Tree Impact Assessment Report

City and Southwest Metro Station Upgrade Works Package 5 & 6

Project wide: Hurlstone Park, Wiley Park, Belmore, Campsie, Dulwich Hill and Punchbowl

Contract: Package 5: 00013/11766

P5 Document No. SMCSWSW5-DEW-WEC-EM-REP-000542

P6 Document No. SMCSWSW6-DEW-WEC-EM-REP-000632

Document Preparation and Control	
Holly Hofland – Environment & Sustainability Advisor Owen Tebbutt – Consulting Arborist Colin Curtis – Consulting Arborist Marc Fisher – Consulting Arborist Iain Dunsmuir – Consulting Arborist	
Document Approval	**Signature**
Amy Williams – Environment and Sustainability Manager	

Project Document Code	Latest Version Number	Latest Version Date
E5TR001R0	Rev 0	12/03/2021
E5TR001R1	Rev 1	18/03/2021
E5TR001R2	Rev 2	31/03/2021
E5TR001R3	Rev 3	05/05/2021
E5TR001R4	Rev 4	13/05/2021
E5TR001R5	Rev 5	04/06/2021
E5TR001R6	Rev 6	15/06/2021
E5TR001R7	Rev 7	03/08/2021

Project Document Code	Latest Version Number	Latest Version Date
E5TR001R8	Rev 8	06/10/2021
E5TR001R9	Rev 9	22/12/2021
E5TR001R10	Rev 10	27/01/2022
E5TR001R11	Rev 11	29/05/2022
E5TR001R12	Rev 12	14/06/2022
E5TR001R13	Rev 13	30/06/2022
E5TR001R14	Rev 14	1/11/2022
E5TR001R15	Rev 15	6/03/2022

Document Version History			
Version No.	**Date**	**Document Status**	**Brief Description of Change(s) from Previous Version**
Rev 0	12/03/2021	Endorsed	N/A – INITIAL DRAFT REPORT
Rev 1	18/03/2021	Endorsed	Address Sydney Metro comments
Rev 2	31/03/2021	Endorsed	Incorporate additional stations scopes
Rev 3	05/05/2021	Endorsed	Address Sydney Metro and ER comments
Rev 4	13/05/2021	Endorsed	Incorporate additional stations scopes
Rev 5	04/06/2021	Endorsed	Incorporate additional stations scopes
Rev 6	15/06/2021	Endorsed	Incorporate additional stations scopes
Rev 7	03/08/2021	Endorsed	Incorporate additional stations scopes
Rev 8	06/10/2021	Endorsed	Incorporate additional stations scopes
Rev 9	22/12/2021	Endorsed	Incorporate additional stations scopes
Rev 10	27/01/2022	Endorsed	Incorporate additional stations scopes
Rev 11	29/05/2022	Endorsed	Incorporate additional stations scopes
Rev 12	14/06/2022	Endorsed	Incorporate additional stations scopes
Rev 13	30/06/2022	Endorsed	Incorporate additional stations scopes

Rev 14	1/11/2022	Endorsed	Incorporate additional stations scopes
Rev 15	6/03/2023	Endorsed	Incorporate additional stations scopes

TABLE OF CONTENTS

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 Package 5 and Package 6 works.
The report has been written in accordance with the requirements of the *Sydney Metro City & Southwest - Sydenham to Bankstown Tree Management Strategy* and *Sydney Metro City & Southwest - Sydenham to Bankstown - Instrument of Approval*, Condition of Approval E5.

2 PROJECT OVERVIEW AND LOCATION

The Sydney Metro City & Southwest project includes a new 30km metro line extending metro rail from the end of the Metro North West Line at Chatswood, under Sydney Harbour, through new Central Business District stations and southwest to Bankstown. It is due to open in 2024 with the ultimate capacity to run a metro train every two minutes each way through the centre of Sydney. Sydney Metro City & Southwest comprises two core components – the Chatswood to Sydenham project, and the Sydenham to Bankstown upgrade. This document refers to the Sydenham to Bankstown upgrade (herein referred to as the Southwest Metro (SWM) Project).

The SWM Project was declared to be State Significant Infrastructure (SSI) and Critical State Significant Infrastructure (CSSI) by a Ministerial order on 10 December 2015 under Section 5.12 (4) and 5.13 of the *Environmental Planning and Assessment Act 1979* (EP&A Act) (previously referred to as sections 115U(4) and 115V prior to amendment of the EP&A Act). An Environmental Impact Statement (EIS) (GHD/AECOM September 2017) was prepared and placed on public exhibition from 13 September 2017 to 8 November 2017. A Submissions and Preferred Infrastructure Report (SPIR) (GHD/AECOM June 2018) was prepared in response to the submissions received during the EIS exhibition period. The SPIR was placed on public exhibition from 20 June 2018 to 18 July 2018. A Submissions Report was then prepared by Sydney Metro (September 2018) in response to submissions received during the SPIR exhibition period. The project was approved by the Minister for Planning on 12 December 2018 (Planning Approval number SSI-8256).

A modification report for the SWM Project was prepared by Sydney Metro (May 2020) and placed on public exhibition from 21 May 2020 to 4 June 2020. A Submissions Report was prepared by Sydney Metro (September 2020) in response to the submissions received during the modification report exhibition period. The SWM Project Modification was determined by the Minister for Planning on 22 October 2020.

