	5	Native	Remove
737	*Callistemon viminalis*	1. Long	A1	8	3	Native	Remove
738	*Callistemon viminalis*	1. Long	A1	8	3	Native	Remove
739	*Callistemon viminalis*	1. Long	A1	8	4	Native	Remove
1128	*Eucalyptus saligna*	2. Medium	A2	20	9	Native	Prune
1939	*Eucalyptus botryoides*	2. Medium	A2	10	5	Native	Prune
1947	*Lophostemon confertus*	3. Short	Z10	6	4	Native	Prune
1951	*Syncarpia glomulifera*	4. Remove	Z4	8	6	Native	Remove
1954	*Eucalyptus botryoides*	2. Medium	A2	10	5	Native	Prune
1959	*Lophostemon confertus*	2. Medium	A2	5	3	Native	Prune
1963	*Lophostemon confertus*	2. Medium	A2	6	3	Native	Remove
1965	*Lophostemon confertus*	2. Medium	A1	5	3	Native	Remove
1967	*Lophostemon confertus*	2. Medium	A2	7	4	Native	Remove
1969	*Lophostemon confertus*	3. Short	Z10	6	4	Native	Remove
1971	*Lophostemon confertus*	3. Short	Z10	6	3	Native	Prune
1973	*Lophostemon confertus*	5. Small/Young	Z1	6	2	Native	Prune
1974	*Lophostemon confertus*	3. Short	Z10	6	4	Native	Remove
1978	*Lophostemon confertus*	3. Short	Z10	5	6	Native	Remove
3333	*Ligustrum lucidum*	2. Medium	Z3	6	2	Exotic	Prune
3334	*Ligustrum lucidum*	2. Medium	Z3	7	2	Exotic	Prune
3335	*Schinus molle*	3. Short	Z10	10	5	Exotic	Prune
3336	*Ligustrum lucidum*	2. Medium	Z3	7	2	Exotic	Prune
3337	*Schinus molle*	2. Medium	A1	10	8	Exotic	Prune
3338	*Ligustrum lucidum*	2. Medium	Z3	6	2	Exotic	Prune
3339	*Schinus molle*	2. Medium	A1	10	5	Exotic	Prune
3340	*Ligustrum lucidum*	2. Medium	Z3	6	2	Exotic	Prune
3341	*Schinus molle*	3. Short	Z10	9	5	Exotic	Prune
3342	*Phoenix canariensis*	5. Small/Young	Z1	3	1	Exotic	Prune

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Tree ID	Botanical Name	SULE	Retention Value	Height (m)	Canopy Spread (m) - radius	Native / Exotic	Prune / Remove
3343	*Ligustrum lucidum*	2. Medium	Z3	6	3	Exotic	Prune
3344	*Schinus molle*	3. Short	Z10	8	6	Exotic	Prune
3345	*Schinus molle*	2. Medium	A1	10	7	Exotic	Prune
3367	*Cinnamomum camphora*	5. Small/Young	Z3	7	2	Exotic	Remove
3368	*Cinnamomum camphora*	5. Small/Young	Z3	7	2	Exotic	Remove
3369	*Cinnamomum camphora*	2. Medium	Z3	9	3	Exotic	Remove
3370	*Cinnamomum camphora*	5. Small/Young	Z3	6	2	Exotic	Remove
3372	*Cinnamomum camphora*	5. Small/Young	Z3	6	2	Exotic	Remove
3583	*Angophora costata*	2. Medium	A2	15	5	Native	Prune
3600	*Schinus molle*	2. Medium	Z10	8	6	Exotic	Prune
3750	*Schinus molle*	5. Small/Young	Z1	4	2	Exotic	Remove
3751	*Ligustrum lucidum*	5. Small/Young	Z3	5	3	Exotic	Remove
3752	*Corymbia citriodora*	1. Long	A1	17	6	Native	Prune
G18	*Acacia longifolia*	5. Small/Young	Z1	6	2	Native	Prune
G3366	*Acacia longifolia*	5. Small/Young	Z1	4	1.5	Native	Remove
G60	*Mixed species*	1. Long	A1	15	5	Native	Prune

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8.3 **Photographs**

Image 1: Looking towards tree 3600. Canopy pruning is required to provide clearance from the fence. Smaller branches growing towards the fence are to be pruned to provide 2m clearance from the fence. The finished cut diameters must not exceed 50mm. The pruning will result in the removal of approximately 20% of the live foliage area of the tree. The area of canopy to be pruned has been marked yellow.

Image 2: Looking towards tree 3333, 3334, 3335, 3336, 3337, 3338, 3339, 3340, 3341, 3342, 3343, 3344 and 3345. Canopy pruning is required to provide clearance from the fence. Smaller branches growing towards the fence are to be pruned to provide 2m clearance from the fence. The pruning will result in the removal of an estimated 10-20% of the live foliage area of each tree. The area requiring pruning has been marked red.

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Image 3: Looking towards tree 3750 and 3751. The trees are recommended for removal

Image 4: Looking towards tree 1978. The tree is recommended for removal due to excessive canopy pruning required for fence clearance.

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Image 5: Looking towards tree 1974. The tree is recommended for removal due to excessive canopy pruning required for fence clearance.

Image 6: Looking towards tree 1973. Canopy pruning is required to provide clearance from the fence. The two first order branches require pruning to provide fence clearance. The finished cut diameters measure approximately 50mm and 60mm. The pruning will result in the removal of approximately 10% of the live foliage area of the tree. The branches to be pruned have been marked yellow.

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Image 7: Looking towards tree 1971. Canopy pruning is required to provide clearance from the fence. The 140mm diameter first order branch to the West is to be pruned (yellow line). The 80mm diameter first order branch and 50mm diameter second order branch to the East are to be pruned (yellow circle). The pruning will result in the removal of approximately 15% of the live foliage area of the tree.

Image 8: Looking towards tree 1969. The tree is recommended for removal due to excessive canopy pruning required for fence clearance.

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Image 9: Looking towards tree 1967. The tree is recommended for removal due to excessive canopy pruning required for fence clearance.

Image 10: Looking towards tree 1965. The tree is recommended for removal due to excessive canopy pruning required for fence clearance.

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Image 11: Looking towards tree 1963. The tree is recommended for removal due to excessive canopy pruning required for fence clearance.

Image 12: Looking towards G18, which is a group of approximately 46 trees recommended for pruning. Smaller branches measuring less than 50mm in diameter are to be pruned. The pruning will result in the removal of less than 10% of the live foliage area of each tree within the group. The approximate area of the pruning has been marked yellow.

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Image 13: Looking towards tree 1959. Canopy pruning is required to provide 2m clearance from the fence. The 180mm diameter first order branch to the South at 1m is to be pruned (yellow line). Smaller branches measuring less than 50mm in diameter also require pruning. The pruning will result in the removal of approximately 20-30% of the live foliage area of the tree, which is signficant pruning, but a preferred option to whole tree removal.

Image 14: Looking towards tree 1954. Canopy pruning is required to provide 2m clearance from the fence. The 250mm diameter first order branch to the South at 3m is to be pruned (yellow line). The pruning will result in the removal of approximately 10% of the live foliage area of the tree.

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Image 15: Looking towards tree 1951. The tree is recommended for removal due to excessive canopy pruning required for fence clearance and due to the condition of the tree (health in advacned decline).

Image 16: Looking towards tree 1947. Canopy pruning is required to provide 2m clearance from the fence. The finished cut diameters must not exceed 100mm. The pruning will result in the removal of approximately 20% of the live foliage area of the tree. The area of canopy to be pruned has been marked yellow.

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Image 17: Looking towards tree 1939. Canopy pruning is required to provide 2m clearance from the fence. The 200mm diameter first order branch to the West at 1.5m is to be pruned (yellow line). The pruning will result in the removal of approximately 10% of the live foliage area of the tree.

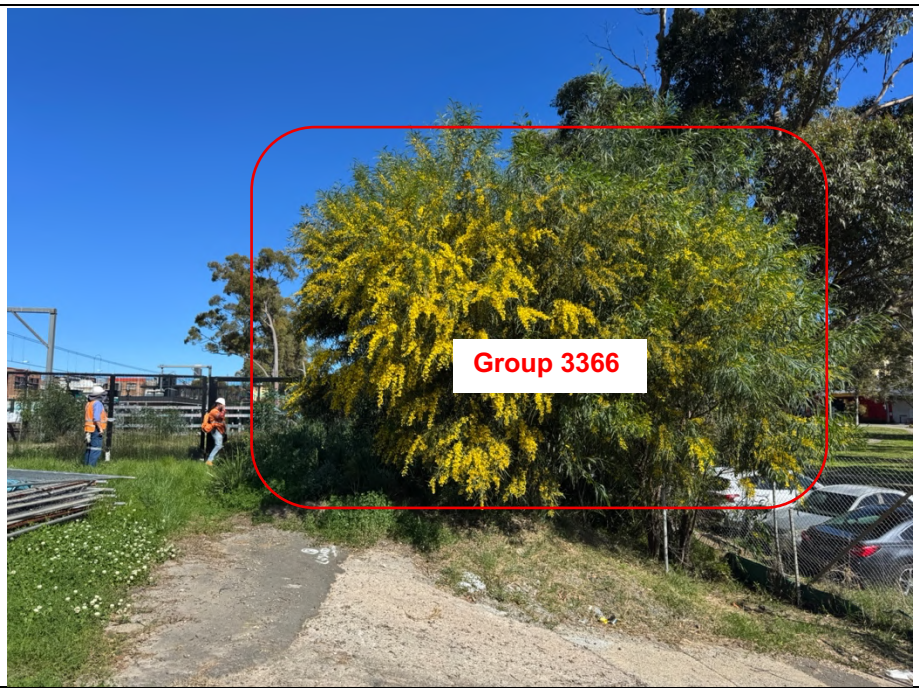

Image 18: Looking group G3366, which is a group of approximately 10. The group of trees is recommended for removal.

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Image 19: Looking towards tree 3367, 3370 and 3372. The trees are recommended for removal.

Image 20: Looking towards tree 3583. Canopy pruning is required to provide 2m clearance from the fence. The 200mm diameter second order branch to the Southwest at 5m is to be pruned (yellow line). The pruning will result in the removal of approximately 10% of the live foliage area of the tree.

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Image 21: Looking towards tree 722. Canopy pruning is required to provide 2m clearance from the fence. The 160mm diameter first order branch to the Northeast at 5m is to be pruned (yellow line). The pruning will result in the removal of approximately 5% of the live foliage area of the tree.

Image 22: Looking towards tree 726. Canopy pruning is required to provide 2m clearance from the fence. The 120mm diameter second order branch to the West at 2m, and the 120 diameter second order branch to the East at 1.8m is to be pruned (yellow lines). The pruning will result in the removal of approximately 10% of the live foliage area of the tree.

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Image 23: Looking towards tree 727. The tree is recommended for removal.

Image 24: Looking towards tree 3752. Canopy pruning is required to provide 2m clearance from the fence. The 80mm diameter second order branch to the West at 3m is to be pruned (yellow line). The pruning will result in the removal of approximately 5% of the live foliage area of the tree.

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Image 25: Looking towards tree 737, 738 and 739. The trees are recommended for removal.

Image 26: Looking towards tree 1128. Canopy pruning is required to provide 2m clearance from the fence. The 200mm diameter frist order branch to the North at 6m is to be reduced in length to the third upright branch, and the 120mm diameter second order branch to the Northwest at 5m is to be pruned (yellow lines). The pruning will result in the removal of approximately 5% of the live foliage area of the tree.

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Image 27: Looking towards Group 60, which is a group of trees recommended for pruning. Smaller branches measuring less than 50mm in diameter are to be pruned. The pruning will result in the removal of less than 10% of the live foliage area of each tree within the group. The approximate area of the pruning for G60 has been marked yellow.

Image 28: Looking towards tree 719. Canopy pruning is required to provide 2m clearance from the fence. Smaller branches measuring less than 80mm in diameter are to be pruned. The pruning will result in the removal of less than 10% of the live foliage area of the tree.

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9. CONCLUSIONS

9.1 **Table 2:** Summary of the trees requiring pruning or removal;

Impact	Reason	Category A	Category Z	TOTAL
		A	Z	
Trees recommended to be removed	Installation of services, line of sight for cameras, solar panel accessibility	737, 738, 739, 1963, 1965, 1967 (Six trees)	727, 1951, 1969, 1974, 1978, 3367, 3368, 3369, 3370, 3372, 3750, 3751, G3366 (Twelve trees & one group of trees)	**18 trees and 1 group of trees**
Trees requiring pruning	Installation of services, line of sight for cameras	719, 722, 726, 1128, 1939, 1954, 1959, 3337, 3339, 3345, 3583, 3752, G60 (Twelve trees and one group of trees)	1947, 1971, 1973, 3333, 3334, 3335, 3336, 3338, 3340, 3341, 3342, 3343, 3344, 3600, G18 (Fourteen trees and one group of trees)	**26 trees & 2 groups of trees**

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10. RECOMMENDATIONS

10.1 This report assesses trees that require pruning or removal for camera visibility works along the rail corridor. Forty-four (44) trees and three (3) groups of trees have been identified and assessed in this report.

10.2 Eighteen (18) trees and one (1) group of trees have been identified for removal in this area, including tree 727, 737, 738, 739, 1951, 1963, 1965, 1967, 1969, 1974, 1978, 3367, 3368, 3369, 3370, 3372, 3750, 3751 and G3366.

10.3 The trees discussed above in section 10.2 have been recommended for removal due to excessive amounts of pruning required to achieve camera visibility, as discussed in section 1.3. It may be possible to retain/prune some of the trees recommended for removal based upon the final installation locations of cameras and their FOV. This will need to be determined by UGL and the project arborist.

10.4 Twenty-six (26) trees and two (2) groups of trees have been identified for canopy pruning in this area, including tree 719, 722, 726, 1128, 1939, 1947, 1954, 1959, 1971, 1973, 3333, 3334, 3335, 3336, 3337, 3338, 3339, 3340, 3341, 3342, 3343, 3344, 3345, 3583, 3600, 3752, G18 and G60. All canopy pruning must be completed in accordance with AS4373 *Pruning of amenity trees* (2007).

10.5 All trees that require canopy pruning can be retained in a viable condition. All trees to be retained must be protected in accordance with AS4970-2025 *Protection of trees on development sites*.

10.6 This report does not provide approval for tree removal or pruning works. All recommendations in this report are subject to approval by the relevant authorities and/or tree owners.

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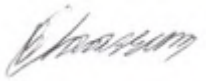
12. LIST OF APPENDICES

The following are included in the appendices:

- Appendix 2 - Tree inspection schedule
- Appendix 3 - Definition of Methodology

Alex Kurath
8004 2802
sales@urbanarbor.com.au
Diploma of Arboriculture (AQF5)
Member of Arboriculture Australia
ISA Member (International Society of Arboriculture)



Bryce Claassens
Diploma of Arboriculture (AQF5)
Cert III Landscape Construction
Member Arboriculture Australia
Quantified Tree Risk Assessment (QTRA)
ISA Tree Risk Assessment Qualification (TRAQ)