This document refers to the Southwest Metro Package 5 and Package 6 station upgrade works comprising of – Dulwich Hill, Campsie and Punchbowl Station (package 5) and Belmore, Hurlstone Park and Wiley Park (package 6) (the Project). Below is a description of the Construction scope for the Project:

Dulwich Hill Station

- Construction of new covered station concourse bridge from Bedford Crescent and Light Rail entry to Ewart Lane with connection to platforms;
- Refurbishment and reuse of overhead booking office;
- Refurbishment and reuse existing platform building;

- Provision of new safety rail to Wardell Road bridge adjacent to booking office;
- Construction of new landscaped public plaza incorporating lighting, seating and access to station entries;
- Construction of new platform building;
- Construction of new shared path linking Wardell Road and Ewart Lane;
- Construction of new stairs to Ewart Lane car park;
- Provision of accessible access to the pedestrian crossing at Wardell Road;
- Provision of new bicycle parking hoops;
- Construction of new service building and associated infrastructure;
- Platform works, including raising platform and provision of platform drainage. Installation of 1500mm deep tile zone, temporary tactiles and yellow safety line;
- Platform works also includes provision for platform edge screens (PES), platform screen doors (PSD) and mechanical gap fillers (MGF) (to be installed by others);
- Provision of new pedestrian lighting between Bedford Crescent and Keith Lane;
- Provision of new shelter and seat for kiss and ride on Bedford Crescent;
- Landscaping to the south of the station;
- Dudley Street bus interchange area works;
- Provision of new vertical protection screens to both sides of existing Wardell Road bridge;
- Provision of 2 new lifts and associated infrastructure, landings and canopies to lift entries;
- Installation of new security and segregation fencing;
- Construction of new Combined Services Route (CSR); and
- Services relocations / enabling works.

Campsie Station

- Refurbishment and reuse of heritage platform buildings;
- Construction of secured bike locker;
- Construction of new canopy over the concourse;
- Platform works, including raising platform and provision of platform drainage. Installation of 1500mm deep tile zone, temporary tactiles and yellow safety line;
- Platform works also includes provision for PES, PSD and MGF (to be installed by others);
- Replace open fencing on Beamish Street and renew existing planters;
- Installation of 16 x bike racks off North Parade in existing car park;
- Construction of new services building and associated infrastructure;
- Replacement of planter beds to corners of Beamish Street;
- Construction of new kiss and ride on South Parade;
- Installation of new security and segregation fencing;
- Construction of new CSR; and
- Services relocations / enabling works.

Punchbowl Station

- Repurpose and refurbishment of station rooms in Platform buildings 1 and 2;
- Provision of three new lifts and associated infrastructure, landings and canopies to lift entries and platform;
- Installation of new canopy over existing stair at Northern entry;
- Installation of new roof above the concourse bridge, Southern entry and platform stairs.

- Removal of hooped top fencing to station concourse overbridge and platform stairs and replaced with compliant glass screens and stair balustrades;
- Installation of new handrails;
- Removal of existing southern stairs, installation of new concrete slab at concourse level and new stairs further south;
- Platform works, including raising platform and provide platform drainage. Installation of 1500mm deep tile zone, temporary tactiles and yellow safety line. Provision of egress ramps off platform as required by fire life safety strategy;
- Platform works also includes provision for PES, PSD and MGF to be installed by others;
- Installation of new bike parking hoops off The Boulevarde and adjacent to the Northern entry;
- Installation of bollards to the edge of the carpark and extension to new paving to lift landing and edge of carpark;
- Landscaping to western end of Southern entry behind the retail properties;
- Mass planting to existing garden beds adjacent to Northern entry and replace timber logs;
- Upgrade to existing pedestrian pathway under Punchbowl Road, including handrail and fencing;
- Upgrade to existing lighting;
- Paint finish to wall and soffit and provision for CCTV;
- Landscaping and new lighting to Northern entry;
- Provision for pop-up retail in the park adjacent the Northern entry.
- Provision of kiss and ride on The Boulevarde;
- Construction of new service building, associated infrastructure and landscaping;
- Installation of new security fencing;
- Construction of retaining walls;
- Construction of new CSR; and
- Services relocations / enabling works.

Hurlstone Park Station

- Refurbishment and re-use of existing overhead booking office with new cladding and new canopy roof;
- Installation of bike parking hoops;
- Provision of new kiss and ride and taxi parking on Floss Street;
- New accessible carpark space at Duntroon Street;
- Construction of new service building
- Landscaped embankment treatment with new planting;
- Regrade platforms as per Metro requirements, including drainage and provision for platform screen doors, platform edge screens and mechanical gap fillers to Platform 1 and 2
- Refurbishment and re-use existing platform buildings;
- Extension of existing concourse and provision of new lifts and stairs, including canopies;
- Repair and repainting of existing fencing on corner of Duntroon Street and Crinan Street;
- Installation of new paving and provision of an extended kerb ramp on Duntroon Street;
- Installation of new vertical protection (anti-throw) screens to both sides of Duntroon Street overbridge; and

- Installation of new security and segregation fencing; and
- Construction of a new Combined Services Route.

Belmore Station

- Raise platform edges, regrade platform as required, provide platform drainage and emergency egress ramps from platforms to rail corridors as required;
- Provision for platform edge screens, platform screen doors and mechanical gap fillers
- Construction of new services building with associated landscaping;
- Replace existing seats and bins;
- Refurbish and reuse platform building;
- Provide associated passenger information displays;
- New vertical protection (anti-throw) screens to Burwood road bridge;
- New landscape works to the north and south of the station entrance, including landscaping, paving and relocation of existing bike parking and new bike parking;
- New shelter and seat to kiss and ride. New kiss and ride and taxi parking on Tobruk Avenue;
- New line marking to accessible parking within the station carpark off Tobruk Avenue;
- Installation of new security fencing;
- Construction of new Combined Services Route.

Wiley Park Station

- Provision of new accessible parking, kiss and ride and taxi spaces on The Boulevarde;
- Refurbishment and reuse of heritage overhead booking office;
- The existing station platforms would be removed, excavated and replaced within a like-for like concrete slab platform;
- Installation of new lifts and retaining walls;
- Refurbishment and reuse of heritage platform buildings;
- Construction of new services building including retaining wall construction;
- Construction of new concrete swale;
- Construction of new platform building and canopy;
- Installation of new public plaza, including paving, planters and bicycle parking;
- Installation of lighting to shared path between King Georges Road and Urunga Parade;
- Installation of errant vehicle bollards at King Georges Road and The Boulevarde intersection;
- Reinstatement of original station kiosk;
- New vertical protection screens to existing King Georges Road bridge;
- Installation of new security fencing; and
- Construction of new Combined Services Route.

An illustrative and aerial overview of each station scope is depicted below:

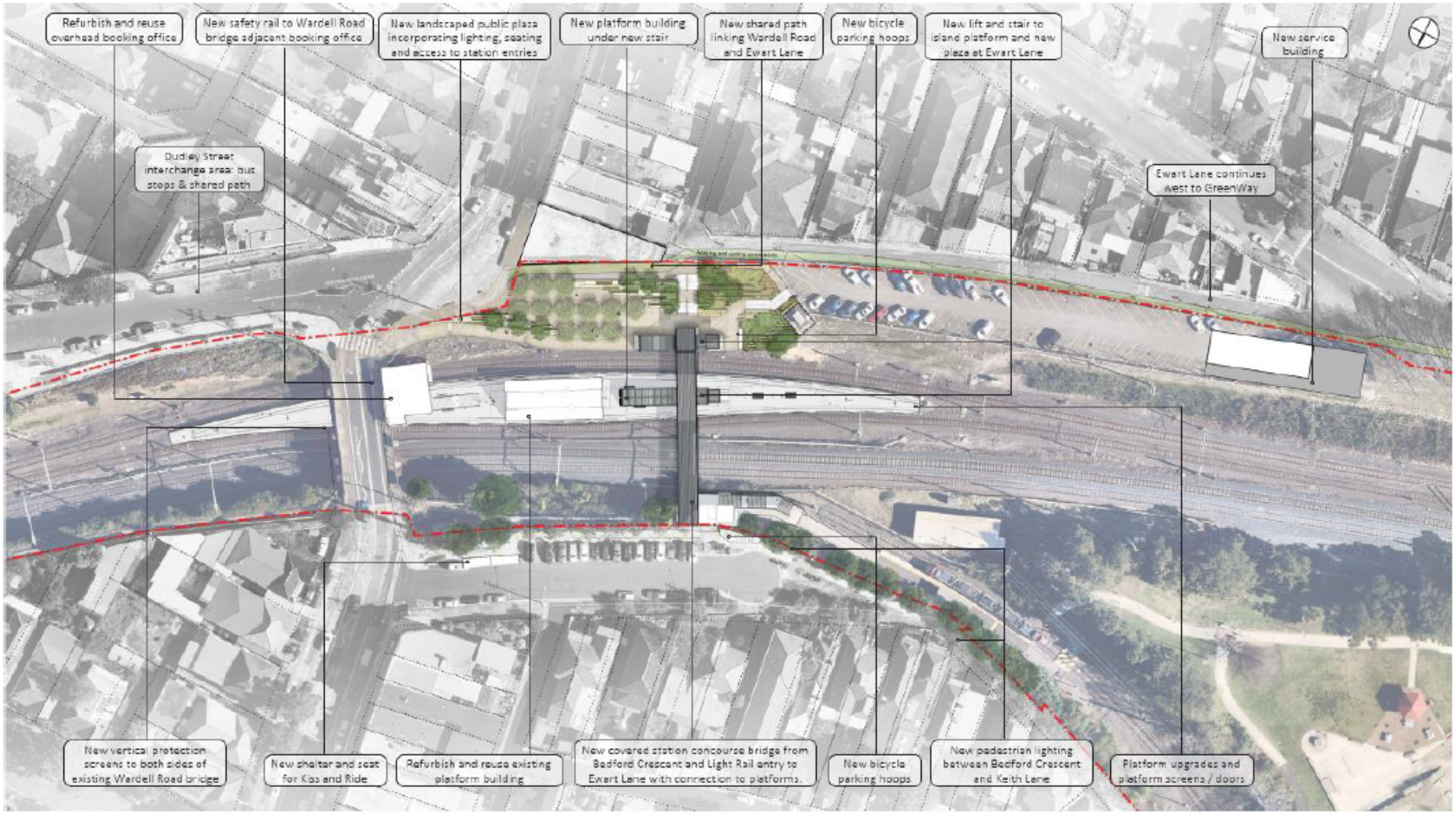


Figure 1 Sydney Metro Dulwich Hill Station upgrades

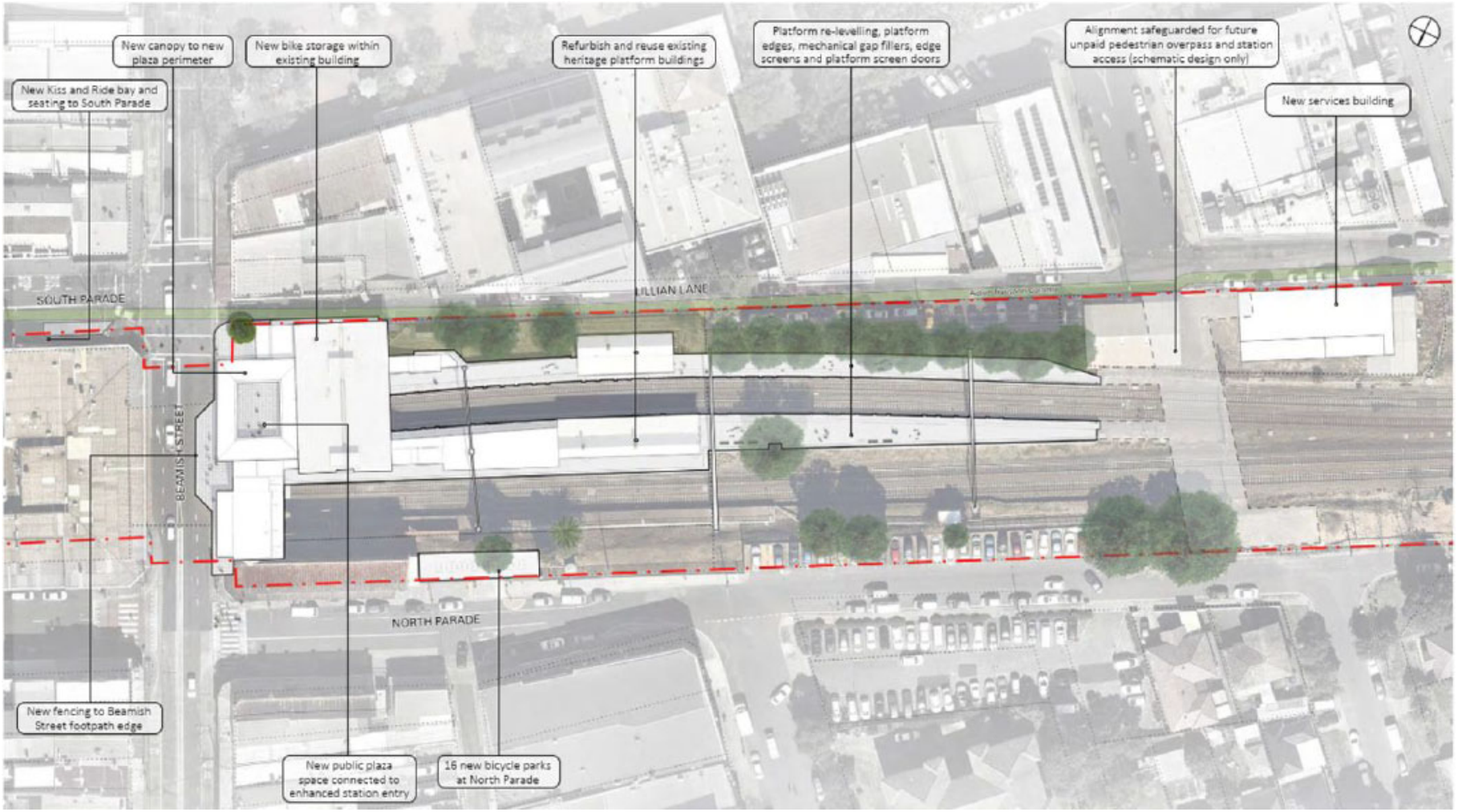


Figure 2 Sydney Metro Campsie Station upgrades

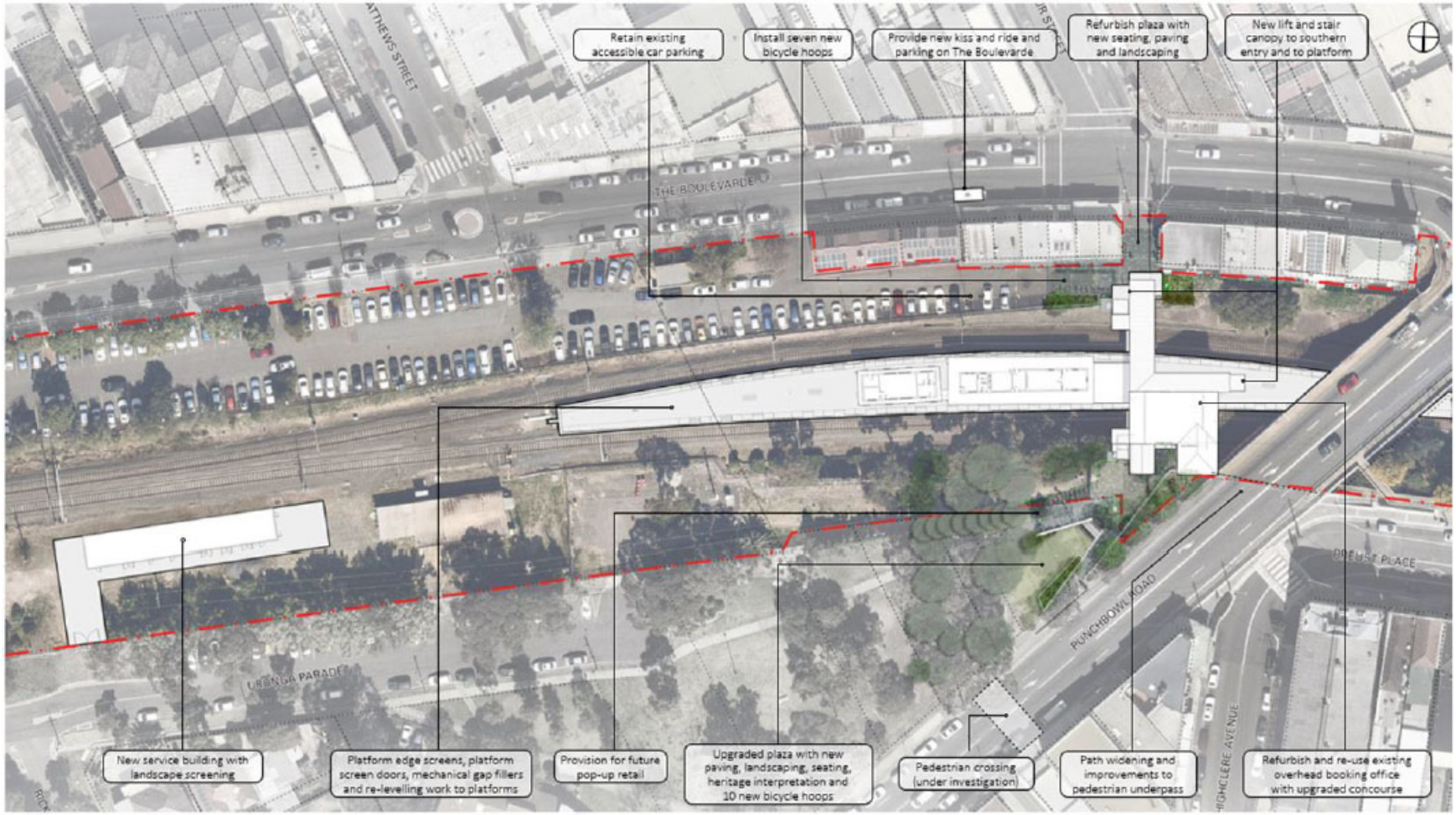


Figure 3 Sydney Metro Punchbowl Station upgrades

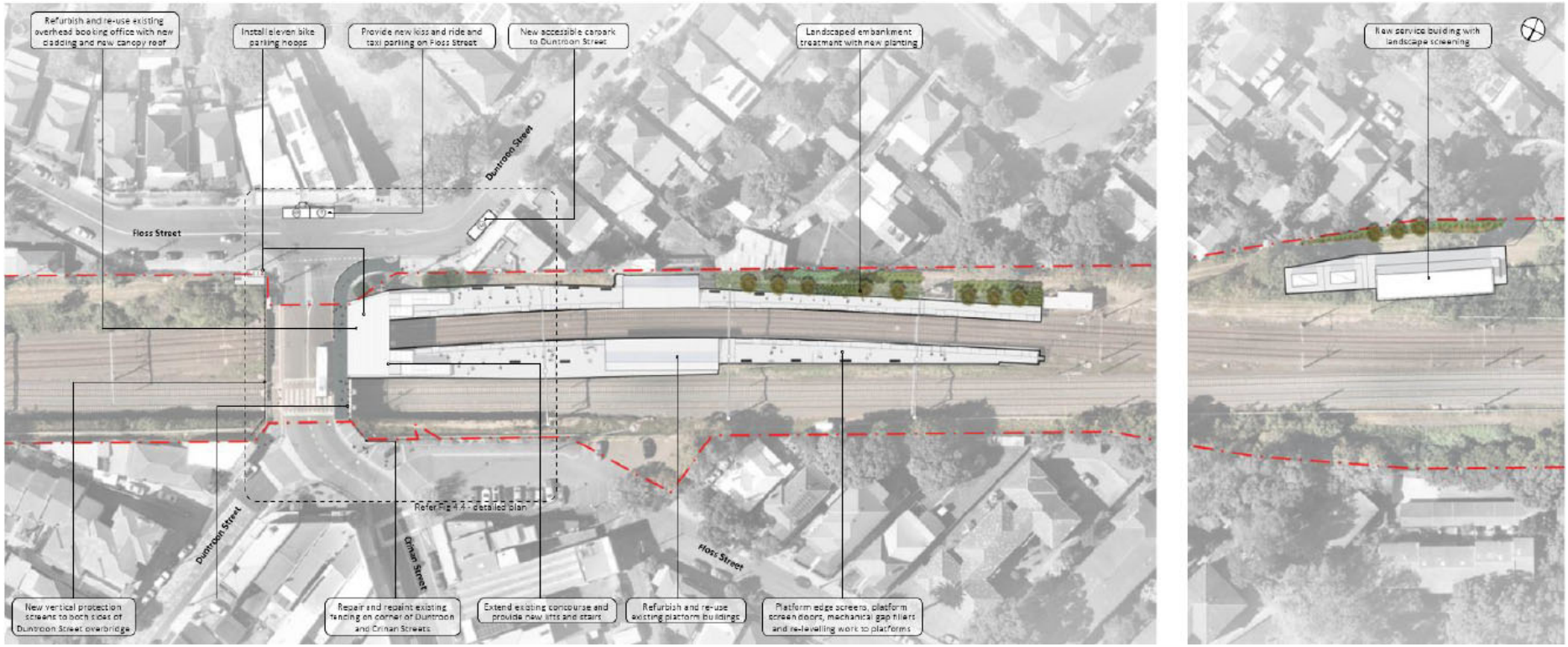


Figure 4 Sydney Metro Hurlstone Park Station upgrades

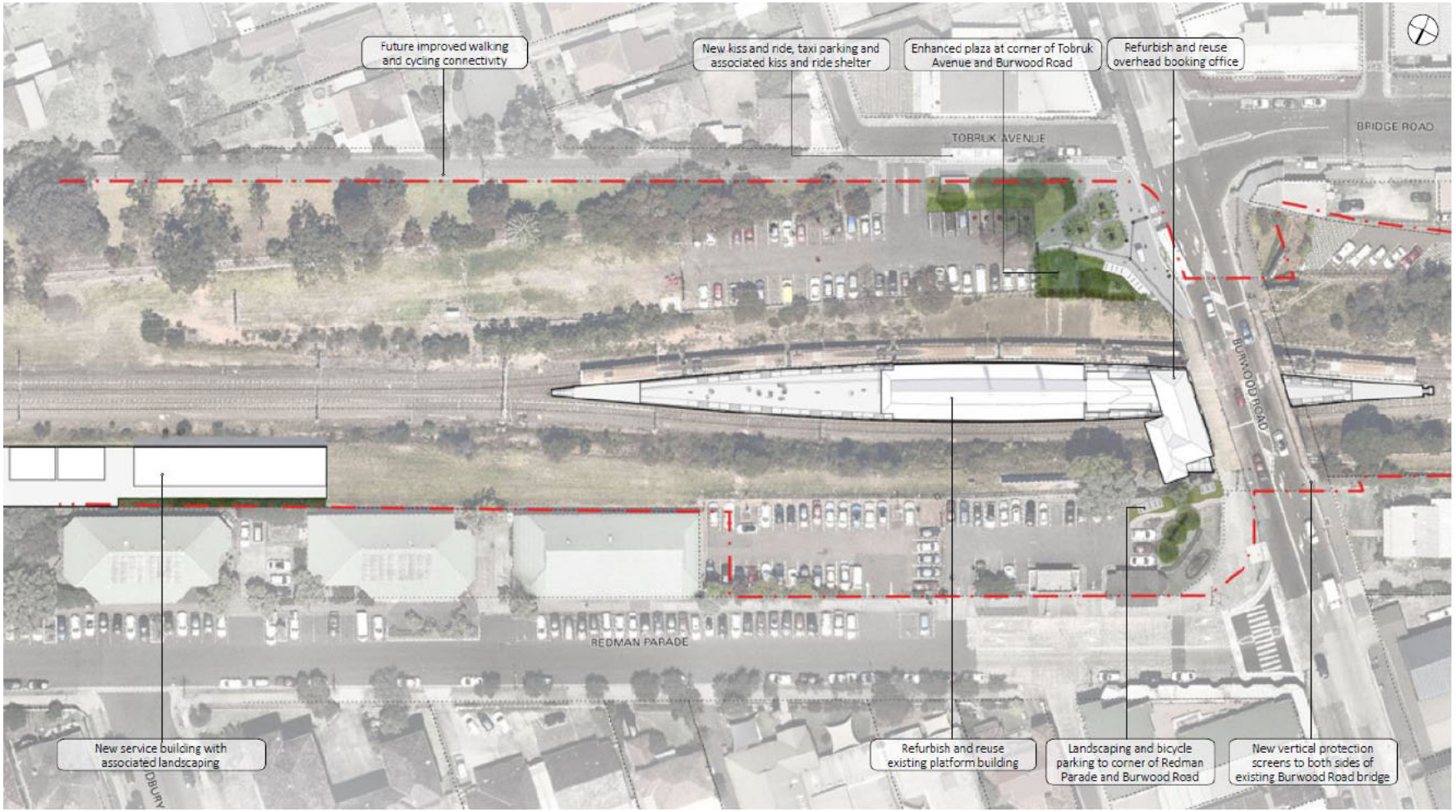


Figure 5 Sydney Metro Belmore Station upgrades