Appendix 2 - Tree Inspection Schedule

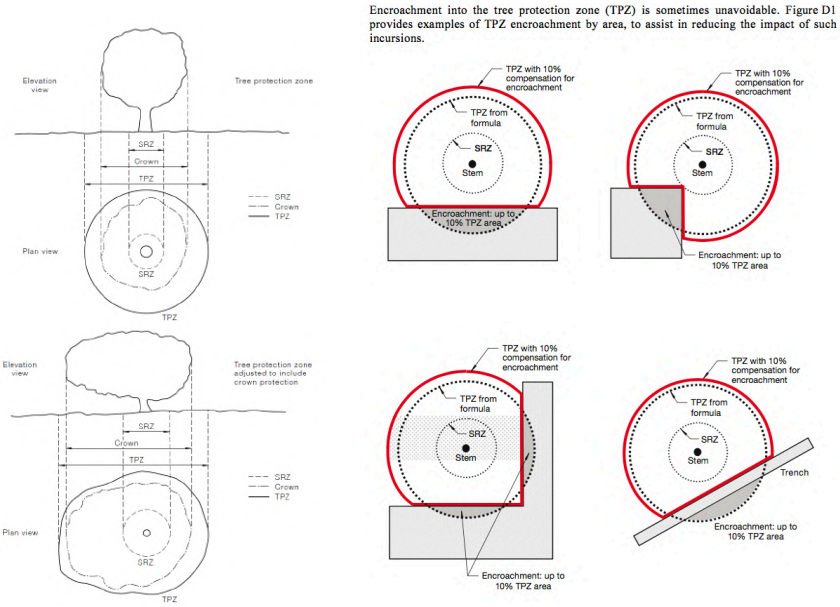
Tree ID	Common Name	Botanical Name	Age Class	Height (m)	Canopy Spread Radius (m)	Stem 1	Stem 2	Stem 3	Stem 4	Stem 5	DSH (mm)	DAB (mm)	Health	Structure	Amenity Value	SULE	Retention Value	NRZ Radius (m)	SRZ Radius (m)	Notes	Native or Exotic	Recommendations
719	English Oak	*Quercus robur*	Mature	8	4	230	240	250			416	500	Good	Fair	Medium	2. Medium	A1	5.0	2.5	Suppressed by adjacent tree.	Exotic	Prune
722	Spotted Gum	*Corymbia maculata*	Mature	22	5	400					400	460	Good	Good	High	1. Long	A1	4.8	2.4	Located within corridor. DBH estimated.	Native	Prune
726	Queensland Brushbox	*Lophostemon confertus*	Mature	7	4	450					450	490	Good	Good	Medium	1. Long	A1	5.4	2.5	Located within corridor. DBH estimated.	Native	Prune
727	Lemon Scented Gum	*Corymbia citriodora*	Semi-mature	9	5	190	260				322	450	Good	Fair	Medium	3. Short	Z10	3.9	2.4	Co-dominant stems with lopped East stem.	Native	Remove
737	Weeping Bottlebrush	*Callistemon viminalis*	Mature	8	3	300					300	350	Good	Good	Medium	1. Long	A1	3.6	2.1	Located within corridor. DBH estimated.	Native	Remove
738	Weeping Bottlebrush	*Callistemon viminalis*	Mature	8	3	300					300	350	Good	Good	Medium	1. Long	A1	3.6	2.1	Located within corridor. DBH estimated.	Native	Remove
739	Weeping Bottlebrush	*Callistemon viminalis*	Mature	8	4	350					350	400	Good	Good	Medium	1. Long	A1	4.2	2.3	Located within corridor. DBH estimated.	Native	Remove
1128	Sydney Blue Gum	*Eucalyptus saligna*	Mature	20	9	880					880	960	Good	Fair	Very High	2. Medium	A2	10.6	3.3	Located within nature strip. Previous branch failures. Large diameter deadwood. Cambium wounds.	Native	Prune
1939	Bangalay	*Eucalyptus botryoides*	Mature	10	5	440					440	510	Good	Fair	High	2. Medium	A2	5.3	2.5	Asymmetric crown shape due to power line clearance.	Native	Prune
1947	Queensland Brushbox	*Lophostemon confertus*	Mature	6	4	480					480	550	Good	Fair	Medium	3. Short	Z10	5.8	2.6	Topped for power line clearance. DBH estimated.	Native	Prune
1951	Turpentine	*Syncarpia glomulifera*	Mature	8	6	1400					1400	1400	Poor	Fair	Medium	4. Remove	Z4	15.0	3.8	Lopped for power line clearance. Advanced stages of decline. DBH estimated.	Native	Remove
1954	Bangalay	*Eucalyptus botryoides*	Mature	10	5	440					440	470	Good	Fair	High	2. Medium	A2	5.3	2.4	Pruned for power line clearance.	Native	Prune
1959	Queensland Brushbox	*Lophostemon confertus*	Mature	5	3	300	240				384	500	Fair	Fair	Medium	2. Medium	A2	4.6	2.5	Lie foliage density for species. Cavity on south side of trunk near base.	Native	Prune
1963	Queensland Brushbox	*Lophostemon confertus*	Mature	6	3	400					400	490	Good	Fair	Medium	2. Medium	A2	4.8	2.5	Asymmetric crown shape due to power line clearance.	Native	Remove
1965	Queensland Brushbox	*Lophostemon confertus*	Mature	5	3	300					300	360	Good	Good	Medium	2. Medium	A1	3.6	2.2	None.	Native	Remove
1967	Queensland Brushbox	*Lophostemon confertus*	Mature	7	4	350	370				509	600	Good	Good	Medium	2. Medium	A2	6.1	2.7	Lopped for power line clearance.	Native	Remove
1969	Queensland Brushbox	*Lophostemon confertus*	Mature	6	4	500					500	600	Good	Fair	Medium	3. Short	Z10	6.0	2.7	Topped for power line clearance.	Native	Remove
1971	Queensland Brushbox	*Lophostemon confertus*	Mature	6	3	370	300				476	550	Fair	Fair	Medium	3. Short	Z10	5.7	2.6	Large pruning wounds and poor overall form.	Native	Prune
1973	Queensland Brushbox	*Lophostemon confertus*	Semi-mature	6	2	120	120	120			208	340	Good	Fair	Low	5. Small/Young	Z1	2.5	2.1	None.	Native	Prune
1974	Queensland Brushbox	*Lophostemon confertus*	Mature	6	4	400					400	500	Good	Fair	Medium	3. Short	Z10	4.8	2.5	Topped for power line clearance.	Native	Remove
1978	Queensland Brushbox	*Lophostemon confertus*	Mature	5	6	620					620	750	Good	Fair	High	3. Short	Z10	7.4	2.9	Topped for power line clearance.	Native	Remove
3333	Broad Leaved Privet	*Ligustrum lucidum*	Semi-mature	6	2	400					400	400	Good	Fair	Very Low	2. Medium	Z3	4.8	2.3	Noxious weed. DBH measured at base.	Exotic	Prune
3334	Broad Leaved Privet	*Ligustrum lucidum*	Mature	7	2	500					500	500	Good	Fair	Very Low	2. Medium	Z3	6.0	2.5	Noxious weed. DBH measured at base.	Exotic	Prune
3335	Pepercorn Tree	*Schinus molle*	Mature	10	5	650					650	700	Fair	Fair	Medium	3. Short	Z10	7.8	2.8	Pruned for power line clearance. Poor overall form.	Exotic	Prune
3336	Broad Leaved Privet	*Ligustrum lucidum*	Semi-mature	7	2	300					300	300	Good	Fair	Very Low	2. Medium	Z3	3.6	2.0	Noxious weed. DBH measured at base.	Exotic	Prune
3337	Pepercorn Tree	*Schinus molle*	Mature	10	8	250	150	380	390		618	1600	Good	Fair	Medium	2. Medium	A1	7.4	4.0	Could not access base of tree. DBH estimated.	Exotic	Prune
3338	Broad Leaved Privet	*Ligustrum lucidum*	Semi-mature	6	2	350					350	350	Good	Fair	Very Low	2. Medium	Z3	4.2	2.1	Noxious weed. DBH measured at base.	Exotic	Prune
3339	Pepercorn Tree	*Schinus molle*	Mature	10	5	500	250				559	890	Good	Fair	Medium	2. Medium	A1	6.7	3.2	Co-dominant stems with minor wound near base.	Exotic	Prune
3340	Broad Leaved Privet	*Ligustrum lucidum*	Semi-mature	6	2	450					450	450	Good	Fair	Very Low	2. Medium	Z3	5.4	2.4	Noxious weed. DBH measured at base.	Exotic	Prune
3341	Pepercorn Tree	*Schinus molle*	Mature	9	5	570					570	650	Fair	Fair	Medium	3. Short	Z10	6.8	2.8	Pruned for power line clearance. Poor overall form.	Exotic	Prune
3342	Canary Palm	*Phoenix canariensis*	Young	3	1	400					400	NA	Good	Fair	Low	5. Small/Young	Z1	2.0	NA	None.	Exotic	Prune
3343	Broad Leaved Privet	*Ligustrum lucidum*	Mature	6	3	600					600	600	Good	Fair	Very Low	2. Medium	Z3	7.2	2.7	Noxious weed. DBH measured at base.	Exotic	Prune
3344	Pepercorn Tree	*Schinus molle*	Mature	8	6	600					600	700	Fair	Fair	Medium	3. Short	Z10	7.2	2.8	Apical dieback. significantly pruned. Poor overall form.	Exotic	Prune
3345	Pepercorn Tree	*Schinus molle*	Mature	10	7	700	420	420			918	1600	Good	Fair	Medium	2. Medium	A1	11.0	4.0	Large deformity on primary stem.	Exotic	Prune
3367	Camphor Laurel	*Cinnamomum camphora*	Semi-mature	7	2	120	110	100			191	450	Good	Fair	Low	5. Small/Young	Z3	2.3	2.4	Under 10m - exempt species.	Exotic	Remove
3368	Camphor Laurel	*Cinnamomum camphora*	Semi-mature	7	2	140	110	100	70	80	230	360	Good	Fair	Low	5. Small/Young	Z3	2.8	2.2	Under 10m - exempt species. Growing through fence.	Exotic	Remove
3369	Camphor Laurel	*Cinnamomum camphora*	Semi-mature	9	3	250					250	290	Good	Fair	Low	2. Medium	Z3	3.0	2.0	Under 10m - exempt species.	Exotic	Remove
3370	Camphor Laurel	*Cinnamomum camphora*	Semi-mature	6	2	140					140	180	Good	Fair	Low	5. Small/Young	Z3	2.0	1.6	Under 10m - exempt species. Growing through fence.	Exotic	Remove
3372	Camphor Laurel	*Cinnamomum camphora*	Semi-mature	6	2	400					400	400	Good	Fair	Low	5. Small/Young	Z3	4.8	2.3	Under 10m - exempt species. DBH measured at base.	Exotic	Remove
3583	Smooth Barked Apple	*Angophora costata*	Mature	15	5	420					420	460	Fair	Fair	High	2. Medium	A2	5.0	2.4	Not on survey. Reduced foliage density with apical dieback.	Native	Prune
3600	Pepercorn Tree	*Schinus molle*	Mature	8	6	800					800	950	Good	Fair	Medium	2. Medium	Z10	9.6	3.2	Not on survey. Asymmetric due to previous topping for overhead power. Cavities on stems	Exotic	Prune
3750	Pepercorn Tree	*Schinus molle*	Young	4	2	100					100	130	Good	Good	Low	5. Small/Young	Z1	2.0	1.5	None	Exotic	Remove
3751	Broad Leaved Privet	*Ligustrum lucidum*	Young	5	3	120					120	150	Good	Good	Very Low	5. Small/Young	Z3	2.0	1.5	Noxious weed.	Exotic	Remove
3752	Lemon Scented Gum	*Corymbia citriodora*	Mature	17	6	350					350	420	Good	Good	High	1. Long	A1	4.2	2.3	None.	Native	Prune
G18	Sydney Golden Wattle	*Acacia longifolia*	Mature	6	2	180					180	220	Good	Fair	Low	5. Small/Young	Z1	2.2	1.8	Group of approximately 46 trees. 100-200mm stem diameter.	Native	Prune
G3366	Sydney Golden Wattle	*Acacia longifolia*	Young	4	1.5	80					80	100	Good	Good	Low	5. Small/Young	Z1	2.0	1.5	Group of approximately 10 trees.	Native	Remove
G60	Mixed species	*Mixed species*	Mature	15	5	300					300	350	Good	Good	Medium	1. Long	A1	3.6	2.1	Mixed species of trees along security fence at top of batter.	Native	Prune

Explanatory Notes

Tree Species - Common name followed by botanical name. Where species is unknown it is indicated with an *'spp'*.
Age Class - Over mature (OM), Mature (M), Early mature (EM), Semi mature (SM), Young (Y).
Diameter at Standard Height (DSH) - Measured with a diameter tape or estimated at approximately 1.4m above ground level.
Diameter Above root Buttresses (DAB): Measured with a diameter tape or estimated above root buttresses (DAB) for calculating the SRZ.
Height - Height from ground level to top of crown. All heights are estimated unless otherwise indicated.
Spread - Radius of crown at widest section. All tree spreads are estimated unless otherwise indicated.
Notional Root Zone (NRZ) - DSH x 12. Measured in radius from the centre of the trunk. Rounded to nearest 0.1m. For monocots, the NRZ is set at 1 metre outside the crown projection.
Structural Root Zone (SRZ) - (DAB x 50) $^{0.42}$ x 0.64. Measured in radius from the centre of the trunk. Rounded up to nearest 0.1m.
Health - Good/Fair/Poor/Dead
Structure - Good/Fair/Poor
Safe Useful Life Expectancy (SULE) - 1. Long (40+years), 2. Medium (15 - 40 years), 3. Short (5 - 15 years), 4. Remove (under 5 years), 5. Small/young.
Amenity Value - Very High/High/Medium/Low/Very Low.
Retention Value: Tree A2, see appendix 3 for categories.

Appendix 3 - Further Information of Methodology

1. **Tree Protection Zone:** The tree protection zone (TPZ) is the principle means of protecting trees on development sites. The TPZ is a combination of the root area and crown area requiring protection. It is an area isolated from construction disturbance, so that the tree remains viable. The radius of the TPZ is calculated for each tree by multiplying its DBH x 12. The derived value is measured in radius from the centre of the stem/trunk at ground level. A TPZ should not be less than 2.0 metres nor greater than 15 metres (except where crown protection is required).
   It is commonly observed that tree roots will extend significant further than the indicative TPZ, however the TPZ is an area identified AS4970-2009 to be extent where root loss or disturbance will generally not impact the viability of the tree. The TPZ is identified as a restricted area to prevent damage to trees either above or below ground during a development. Where trees are intended to be retained proposed developments must provide an adequate TPZ around trees. The TPZ is set aside for the tree's root zone, trunk and crown and it is essential for the stability and longevity of the tree. The tree protection also incorporates the SRZ (see below for more information about the SRZ). I have calculated the TPZ of palms, other monocots, cycads and tree ferns at one metre outside the crown projection. See appendices for additional information about the TPZ including information about calculating the TPZ and examples of TPZ encroachment.
   Minor encroachment into TPZ: Sometimes encroachment into the TPZ is unavoidable. Encroachment includes but is not limited to activities such as excavation, compacted fill and machine trenching. Minor encroachment of up to 10% of the overall TPZ area is normally considered acceptable, providing there is space adjacent to the TPZ for the tree to compensate and the tree is displaying adequate vigour/health to tolerate changes to its growing environment.
   Major encroachment into TPZ: Where encroachment of more than 10% of the overall TPZ area is proposed the project Arborist must investigate and demonstrate that the tree will remain in a viable condition. In some cases, tree sensitive construction methods such as pier and beam footings, suspended slabs, or cantilevered sections, can be utilised to allow additional encroachment into the TPZ by bridging over roots and minimising root disturbance. Major encroachment is only possible if it can be undertaken without severing significant size roots, or if it can be demonstrated that significant roots will not be impacted.



2. **Structural Root Zone:** This is the area around the base of a tree required for the trees stability in the ground. An area larger than the SRZ always need to be maintained to preserve a viable tree as it will only have a minor effect on the trees vigour and health. There are several factors that determine the SRZ which include height, crown area, soil type and soil moisture. It can also be influenced by other factors such as natural or built structures. Generally work within the SRZ should be avoided.
   An indicative SRZ radius can be determined from the diameter of the trunk measured immediately above the root buttresses. Root investigation could provide more information about the extent of the SRZ. The following formula should be used to calculate the SRZ.
   SRZ radius = $(D \times 50)^{0.42} \times 0.64$ (D = Diameter above root buttress).

3. **Tree Age Class:** If can be difficult to determine the age of a tree without carrying out invasive tests that may damage the tree, so we have categorised there likely age class which is defined below;
   - Young/Newly planted: Young or recently planted tree.
   - Semi Mature: Up to 20% of the usual life expectancy for the species.
   - Early mature/Mature: Between 20%-80% of the usual life expectancy for the species.
   - Over mature: Over 80% of the usual life expectancy for the species.
   - Dead: Tree is dead or almost dead.

4. **Health/Physiological Condition:** Below are examples conditions used when assigning a category for tree health.

Category	Example condition	Summary
Good	• Crown has good foliage density for species. • Tree shows no or minimal signs of pathogens that are unlikely to have an effect on the health of the tree. • Tree is displaying good vigour and reactive growth development.	• The tree is in above average health and condition and no remedial works are required.
Fair	• The tree may be starting to dieback or have over 25% deadwood. • Tree may have slightly reduced crown density or thinning. • There may be some discolouration of foliage. • Average reactive growth development. • There may be early signs of pathogens which may further deteriorate the health of the tree. • There may be epicormic growth indicating increased levels of stress within the tree.	• The tree is in below average health and condition and may require remedial works to improve the trees health.
Poor	• The may be in decline, have extensive dieback or have over 30% deadwood. • The canopy may be sparse or the leaves may be unusually small for species. • Pathogens or pests are having a significant detrimental effect on the tree health.	• The tree is displaying low levels of health and removal or remedial works may be required.
Dead	• The tree is dead or almost dead.	• The tree should generally be removed.

5. **Structural Condition:** Below are examples conditions used when assigning a category for structural condition.

Category	Example condition	Summary
Good	• Branch unions appear to be strong with no sign of defects. • There are no significant cavities. • The tree is unlikely to fail in usual conditions. • The tree has a balanced crown shape and form.	• The tree is considered structurally good with well developed form.
Fair	• The tree may have minor structural defects within the structure of the crown that could potentially develop into more significant defects. • The tree may a cavity that is currently unlikely to fail but may deteriorate in the future. • The tree is an unbalanced shape or leans significantly. • The tree may have minor damage to its roots. • The root plate may have moved in the past but the tree has now compensated for this. • Branches may be rubbing or crossing.	• The identified defects are unlikely cause major failure. • Some branch failure may occur in usual conditions. • Remedial works can be undertaken to alleviate potential defects.
Poor	• The tree has significant structural defects. • Branch unions may be poor or weak. • The tree may have a cavity or cavities with excessive levels of decay that could cause catastrophic failure. • The tree may have root damage or is displaying signs of recent movement. • The tree crown may have poor weight distribution which could cause failure.	• The identified defects are likely to cause either partial or whole failure of the tree.

6. **Amenity Value:** To determine the amenity value of a tree we assess a number of different factors, which include but are not limited to the information below.
   - The visibility of the tree to adjacent sites.
   - The relationship between the tree and the site.
   - Whether the tree is protected by any statuary conditions.
   - The habitat value of the tree.
   - Whether the tree is considered a noxious weed species.

   The amenity value is rated using one of the following values.
   - Very High
   - High
   - Moderate
   - Low
   - Very Low

7. **Safe Useful Life Expectancy (SULE), (Barrel, 2001):** A trees safe useful life expectancy is determined by assessing a number of different factors including the health and vitality, estimated age in relation to expected life expectancy for the species, structural defects, and remedial works that could allow retention in the existing situation.

Category	Description
1. Long - Over 40 years	(a) Structurally sound trees located in positions that can accommodate future growth. (b) Trees that could be made suitable for retention in the long term by remedial tree care. (c) Trees of special significance for historical, commemorative or rarity reasons that would warrant extraordinary efforts to secure their long term retention.
2. Medium - 15 to 40 years	(a) Trees that may only live between 15 and 40 more years. (b) Trees that could live for more than 40 years but may be removed for safety or nuisance reasons. (c) Trees that could live for more than 40 years but may be removed to prevent interference with more suitable individuals or to provide space for new planting. (d) Trees that could be made suitable for retention in the medium term by remedial tree care.
3. Short - 5 to 15 years	(a) Trees that may only live between 5 and 15 more years. (b) Trees that could live for more than 15 years but may be removed for safety or nuisance reasons. (c) Trees that could live for more than 15 years but may be removed to prevent interference with more suitable individuals or to provide space for new planting. (d) Trees that require substantial remedial tree care and are only suitable for retention in the short term.
4. Remove - Under 5 years	(a) Dead, dying, suppressed or declining trees because of disease or inhospitable conditions. (b) Dangerous trees because of instability or recent loss of adjacent trees. (c) Dangerous trees because of structural defects including cavities, decay, included bark, wounds or poor form. (d) Damaged trees that are clearly not safe to retain. (e) Trees that could live for more than 5 years but may be removed to prevent interference with more suitable individuals or to provide space for new planting. (f) Trees that are damaging or may cause damage to existing structures within 5 years. (g) Trees that will become dangerous after removal of other trees for the reasons given in (a) to (f). (h) Trees in categories (a) to (g) that have a high wildlife habitat value and, with appropriate treatment, could be retained subject to regular review.
5. Small/Young	(a) Small trees less than 5m in height. (b) Young trees less than 15 years old but over 5m in height. (c) Formal hedges and trees intended for regular pruning to artificially control growth.

8. **Root investigations:** The root investigations should identify roots greater than 30mm in diameter that are located along the edge of the structures footprint or in the location of footings. Root investigations must be carried out using non-invasive methods (manual excavations). Any excavations for the root investigations must carried out manually to avoid damaging the roots during excavations. Manual excavation may include the use of a high-pressure air/air knife, or a combination of high-pressure water and a vacuum device. When hand excavating carefully work around roots retaining as many as possible. Take care to not fray, wound, or cause damage to any roots during excavations as this may cause decay or infection from pathogens. It is essential that exposed roots are kept moist and the excavation back filled as soon as possible. The root investigations should be carried out by a qualified Arborist minimum AQF3. Once roots are exposed, a visual assessment can be carried out by a consulting Arborist to evaluate the potential impact of the proposed root loss on the health and stability of the tree. A root map/report should be prepared identifying the findings of investigations, including photographs as supporting evidence in the report.

9. **Retention Value:** The system I have used to award the retention value is Tree AZ. Tree AZ is used to identify higher value trees worthy of being a constraint to development and lower value trees that should generally not be a constraint to the development. The table below provides a brief description of each category.

TreeAZ Categories (Version 10.04-ANZ)

CAUTION: TreeAZ assessments must be carried out by a competent person qualified and experienced in arboriculture. The following category descriptions are designed to be a brief field reference and are not intended to be self-explanatory. They must be read in conjunction with the most current explanations published at www.TreeAZ.com.

Category Z: Unimportant trees not worthy of being a material constraint

Local policy exemptions: Trees that are unsuitable for legal protection for local policy reasons including size, proximity and species	
Z1	Young or insignificant small trees, i.e. below the local size threshold for legal protection, etc
Z2	Too close to a building, i.e. exempt from legal protection because of proximity, etc
Z3	Species that cannot be protected for other reasons, i.e. scheduled noxious weeds, out of character in a setting of acknowledged importance, etc
High risk of death or failure: Trees that are likely to be removed within 10 years because of acute health issues or severe structural failure	
Z4	Dead, dying, diseased or declining
Z5	Severe damage and/or structural defects where a high risk of failure cannot be satisfactorily reduced by reasonable remedial care, i.e. cavities, decay, included bark, wounds, excessive imbalance, overgrown and vulnerable to adverse weather conditions, etc
Z6	Instability, i.e. poor anchorage, increased exposure, etc
Excessive nuisance: Trees that are likely to be removed within 10 years because of unacceptable impact on people	
Z7	Excessive, severe and intolerable inconvenience to the extent that a locally recognized court or tribunal would be likely to authorize removal, i.e. dominance, debris, interference, etc
Z8	Excessive, severe and intolerable damage to property to the extent that a locally recognized court or tribunal would be likely to authorize removal, i.e. severe structural damage to surfacing and buildings, etc
Good management: Trees that are likely to be removed within 10 years through responsible management of the tree population	
Z9	Severe damage and/or structural defects where a high risk of failure can be temporarily reduced by reasonable remedial care, i.e. cavities, decay, included bark, wounds, excessive imbalance, vulnerable to adverse weather conditions, etc
Z10	Poor condition or location with a low potential for recovery or improvement, i.e. dominated by adjacent trees or buildings, poor architectural framework, etc
Z11	Removal would benefit better adjacent trees, i.e. relieve physical interference, suppression, etc
Z12	Unacceptably expensive to retain, i.e. severe defects requiring excessive levels of maintenance, etc

NOTE: Z trees with a high risk of death/failure (Z4, Z5 & Z6) or causing severe inconvenience (Z7 & Z8) at the time of assessment and need an urgent risk assessment can be designated as ZZ. ZZ trees are likely to be unsuitable for retention and at the bottom of the categorization hierarchy. In contrast, although Z trees are not worthy of influencing new designs, urgent removal is not essential and they could be retained in the short term, if appropriate.

Category A: Important trees suitable for retention for more than 10 years and worthy of being a material constraint

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

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

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Glossary of Terms

Abiotic - Pertaining to non-living agents; e.g. environmental factors

Adventitious shoots - Shoots that develop other than from apical, axillary or dormant buds; see also 'epicormic'

Anchorage - The system whereby a tree is fixed within the soil, involving cohesion between roots and soil and the development of a branched system of roots which withstands wind and gravitational forces transmitted from the aerial parts of the tree

Bark - A term usually applied to all the tissues of a woody plant lying outside the vascular cambium, thus including the phloem, cortex and periderm; occasionally applied only to the periderm or the phellem

Branch:
• **Primary**. A first order branch arising from a stem
• **Lateral**. A second order branch, subordinate to a primary branch or stem and bearing sub-lateral branches
• **Sub-lateral**. A third order branch, subordinate to a lateral or primary branch, or stem and usually bearing only twigs

Branch collar - A visible swelling formed at the base of a branch whose diameter growth has been disproportionately slow compared to that of the parent stem; a term sometimes applied also to the pattern of growth of the cells of the parent stem around the branch base

Brown-rot - A type of wood decay in which cellulose is degraded, while lignin is only modified

Buckling - An irreversible deformation of a structure subjected to a bending load

Buttress zone - The region at the base of a tree where the major lateral roots join the stem, with buttress-like formations on the upper side of the junctions

Cambium - Layer of dividing cells producing xylem (woody) tissue internally and phloem (bark) tissue externally

Canker - A persistent lesion formed by the death of bark and cambium due to colonisation by fungi or bacteria

Compartmentalisation - The confinement of disease, decay or other dysfunction within an anatomically discrete region of plant tissue, due to passive and/or active defences operating at the boundaries of the affected region

Compressive loading - Mechanical loading which exerts a positive pressure; the opposite to tensile loading

Condition - An indication of the physiological condition of the tree. Where the term ‘condition’ is used in a report, it should not be taken as an indication of the stability of the tree

Crown/Canopy - The main foliage bearing section of the tree

Crown lifting - The removal of limbs and small branches to a specified height above ground level

Crown thinning - The removal of a proportion of secondary branch growth throughout the crown to produce an even density of foliage around a well-balanced branch structure

Crown reduction/shaping - A specified reduction in crown size whilst preserving, as far as possible, the natural tree shape

DAB (Diameter Above Buttress) - Trunk diameter measured above the root buttress

Defect - In relation to tree hazards, any feature of a tree which detracts from the uniform distribution of mechanical stress, or which makes the tree mechanically unsuited to its environment

Dieback - The death of parts of a woody plant, starting at shoot-tips or root-tips

Disease - A malfunction in or destruction of tissues within a living organism, usually excluding mechanical damage; in trees, usually caused by pathogenic micro-organisms

Dominance - In trees, the tendency for a leading shoot to grow faster or more vigorously than the lateral shoots; also the tendency of a tree to maintain a taller crown than its neighbours

Dormant bud - An axial bud which does not develop into a shoot until after the formation of two or more annual wood increments; many such buds persist through the life of a tree and develop only if stimulated to do so

Dysfunction - In woody tissues, the loss of physiological function, especially water conduction, in sapwood

DBH (Diameter at Breast Height) - Stem diameter measured at a height of 1.4 metres or the nearest measurable point. Where measurement at a height of 1.4 metres is not possible, another height may be specified

Deadwood - Branch or stem wood bearing no live tissues. Retention of deadwood provides valuable habitat for a wide range of species and seldom represents a threat to the health of the tree. Removal of deadwood can result in the ingress of decay to otherwise sound tissues and climbing operations to access deadwood can cause significant damage to a tree. Removal of deadwood is generally recommended only where it represents an unacceptable level of hazard

Epicormic shoot - A shoot having developed from a dormant or adventitious bud and not having developed from a first year shoot

Flush-cut - A pruning cut which removes part of the branch bark ridge and or branch-collar

Girdling root - A root which circles and constricts the stem or roots possibly causing death of phloem and/or cambial tissue

Habit - The overall growth characteristics, shape of the tree and branch structure

Hazard beam - An upwardly curved part of a tree in which strong internal stresses may occur without being reduced by adaptive growth; prone to longitudinal splitting

Incorporating extracts from Lonsdale, D. 1999. Principles of Tree Hazard Assessment. Her Majesty's Stationary Office, London

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Heartwood/false-heartwood - The dead central wood that has become dysfunctional as part of the aging processes and being distinct from the sapwood

Heave - A term mainly applicable to a shrinkable clay soil which expands due to re-wetting after the felling of a tree which was previously extracting moisture from the deeper layers; also the lifting of pavements and other structures by root diameter expansion; also the lifting of one side of a wind-rocked root-plate

Included bark (ingrown bark) - Bark of adjacent parts of a tree (usually forks, acutely joined branches or basal flutes) which is in face-to-face contact

Lever arm - A mechanical term denoting the length of the lever represented by a structure that is free to move at one end, such as a tree or an individual branch

Lignin - The hard, cement-like constituent of wood cells; deposition of lignin within the matrix of cellulose microfibrils in the cell wall is termed Lignification

Lions tailing - A term applied to a branch of a tree that has few if any side-branches except at its end, and is thus liable to snap due to end- loading

Loading - A mechanical term describing the force acting on a structure from a particular source; e.g. the weight of the structure itself or wind pressure

Mycelium - The body of a fungus, consisting of branched filaments (hyphae)

Occlusion - The process whereby a wound is progressively closed by the formation of new wood and bark around it

Pathogen - A micro-organism which causes disease in another organism

Photosynthesis - The process whereby plants use light energy to split hydrogen from water molecules, and combine it with carbon dioxide to form the molecular building blocks for synthesizing carbohydrates and other biochemical products

Probability - A statistical measure of the likelihood that a particular event might occur

Pruning - The removal or cutting back of twigs or branches, sometimes applied to twigs or small branches only, but often used to describe most activities involving the cutting of trees or shrubs

Radial - In the plane or direction of the radius of a circular object such as a tree stem

Reactive Growth/Reaction Wood - Production of woody tissue in response to altered mechanical loading; often in response to internal defect or decay and associated strength loss (cf. adaptive growth)

Ring-barking - The removal of a ring of bark and phloem around the circumference of a stem or branch, normally resulting in an inability to transport photosynthetic assimilates below the area of damage. Almost inevitably results in the eventual death of the affected stem or branch above the damage

Root-collar - The transitional area between the stem/s and roots

Sapwood - Living xylem tissues

Soft-rot - A kind of wood decay in which a fungus degrades cellulose within the cell walls, without any general degradation of the wall as a whole

Stem/s - Principle above-ground structural component(s) of a tree that supports its branches

Stress - In plant physiology, a condition under which one or more physiological functions are not operating within their optimum range, for example due to lack of water, inadequate nutrition or extremes of temperature

SRZ (Structural Root Zone) - The area around the base of the tree required for the trees stability in the ground

Subsidence - In relation to soil or structures resting in or on soil, a sinking due to shrinkage when certain types of clay soil dry out, sometimes due to extraction of moisture by tree roots

Taper - In stems and branches, the degree of change in girth along a given length

Targets - In tree risk assessment (with slight misuse of normal meaning) persons or property or other things of value which might be harmed by mechanical failure of the tree or by objects falling from it

Topping - In arboriculture, the removal of the crown of a tree, or of a major proportion of it

Transpiration - The evaporation of moisture from the surface of a plant, especially via the stomata of leaves; it exerts a suction which draws water up from the roots and through the intervening xylem cells

TPZ (Tree Protection Zone) - A specified area above and below ground and at a given distance from the trunk set aside for the protection of a tree's roots and crown to provide for the viability and stability of a tree to be retained where it is potentially subject to damage by development

Understory - This layer consists of younger individuals of the dominant trees, together with smaller trees and shrubs which are adapted to grow under lower light conditions

Veteran tree - Tree that, by recognised criteria, shows features of biological, cultural or aesthetic value that are characteristic of, but not exclusive to, individuals surviving beyond the typical age range for the species concerned. These characteristics might typically include a large girth, signs of crown retrenchment and hollowing of the stem

Vigour - The expression of carbohydrate expenditure to growth (in trees)

White-rot - A range of kinds of wood decay in which lignin, usually together with cellulose and other wood constituents, is degraded

Wind exposure - The degree to which a tree or other object is exposed to wind, both in terms of duration and velocity

Wind pressure - The force exerted by a wind on a particular object

Windthrow - The blowing over of a tree at its roots

Incorporating extracts from Lonsdale, D. 1999. Principles of Tree Hazard Assessment. Her Majesty's Stationary Office, London

Appendix A (Part H) – Addendum to Arboricultural Pruning Specification Report (Southwest Metro –Sydenham Marrickville and Dulwich Hill)

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Addendum to Arboricultural Pruning Specification Report

Site Location: Southwest Metro – Sydenham Marrickville and Dulwich Hill

Prepared for:
UGL

Prepared by: Bryce Claassens and Alex Kurath
Date prepared: 20 October 2025
Ref: 251020_SWM_Ineco_PS_Ad8.1
Addendum: 8.1

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1. INTRODUCTION

1.1 Urban Arbor have been instructed to prepare an addendum to the previous Pruning Specification Report (18 November 2024) in relation to Corridor Intruder Detection System (CIDS) and Object Detection System (ODS) trouble spots. The report is to address trees within and adjacent to the rail corridor between Sydenham Station to Dulwich Hill Station.

1.2 Documents and information provided to assist in preparing the report;

A) Arboricultural Pruning Specification Report, Urban Arbor, Ref:241118_SWM_Ineco_PS, Revision 2,18 November 2024.
B) CCTV LOS and Nuisance Alarm Register, Doc No. SMCSWIDS-UGL-1NL-TC-REG-000745, Revision B, (Sydenham to Marrickville) 25 September 2025.
C) CCTV LOS and Nuisance Alarm Register, Doc No. SMCSWIDS-UGL-1NL-TC-REG-000745, Revision B, (Marrickville to Dulwich Hill) 25 September 2025.

1.3 The site and tree inspections were carried out on 1 October 2025 by Alex Kurath of Urban Arbor, in conjunction with representatives from UGL (Rares Pop), JHLORJV (Andre Kruize) and Sydney Metro. UGL advised the trees requiring pruning or removal to obtain camera visibility of fence lines.

1.4 Some trees included within this report were previously inspected between the dates of 6 January 2020 to 3 April 2020 by Bryce Claassens during the South West Metro Rail Corridor (SWMRC) and Station Precinct design works. Access was available to the subject site and adjoining public areas only. This report has been written by Bryce Claassens.

2. SCOPE OF THE REPORT

2.1 This report has been undertaken to meet the following objectives.

2.1.1 Conduct a walk-through assessment of the areas where trees (identified by UGL) are currently obstructing camera visibility, which require pruning or removal. The decision of pruning or removal of trees is subject to the agreement and approval of the stakeholders.

2.1.2 Conduct a visual assessment of significant trees not previously included in the Pruning Specification Report (dated 18 November 2024), located within areas identified by UGL. For the purpose of this report, a significant tree is a ‘Long lived woody perennial plant greater than (or usually greater than) 3 metres in height with one or relatively few main stems or trunks’.

2.1.3 Determine the trees estimated contribution years and remaining useful life expectancy and award the trees a retention value.

2.1.4 Provide pruning specifications for trees where required, in accordance with AS4373-2007.

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3. LIMITATIONS

3.1 The observations and recommendations are based on the site inspections identified in section 1 only. The findings of this report are based on the observations and site conditions at the time of inspection.

3.2 All of the observations were carried out from ground level. The accuracy of the assessment of the subject trees structural condition and health is limited to the visibility of the tree at the time of inspection.

3.3 The tree inspection was visual from ground level only. No soil or tissue testing was carried out as part of the tree inspection. None of the surrounding surfaces adjacent to trees were lifted or removed during the tree inspections.

3.4 Root decay can sometimes be present with no visual indication above ground. It is also impossible to know the extent of any root damage caused by mechanical damage such as underground root cutting during the installation of services without undertaking detailed root investigation. Any form of tree failure due to these activities is beyond the scope of this assessment.

3.5 The report reflects the subject tree(s) as found on the day of inspection. Any changes to the growing environment of the subject tree, or tree management works beyond those recommended in this report may alter the findings of the report. There is no warranty, expressed or implied, that problems or deficiencies relating to the subject tree, or subject site may not arise in the future.

3.6 Tree identification is based on accessible visual characteristics at the time of inspection. As key identifying features are not always available the accuracy of identification is not guaranteed. Where tree species is unknown, it is indicated with an *spp*.

3.7 Some trees included within this report have been located using a Trimble TDC100 hand held GNSS device by Urban Arbor Pty Ltd. Tree locations captured by the Trimble TDC100 are only accurate to within 1m - 3m. If an accurate location of these trees is required, a registered surveyor should locate the trees.

3.8 In some instances, multiple trees or groups of small trees have been identified as groups of trees within this report.

3.9 All diagrams, plans and photographs included in this report are visual aids only and are not to scale unless otherwise indicated.

3.10 Alteration of this report invalidates the entire report.

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4. METHODOLOGY

4.1 The following information was collected during the assessment of the subject tree(s).

- 4.1.1 Tree common name
- 4.1.2 Tree botanical name
- 4.1.3 Tree age class
- 4.1.4 DSH (Trunk/Stem diameter at breast height/1.4m) - millimetres.
- 4.1.5 DAB (Trunk diameter directly above the root buttress) – millimetres.
- 4.1.6 Estimated height - metres
- 4.1.7 Estimated crown spread (diameter of crown) - metres
- 4.1.8 Health
- 4.1.9 Structural condition
- 4.1.10 Amenity value
- 4.1.11 Estimated remaining contribution years (SULE)[1]
- 4.1.12 Retention value (Tree AZ)[2]
- 4.1.13 Notes/comments

4.2 An assessment of the trees condition was made using the visual tree assessment (VTA) model (Mattheck & Breloer, 1994).[3]

4.3 Tree diameter was measured using a DSH tape or in some cases estimated. Tree height and tree canopy spread was measured with a clinometer or in some cases estimated. All other measurements were estimations unless otherwise stated. The other tools used during the assessment were a nylon mallet, compass, camera and a steel probe.

4.4 All DSH measurements, notional root zones, and structural root zones within Appendix 2 of this report were calculated in accordance with methods set out in AS4970 Protection of trees on development sites (2025).[4]

4.5 Details of how the observations in this report have been assessed are listed in the appendices.

[1] Barrell, J. (2001), *'SULE: Its use and status in the new millennium' in Management of Mature Trees proceedings of the 4th NAAA Workshop*, Sydney, 2001. Barrell.

[2] Barrell Tree Consultancy, *Tree AZ version 10.10-ANZ*, http://www.treeaz.com/.

[3] Mattheck, C. & Breloer, H., *The body language of trees - A handbook for failure analysis*, The Stationary Office, London, England (1994).

[4] Council Of Standards Australia, *AS4970 Protection of trees on development sites* (2025).

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5. SITE LOCATION AND BRIEF DESCRIPTION

5.1 The area covered in the site inspections is located within the Inner West Local Government Area. All trees within this report are subject to protection under the Inner West Local Environmental Plan (LEP) 2022[5] and the Inner West Council Tree Management DCP 2023.[6]

6. AREAS ASSESSED

6.1 The areas assessed in this report have been identified by UGL in the reports CCTV LOS and Nuisance Alarm Register (dated 25 September 2025), which includes trees within and adjacent to the rail corridor between Sydenham Station to Marrickville Station (STM) and Marrickville Station to Dulwich Hill Station (MTD).

7. TREE OBSERVATIONS

7.1 **Tree information:** Details of each individual tree assessed, including the observations taken during the site inspections, can be found in the tree inspection schedule in appendix 2. Each of the subject trees have been awarded a retention value based on the observations using the Tree AZ method. Tree AZ is used to identify higher value trees worthy of being a constraint to development and lower value trees that should generally not be a constraint to the development. The Tree AZ categories sheet (Barrell Tree Consultancy) has been included in appendix 3 to assist with understanding the retention values. The retention values that have been allocated to the subject trees in this report is not definitive and should only be used as a guideline.

8. ASSESSMENT OF TREE IMPACTS BY AREA

8.1 The trees included in the following sections have been identified by UGL as being subject to impacts from development works. All trees to be retained should be protected in accordance with AS4970-2025 *Protection of trees on development sites*. If there are any development works that have not been assessed and could potentially impact additional trees, the project arborist must assess the impact of the proposed works to the condition of the trees, determining the trees viability for retention.

5 *Inner West Local Environmental Plan 2022*, https://www.legislation.nsw.gov.au/#/view/EPI/2011/645/full, accessed 11 June 2025.

6 *Inner West Tree Management Development Control Plan 2023*, https://www.innerwest.nsw.gov.au/live/information-for-residents/trees/trees-on-your-property-pruning-or-removing, accessed 11 June 2025.

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8.2 Sydenham to Marrickville (STM_02 – STM_07)

8.2.1 Three (3) trees and one (1) group of trees have been identified for removal in this area, including tree 3764, 3765, 3767 and G70. Additional multi-stemmed plants that do not meet the criteria of significant trees are also recommended for removal (Image 2).

8.2.2 Four (4) trees and one (1) group of trees have been identified for canopy pruning in this area, including tree 3587, 3763, 3766, 3768 and G1.26. All canopy pruning must be completed in accordance with AS4373 *Pruning of amenity trees* (2007).

8.2.3 The details of the trees are summarised in the table below. Photographs of the trees are included in section 8.3.

Tree ID	Botanical Name	SULE	Retention Value	Height (m)	Canopy Spread (m) - radius	Native / Exotic	Prune / Remove
3687	*Jacaranda mimosifolia*	1. Long	A1	13	8	Exotic	Prune
3763	*Quercus suber*	1. Long	A1	17	9	Exotic	Prune
3764	*Cinnamomum camphora*	5. Small/Young	Z1	8	3	Exotic	Remove
3765	*Casuarina cunninghamiana*	5. Small/Young	Z1	4	1	Native	Remove
3766	*Acacia longifolia*	3. Short	A1	7	4	Native	Prune
3767	*Casuarina cunninghamiana*	5. Small/Young	Z1	5	1.5	Native	Remove
3768	*Casuarina glauca*	5. Small/Young	Z1	8	3	Native	Prune
G1.26	*Celtis spp*	5. Small/Young	Z1	6	3	Exotic	Prune
G70	*Mixed species*	5. Small/Young	Z1	6	2.5	Native	Remove

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8.3 **Photographs**

Image 1: Looking towards G1.26, which is a group of approximately 4 trees. Canopy pruning is required to provide 2m clearance from the fence. Smaller branches measuring less than 50mm in diameter are to be pruned. The pruning will result in the removal of less than 10% of the live foliage area of each tree.

Image 2: Looking towards a group of *Yucca aloifolia* (Spanish Bayonet) located in the Portuguese Community Club. The plants are multi-stemmed and do not meet the criteria of significant trees as per section 2.1.2. The plants are recommended for removal to provide 2m clearance from the fence.

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Image 3: Looking towards tree 3763, located in the Portuguese Community Club. Canopy pruning is required to provide clearance from the fence. The second and third order branches to the South require pruning to provide fence clearance. The maximum finished cut diameter measures approximately 160mm. The pruning will result in the removal of approximately 5% of the live foliage area of the tree. The branches to be pruned have been marked yellow.

Image 4: Looking towards tree 3587. The 250mm diameter first order branch to the South requires pruning to provide fence clearance. The pruning will result in the removal of approximately 20% of the live foliage area of the tree. The branch to be pruned has been marked yellow.

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Image 5: Looking towards tree 3764. The tree is recommended for removal.

Image 6: Looking towards tree 3765. The tree is recommended for removal.

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Image 7: Looking towards tree 3766. Canopy pruning is required to provide 2m clearance from the fence. Smaller branches measuring less than 100mm in diameter are to be pruned. The pruning will result in the removal of 5% of the live foliage area of the tree.

Image 8: Looking towards tree 3767. The tree is recommended for removal.

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Image 9: Looking towards tree 3768. Canopy pruning is required to provide 2m clearance from the fence. Smaller branches measuring less than 100mm in diameter are to be pruned. The pruning will result in the removal of less than 10% of the live foliage area of the tree.

Image 10: Looking towards G70, which is a group of approximately 4 small trees. The trees are recommended for removal.

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8.4 Marrickville to Dulwich Hill (MTD_02 – MTD_05)

8.4.1 Four (4) trees have been identified for removal in this area, including tree 3760, 3761, 3762 and 3763a. Additional multi-stemmed plants that do not meet the criteria of significant trees are also recommended for removal (Image 15).

8.4.2 Four (4) trees have been identified for canopy pruning in this area, including tree 87, 88, 89 and 757. All canopy pruning must be completed in accordance with AS4373 *Pruning of amenity trees* (2007).

8.4.3 The details of the trees are summarised in the table below. Photographs of the trees are included in section 8.5.

Tree ID	Botanical Name	SULE	Retention Value	Height (m)	Canopy Spread (m) - radius	Native / Exotic	Prune / Remove
87	*Cinnamomum camphora*	1. Long	A1	10	5	Exotic	Prune
88	*Cinnamomum camphora*	2. Medium	A1	10	4	Exotic	Prune
89	*Cinnamomum camphora*	1. Long	A1	10	5	Exotic	Prune
757	*Morus nigra*	5. Small/Young	Z1	5	2	Exotic	Prune
3760	*Angophora costata*	5. Small/Young	Z1	4	1.5	Native	Remove
3761	*Ficus rubiginosa*	5. Small/Young	Z1	5	4	Native	Remove
3762	*Lophostemon confertus*	5. Small/Young	Z10	5	2	Native	Remove
3763a	*Eucalyptus spp*	5. Small/Young	Z1	4	1	Native	Remove

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8.5 **Photographs**

Image 11: Looking towards tree 3760 and 3761. The trees are recommended for removal.