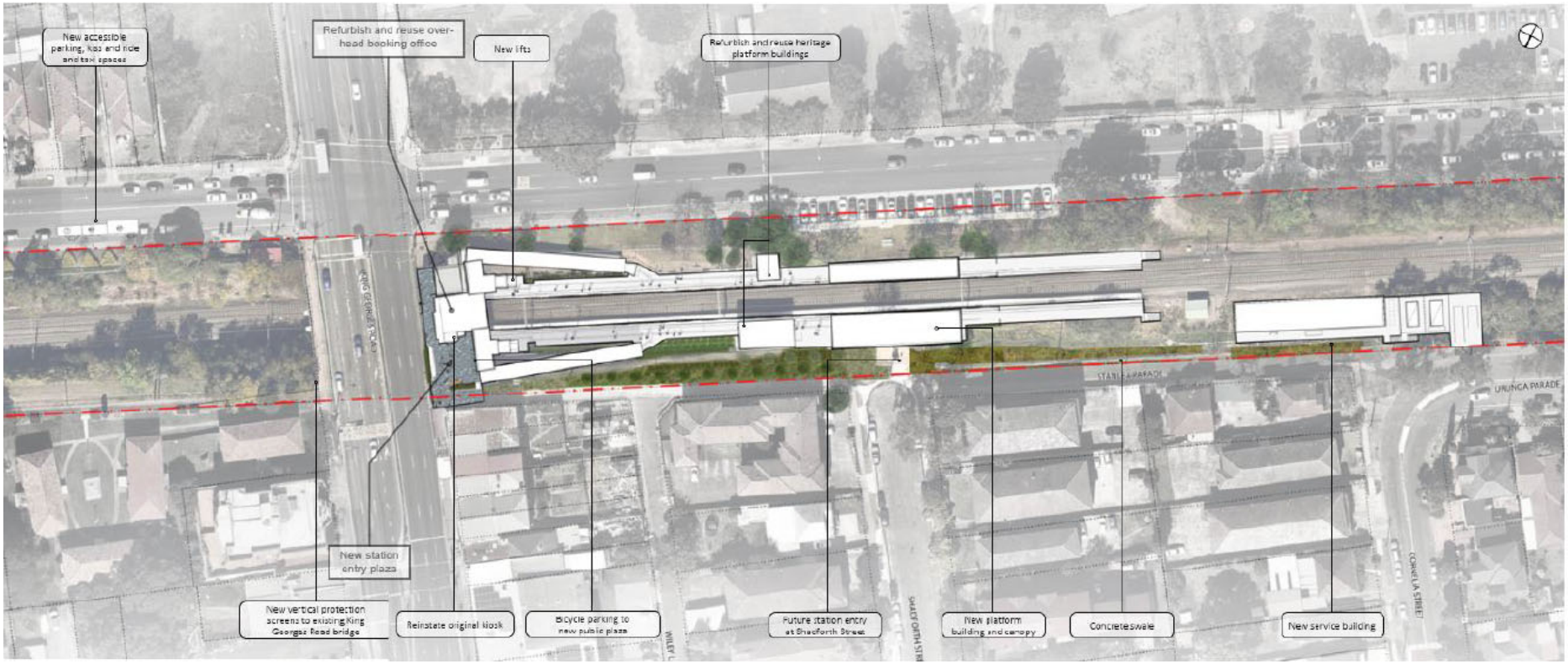


Figure 6 Sydney Metro Wiley Park Station upgrades

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 Chatswood to Sydenham 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 regard 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 impact area. Downy Wattle (Acacia pubescens) was recorded near Punchbowl Station (not within 20m of the work zone). The Downy Wattle will not be impacted or 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."