Image 12: Looking towards tree 3762. The tree is recommended for removal.

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Image 13: Looking towards tree 3763a. The tree is recommended for removal.

Image 14: Looking towards tree 87, 88 and 89. Canopy pruning is required to provide 2m clearance from the fence. Smaller branches measuring less than 80mm in diameter are to be pruned. The pruning will result in the removal of less than 10% of the live foliage area of each tree.

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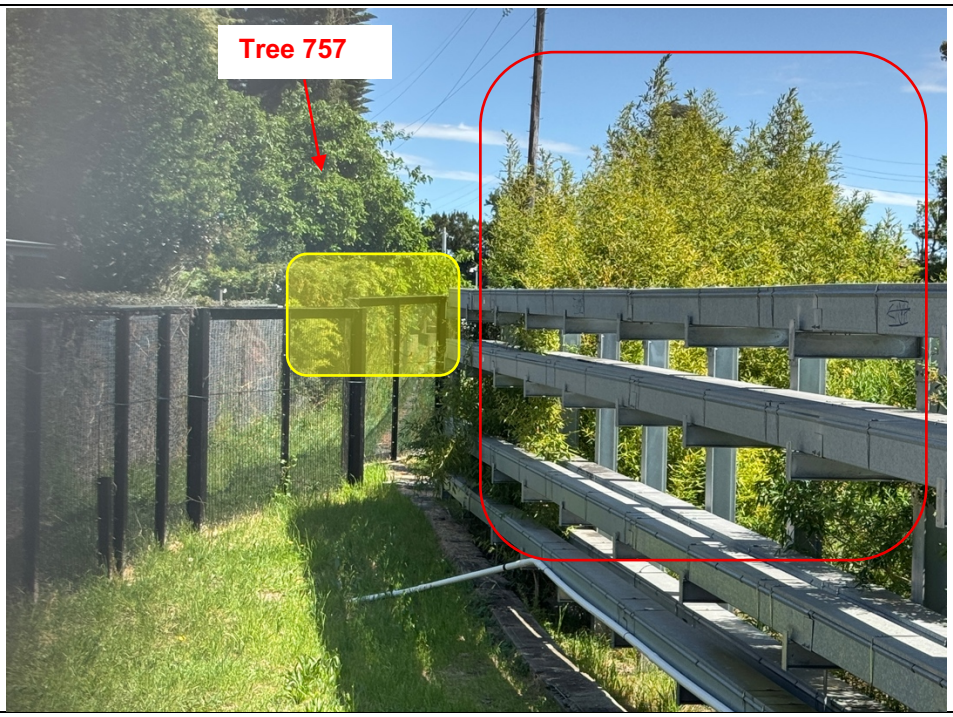

Image 15: Looking towards tree 757. Canopy pruning is required to provide 2m clearance from the fence. Smaller branches measuring less than 50mm in diameter are to be pruned. The pruning will result in the removal of less than 10% of the live foliage area of the tree (yellow hatched area). Also showing the bamboo (red outline) that is recommended for removal. The bamboo are multi-stemmed monocotyledons and do not meet the criteria of significant trees as per section 2.1.2.

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9. CONCLUSIONS

9.1 **Table 2:** Summary of the trees requiring pruning or removal;

Impact	Reason	Category A	Category Z	TOTAL
		A	Z	
Trees recommended to be removed	Installation of services, line of sight for cameras, solar panel accessibility	None	3760, 3761, 3762, 3763a, 3764, 3765, 3767, G70 (Seven trees & one group of trees)	**7 trees and 1 group of trees**
Trees requiring pruning	Installation of services, line of sight for cameras	87, 88, 89, 3587, 3763, 3766 (Six trees)	757, 3768, G1.26 (Two trees and one group of trees)	**8 trees and 1 group of trees**

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10. RECOMMENDATIONS

10.1 This report assesses trees that require pruning or removal for camera visibility works along the rail corridor. Fifteen (15) trees and two (2) groups of trees have been identified and assessed in this report.

10.2 Seven (7) trees and one (1) group of trees have been identified for removal in the identified areas, including tree 3760, 3761, 3762, 3763a, 3764, 3765, 3767 and G70. Additional multi-stemmed plants that do not meet the criteria of significant trees are also recommended for removal (see Image 2 and Image 15).

10.3 The trees discussed above in section 10.2 have been recommended for removal due to excessive amounts of pruning required to achieve camera visibility, as discussed in section 1.3. It may be possible to retain/prune some of the trees recommended for removal based upon the final installation locations of cameras and their FOV. This will need to be determined by UGL and the project arborist.

10.4 Eight (8) trees one (1) group of trees have been identified for canopy pruning in this area, including tree 87, 88, 89, 757, 3587, 3763, 3766, 3768 and G1.26. All canopy pruning must be completed in accordance with AS4373 *Pruning of amenity trees* (2007).

10.5 All trees that require canopy pruning can be retained in a viable condition. All trees to be retained must be protected in accordance with AS4970-2025 *Protection of trees on development sites*.

10.6 This report does not provide approval for tree removal or pruning works. All recommendations in this report are subject to approval by the relevant authorities and/or tree owners.

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12. LIST OF APPENDICES

The following are included in the appendices:

- Appendix 2 - Tree inspection schedule
- Appendix 3 - Definition of Methodology

Alex Kurath
8004 2802
sales@urbanarbor.com.au
Diploma of Arboriculture (AQF5)
Member of Arboriculture Australia
ISA Member (International Society of Arboriculture)

Bryce Claassens
Diploma of Arboriculture (AQF5)
Cert III Landscape Construction
Member Arboriculture Australia
Quantified Tree Risk Assessment (QTRA)
ISA Tree Risk Assessment Qualification (TRAQ)

Appendix 2 - Tree Inspection Schedule

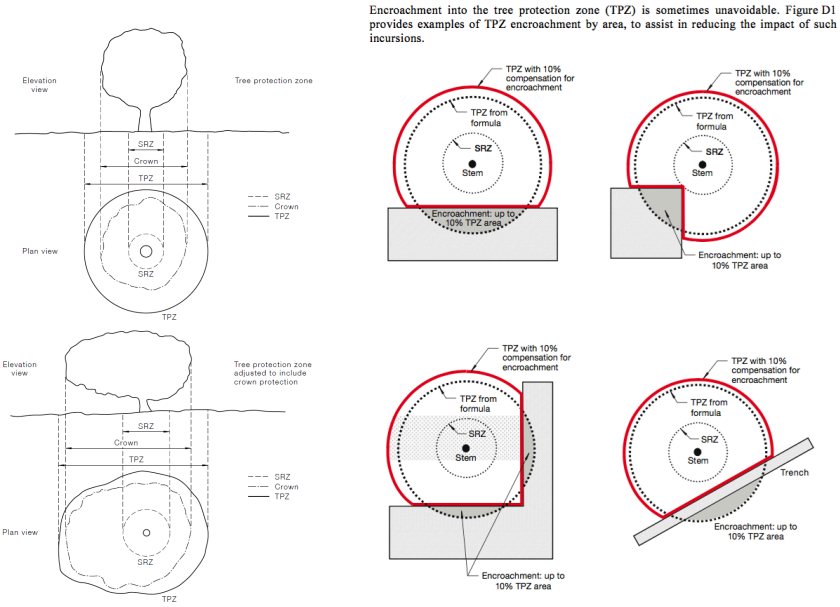
Tree ID	Common Name	Botanical Name	Age Class	Height (m)	Canopy Spread Radius (m)	Stem 1	Stem 2	Stem 3	Stem 4	Stem 5	DSH (mm)	DAB (mm)	Health	Structure	Amenity Value	SULE	Retention Value	NRZ Radius (m)	SRZ Radius (m)	Notes	Native or Exotic	Recommendations
87	Camphor Laurel	*Cinnamomum camphora*	Mature	10	5	1500					1500	1500	Good	Good	Medium	1. Long	A1	15.0	3.9	Located within corridor. Multi stem tree DBH estimated.	Exotic	Prune
88	Camphor Laurel	*Cinnamomum camphora*	Mature	10	4	1400					1400	1400	Good	Fair	Medium	2. Medium	A1	15.0	3.8	Cavity at base. Located within corridor.	Exotic	Prune
89	Camphor Laurel	*Cinnamomum camphora*	Mature	10	5	1200					1200	1200	Good	Good	Medium	1. Long	A1	14.4	3.6	Located within corridor.	Exotic	Prune
757	Black Mulberry	*Morus nigra*	Mature	5	2	250					250	300	Good	Fair	Low	5. Small/Young	Z3	3.0	2.0	Canopy extends into corridor.	Exotic	Prune
3587	Jacaranda	*Jacaranda mimosifolia*	Mature	13	8	450	450	300			704	750	Good	Good	Medium	1. Long	A1	8.4	2.9	None.	Exotic	Prune
3760	Smooth Barked Apple	*Angophora costata*	Young	4	1.5	80					80	100	Good	Good	Low	5. Small/Young	Z1	2.0	1.5	None.	Native	Remove
3761	Port Jackson Fig	*Ficus rubiginosa*	Semi-mature	5	4	100	80	60			141	150	Good	Good	Low	5. Small/Young	Z1	2.0	1.5	None.	Native	Remove
3762	Brushbox	*Lophostemon confertus*	Young	5	2	50	60	50	50	60	121	150	Good	Fair	Low	5. Small/Young	Z10	2.0	1.5	Regrowth from cut tree.	Native	Remove
3763	Cork Oak	*Quercus suber*	Mature	17	9	900					900	1100	Good	Good	High	1. Long	A1	10.8	3.4	Culturally signifcant tree located in the Sydney Portugal Community Club.	Exotic	Prune
3763a	Eucalypt	*Eucalyptus spp*	Young	4	1	80					80	100	Good	Good	Low	5. Small/Young	Z1	2.0	1.5	None.	Native	Remove
3764	Camphor Laurel	*Cinnamomum camphora*	Semi-mature	8	3	180					180	210	Good	Fair	Low	5. Small/Young	Z1	2.2	1.7	None.	Exotic	Remove
3765	River She Oak	*Casuarina cunninghamiana*	Young	4	1	80					80	100	Good	Good	Low	5. Small/Young	Z1	2.0	1.5	None.	Native	Remove
3766	Sydney Golden Wattle	*Acacia longifolia*	Mature	7	4	200	160	140			292	340	Good	Fair	Medium	3. Short	A1	3.5	2.1	Co-dominant included stems at base.	Native	Prune
3767	River She Oak	*Casuarina cunninghamiana*	Young	5	1.5	100					100	120	Good	Good	Low	5. Small/Young	Z1	2.0	1.5	None.	Native	Remove
3768	Swamp Oak	*Casuarina glauca*	Semi-mature	8	3	140					140	160	Good	Good	Low	5. Small/Young	Z1	2.0	1.5	None.	Native	Prune
G1.26	Nettle Tree	*Celtis spp*	Young	6	3	120	100				156	150	Good	Good	Low	5. Small/Young	Z1	2.0	1.5	Group of 3-4 trees. No access available. DBH estimated.	Exotic	Prune
G70	Mixed species	*Mixed species*	Young	6	2.5	100					100	120	Good	Good	Low	5. Small/Young	Z1	2.0	1.5	Group of 3 trees. Two Acacia longifolia and one Casuarina glauca.	Native	Remove

Explanatory Notes

Tree Species - Common name followed by botanical name. Where species is unknown it is indicated with an *'spp'*.
Age Class - Over mature (OM), Mature (M), Early mature (EM), Semi mature (SM), Young (Y).
Diameter at Standard Height (DSH) - Measured with a diameter tape or estimated at approximately 1.4m above ground level.
Diameter Above root Buttresses (DAB): Measured with a diameter tape or estimated above root buttresses (DAB) for calculating the SRZ.
Height - Height from ground level to top of crown. All heights are estimated unless otherwise indicated.
Spread - Radius of crown at widest section. All tree spreads are estimated unless otherwise indicated.
Notional Root Zone (NRZ) - DSH x 12. Measured in radius from the centre of the trunk. Rounded to nearest 0.1m. For monocots, the NRZ is set at 1 metre outside the crown projection.
Structural Root Zone (SRZ) - (DAB x 50) $^{0.42}$ x 0.64. Measured in radius from the centre of the trunk. Rounded up to nearest 0.1m.
Health - Good/Fair/Poor/Dead
Structure - Good/Fair/Poor
Safe Useful Life Expectancy (SULE) - 1. Long (40+years), 2. Medium (15 - 40 years), 3. Short (5 - 15 years), 4. Remove (under 5 years), 5. Small/young.
Amenity Value - Very High/High/Medium/Low/Very Low.
Retention Value: Tree A2, see appendix 3 for categories.

Appendix 3 - Further Information of Methodology

1. **Tree Protection Zone:** The tree protection zone (TPZ) is the principle means of protecting trees on development sites. The TPZ is a combination of the root area and crown area requiring protection. It is an area isolated from construction disturbance, so that the tree remains viable. The radius of the TPZ is calculated for each tree by multiplying its DBH x 12. The derived value is measured in radius from the centre of the stem/trunk at ground level. A TPZ should not be less than 2.0 metres nor greater than 15 metres (except where crown protection is required).
It is commonly observed that tree roots will extend significant further than the indicative TPZ, however the TPZ is an area identified AS4970-2009 to be extent where root loss or disturbance will generally not impact the viability of the tree. The TPZ is identified as a restricted area to prevent damage to trees either above or below ground during a development. Where trees are intended to be retained proposed developments must provide an adequate TPZ around trees. The TPZ is set aside for the tree's root zone, trunk and crown and it is essential for the stability and longevity of the tree. The tree protection also incorporates the SRZ (see below for more information about the SRZ). I have calculated the TPZ of palms, other monocots, cycads and tree ferns at one metre outside the crown projection. See appendices for additional information about the TPZ including information about calculating the TPZ and examples of TPZ encroachment.
Minor encroachment into TPZ: Sometimes encroachment into the TPZ is unavoidable. Encroachment includes but is not limited to activities such as excavation, compacted fill and machine trenching. Minor encroachment of up to 10% of the overall TPZ area is normally considered acceptable, providing there is space adjacent to the TPZ for the tree to compensate and the tree is displaying adequate vigour/health to tolerate changes to its growing environment.
Major encroachment into TPZ: Where encroachment of more than 10% of the overall TPZ area is proposed the project Arborist must investigate and demonstrate that the tree will remain in a viable condition. In some cases, tree sensitive construction methods such as pier and beam footings, suspended slabs, or cantilevered sections, can be utilised to allow additional encroachment into the TPZ by bridging over roots and minimising root disturbance. Major encroachment is only possible if it can be undertaken without severing significant size roots, or if it can be demonstrated that significant roots will not be impacted.



2. **Structural Root Zone:** This is the area around the base of a tree required for the trees stability in the ground. An area larger than the SRZ always need to be maintained to preserve a viable tree as it will only have a minor effect on the trees vigour and health. There are several factors that determine the SRZ which include height, crown area, soil type and soil moisture. It can also be influenced by other factors such as natural or built structures. Generally work within the SRZ should be avoided.
An indicative SRZ radius can be determined from the diameter of the trunk measured immediately above the root buttresses. Root investigation could provide more information about the extent of the SRZ. The following formula should be used to calculate the SRZ.
SRZ radius = $(D \times 50)^{0.42} \times 0.64$ (D = Diameter above root buttress).

3. **Tree Age Class:** If can be difficult to determine the age of a tree without carrying out invasive tests that may damage the tree, so we have categorised there likely age class which is defined below;
    - Young/Newly planted: Young or recently planted tree.
    - Semi Mature: Up to 20% of the usual life expectancy for the species.
    - Early mature/Mature: Between 20%-80% of the usual life expectancy for the species.
    - Over mature: Over 80% of the usual life expectancy for the species.
    - Dead: Tree is dead or almost dead.

4. **Health/Physiological Condition:** Below are examples conditions used when assigning a category for tree health.

Category	Example condition	Summary
Good	• Crown has good foliage density for species. • Tree shows no or minimal signs of pathogens that are unlikely to have an effect on the health of the tree. • Tree is displaying good vigour and reactive growth development.	• The tree is in above average health and condition and no remedial works are required.
Fair	• The tree may be starting to dieback or have over 25% deadwood. • Tree may have slightly reduced crown density or thinning. • There may be some discolouration of foliage. • Average reactive growth development. • There may be early signs of pathogens which may further deteriorate the health of the tree. • There may be epicormic growth indicating increased levels of stress within the tree.	• The tree is in below average health and condition and may require remedial works to improve the trees health.
Poor	• The may be in decline, have extensive dieback or have over 30% deadwood. • The canopy may be sparse or the leaves may be unusually small for species. • Pathogens or pests are having a significant detrimental effect on the tree health.	• The tree is displaying low levels of health and removal or remedial works may be required.
Dead	• The tree is dead or almost dead.	• The tree should generally be removed.

5. **Structural Condition:** Below are examples conditions used when assigning a category for structural condition.

Category	Example condition	Summary
Good	• Branch unions appear to be strong with no sign of defects. • There are no significant cavities. • The tree is unlikely to fail in usual conditions. • The tree has a balanced crown shape and form.	• The tree is considered structurally good with well developed form.
Fair	• The tree may have minor structural defects within the structure of the crown that could potentially develop into more significant defects. • The tree may a cavity that is currently unlikely to fail but may deteriorate in the future. • The tree is an unbalanced shape or leans significantly. • The tree may have minor damage to its roots. • The root plate may have moved in the past but the tree has now compensated for this. • Branches may be rubbing or crossing.	• The identified defects are unlikely cause major failure. • Some branch failure may occur in usual conditions. • Remedial works can be undertaken to alleviate potential defects.
Poor	• The tree has significant structural defects. • Branch unions may be poor or weak. • The tree may have a cavity or cavities with excessive levels of decay that could cause catastrophic failure. • The tree may have root damage or is displaying signs of recent movement. • The tree crown may have poor weight distribution which could cause failure.	• The identified defects are likely to cause either partial or whole failure of the tree.

6. **Amenity Value:** To determine the amenity value of a tree we assess a number of different factors, which include but are not limited to the information below.
   - The visibility of the tree to adjacent sites.
   - The relationship between the tree and the site.
   - Whether the tree is protected by any statuary conditions.
   - The habitat value of the tree.
   - Whether the tree is considered a noxious weed species.

   The amenity value is rated using one of the following values.
   - Very High
   - High
   - Moderate
   - Low
   - Very Low

7. **Safe Useful Life Expectancy (SULE), (Barrel, 2001):** A trees safe useful life expectancy is determined by assessing a number of different factors including the health and vitality, estimated age in relation to expected life expectancy for the species, structural defects, and remedial works that could allow retention in the existing situation.

Category	Description
1. Long - Over 40 years	(a) Structurally sound trees located in positions that can accommodate future growth. (b) Trees that could be made suitable for retention in the long term by remedial tree care. (c) Trees of special significance for historical, commemorative or rarity reasons that would warrant extraordinary efforts to secure their long term retention.
2. Medium - 15 to 40 years	(a) Trees that may only live between 15 and 40 more years. (b) Trees that could live for more than 40 years but may be removed for safety or nuisance reasons. (c) Trees that could live for more than 40 years but may be removed to prevent interference with more suitable individuals or to provide space for new planting. (d) Trees that could be made suitable for retention in the medium term by remedial tree care.
3. Short - 5 to 15 years	(a) Trees that may only live between 5 and 15 more years. (b) Trees that could live for more than 15 years but may be removed for safety or nuisance reasons. (c) Trees that could live for more than 15 years but may be removed to prevent interference with more suitable individuals or to provide space for new planting. (d) Trees that require substantial remedial tree care and are only suitable for retention in the short term.
4. Remove - Under 5 years	(a) Dead, dying, suppressed or declining trees because of disease or inhospitable conditions. (b) Dangerous trees because of instability or recent loss of adjacent trees. (c) Dangerous trees because of structural defects including cavities, decay, included bark, wounds or poor form. (d) Damaged trees that are clearly not safe to retain. (e) Trees that could live for more than 5 years but may be removed to prevent interference with more suitable individuals or to provide space for new planting. (f) Trees that are damaging or may cause damage to existing structures within 5 years. (g) Trees that will become dangerous after removal of other trees for the reasons given in (a) to (f). (h) Trees in categories (a) to (g) that have a high wildlife habitat value and, with appropriate treatment, could be retained subject to regular review.
5. Small/Young	(a) Small trees less than 5m in height. (b) Young trees less than 15 years old but over 5m in height. (c) Formal hedges and trees intended for regular pruning to artificially control growth.

8. **Root investigations:** The root investigations should identify roots greater than 30mm in diameter that are located along the edge of the structures footprint or in the location of footings. Root investigations must be carried out using non-invasive methods (manual excavations). Any excavations for the root investigations must carried out manually to avoid damaging the roots during excavations. Manual excavation may include the use of a high-pressure air/air knife, or a combination of high-pressure water and a vacuum device. When hand excavating carefully work around roots retaining as many as possible. Take care to not fray, wound, or cause damage to any roots during excavations as this may cause decay or infection from pathogens. It is essential that exposed roots are kept moist and the excavation back filled as soon as possible. The root investigations should be carried out by a qualified Arborist minimum AQF3. Once roots are exposed, a visual assessment can be carried out by a consulting Arborist to evaluate the potential impact of the proposed root loss on the health and stability of the tree. A root map/report should be prepared identifying the findings of investigations, including photographs as supporting evidence in the report.

9. **Retention Value:** The system I have used to award the retention value is Tree AZ. Tree AZ is used to identify higher value trees worthy of being a constraint to development and lower value trees that should generally not be a constraint to the development. The table below provides a brief description of each category.

TreeAZ Categories (Version 10.04-ANZ)

CAUTION: TreeAZ assessments must be carried out by a competent person qualified and experienced in arboriculture. The following category descriptions are designed to be a brief field reference and are not intended to be self-explanatory. They must be read in conjunction with the most current explanations published at www.TreeAZ.com.

Category Z: Unimportant trees not worthy of being a material constraint

Local policy exemptions: Trees that are unsuitable for legal protection for local policy reasons including size, proximity and species	
Z1	Young or insignificant small trees, i.e. below the local size threshold for legal protection, etc
Z2	Too close to a building, i.e. exempt from legal protection because of proximity, etc
Z3	Species that cannot be protected for other reasons, i.e. scheduled noxious weeds, out of character in a setting of acknowledged importance, etc
High risk of death or failure: Trees that are likely to be removed within 10 years because of acute health issues or severe structural failure	
Z4	Dead, dying, diseased or declining
Z5	Severe damage and/or structural defects where a high risk of failure cannot be satisfactorily reduced by reasonable remedial care, i.e. cavities, decay, included bark, wounds, excessive imbalance, overgrown and vulnerable to adverse weather conditions, etc
Z6	Instability, i.e. poor anchorage, increased exposure, etc
Excessive nuisance: Trees that are likely to be removed within 10 years because of unacceptable impact on people	
Z7	Excessive, severe and intolerable inconvenience to the extent that a locally recognized court or tribunal would be likely to authorize removal, i.e. dominance, debris, interference, etc
Z8	Excessive, severe and intolerable damage to property to the extent that a locally recognized court or tribunal would be likely to authorize removal, i.e. severe structural damage to surfacing and buildings, etc
Good management: Trees that are likely to be removed within 10 years through responsible management of the tree population	
Z9	Severe damage and/or structural defects where a high risk of failure can be temporarily reduced by reasonable remedial care, i.e. cavities, decay, included bark, wounds, excessive imbalance, vulnerable to adverse weather conditions, etc
Z10	Poor condition or location with a low potential for recovery or improvement, i.e. dominated by adjacent trees or buildings, poor architectural framework, etc
Z11	Removal would benefit better adjacent trees, i.e. relieve physical interference, suppression, etc
Z12	Unacceptably expensive to retain, i.e. severe defects requiring excessive levels of maintenance, etc

NOTE: Z trees with a high risk of death/failure (Z4, Z5 & Z6) or causing severe inconvenience (Z7 & Z8) at the time of assessment and need an urgent risk assessment can be designated as ZZ. ZZ trees are likely to be unsuitable for retention and at the bottom of the categorization hierarchy. In contrast, although Z trees are not worthy of influencing new designs, urgent removal is not essential and they could be retained in the short term, if appropriate.

Category A: Important trees suitable for retention for more than 10 years and worthy of being a material constraint

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

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

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

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Glossary of Terms

Abiotic - Pertaining to non-living agents; e.g. environmental factors

Adventitious shoots - Shoots that develop other than from apical, axillary or dormant buds; see also 'epicormic'

Anchorage - The system whereby a tree is fixed within the soil, involving cohesion between roots and soil and the development of a branched system of roots which withstands wind and gravitational forces transmitted from the aerial parts of the tree

Bark - A term usually applied to all the tissues of a woody plant lying outside the vascular cambium, thus including the phloem, cortex and periderm; occasionally applied only to the periderm or the phellem

Branch:
• **Primary**. A first order branch arising from a stem
• **Lateral**. A second order branch, subordinate to a primary branch or stem and bearing sub-lateral branches
• **Sub-lateral**. A third order branch, subordinate to a lateral or primary branch, or stem and usually bearing only twigs

Branch collar - A visible swelling formed at the base of a branch whose diameter growth has been disproportionately slow compared to that of the parent stem; a term sometimes applied also to the pattern of growth of the cells of the parent stem around the branch base

Brown-rot - A type of wood decay in which cellulose is degraded, while lignin is only modified

Buckling - An irreversible deformation of a structure subjected to a bending load

Buttress zone - The region at the base of a tree where the major lateral roots join the stem, with buttress-like formations on the upper side of the junctions

Cambium - Layer of dividing cells producing xylem (woody) tissue internally and phloem (bark) tissue externally

Canker - A persistent lesion formed by the death of bark and cambium due to colonisation by fungi or bacteria

Compartmentalisation - The confinement of disease, decay or other dysfunction within an anatomically discrete region of plant tissue, due to passive and/or active defences operating at the boundaries of the affected region

Compressive loading - Mechanical loading which exerts a positive pressure; the opposite to tensile loading

Condition - An indication of the physiological condition of the tree. Where the term ‘condition’ is used in a report, it should not be taken as an indication of the stability of the tree

Crown/Canopy - The main foliage bearing section of the tree

Crown lifting - The removal of limbs and small branches to a specified height above ground level

Crown thinning - The removal of a proportion of secondary branch growth throughout the crown to produce an even density of foliage around a well-balanced branch structure

Crown reduction/shaping - A specified reduction in crown size whilst preserving, as far as possible, the natural tree shape

DAB (Diameter Above Buttress) - Trunk diameter measured above the root buttress

Defect - In relation to tree hazards, any feature of a tree which detracts from the uniform distribution of mechanical stress, or which makes the tree mechanically unsuited to its environment

Dieback - The death of parts of a woody plant, starting at shoot-tips or root-tips

Disease - A malfunction in or destruction of tissues within a living organism, usually excluding mechanical damage; in trees, usually caused by pathogenic micro-organisms

Dominance - In trees, the tendency for a leading shoot to grow faster or more vigorously than the lateral shoots; also the tendency of a tree to maintain a taller crown than its neighbours

Dormant bud - An axial bud which does not develop into a shoot until after the formation of two or more annual wood increments; many such buds persist through the life of a tree and develop only if stimulated to do so

Dysfunction - In woody tissues, the loss of physiological function, especially water conduction, in sapwood

DBH (Diameter at Breast Height) - Stem diameter measured at a height of 1.4 metres or the nearest measurable point. Where measurement at a height of 1.4 metres is not possible, another height may be specified

Deadwood - Branch or stem wood bearing no live tissues. Retention of deadwood provides valuable habitat for a wide range of species and seldom represents a threat to the health of the tree. Removal of deadwood can result in the ingress of decay to otherwise sound tissues and climbing operations to access deadwood can cause significant damage to a tree. Removal of deadwood is generally recommended only where it represents an unacceptable level of hazard

Epicormic shoot - A shoot having developed from a dormant or adventitious bud and not having developed from a first year shoot

Flush-cut - A pruning cut which removes part of the branch bark ridge and or branch-collar

Girdling root - A root which circles and constricts the stem or roots possibly causing death of phloem and/or cambial tissue

Habit - The overall growth characteristics, shape of the tree and branch structure

Hazard beam - An upwardly curved part of a tree in which strong internal stresses may occur without being reduced by adaptive growth; prone to longitudinal splitting

Incorporating extracts from Lonsdale, D. 1999. Principles of Tree Hazard Assessment. Her Majesty's Stationary Office, London

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Heartwood/false-heartwood - The dead central wood that has become dysfunctional as part of the aging processes and being distinct from the sapwood

Heave - A term mainly applicable to a shrinkable clay soil which expands due to re-wetting after the felling of a tree which was previously extracting moisture from the deeper layers; also the lifting of pavements and other structures by root diameter expansion; also the lifting of one side of a wind-rocked root-plate

Included bark (ingrown bark) - Bark of adjacent parts of a tree (usually forks, acutely joined branches or basal flutes) which is in face-to-face contact

Lever arm - A mechanical term denoting the length of the lever represented by a structure that is free to move at one end, such as a tree or an individual branch

Lignin - The hard, cement-like constituent of wood cells; deposition of lignin within the matrix of cellulose microfibrils in the cell wall is termed Lignification

Lions tailing - A term applied to a branch of a tree that has few if any side-branches except at its end, and is thus liable to snap due to end- loading

Loading - A mechanical term describing the force acting on a structure from a particular source; e.g. the weight of the structure itself or wind pressure

Mycelium - The body of a fungus, consisting of branched filaments (hyphae)

Occlusion - The process whereby a wound is progressively closed by the formation of new wood and bark around it

Pathogen - A micro-organism which causes disease in another organism

Photosynthesis - The process whereby plants use light energy to split hydrogen from water molecules, and combine it with carbon dioxide to form the molecular building blocks for synthesizing carbohydrates and other biochemical products

Probability - A statistical measure of the likelihood that a particular event might occur

Pruning - The removal or cutting back of twigs or branches, sometimes applied to twigs or small branches only, but often used to describe most activities involving the cutting of trees or shrubs

Radial - In the plane or direction of the radius of a circular object such as a tree stem

Reactive Growth/Reaction Wood - Production of woody tissue in response to altered mechanical loading; often in response to internal defect or decay and associated strength loss (cf. adaptive growth)

Ring-barking - The removal of a ring of bark and phloem around the circumference of a stem or branch, normally resulting in an inability to transport photosynthetic assimilates below the area of damage. Almost inevitably results in the eventual death of the affected stem or branch above the damage

Root-collar - The transitional area between the stem/s and roots

Sapwood - Living xylem tissues

Soft-rot - A kind of wood decay in which a fungus degrades cellulose within the cell walls, without any general degradation of the wall as a whole

Stem/s - Principle above-ground structural component(s) of a tree that supports its branches

Stress - In plant physiology, a condition under which one or more physiological functions are not operating within their optimum range, for example due to lack of water, inadequate nutrition or extremes of temperature

SRZ (Structural Root Zone) - The area around the base of the tree required for the trees stability in the ground

Subsidence - In relation to soil or structures resting in or on soil, a sinking due to shrinkage when certain types of clay soil dry out, sometimes due to extraction of moisture by tree roots

Taper - In stems and branches, the degree of change in girth along a given length

Targets - In tree risk assessment (with slight misuse of normal meaning) persons or property or other things of value which might be harmed by mechanical failure of the tree or by objects falling from it

Topping - In arboriculture, the removal of the crown of a tree, or of a major proportion of it

Transpiration - The evaporation of moisture from the surface of a plant, especially via the stomata of leaves; it exerts a suction which draws water up from the roots and through the intervening xylem cells

TPZ (Tree Protection Zone) - A specified area above and below ground and at a given distance from the trunk set aside for the protection of a tree's roots and crown to provide for the viability and stability of a tree to be retained where it is potentially subject to damage by development

Understory - This layer consists of younger individuals of the dominant trees, together with smaller trees and shrubs which are adapted to grow under lower light conditions

Veteran tree - Tree that, by recognised criteria, shows features of biological, cultural or aesthetic value that are characteristic of, but not exclusive to, individuals surviving beyond the typical age range for the species concerned. These characteristics might typically include a large girth, signs of crown retrenchment and hollowing of the stem

Vigour - The expression of carbohydrate expenditure to growth (in trees)

White-rot - A range of kinds of wood decay in which lignin, usually together with cellulose and other wood constituents, is degraded

Wind exposure - The degree to which a tree or other object is exposed to wind, both in terms of duration and velocity

Wind pressure - The force exerted by a wind on a particular object

Windthrow - The blowing over of a tree at its roots

Incorporating extracts from Lonsdale, D. 1999. Principles of Tree Hazard Assessment. Her Majesty's Stationary Office, London

Appendix A (Part I) – Addendum to Arboricultural Pruning Specification Report (Southwest Metro –Belmore to Lakemba)

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Addendum to Arboricultural Pruning Specification Report

Site Location: Southwest Metro – Belmore to Lakemba

Prepared for:
UGL

Prepared by: Bryce Claassens and Alex Kurath
Date prepared: 3 November 2025
Ref: 251103_SWM_Ineco_PS_Ad9
Addendum: 9

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1. INTRODUCTION

1.1 Urban Arbor have been instructed to prepare an addendum to the previous Pruning Specification Report (18 November 2024) in relation to Corridor Intruder Detection System (CIDS) and Object Detection System (ODS) trouble spots. The report is to address trees within and adjacent to the rail corridor between Belmore Station and Lakemba Station.

1.2 Documents and information provided to assist in preparing the report;

A) Arboricultural Pruning Specification Report, Urban Arbor, Ref:241118_SWM_Ineco_PS, Revision 2,18 November 2024.
B) CCTV LOS and Nuisance Alarm Register, Doc No. SMCSWIDS-UGL-1NL-TC-REG-000745, (Belmore to Lakemba) 14 October 2025.

1.3 The site and tree inspections were carried out on 23 October 2025 by Alex Kurath of Urban Arbor, in conjunction with representatives from UGL (Rares Pop), JHLORJV (Andre Kruize) and Sydney Metro. UGL advised the trees requiring pruning or removal to obtain camera visibility of fence lines.

1.4 Some trees included within this report were previously inspected between the dates of 6 January 2020 to 3 April 2020 by Bryce Claassens during the South West Metro Rail Corridor (SWMRC) and Station Precinct design works. Access was available to the subject site and adjoining public areas only. This report has been written by Bryce Claassens.

2. SCOPE OF THE REPORT

2.1 This report has been undertaken to meet the following objectives.

2.1.1 Conduct a walk-through assessment of the areas where trees (identified by UGL) are currently obstructing camera visibility, which require pruning or removal. The decision of pruning or removal of trees is subject to the agreement and approval of the stakeholders.

2.1.2 Conduct a visual assessment of significant trees not previously included in the Pruning Specification Report (dated 18 November 2024), located within areas identified by UGL. For the purpose of this report, a significant tree is a ‘Long lived woody perennial plant greater than (or usually greater than) 3 metres in height with one or relatively few main stems or trunks’.

2.1.3 Determine the trees estimated contribution years and remaining useful life expectancy and award the trees a retention value.

2.1.4 Provide pruning specifications for trees where required, in accordance with AS4373-2007.

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3. LIMITATIONS

3.1 The observations and recommendations are based on the site inspections identified in section 1 only. The findings of this report are based on the observations and site conditions at the time of inspection.

3.2 All of the observations were carried out from ground level. The accuracy of the assessment of the subject trees structural condition and health is limited to the visibility of the tree at the time of inspection.

3.3 The tree inspection was visual from ground level only. No soil or tissue testing was carried out as part of the tree inspection. None of the surrounding surfaces adjacent to trees were lifted or removed during the tree inspections.

3.4 Root decay can sometimes be present with no visual indication above ground. It is also impossible to know the extent of any root damage caused by mechanical damage such as underground root cutting during the installation of services without undertaking detailed root investigation. Any form of tree failure due to these activities is beyond the scope of this assessment.

3.5 The report reflects the subject tree(s) as found on the day of inspection. Any changes to the growing environment of the subject tree, or tree management works beyond those recommended in this report may alter the findings of the report. There is no warranty, expressed or implied, that problems or deficiencies relating to the subject tree, or subject site may not arise in the future.

3.6 Tree identification is based on accessible visual characteristics at the time of inspection. As key identifying features are not always available the accuracy of identification is not guaranteed. Where tree species is unknown, it is indicated with an *spp*.

3.7 Some trees included within this report have been located using a Trimble TDC100 hand held GNSS device by Urban Arbor Pty Ltd. Tree locations captured by the Trimble TDC100 are only accurate to within 1m - 3m. If an accurate location of these trees is required, a registered surveyor should locate the trees.

3.8 In some instances, multiple trees or groups of small trees have been identified as groups of trees within this report.

3.9 All diagrams, plans and photographs included in this report are visual aids only and are not to scale unless otherwise indicated.

3.10 Alteration of this report invalidates the entire report.

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4. METHODOLOGY

4.1 The following information was collected during the assessment of the subject tree(s).

- 4.1.1 Tree common name
- 4.1.2 Tree botanical name
- 4.1.3 Tree age class
- 4.1.4 DSH (Trunk/Stem diameter at breast height/1.4m) - millimetres.
- 4.1.5 DAB (Trunk diameter directly above the root buttress) – millimetres.
- 4.1.6 Estimated height - metres
- 4.1.7 Estimated crown spread (diameter of crown) - metres
- 4.1.8 Health
- 4.1.9 Structural condition
- 4.1.10 Amenity value
- 4.1.11 Estimated remaining contribution years (SULE)[1]
- 4.1.12 Retention value (Tree AZ)[2]
- 4.1.13 Notes/comments

4.2 An assessment of the trees condition was made using the visual tree assessment (VTA) model (Mattheck & Breloer, 1994).[3]

4.3 Tree diameter was measured using a DSH tape or in some cases estimated. Tree height and tree canopy spread was measured with a clinometer or in some cases estimated. All other measurements were estimations unless otherwise stated. The other tools used during the assessment were a nylon mallet, compass, camera and a steel probe.

4.4 All DSH measurements, notional root zones, and structural root zones within Appendix 2 of this report were calculated in accordance with methods set out in AS4970 Protection of trees on development sites (2025).[4]

4.5 Details of how the observations in this report have been assessed are listed in the appendices.

[1] Barrell, J. (2001), *'SULE: Its use and status in the new millennium' in Management of Mature Trees proceedings of the 4th NAAA Workshop*, Sydney, 2001. Barrell.

[2] Barrell Tree Consultancy, *Tree AZ version 10.10-ANZ*, http://www.treeaz.com/.

[3] Mattheck, C. & Breloer, H., *The body language of trees - A handbook for failure analysis*, The Stationary Office, London, England (1994).

[4] Council Of Standards Australia, *AS4970 Protection of trees on development sites* (2025).

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5. SITE LOCATION AND BRIEF DESCRIPTION

5.1 The area covered in the site inspections is located within the Canterbury Bankstown LGA. All trees within the Canterbury Bankstown LGA are subject to protection under the Canterbury Bankstown LEP 2023[5] and Canterbury Bankstown DCP 2023.[6]

6. AREAS ASSESSED

6.1 The areas assessed in this report have been identified by UGL in the reports CCTV LOS and Nuisance Alarm Register (dated 25 September 2025), which includes trees within and adjacent to the rail corridor between Belmore Station and Lakemba Station (BTL).

7. TREE OBSERVATIONS

7.1 **Tree information:** Details of each individual tree assessed, including the observations taken during the site inspections, can be found in the tree inspection schedule in appendix 2. Each of the subject trees have been awarded a retention value based on the observations using the Tree AZ method. Tree AZ is used to identify higher value trees worthy of being a constraint to development and lower value trees that should generally not be a constraint to the development. The Tree AZ categories sheet (Barrell Tree Consultancy) has been included in appendix 3 to assist with understanding the retention values. The retention values that have been allocated to the subject trees in this report is not definitive and should only be used as a guideline.

8. ASSESSMENT OF TREE IMPACTS BY AREA

8.1 The trees included in the following sections have been identified by UGL as being subject to impacts from development works. All trees to be retained should be protected in accordance with AS4970-2025 *Protection of trees on development sites*. If there are any development works that have not been assessed and could potentially impact additional trees, the project arborist must assess the impact of the proposed works to the condition of the trees, determining the trees viability for retention.

[5] *Canterbury Bankstown Local Environmental Plan 2023*, https://legislation.nsw.gov.au/view/html/inforce/current/epi-2023-0336, accessed 10 June 2025.

[6] *Canterbury Bankstown Development Control Plan 2023*, https://www.cbcity.nsw.gov.au/development/planning-control-policies/canterbury-bankstown-development-control-plan-2023, accessed 10 June 2025.

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8.2 Belmore to Lakemba (BLT01 – BLT07)

8.2.1 Five (5) trees and five (5) groups of trees have been identified for removal in this area, including tree 3569, 3769, 3770, 3771a, 3772, G80, G81, G82, G83 and G84.

8.2.2 Fifty-one (51) trees and two (2) groups of trees have been identified for canopy pruning in this area, including tree 658a, 930, 931, 951, 961, 962, 966, 2099, 2100, 2101, 2102, 2103, 2104, 2105, 2106, 2107, 2116, 2117, 2119, 2120, 3434, 3435, 3436, 3437, 3438, 3439, 3440, 3441, 3442, 3443, 3444, 3445, 3446, 3476, 3477, 3478, 3479, 3480, 3481, 3482, 3483, 3484, 3485, 3486, 3487, 3488, 3489, 3490, 3491, 3769a, 3771, G1.14 and G22-A. All canopy pruning must be completed in accordance with AS4373 *Pruning of amenity trees* (2007).