As part of the EIS, GHD produced a report to support the EIS Biodiversity Impact assessments, GHD's report: *Sydney Metro: Sydenham to Bankstown tree count dated 21 August 2017* considered the numbers of trees within each station precinct and in the rail corridor between each station. The below summarises the tree count within the station precincts:

Figure 7: tree count within the stations:
Note: only Dulwich Hill, Wiley Park, Hurlstone Park, Campsie, Punchbowl and Belmore are applicable.

Station	Native			Exotic			Total
	Small	Medium	Large	Small	Medium	Large	
Marrickville	9	46	9	8	13	3	**88**
Dulwich Hill	10	3	-	1	4	1	**19**
Hurlstone Park	8	10	-	9	14	2	**43**
Canterbury	30	13	-	2	4	7	**56**
Campsie	17	16	2	2	10	1	**48**
Belmore	44	45	16	12	8	5	**130**
Lakemba	35	26	6	3	16	2	**88**
Wiley Park	26	14	7	24	33	4	**108**
Punchbowl	17	51	14	15	35	5	**137**
Bankstown	1	77	19	44	33	2	**176**
Total	**197**	**301**	**73**	**120**	**170**	**32**	**893**

GHD further identified the tree count between the stations as per the below:

Figure 8: tree count between stations:
Note: only Dulwich Hill, Wiley Park, Hurlstone Park, Campsie, Punchbowl and Belmore are applicable.

Station	Native			Exotic			Total
	Small	Medium	Large	Small	Medium	Large	
East of Marrickville	41	60	5	1	2	2	**111**
Marrickville – Dulwich Hill	20	45	5	2	12	10	**94**
Dulwich Hill – Hurlstone Park	21	9	1	1	3	9	**44**
Hurlstone Park – Canterbury	30	41	24	68	45	11	**219**
Canterbury – Campsie	188	171	5	7	14	1	**386**
Campsie – Belmore	36	58	10	10	31	14	**159**
Belmore – Lakemba	20	67	10		7	1	**105**
Lakemba – Wiley Park	58	38	16		4	5	**121**
Wiley Park – Punchbowl	29	25	9	9	18	10	**100**
Punchbowl – Bankstown	134	94	18	9	3	1	**259**
West of Bankstown	47	40	18	9	10	4	**128**
Total	**624**	**648**	**121**	**116**	**149**	**68**	**1726**

The total numbers were assessed and during the SPIR consultation process, which further elaborated upon: 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. Furthermore, these areas represent the clearing to occur for corridor 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 of the different packages under which the project has been staged).
However, the SPIR does provide a summarised overview of the anticipated number of trees to be removed within each station precinct, as per Table 2.1 of Appendix B of the SPIR. This is extracted as below:

Figure 9: estimated number of trees to be removed per station:

Note: only Dulwich Hill, Wiley Park, Hurlstone Park, Campsie, Punchbowl and Belmore are applicable.

Station	Native trees	Exotic trees	Total trees
Marrickville	50	15	65
Dulwich Hill	11	2	13
Hurlstone Park	8	9	17
Canterbury	38	7	45
Campsie	28	6	34
Belmore	61	11	72
Lakemba	67	0	67
Wiley Park	22	41	63
Punchbowl	25	22	47
Bankstown	79	1	80

Note: The table presents the maximum number of trees around stations with the potential to be impacted during construction. The final numbers would be confirmed during detailed design. It does not include other trees along the corridor that may also need to be removed as part of general vegetation removal in the rail corridor (refer to Section 2.4.3).

Whilst the above nominates an anticipated number of trees per station, Appendix B of the SPIR Section 2.4.4 identifies *"The biodiversity assessment for the preferred project was undertaken based on the assumption that all vegetation within the rail corridor would need to be removed to construct the preferred project"* Based on this assessment whilst the above table is anticipated numbers within each station precinct, the SPIR acknowledges that the final number is not finite.

Further to this it should be acknowledged that the boundaries for each station precinct as assessed by GHD which created the follow on to the SPIR, does not align to the station project boundaries with respect the Stage 3 design package and the Metro Service Building footprints. As a result, the number of trees identified in the SPIR for the reduced volumes per station in **Figure 9** above does not consider a number of Metro Service Building Locations which sit within the "corridor" and not the precinct boundary as assessed by GHD.

On this understanding it is considered that for Package 5 and Package 6 the anticipated number of trees to be impacted as noted in **Figure 9** of this document (within the station precinct) shall be combined with the total anticipated within the corridor as per **Figure 8** of this document.

In accordance with the Project approvals CSSI 8256 the combination of the above shall demonstrate the total tree count for impact for the Project. Following confirmation of the total tree count for all stations and prior to operational handover Downer shall implement replacement planting for all trees not able to be replaced within the project boundary in consultation with council's in a ratio of 2:1, as per CoA E4.

Essentially this report shall present the number of trees impacted by the Project within the GHD assigned precinct boundary and those which sit within the "corridor". The total numbers for each area are less than those noted above in **Figure 8** and **Figure 9** of this document, demonstrating consistency to the CSSI 8256.