8.2.3 The details of the trees are summarised in the table below. Photographs of the trees are included in section 8.3.

Tree ID	Botanical Name	SULE	Retention Value	Height (m)	Canopy Spread (m) - radius	Native / Exotic	Prune / Remove
658a	*Melaleuca linariifolia*	1. Long	A1	8	4	Native	Prune
930	*Lophostemon confertus*	2. Medium	A1	6	4	Native	Prune
931	*Lophostemon confertus*	2. Medium	A1	6	4	Native	Prune
951	*Lophostemon confertus*	2. Medium	A1	8	4	Native	Prune
961	*Acacia longifolia*	5. Small/Young	Z1	5	1	Native	Prune
962	*Acacia longifolia*	5. Small/Young	Z1	5	2	Native	Prune
966	*Afrocarpus falcatus*	1. Long	A1	9	6	Exotic	Prune
2099	*Lophostemon confertus*	5. Small/Young	Z1	5	2	Native	Prune
2100	*Lophostemon confertus*	5. Small/Young	Z1	5	2	Native	Prune
2101	*Lophostemon confertus*	1. Long	A1	6	2	Native	Prune
2102	*Lophostemon confertus*	5. Small/Young	Z1	3	1	Native	Prune
2103	*Lophostemon confertus*	5. Small/Young	Z1	6	2	Native	Prune
2104	*Lophostemon confertus*	1. Long	A1	8	3	Native	Prune
2105	*Lophostemon confertus*	1. Long	A1	7	3	Native	Prune
2106	*Lophostemon confertus*	1. Long	A1	8	4	Native	Prune
2107	*Lophostemon confertus*	2. Medium	A2	9	3	Native	Prune
2116	*Callistemon salignus*	5. Small/Young	Z1	4	1	Native	Prune
2117	*Callistemon salignus*	5. Small/Young	Z1	5	1	Native	Prune
2119	*Callistemon salignus*	5. Small/Young	Z1	5	1	Native	Prune
2120	*Callistemon salignus*	2. Medium	A1	9	2	Native	Prune
3434	*Acacia saligna*	5. Small/Young	Z1	5	2	Native	Prune
3435	*Acacia saligna*	5. Small/Young	Z1	5	2	Native	Prune
3436	*Acacia saligna*	5. Small/Young	Z1	5	2	Native	Prune
3437	*Acacia saligna*	3. Short	Z10	3	4	Native	Prune
3438	*Acacia saligna*	1. Long	A1	6	3	Native	Prune
3439	*Acacia saligna*	5. Small/Young	Z1	5	2	Native	Prune
3440	*Acacia saligna*	5. Small/Young	Z1	5	1	Native	Prune
3441	*Acacia saligna*	4. Remove	Z4	6	1	Native	Prune
3442	*Acacia saligna*	3. Short	Z10	5	3	Native	Prune
3443	*Acacia saligna*	5. Small/Young	Z1	4	2	Native	Prune

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Tree ID	Botanical Name	SULE	Retention Value	Height (m)	Canopy Spread (m) - radius	Native / Exotic	Prune / Remove
3444	*Acacia saligna*	5. Small/Young	Z1	6	1	Native	Prune
3445	*Acacia saligna*	5. Small/Young	Z1	7	2	Native	Prune
3446	*Acacia saligna*	3. Short	Z4	7	2	Native	Prune
3476	*Acacia saligna*	5. Small/Young	Z1	4	2	Native	Prune
3477	*Acacia saligna*	5. Small/Young	Z1	3	2	Native	Prune
3478	*Acacia saligna*	5. Small/Young	Z1	3.5	1	Native	Prune
3479	*Acacia saligna*	5. Small/Young	Z1	3.5	1	Native	Prune
3480	*Acacia saligna*	5. Small/Young	Z1	3.5	1	Native	Prune
3481	*Acacia saligna*	5. Small/Young	Z1	3.5	1.5	Native	Prune
3482	*Acacia saligna*	5. Small/Young	Z1	3.5	1	Native	Prune
3483	*Acacia saligna*	5. Small/Young	Z1	4	1.5	Native	Prune
3484	*Acacia saligna*	5. Small/Young	Z1	3	1	Native	Prune
3485	*Acacia saligna*	4. Remove	Z4	4	2	Native	Prune
3486	*Acacia saligna*	5. Small/Young	Z1	6	1.5	Native	Prune
3487	*Acacia saligna*	5. Small/Young	Z1	4	2	Native	Prune
3488	*Acacia saligna*	5. Small/Young	Z1	6	1.5	Native	Prune
3489	*Pittosporum undulatum*	5. Small/Young	Z1	4	2	Native	Prune
3490	*Acacia prominens*	5. Small/Young	Z1	4	1.5	Native	Prune
3491	*Acacia prominens*	5. Small/Young	Z1	3	1	Native	Prune
3569	*Acacia parramattensis*	5. Small/Young	Z1	4	2	Native	Remove
3769	*Acacia longifolia*	5. Small/Young	Z1	5	2	Native	Remove
3769a	*Afrocarpus falcatus*	1. Long	A1	15	7	Exotic	Prune
3770	*Acacia longifolia*	5. Small/Young	Z1	4	2	Native	Remove
3771	*Acacia longifolia*	5. Small/Young	Z1	4	2	Native	Prune
3771a	*Ligustrum sinense*	5. Small/Young	Z1	6	2.5	Exotic	Remove
3772	*Grevillea robusta*	5. Small/Young	Z1	6	2	Native	Remove
G1.14	*Casuarina glauca*	5. Small/Young	Z1	7	1	Native	Prune
G22-A	*Acacia longifolia*	5. Small/Young	Z1	5	2	Native	Prune
G80	*Casuarina glauca*	5. Small/Young	Z1	6	1.5	Native	Remove
G81	*Casuarina glauca*	5. Small/Young	Z1	5	2	Native	Remove
G82	*Acacia spp*	5. Small/Young	Z1	4	2	Native	Remove
G83	*Acacia spp*	5. Small/Young	Z1	5	3	Native	Remove
G84	*Mixed species*	5. Small/Young	Z1	6	1.5	Native	Remove

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8.3 **Photographs**

Image 1: Looking towards tree 658a. Canopy pruning is required to provide clearance from the fence. The primary stem to the South is to be removed. The finished cut diameter measures approximately 350mm. The pruning will result in the removal of approximately 20% of the live foliage area of the tree. The stem to be removed has been marked yellow.

Image 2: Looking towards tree 3769. The tree is recommended for removal.

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Image 3: Looking towards tree G1.14. Canopy pruning is required to provide 2m clearance from the fence. The maximum finished cut diameter must not exceed 100mm. The pruning will result in the removal of approximately 5% of the live foliage area of each tree in the group. The approximate area of pruning has been marked yellow.

Image 4: Looking towards tree 931. The four branches marked yellow require pruning to provide fence clearance. The pruning will result in the removal of approximately 10% of the live foliage area of the tree. The maximum finished cut diameter measures approximately 140mm.

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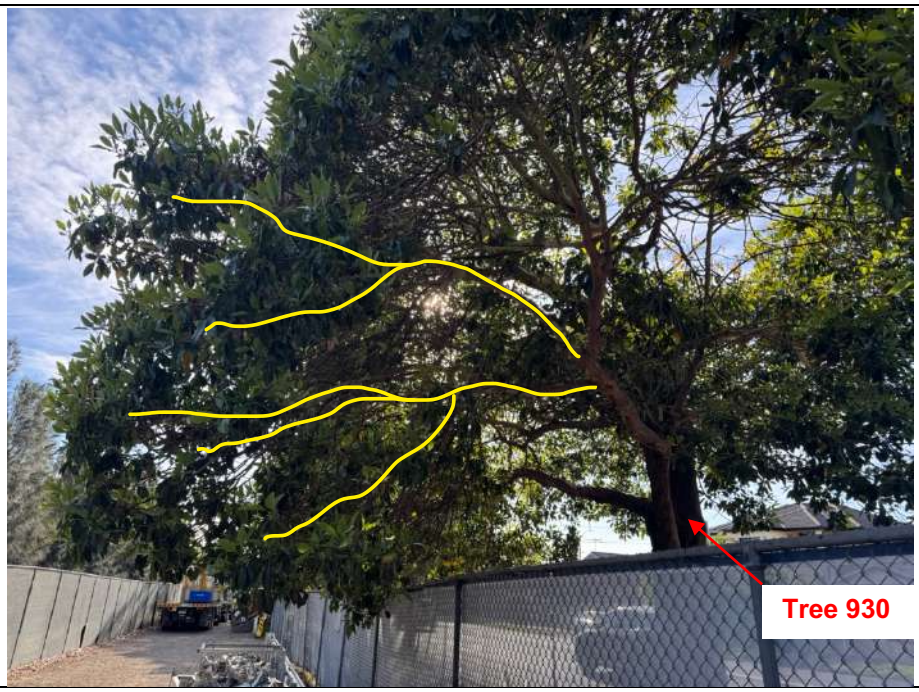

Image 5: Looking towards tree 930. The two branches marked yellow require pruning to provide fence clearance. The pruning will result in the removal of approximately 5% of the live foliage area of the tree. The maximum finished cut diameter measures approximately 70mm.

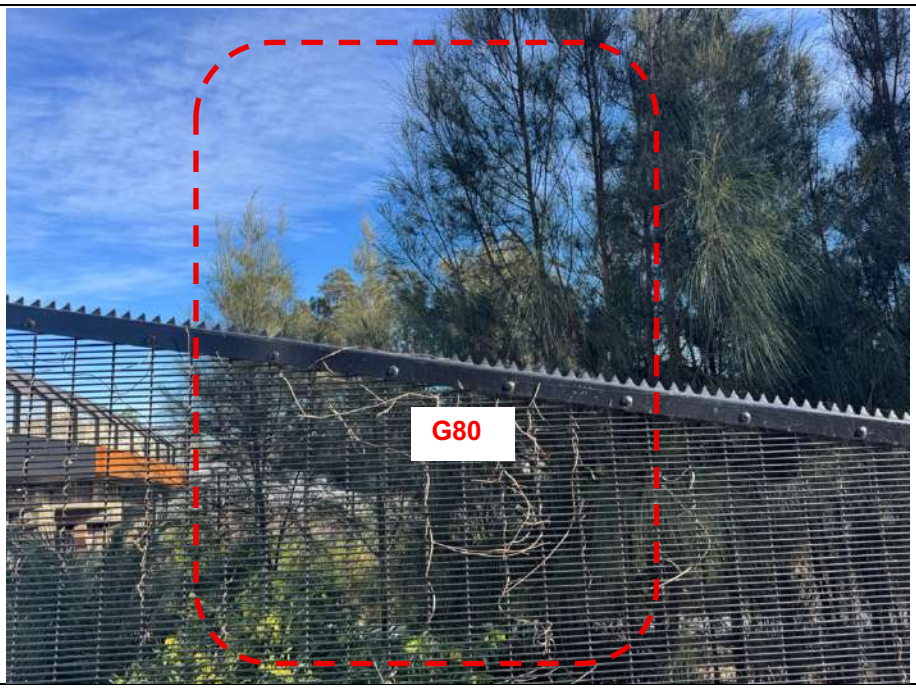

Image 6: Looking towards tree G80, which is a group of four trees. The trees are recommended for removal.

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Image 7: Looking towards tree G81, which is a group of three trees. The trees are recommended for removal.

Image 8: Looking towards trees 961 and 962. Canopy pruning is required to provide 2m clearance from the fence. Smaller branches measuring less than 50mm in diameter are to be pruned. The pruning will result in the removal of 10% of the live foliage area of each tree.

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Image 9: Looking towards tree 951. The two branches marked yellow require pruning to provide fence clearance. The pruning will result in the removal of approximately 5% of the live foliage area of the tree. The maximum finished cut diameter measures approximately 120mm.

Image 10: Looking towards tree G82, which is a group of four trees. The trees are recommended for removal.

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Image 11: Looking along the fence line adjacent to tree 3434 – 3446 (thirteen trees). Canopy pruning is required to provide 2m clearance from the fence. Smaller branches measuring less than 100mm in diameter are to be pruned. The pruning will result in the removal of less than 10% of the live foliage area of each tree. The approximate area requiring pruning has been marked yellow.

Image 12: Looking towards tree 3769a. Canopy pruning is required to provide 2m clearance from the fence. Smaller branches measuring less than 70mm in diameter are to be pruned. The pruning will result in the removal of less than 5% of the live foliage area of the tree.

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Image 13: Looking towards tree 966. Canopy pruning is required to provide 2m clearance from the fence. Smaller branches measuring less than 70mm in diameter are to be pruned. The pruning will result in the removal of less than 5% of the live foliage area of the tree.

Image 14: Looking towards tree G22-A. Canopy pruning is required to provide 2m clearance from the fence. The maximum finished cut diameter must not exceed 100mm. The pruning will result in the removal of approximately 5% of the live foliage area of each tree in the group. The approximate area of pruning has been marked yellow.

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Image 15: Looking towards tree G83, which is a group of five trees. The trees are recommended for removal.

Image 16: Looking along the fence line adjacent to tree 2116, 2117, 2119, 2120 (four trees). Canopy pruning is required to provide 2m clearance from the fence. Smaller branches measuring less than 100mm in diameter are to be pruned. The pruning will result in the removal of less than 10% of the live foliage area of each tree. The approximate area requiring pruning has been marked yellow.

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Image 17: Looking towards tree 3770. The tree is recommended for removal.

Image 18: Looking towards tree 3771. Canopy pruning is required to provide line of sight to the UTO fence. Smaller branches measuring less than 50mm in diameter are to be pruned that extend towards the fence. The pruning will result in the removal of approximately 20% of the live foliage area and is considered signficant, however it is a preferred option to whole tree removal. The approximate area requiring pruning has been marked yellow.

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Image 19: Looking along the fence line adjacent to tree 2156, 2157, and tree 3476 - 3491 (sixteen trees). Canopy pruning is required to provide 2m clearance from the fence. Smaller branches measuring less than 100mm in diameter are to be pruned. The pruning will result in the removal of less than 10% of the live foliage area of each tree. The approximate area requiring pruning has been marked yellow.

Image 20: Looking towards tree G84, which is a group of forty young trees/saplings. The trees are recommended for removal.

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Image 21: Looking towards tree 3771a. The tree is recommended for removal.

Image 22: Looking towards tree 3569 and 3772. The trees are recommended for removal.

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Image 23: Looking towards tree 2099. The 80mm diameter third order branch marked yellow requires pruning to provide fence clearance. The pruning will result in the removal of approximately 5% of the live foliage area of the tree.

Image 24: Looking towards tree 2100. The three second order branches marked yellow require pruning to provide fence clearance. The pruning will result in the removal of approximately 5% of the live foliage area of the tree. The maximum finished cut diameter measure less than 50mm

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Image 25: Looking towards tree 2101. The four branches marked yellow require pruning to provide fence clearance. The pruning will result in the removal of approximately 10% of the live foliage area of the tree. The maximum finished cut diameter measure less than 120mm.

Image 26: Looking towards tree 2102. The two branches marked yellow require pruning to provide fence clearance. The pruning will result in the removal of approximately 15% of the live foliage area of the tree. The maximum finished cut diameter measure less than 70mm

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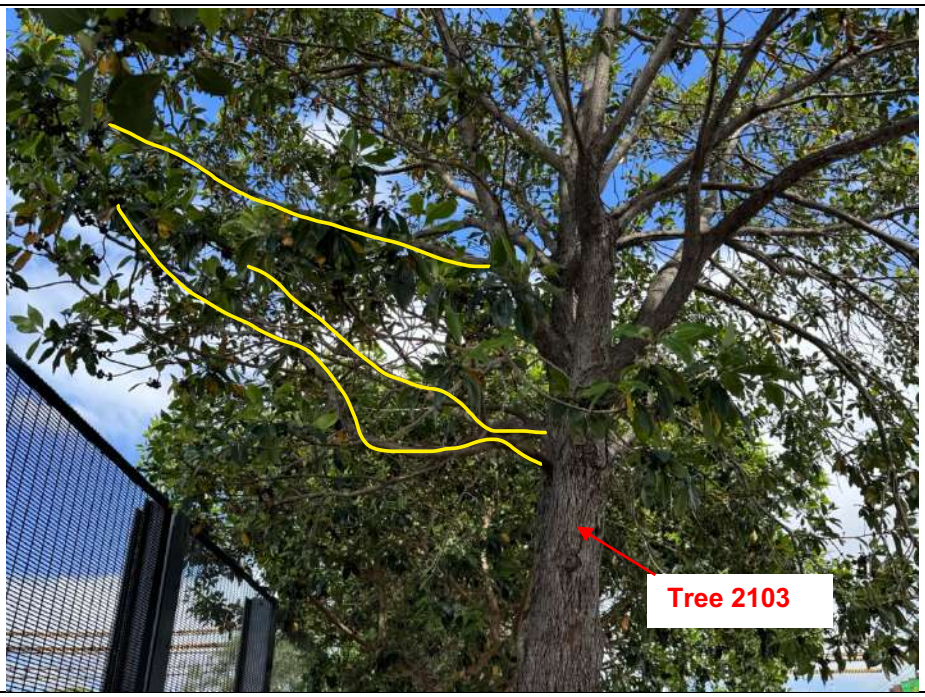

Image 27: Looking towards tree 2103. The three branches marked yellow require pruning to provide fence clearance. The pruning will result in the removal of approximately 5% of the live foliage area of the tree. The maximum finished cut diameter measure less than 60mm

Image 28: Looking towards tree 2104. The 40mm diameter second order branch marked yellow requires pruning to provide fence clearance. The pruning will result in the removal of approximately 5% of the live foliage area of the tree.

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Image 29: Looking towards tree 2105. The three branches marked yellow require pruning to provide fence clearance. The pruning will result in the removal of approximately 30% of the live foliage area of the tree and is considered signficant, however the pruning will improve the future form of the tree. The maximum finished cut diameter measures approcimately 120mm.

Image 30: Looking towards tree 2106. The 250mm diameter first order branch marked yellow requires pruning to provide fence clearance. The pruning will result in the removal of approximately 10-15% of the live foliage area of the tree.

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Image 31: Looking towards tree 2107. The 50mm diameter second order branch marked yellow requires pruning to provide fence clearance. The pruning will result in the removal of less than 5% of the live foliage area of the tree.

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9. CONCLUSIONS

9.1 **Table 2:** Summary of the trees requiring pruning or removal;

Impact	Reason	Category A	Category Z	TOTAL
		A	Z	
Trees recommended to be removed	Installation of services, line of sight for cameras, solar panel accessibility	None	3569, 3769, 3770, 3771a, 3772, G80, G81, G82, G83, G84 (Five trees & five groups of trees)	**5 trees and 5 groups of trees**
Trees requiring pruning	Installation of services, line of sight for cameras	658a, 930, 931, 951, 966, 2101, 2104, 2105, 2106, 2107, 2120, 3438, 3769a (Thirteen trees)	961, 962, 2099, 2100, 2102, 2103, 2116, 2117, 2119, 3434, 3435, 3436, 3437, 3439, 3440, 3441, 3442, 3443, 3444, 3445, 3446, 3476, 3477, 3478, 3479, 3480, 3481, 3482, 3483, 3484, 3485, 3486, 3487, 3488, 3489, 3490, 3491, 3771, G1.14, G22-A (Thirty-eight trees and two groups of trees)	**51 trees and 2 group of trees**

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10. RECOMMENDATIONS

10.1 This report assesses trees that require pruning or removal for camera visibility works along the rail corridor. Fifty-six (56) trees and seven (7) groups of trees have been identified and assessed in this report.

10.2 Five (5) trees and five (5) groups of trees have been identified for removal in this area, including tree 3569, 3769, 3770, 3771a, 3772, G80, G81, G82, G83 and G84.

10.3 The trees discussed above in section 10.2 have been recommended for removal due to excessive amounts of pruning required to achieve camera visibility, as discussed in section 1.3. It may be possible to retain/prune some of the trees recommended for removal based upon the final installation locations of cameras and their FOV. This will need to be determined by UGL and the project arborist.

10.4 Fifty-one (51) trees and two (2) groups of trees have been identified for canopy pruning in this area, including tree 658a, 930, 931, 951, 961, 962, 966, 2099, 2100, 2101, 2102, 2103, 2104, 2105, 2106, 2107, 2116, 2117, 2119, 2120, 3434, 3435, 3436, 3437, 3438, 3439, 3440, 3441, 3442, 3443, 3444, 3445, 3446, 3476, 3477, 3478, 3479, 3480, 3481, 3482, 3483, 3484, 3485, 3486, 3487, 3488, 3489, 3490, 3491, 3769a, 3771, G1.14 and G22-A. All canopy pruning must be completed in accordance with AS4373 *Pruning of amenity trees* (2007).

10.5 All trees that require canopy pruning can be retained in a viable condition. All trees to be retained must be protected in accordance with AS4970-2025 *Protection of trees on development sites*.

10.6 This report does not provide approval for tree removal or pruning works. All recommendations in this report are subject to approval by the relevant authorities and/or tree owners.

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12. LIST OF APPENDICES

The following are included in the appendices:

- Appendix 2 - Tree inspection schedule
- Appendix 3 - Definition of Methodology

Alex Kurath
8004 2802
sales@urbanarbor.com.au
Diploma of Arboriculture (AQF5)
Member of Arboriculture Australia
ISA Member (International Society of Arboriculture)

Bryce Claassens
Diploma of Arboriculture (AQF5)
Cert III Landscape Construction
Member Arboriculture Australia
Quantified Tree Risk Assessment (QTRA)
ISA Tree Risk Assessment Qualification (TRAQ)

Appendix 2 - Tree Inspection Schedule

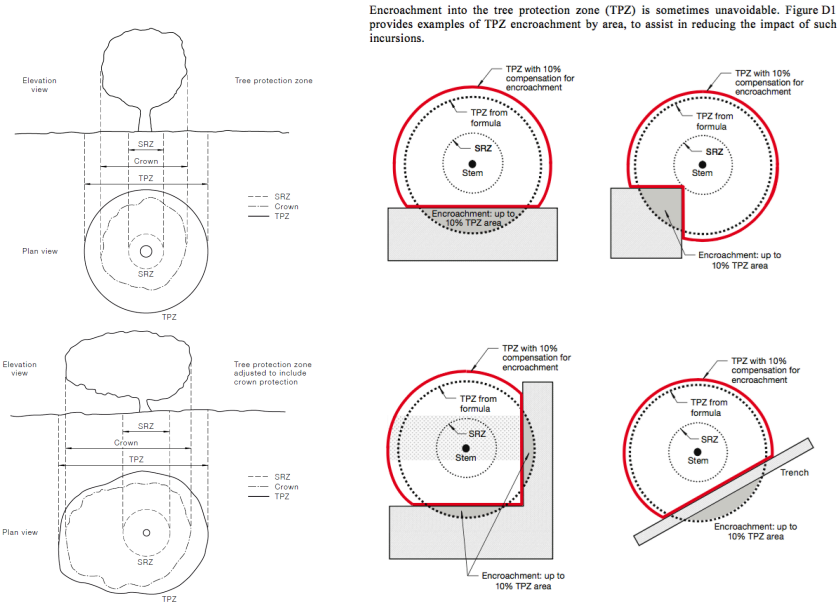
Tree ID	Common Name	Botanical Name	Age Class	Height (m)	Canopy Spread Radius (m)	Stem 1	Stem 2	Stem 3	Stem 4	Stem 5	DSH (mm)	DAB (mm)	Health	Structure	Amenity Value	SULE	Retention Value	NRZ Radius (m)	SRZ Radius (m)	Notes	Native or Exotic	Recommendations
658a	Snow In Summer	*Melaleuca linarifolia*	Mature	8	4	450	350	650			865	800	Good	Good	Medium	1. Long	A1	10.4	3.0	Not on survey.	Native	Prune
930	Queensland Brushbox	*Lophostemon confertus*	Mature	6	4	490					490	560	Good	Fair	Medium	2. Medium	A1	5.9	2.6	Located within nature strip. Pruned for power line clearance.	Native	Prune
931	Queensland Brushbox	*Lophostemon confertus*	Mature	6	4	420					420	480	Good	Good	Medium	2. Medium	A1	5.0	2.4	Located within nature strip. Pruned for power line clearance.	Native	Prune
951	Queensland Brushbox	*Lophostemon confertus*	Mature	8	4	400					400	440	Good	Fair	Medium	2. Medium	A1	4.8	2.3	Located within nature strip. Pruned for power line clearance.	Native	Prune
961	Sydney Golden Wattle	*Acacia longifolia*	Mature	5	1	100	100				141	200	Good	Fair	Low	5. Small/Young	Z1	2.0	1.7	Located within corridor.	Native	Prune
962	Sydney Golden Wattle	*Acacia longifolia*	Mature	5	2	200					200	200	Good	Fair	Low	5. Small/Young	Z1	2.4	1.7	Located within corridor.	Native	Prune
966	Plum Fruited Yew	*Afrocarpus falcatus*	Mature	9	6	720					720	780	Good	Good	High	1. Long	A1	8.6	3.0	Canopy extends into corridor.	Exotic	Prune
2099	Queensland Brushbox	*Lophostemon confertus*	Semi-mature	5	2	200					200	230	Good	Good	Low	5. Small/Young	Z1	2.4	1.8	None.	Native	Prune
2100	Queensland Brushbox	*Lophostemon confertus*	Semi-mature	5	2	170					170	200	Good	Good	Low	5. Small/Young	Z1	2.0	1.7	None.	Native	Prune
2101	Queensland Brushbox	*Lophostemon confertus*	Semi-mature	6	2	200					200	220	Good	Good	Medium	1. Long	A1	2.4	1.8	None.	Native	Prune
2102	Queensland Brushbox	*Lophostemon confertus*	Young	3	1	140					140	170	Good	Fair	Low	5. Small/Young	Z1	2.0	1.6	Topped at 2m.	Native	Prune
2103	Queensland Brushbox	*Lophostemon confertus*	Semi-mature	6	2	160					160	200	Good	Fair	Low	5. Small/Young	Z1	2.0	1.7	Co-dominant stems.	Native	Prune
2104	Queensland Brushbox	*Lophostemon confertus*	Mature	8	3	300					300	360	Good	Good	Medium	1. Long	A1	3.6	2.2	None.	Native	Prune
2105	Queensland Brushbox	*Lophostemon confertus*	Mature	7	3	310					310	330	Good	Good	Medium	1. Long	A1	3.7	2.1	None.	Native	Prune
2106	Queensland Brushbox	*Lophostemon confertus*	Mature	8	4	380					380	440	Good	Good	Medium	1. Long	A1	4.6	2.3	None.	Native	Prune
2107	Queensland Brushbox	*Lophostemon confertus*	Mature	9	3	310					310	360	Fair	Good	Medium	2. Medium	A2	3.7	2.2	Low foliage density for species.	Native	Prune
2116	Willow Bottlebrush	*Callistemon salignus*	Young	4	1	100					100	120	Good	Fair	Low	5. Small/Young	Z1	2.0	1.5	None.	Native	Prune
2117	Willow Bottlebrush	*Callistemon salignus*	Young	5	1	110					110	150	Good	Fair	Low	5. Small/Young	Z1	2.0	1.5	None.	Native	Prune
2119	Willow Bottlebrush	*Callistemon salignus*	Semi-mature	5	1	100	100				141	150	Good	Fair	Low	5. Small/Young	Z1	2.0	1.5	None.	Native	Prune
2120	Willow Bottlebrush	*Callistemon salignus*	Semi-mature	9	2	170	150				227	320	Good	Good	Medium	2. Medium	A1	2.7	2.1	None.	Native	Prune
3434	Golden Wreath Wattle	*Acacia saligna*	Mature	5	2	250					250	280	Good	Fair	Low	5. Small/Young	Z1	3.0	1.9	Significant trunk lean.	Native	Prune
3435	Golden Wreath Wattle	*Acacia saligna*	Semi-mature	5	2	150	100				180	190	Good	Fair	Low	5. Small/Young	Z1	2.2	1.6	Growing through fence.	Native	Prune
3436	Golden Wreath Wattle	*Acacia saligna*	Semi-mature	5	2	150					150	170	Good	Fair	Low	5. Small/Young	Z1	2.0	1.6	Growing through fence.	Native	Prune
3437	Golden Wreath Wattle	*Acacia saligna*	Mature	3	4	300					300	450	Good	Fair	Low	3. Short	Z10	3.6	2.4	Growing through fence.	Native	Prune
3438	Golden Wreath Wattle	*Acacia saligna*	Mature	6	3	260					260	310	Good	Good	Medium	1. Long	A1	3.1	2.0	None.	Native	Prune
3439	Golden Wreath Wattle	*Acacia saligna*	Semi-mature	5	2	200					200	230	Good	Fair	Low	5. Small/Young	Z1	2.4	1.8	Asymmetric crown shape.	Native	Prune
3440	Golden Wreath Wattle	*Acacia saligna*	Young	5	1	110					110	120	Good	Good	Low	5. Small/Young	Z1	2.0	1.5	None.	Native	Prune
3441	Golden Wreath Wattle	*Acacia saligna*	Dead	6	1	150					150	180	Dead	Poor	Low	4. Remove	Z4	2.0	1.6	Dead tree.	Native	Prune
3442	Golden Wreath Wattle	*Acacia saligna*	Mature	5	3	200	180				269	350	Good	Fair	Medium	3. Short	Z10	3.2	2.1	Growing through fence.	Native	Prune
3443	Golden Wreath Wattle	*Acacia saligna*	Semi-mature	4	2	130					130	150	Good	Fair	Low	5. Small/Young	Z1	2.0	1.5	Growing through fence.	Native	Prune
3444	Golden Wreath Wattle	*Acacia saligna*	Semi-mature	6	1	110	120	100			191	220	Good	Fair	Low	5. Small/Young	Z1	2.3	1.8	Growing through fence.	Native	Prune
3445	Golden Wreath Wattle	*Acacia saligna*	Semi-mature	7	2	200					200	220	Good	Good	Low	5. Small/Young	Z1	2.4	1.8	None.	Native	Prune
3446	Golden Wreath Wattle	*Acacia saligna*	Semi-mature	7	2	240					240	250	Fair	Fair	Low	3. Short	Z4	2.9	1.8	Growing through fence. In decline.	Native	Prune
3476	Golden Wreath Wattle	*Acacia saligna*	Semi-mature	4	2	240					240	240	Good	Fair	Low	5. Small/Young	Z1	2.9	1.8	Remove excessive canopy pruning.	Native	Prune
3477	Golden Wreath Wattle	*Acacia saligna*	Young	3	2	80	120				144	400	Good	Fair	Low	5. Small/Young	Z1	2.0	2.3	Prune	Native	Prune
3478	Golden Wreath Wattle	*Acacia saligna*	Young	3.5	1	50	30				58	70	Good	Fair	Low	5. Small/Young	Z1	2.0	1.5	Remove due to excessive pruning.	Native	Prune
3479	Golden Wreath Wattle	*Acacia saligna*	Young	3.5	1	50	30				58	70	Good	Fair	Low	5. Small/Young	Z1	2.0	1.5	Remove due to excessive pruning.	Native	Prune
3480	Golden Wreath Wattle	*Acacia saligna*	Young	3.5	1	50	30				58	70	Good	Fair	Low	5. Small/Young	Z1	2.0	1.5	Remove due to excessive pruning.	Native	Prune
3481	Golden Wreath Wattle	*Acacia saligna*	Young	3.5	1.5	100					100	100	Good	Fair	Low	5. Small/Young	Z1	2.0	1.5	Pruning	Native	Prune
3482	Golden Wreath Wattle	*Acacia saligna*	Young	3.5	1	110					110	110	Good	Fair	Low	5. Small/Young	Z1	2.0	1.5	Prune	Native	Prune
3483	Golden Wreath Wattle	*Acacia saligna*	Young	4	1.5	160					160	160	Good	Fair	Low	5. Small/Young	Z1	2.0	1.5	Remove due to pruning	Native	Prune
3484	Golden Wreath Wattle	*Acacia saligna*	Young	3	1	50					50	70	Good	Fair	Low	5. Small/Young	Z1	2.0	1.5	Remove due to pruning	Native	Prune
3485	Golden Wreath Wattle	*Acacia saligna*	Dead	4	2	200					200	260	Dead	Poor	Low	4. Remove	Z4	2.4	1.9	Prune south side	Native	Prune
3486	Golden Wreath Wattle	*Acacia saligna*	Young	6	1.5	150					150	170	Good	Good	Low	5. Small/Young	Z1	2.0	1.6	Prune	Native	Prune
3487	Golden Wreath Wattle	*Acacia saligna*	Young	4	2	160					160	200	Good	Fair	Low	5. Small/Young	Z1	2.0	1.7	Prune	Native	Prune
3488	Golden Wreath Wattle	*Acacia saligna*	Young	6	1.5	100					100	140	Good	Fair	Low	5. Small/Young	Z1	2.0	1.5	Prune	Native	Prune
3489	Sweet Pittosporum	*Pittosporum undulatum*	Semi-mature	4	2	200					200	200	Good	Fair	Low	5. Small/Young	Z1	2.4	1.7	DBH estimated near base. Prune	Native	Prune
3490	Golden Rain Wattle	*Acacia prominens*	Young	4	1.5	120					120	120	Good	Fair	Low	5. Small/Young	Z1	2.0	1.5	Prune	Native	Prune
3491	Golden Rain Wattle	*Acacia prominens*	Young	3	1	150					150	150	Good	Fair	Low	5. Small/Young	Z1	2.0	1.5	Prune	Native	Prune
3569	Parramatta Wattle	*Acacia parramattensis*	Young	4	2	60	50				78	100	Good	Fair	Low	5. Small/Young	Z1	2.0	1.5	Not on survey. Asymmetric canopy to the East.	Native	Remove
3769	Sydney Golden Wattle	*Acacia longifolia*	Semi-mature	5	2	120					120	150	Good	Good	Low	5. Small/Young	Z1	2.0	1.5	None.	Native	Remove
3769a	Plum Fruited Yew	*Afrocarpus falcatus*	Mature	15	7	500	550	500			896	750	Good	Good	High	1. Long	A1	10.7	2.9	None.	Exotic	Prune
3770	Sydney Golden Wattle	*Acacia longifolia*	Young	4	2	50	50	50	50		100	100	Good	Good	Low	5. Small/Young	Z1	2.0	1.5	None.	Native	Remove
3771	Sydney Golden Wattle	*Acacia longifolia*	Young	4	2	60	50				78	100	Good	Good	Low	5. Small/Young	Z1	2.0	1.5	None.	Native	Prune
3771a	Small Leaved Privet	*Ligustrum sinense*	Semi-mature	6	2.5	80	100				128	150	Good	Good	Low	5. Small/Young	Z1	2.0	1.5	Located on private property.	Exotic	Remove
3772	Silky Oak	*Grevillea robusta*	Young	6	2	100					100	150	Good	Good	Low	5. Small/Young	Z1	2.0	1.5	None.	Native	Remove
G1.14	Swamp Oak	*Casuarina glauca*	Young	7	1	100	80				128	120	Good	Good	Low	5. Small/Young	Z1	2.0	1.5	Not on survey Group of trees inside corridor from tree 924 to 933 closest to bridge.	Native	Prune
G22-A	Sydney Golden Wattle	*Acacia longifolia*	Semi-mature	5	2	150					150	180	Good	Good	Low	5. Small/Young	Z1	2.0	1.6	Not on survey. Group of 4 trees.	Native	Prune
G80	Swamp Oak	*Casuarina glauca*	Young	6	1.5	80					80	100	Good	Good	Low	5. Small/Young	Z1	2.0	1.5	Group of 4 trees within G1.14	Native	Remove
G81	Swamp Oak	*Casuarina glauca*	Semi-mature	5	2	130					130	170	Good	Good	Low	5. Small/Young	Z1	2.0	1.6	Group of three trees closest to bridge.	Native	Remove
G82	Wattle	*Acacia spp*	Young	4	2	80					80	100	Good	Good	Low	5. Small/Young	Z1	2.0	1.5	Group of four various species of wattles.	Native	Remove
G83	Wattle	*Acacia spp*	Mature	5	3	140	120				184	180	Good	Fair	Low	5. Small/Young	Z1	2.2	1.6	Group of five Acacia species.	Native	Remove
G84	Mixed species	*Mixed species*	Young	6	1.5	50					50	70	Good	Good	Low	5. Small/Young	Z1	2.0	1.5	Group of approximately 40 new growth trees. Consisting predominantly of Casuarina glaucas, with a few Eucalyptus saplings and Acacias	Native	Remove

Explanatory Notes

Tree Species - Common name followed by botanical name. Where species is unknown it is indicated with an '*spp*'.
Age Class - Over mature (OM), Mature (M), Early mature (EM), Semi mature (SM), Young (Y).
Diameter at Standard Height (DSH) - Measured with a diameter tape or estimated at approximately 1.4m above ground level.
Diameter Above root Buttresses (DAB): Measured with a diameter tape or estimated above root buttresses (DAB) for calculating the SRZ.
Height - Height from ground level to top of crown. All heights are estimated unless otherwise indicated.
Spread - Radius of crown at widest section. All tree spreads are estimated unless otherwise indicated.
Notional Root Zone (NRZ) - DSH x 12. Measured in radius from the centre of the trunk. Rounded to nearest 0.1m. For monocots, the NRZ is set at 1 metre outside the crown projection.
Structural Root Zone (SRZ) - (DAB x 50) $^{0.42}$ x 0.64. Measured in radius from the centre of the trunk. Rounded up to nearest 0.1m.
Health - Good/Fair/Poor/Dead
Structure - Good/Fair/Poor
Safe Useful Life Expectancy (SULE) - 1. Long (40+years), 2. Medium (15 - 40 years), 3. Short (5 - 15 years), 4. Remove (under 5 years), 5. Small/young.
Amenity Value - Very High/High/Medium/Low/Very Low.
Retention Value: Tree AZ, see appendix 3 for categories.

Appendix 3 - Further Information of Methodology

1. **Tree Protection Zone:** The tree protection zone (TPZ) is the principle means of protecting trees on development sites. The TPZ is a combination of the root area and crown area requiring protection. It is an area isolated from construction disturbance, so that the tree remains viable. The radius of the TPZ is calculated for each tree by multiplying its DBH x 12. The derived value is measured in radius from the centre of the stem/trunk at ground level. A TPZ should not be less than 2.0 metres nor greater than 15 metres (except where crown protection is required).
It is commonly observed that tree roots will extend significant further than the indicative TPZ, however the TPZ is an area identified AS4970-2009 to be extent where root loss or disturbance will generally not impact the viability of the tree. The TPZ is identified as a restricted area to prevent damage to trees either above or below ground during a development. Where trees are intended to be retained proposed developments must provide an adequate TPZ around trees. The TPZ is set aside for the tree's root zone, trunk and crown and it is essential for the stability and longevity of the tree. The tree protection also incorporates the SRZ (see below for more information about the SRZ). I have calculated the TPZ of palms, other monocots, cycads and tree ferns at one metre outside the crown projection. See appendices for additional information about the TPZ including information about calculating the TPZ and examples of TPZ encroachment.
Minor encroachment into TPZ: Sometimes encroachment into the TPZ is unavoidable. Encroachment includes but is not limited to activities such as excavation, compacted fill and machine trenching. Minor encroachment of up to 10% of the overall TPZ area is normally considered acceptable, providing there is space adjacent to the TPZ for the tree to compensate and the tree is displaying adequate vigour/health to tolerate changes to its growing environment.
Major encroachment into TPZ: Where encroachment of more than 10% of the overall TPZ area is proposed the project Arborist must investigate and demonstrate that the tree will remain in a viable condition. In some cases, tree sensitive construction methods such as pier and beam footings, suspended slabs, or cantilevered sections, can be utilised to allow additional encroachment into the TPZ by bridging over roots and minimising root disturbance. Major encroachment is only possible if it can be undertaken without severing significant size roots, or if it can be demonstrated that significant roots will not be impacted.



2. **Structural Root Zone:** This is the area around the base of a tree required for the trees stability in the ground. An area larger than the SRZ always need to be maintained to preserve a viable tree as it will only have a minor effect on the trees vigour and health. There are several factors that determine the SRZ which include height, crown area, soil type and soil moisture. It can also be influenced by other factors such as natural or built structures. Generally work within the SRZ should be avoided.
An indicative SRZ radius can be determined from the diameter of the trunk measured immediately above the root buttresses. Root investigation could provide more information about the extent of the SRZ. The following formula should be used to calculate the SRZ.
SRZ radius = $(D \times 50)^{0.42} \times 0.64$ (D = Diameter above root buttress).

3. **Tree Age Class:** If can be difficult to determine the age of a tree without carrying out invasive tests that may damage the tree, so we have categorised there likely age class which is defined below;
    - Young/Newly planted: Young or recently planted tree.
    - Semi Mature: Up to 20% of the usual life expectancy for the species.
    - Early mature/Mature: Between 20%-80% of the usual life expectancy for the species.
    - Over mature: Over 80% of the usual life expectancy for the species.
    - Dead: Tree is dead or almost dead.

4. **Health/Physiological Condition:** Below are examples conditions used when assigning a category for tree health.

Category	Example condition	Summary
Good	• Crown has good foliage density for species. • Tree shows no or minimal signs of pathogens that are unlikely to have an effect on the health of the tree. • Tree is displaying good vigour and reactive growth development.	• The tree is in above average health and condition and no remedial works are required.
Fair	• The tree may be starting to dieback or have over 25% deadwood. • Tree may have slightly reduced crown density or thinning. • There may be some discolouration of foliage. • Average reactive growth development. • There may be early signs of pathogens which may further deteriorate the health of the tree. • There may be epicormic growth indicating increased levels of stress within the tree.	• The tree is in below average health and condition and may require remedial works to improve the trees health.
Poor	• The may be in decline, have extensive dieback or have over 30% deadwood. • The canopy may be sparse or the leaves may be unusually small for species. • Pathogens or pests are having a significant detrimental effect on the tree health.	• The tree is displaying low levels of health and removal or remedial works may be required.
Dead	• The tree is dead or almost dead.	• The tree should generally be removed.

5. **Structural Condition:** Below are examples conditions used when assigning a category for structural condition.

Category	Example condition	Summary
Good	• Branch unions appear to be strong with no sign of defects. • There are no significant cavities. • The tree is unlikely to fail in usual conditions. • The tree has a balanced crown shape and form.	• The tree is considered structurally good with well developed form.
Fair	• The tree may have minor structural defects within the structure of the crown that could potentially develop into more significant defects. • The tree may a cavity that is currently unlikely to fail but may deteriorate in the future. • The tree is an unbalanced shape or leans significantly. • The tree may have minor damage to its roots. • The root plate may have moved in the past but the tree has now compensated for this. • Branches may be rubbing or crossing.	• The identified defects are unlikely cause major failure. • Some branch failure may occur in usual conditions. • Remedial works can be undertaken to alleviate potential defects.
Poor	• The tree has significant structural defects. • Branch unions may be poor or weak. • The tree may have a cavity or cavities with excessive levels of decay that could cause catastrophic failure. • The tree may have root damage or is displaying signs of recent movement. • The tree crown may have poor weight distribution which could cause failure.	• The identified defects are likely to cause either partial or whole failure of the tree.

6. **Amenity Value:** To determine the amenity value of a tree we assess a number of different factors, which include but are not limited to the information below.
   - The visibility of the tree to adjacent sites.
   - The relationship between the tree and the site.
   - Whether the tree is protected by any statuary conditions.
   - The habitat value of the tree.
   - Whether the tree is considered a noxious weed species.

   The amenity value is rated using one of the following values.
   - Very High
   - High
   - Moderate
   - Low
   - Very Low

7. **Safe Useful Life Expectancy (SULE), (Barrel, 2001):** A trees safe useful life expectancy is determined by assessing a number of different factors including the health and vitality, estimated age in relation to expected life expectancy for the species, structural defects, and remedial works that could allow retention in the existing situation.

Category	Description
1. Long - Over 40 years	(a) Structurally sound trees located in positions that can accommodate future growth. (b) Trees that could be made suitable for retention in the long term by remedial tree care. (c) Trees of special significance for historical, commemorative or rarity reasons that would warrant extraordinary efforts to secure their long term retention.
2. Medium - 15 to 40 years	(a) Trees that may only live between 15 and 40 more years. (b) Trees that could live for more than 40 years but may be removed for safety or nuisance reasons. (c) Trees that could live for more than 40 years but may be removed to prevent interference with more suitable individuals or to provide space for new planting. (d) Trees that could be made suitable for retention in the medium term by remedial tree care.
3. Short - 5 to 15 years	(a) Trees that may only live between 5 and 15 more years. (b) Trees that could live for more than 15 years but may be removed for safety or nuisance reasons. (c) Trees that could live for more than 15 years but may be removed to prevent interference with more suitable individuals or to provide space for new planting. (d) Trees that require substantial remedial tree care and are only suitable for retention in the short term.
4. Remove - Under 5 years	(a) Dead, dying, suppressed or declining trees because of disease or inhospitable conditions. (b) Dangerous trees because of instability or recent loss of adjacent trees. (c) Dangerous trees because of structural defects including cavities, decay, included bark, wounds or poor form. (d) Damaged trees that are clearly not safe to retain. (e) Trees that could live for more than 5 years but may be removed to prevent interference with more suitable individuals or to provide space for new planting. (f) Trees that are damaging or may cause damage to existing structures within 5 years. (g) Trees that will become dangerous after removal of other trees for the reasons given in (a) to (f). (h) Trees in categories (a) to (g) that have a high wildlife habitat value and, with appropriate treatment, could be retained subject to regular review.
5. Small/Young	(a) Small trees less than 5m in height. (b) Young trees less than 15 years old but over 5m in height. (c) Formal hedges and trees intended for regular pruning to artificially control growth.

8. **Root investigations:** The root investigations should identify roots greater than 30mm in diameter that are located along the edge of the structures footprint or in the location of footings. Root investigations must be carried out using non-invasive methods (manual excavations). Any excavations for the root investigations must carried out manually to avoid damaging the roots during excavations. Manual excavation may include the use of a high-pressure air/air knife, or a combination of high-pressure water and a vacuum device. When hand excavating carefully work around roots retaining as many as possible. Take care to not fray, wound, or cause damage to any roots during excavations as this may cause decay or infection from pathogens. It is essential that exposed roots are kept moist and the excavation back filled as soon as possible. The root investigations should be carried out by a qualified Arborist minimum AQF3. Once roots are exposed, a visual assessment can be carried out by a consulting Arborist to evaluate the potential impact of the proposed root loss on the health and stability of the tree. A root map/report should be prepared identifying the findings of investigations, including photographs as supporting evidence in the report.

9. **Retention Value:** The system I have used to award the retention value is Tree AZ. Tree AZ is used to identify higher value trees worthy of being a constraint to development and lower value trees that should generally not be a constraint to the development. The table below provides a brief description of each category.

TreeAZ Categories (Version 10.04-ANZ)

CAUTION: TreeAZ assessments must be carried out by a competent person qualified and experienced in arboriculture. The following category descriptions are designed to be a brief field reference and are not intended to be self-explanatory. They must be read in conjunction with the most current explanations published at www.TreeAZ.com.

Category Z: Unimportant trees not worthy of being a material constraint

Local policy exemptions: Trees that are unsuitable for legal protection for local policy reasons including size, proximity and species	
Z1	Young or insignificant small trees, i.e. below the local size threshold for legal protection, etc
Z2	Too close to a building, i.e. exempt from legal protection because of proximity, etc
Z3	Species that cannot be protected for other reasons, i.e. scheduled noxious weeds, out of character in a setting of acknowledged importance, etc
High risk of death or failure: Trees that are likely to be removed within 10 years because of acute health issues or severe structural failure	
Z4	Dead, dying, diseased or declining
Z5	Severe damage and/or structural defects where a high risk of failure cannot be satisfactorily reduced by reasonable remedial care, i.e. cavities, decay, included bark, wounds, excessive imbalance, overgrown and vulnerable to adverse weather conditions, etc
Z6	Instability, i.e. poor anchorage, increased exposure, etc
Excessive nuisance: Trees that are likely to be removed within 10 years because of unacceptable impact on people	
Z7	Excessive, severe and intolerable inconvenience to the extent that a locally recognized court or tribunal would be likely to authorize removal, i.e. dominance, debris, interference, etc
Z8	Excessive, severe and intolerable damage to property to the extent that a locally recognized court or tribunal would be likely to authorize removal, i.e. severe structural damage to surfacing and buildings, etc
Good management: Trees that are likely to be removed within 10 years through responsible management of the tree population	
Z9	Severe damage and/or structural defects where a high risk of failure can be temporarily reduced by reasonable remedial care, i.e. cavities, decay, included bark, wounds, excessive imbalance, vulnerable to adverse weather conditions, etc
Z10	Poor condition or location with a low potential for recovery or improvement, i.e. dominated by adjacent trees or buildings, poor architectural framework, etc
Z11	Removal would benefit better adjacent trees, i.e. relieve physical interference, suppression, etc
Z12	Unacceptably expensive to retain, i.e. severe defects requiring excessive levels of maintenance, etc

NOTE: Z trees with a high risk of death/failure (Z4, Z5 & Z6) or causing severe inconvenience (Z7 & Z8) at the time of assessment and need an urgent risk assessment can be designated as ZZ. ZZ trees are likely to be unsuitable for retention and at the bottom of the categorization hierarchy. In contrast, although Z trees are not worthy of influencing new designs, urgent removal is not essential and they could be retained in the short term, if appropriate.

Category A: Important trees suitable for retention for more than 10 years and worthy of being a material constraint

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

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

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

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Glossary of Terms

Abiotic - Pertaining to non-living agents; e.g. environmental factors

Adventitious shoots - Shoots that develop other than from apical, axillary or dormant buds; see also 'epicormic'

Anchorage - The system whereby a tree is fixed within the soil, involving cohesion between roots and soil and the development of a branched system of roots which withstands wind and gravitational forces transmitted from the aerial parts of the tree

Bark - A term usually applied to all the tissues of a woody plant lying outside the vascular cambium, thus including the phloem, cortex and periderm; occasionally applied only to the periderm or the phellem

Branch:
• **Primary**. A first order branch arising from a stem
• **Lateral**. A second order branch, subordinate to a primary branch or stem and bearing sub-lateral branches
• **Sub-lateral**. A third order branch, subordinate to a lateral or primary branch, or stem and usually bearing only twigs

Branch collar - A visible swelling formed at the base of a branch whose diameter growth has been disproportionately slow compared to that of the parent stem; a term sometimes applied also to the pattern of growth of the cells of the parent stem around the branch base

Brown-rot - A type of wood decay in which cellulose is degraded, while lignin is only modified

Buckling - An irreversible deformation of a structure subjected to a bending load

Buttress zone - The region at the base of a tree where the major lateral roots join the stem, with buttress-like formations on the upper side of the junctions

Cambium - Layer of dividing cells producing xylem (woody) tissue internally and phloem (bark) tissue externally

Canker - A persistent lesion formed by the death of bark and cambium due to colonisation by fungi or bacteria

Compartmentalisation - The confinement of disease, decay or other dysfunction within an anatomically discrete region of plant tissue, due to passive and/or active defences operating at the boundaries of the affected region

Compressive loading - Mechanical loading which exerts a positive pressure; the opposite to tensile loading

Condition - An indication of the physiological condition of the tree. Where the term ‘condition’ is used in a report, it should not be taken as an indication of the stability of the tree

Crown/Canopy - The main foliage bearing section of the tree

Crown lifting - The removal of limbs and small branches to a specified height above ground level

Crown thinning - The removal of a proportion of secondary branch growth throughout the crown to produce an even density of foliage around a well-balanced branch structure

Crown reduction/shaping - A specified reduction in crown size whilst preserving, as far as possible, the natural tree shape

DAB (Diameter Above Buttress) - Trunk diameter measured above the root buttress

Defect - In relation to tree hazards, any feature of a tree which detracts from the uniform distribution of mechanical stress, or which makes the tree mechanically unsuited to its environment

Dieback - The death of parts of a woody plant, starting at shoot-tips or root-tips

Disease - A malfunction in or destruction of tissues within a living organism, usually excluding mechanical damage; in trees, usually caused by pathogenic micro-organisms

Dominance - In trees, the tendency for a leading shoot to grow faster or more vigorously than the lateral shoots; also the tendency of a tree to maintain a taller crown than its neighbours

Dormant bud - An axial bud which does not develop into a shoot until after the formation of two or more annual wood increments; many such buds persist through the life of a tree and develop only if stimulated to do so

Dysfunction - In woody tissues, the loss of physiological function, especially water conduction, in sapwood

DBH (Diameter at Breast Height) - Stem diameter measured at a height of 1.4 metres or the nearest measurable point. Where measurement at a height of 1.4 metres is not possible, another height may be specified

Deadwood - Branch or stem wood bearing no live tissues. Retention of deadwood provides valuable habitat for a wide range of species and seldom represents a threat to the health of the tree. Removal of deadwood can result in the ingress of decay to otherwise sound tissues and climbing operations to access deadwood can cause significant damage to a tree. Removal of deadwood is generally recommended only where it represents an unacceptable level of hazard

Epicormic shoot - A shoot having developed from a dormant or adventitious bud and not having developed from a first year shoot

Flush-cut - A pruning cut which removes part of the branch bark ridge and or branch-collar

Girdling root - A root which circles and constricts the stem or roots possibly causing death of phloem and/or cambial tissue

Habit - The overall growth characteristics, shape of the tree and branch structure

Hazard beam - An upwardly curved part of a tree in which strong internal stresses may occur without being reduced by adaptive growth; prone to longitudinal splitting

Incorporating extracts from Lonsdale, D. 1999. Principles of Tree Hazard Assessment. Her Majesty's Stationary Office, London

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Heartwood/false-heartwood - The dead central wood that has become dysfunctional as part of the aging processes and being distinct from the sapwood

Heave - A term mainly applicable to a shrinkable clay soil which expands due to re-wetting after the felling of a tree which was previously extracting moisture from the deeper layers; also the lifting of pavements and other structures by root diameter expansion; also the lifting of one side of a wind-rocked root-plate

Included bark (ingrown bark) - Bark of adjacent parts of a tree (usually forks, acutely joined branches or basal flutes) which is in face-to-face contact

Lever arm - A mechanical term denoting the length of the lever represented by a structure that is free to move at one end, such as a tree or an individual branch

Lignin - The hard, cement-like constituent of wood cells; deposition of lignin within the matrix of cellulose microfibrils in the cell wall is termed Lignification

Lions tailing - A term applied to a branch of a tree that has few if any side-branches except at its end, and is thus liable to snap due to end- loading

Loading - A mechanical term describing the force acting on a structure from a particular source; e.g. the weight of the structure itself or wind pressure

Mycelium - The body of a fungus, consisting of branched filaments (hyphae)

Occlusion - The process whereby a wound is progressively closed by the formation of new wood and bark around it

Pathogen - A micro-organism which causes disease in another organism

Photosynthesis - The process whereby plants use light energy to split hydrogen from water molecules, and combine it with carbon dioxide to form the molecular building blocks for synthesizing carbohydrates and other biochemical products

Probability - A statistical measure of the likelihood that a particular event might occur

Pruning - The removal or cutting back of twigs or branches, sometimes applied to twigs or small branches only, but often used to describe most activities involving the cutting of trees or shrubs

Radial - In the plane or direction of the radius of a circular object such as a tree stem

Reactive Growth/Reaction Wood - Production of woody tissue in response to altered mechanical loading; often in response to internal defect or decay and associated strength loss (cf. adaptive growth)

Ring-barking - The removal of a ring of bark and phloem around the circumference of a stem or branch, normally resulting in an inability to transport photosynthetic assimilates below the area of damage. Almost inevitably results in the eventual death of the affected stem or branch above the damage

Root-collar - The transitional area between the stem/s and roots

Sapwood - Living xylem tissues

Soft-rot - A kind of wood decay in which a fungus degrades cellulose within the cell walls, without any general degradation of the wall as a whole

Stem/s - Principle above-ground structural component(s) of a tree that supports its branches

Stress - In plant physiology, a condition under which one or more physiological functions are not operating within their optimum range, for example due to lack of water, inadequate nutrition or extremes of temperature

SRZ (Structural Root Zone) - The area around the base of the tree required for the trees stability in the ground

Subsidence - In relation to soil or structures resting in or on soil, a sinking due to shrinkage when certain types of clay soil dry out, sometimes due to extraction of moisture by tree roots

Taper - In stems and branches, the degree of change in girth along a given length

Targets - In tree risk assessment (with slight misuse of normal meaning) persons or property or other things of value which might be harmed by mechanical failure of the tree or by objects falling from it

Topping - In arboriculture, the removal of the crown of a tree, or of a major proportion of it

Transpiration - The evaporation of moisture from the surface of a plant, especially via the stomata of leaves; it exerts a suction which draws water up from the roots and through the intervening xylem cells

TPZ (Tree Protection Zone) - A specified area above and below ground and at a given distance from the trunk set aside for the protection of a tree's roots and crown to provide for the viability and stability of a tree to be retained where it is potentially subject to damage by development

Understory - This layer consists of younger individuals of the dominant trees, together with smaller trees and shrubs which are adapted to grow under lower light conditions

Veteran tree - Tree that, by recognised criteria, shows features of biological, cultural or aesthetic value that are characteristic of, but not exclusive to, individuals surviving beyond the typical age range for the species concerned. These characteristics might typically include a large girth, signs of crown retrenchment and hollowing of the stem

Vigour - The expression of carbohydrate expenditure to growth (in trees)

White-rot - A range of kinds of wood decay in which lignin, usually together with cellulose and other wood constituents, is degraded

Wind exposure - The degree to which a tree or other object is exposed to wind, both in terms of duration and velocity

Wind pressure - The force exerted by a wind on a particular object

Windthrow - The blowing over of a tree at its roots

Incorporating extracts from Lonsdale, D. 1999. Principles of Tree Hazard Assessment. Her Majesty's Stationary Office, London

Appendix B – Urban Arbor Curriculum Vitae

Curriculum Vitae - Bryce Claassens - Consulting Arborist
Urban Arbor Pty Ltd

Address: Urban Arbor Pty Ltd, Unit 12/36 Leighton Place, Hornsby, NSW
Contact:

Arboricultural and Horticultural Qualifications

- Diploma of Arboriculture (AQF5)
- Cert III Horticulture - Landscape (AQF3)
- Registered Quantified Tree Risk Assessment assessor (QTRA)

Professional Memberships

- General Membership of Arboriculture Australia (AA)

Experience

Bryce brings ten (10) years of experience in Arboriculture and Horticulture. His career has varied experience in both landscape construction/horticulture and arboricultural consulting.
Bryce is a Consulting Arborist for Urban Arbor Pty Ltd. Urban Arbor is a consultancy company that specifically deals with tree management with no practical tree work being offered. Bryce has managed sites and provided expert reports on various projects, from single trees through to large sites with over 600 trees.
Bryce has experience delivering arboricultural management and recommendations throughout the Sydney region.
Bryce's current role includes the following;
- Report writing including preliminary reports, development impact assessments, risk assessment and tree protection during development.
- Developing and implementing tree management programs
- Risk assessments using the QTRA method
- Project Arborist work
- Diagnostic procedures for determination of various tree related issues
- Consultancy work both verbal and written format

Arboricultural and Horticultural Employment History

- 2017 to Present: Consulting Arborist at Urban Arbor Pty Ltd, Sydney, NSW
- 2015 to 2017: Landscape Construction Tradesman/Stonemason at Collaroy Stoneworks, Sydney, NSW
- 2008 to 2015: Landscape Construction Apprentice-Tradesman at All Landscape Services, Sydney, NSW

Recent Project Works Undertaken

Preparing Arboricultural Impact Assessment reports for large projects, such as the new private hospital in Terrey Hills and various public schools for the Department of Education and Training school beautification project, including providing significant tree sensitive solutions of developments within public schools across Sydney.
Project Arborist on large developments including Royal Far West in Manly and

Macquarie University. Bryce has worked as a project Arborist for many first tier construction companies, such as Richard Crookes, Liang O'Rourke, PDS Group and FDC Construction.
Delivering Arboricultural Impact Assessments and Project Arborist works for private developers within Councils including Ku Ring Gai Council, Hornsby Council, The Hills Shire, Holroyd Council, Inner West Council, Manly Council, Warringah Council, Pittwater Council, North Sydney Council, Mosman Council, Hunters Hill Council, Lane Cove Council, Parramatta Council, Ryde Council, Blacktown Council, Woollahra Council, Waverley Council, Sutherland Council, and Hawkesbury Council.

Appendix C – Compliance Matrix

Table 1 lists the Section of this report that demonstrate compliance with CoA – E5.

Details	**Compliance**
The Proponent must commission an independent experienced and suitably qualified arborist, to prepare a comprehensive Tree Report(s) before removing any trees as detailed in the documents listed in Condition A1. The Tree Report may be prepared for the entire CSSI or separate reports may be prepared for individual areas where trees are required to be removed. The report(s) must identify the impacts of the CSSI on trees and vegetation within and adjacent to the Construction footprint.	Section 2 of Appendix A. Bryce Claassens, consulting arborist from Urban Arbor was engaged to assess trees.
The report(s) must include:	
(a) a description of the conditions of the tree(s) and its amenity and visual value;	Appendix A
(b) consideration of all options to avoid tree removal, including relocation of services, redesign or relocation of ancillary components (such as substations, fencing etc.) and reduction of standard offsets to underground services; and	Section 4, Appendix A
(c) measures to avoid the removal of trees or minimise damage to existing trees and ensure the health and stability of those trees to be protected. This includes details of any proposed canopy or root pruning, root protection zone, excavation, site controls on waste disposal, vehicular access, storage of materials and protection of public utilities.	Appendix A
A copy of the report(s) must be submitted to the Planning Secretary before the removal or pruning of any trees, including those affected by site establishment Work. All recommendations of the report must be implemented by the Proponent, unless otherwise agreed by the Planning Secretary.	Section 5