4 SITE INSPECTIONS

As part of the design development (by others) the Sydney Metro design contract (METRON T2N) commissioned Arboricultural Impact Assessment (AIA) for each station (Package 5 and Package 6) by Urban Arbor. Revision B & Revision C available to Downer are as follows:

Belmore: Belmore Station Arborist Report Revision B - SMCSWSWM-MTM-WBS-LA-REP-211000

Wiley Park: Wiley Park Station Arborist Report Revision B - SMCSWSWM-MTM-WWP-LA-REP-231000

Hurlstone Park: Hurlstone Park Station Arborist Report Revision C - SMCSWSWM-MTM-WHP-LA-REP-131000-C

Dulwich Hill: Dulwich Hill Station Arborist Report Revision B - SMCSWSWM-MTM-WDH-LA-REP-121000

Campsie: Campsie Station Arborist Report Revision D - SMCSWSWM-MTM-WCS-LA-REP-151000

Punchbowl: Punchbowl Station Arborist Report Revision C - SMCSWSWM-MTM-WPS-LA-REP-241000

The above AIA were based on site inspections conducted by Urban Arbor between 2019 and 2021 to identify the total number of trees to be impacted for the entire design scope of each station.

Downer has identified a number of omissions in the reports produced by Urban Arbor, notably the departure from the definition of a tree as per the planning approval: *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". The reports produced by Urban Arbor to facilitate the detailed design development have been based on "significant trees" as defined by Urban Arbor as trees greater than 5m in height" (refer to Section 2.1.1 of each report).

To satisfy the Planning Approval E5 Downer has subsequently engaged Consulting Arborist Owen Tebbutt of Plateau Trees to conduct a gap analysis for the total number of trees greater than 3m for the total design inclusive of those originally identified by Urban Arbor. The intent of this exercise is to conclusively satisfy the requirements of E5 for the latest iteration of Detailed Design and ensure all trees which meet the *Sydney Metro City & Southwest Sydenham to Bankstown* definition of a tree have been accounted within this report.

A copy of the latest available Urban Arbor AIA's is detailed within the appendices (Appendix 1,3,5,7, 9 and 11) of this document. To support the Urban Arbor reports, the updated reports by Consulting Arborist Owen Tebbutt & Colin Curtis of Plateau Trees can also be found in the appendices of this report (Appendix 2, 2.1,2.2, 4, 4.1, 4.2, 4.3, 6, 6.1, 6.2, 8, 8.1, 8.2, 10, 10.1, 10.2, 10.4, 12, 12.1, 12.2, 12.3,12.4, 12.5 & 12.6)

A combination of both reports per station demonstrates the total number of trees to be removed and trimmed for each station precinct and adjacent MSB.

5 INSPECTION RESULTS

As stated in the Urban Arbor reports and Plateau Trees reports vegetation has been inspected within a number of zones across the Projects. The below provides a summary of the trees and vegetation to be impacted as a result of each Project, within Package 5 and Packages 6 as a result of design alignment or construction areas. All trees and vegetation are consistent with the assessed mix of planted native and exotic species as detailed in the EIS and SPIR. No trees or species are considered as endangered or threatened ecological communities.

Detailed results can be found in the arborist reports per station within the appendices of this document.

Table 1: Vegetation impact per Project

Key:

- ***Trees to be cleared contributing to Total Impact (Column 5)***
- ***Trees to be pruned contributing to Total Impact (Column 5)***

Project	Number to be removed / trimmed assessed in Urban Arbor Revision A design package reports: refer to Section 9 of each report	Number to be removed / trimmed assessed in Urban Arbor Revision B & C of design package reports: refer to Section 9 of each report	Additional gap analysis assessed in Plateau Trees reports to be trimmed / removed: refer to Appendix 1 of each report.	Total impact (at date of this report) Total = all trees and vegetation, native and exotic.
Belmore	Document location in this report: **Superseded** 5 trees	Document location in this report: **Appendix 1** Revision B of the Urban Arbor arborist report identifies 8 trees for removal (5 additional trees not assessed for removal in revision A; tree 663, 667, 2267, 2268, 2268).	Document location in this report: **Appendix 2 & Appendix 2.1** **12** additional trees **4** trees to be pruned {Appendix 2} **2** trees (additional trees not assessed in the Urban Arbor	**24** trees **10** trees to be pruned (excluded from total tree count) Total vegetation to be impacted: 754 m2 (vegetation includes all trees and shrubs)

		1 Tree (657) identified within revision A of Urban Arbor report for removal is assessed within revision B for retention. 3 trees (663, 667 & 2267) have not been assessed for removal within the gap analysis completed by Plateau Trees. In total, **6** trees are required to be removed detailed within Revision B of the Urban Arbor Report and not accounted for within the Plateau tree report (658, 659, 660, 663, 667 & 2267).	report are required for removal and assessed in the Plateau Report for removal). **6** trees to be pruned {Appendix 2.1} **3** additional trees not assessed for removal 660, 665 and 666, in the Urban Arbor report are required for removal along with **1** additional trees detailed in Plateau Report {Appendix 2.2}	
Wiley Park	Document location in this report: **Superseded** 9 trees	Document location in this report: **Appendix 3** Revision B of the Urban Arbor arborist report identifies 44 trees for removal (35 additional trees not assessed for removal in revision A; tree 691, 693, 694, 707, 708, 3325, 3330, 3337, 3339, 3345, 689, 690, 3286, 3287, 3288, 3289, 3321, 3322,	Document location in this report: **Appendix 4, Appendix 4.1 & Appendix 4.2** **80** trees plus **1** tree to be pruned {Appendix 4.0} **7** additional trees not assessed for removal 689, 690, 691, 693,	**112** trees **1** tree to be pruned (excluded from total tree count) Total vegetation to be impacted: 1206m2 (vegetation includes all trees and shrubs)

		3323, 3324, 3326, 3327, 3328, 3329, 3331, 3332, 3333, 3334, 3335, 3336, 3338, 3340, 3341, 3342, 3343, 3344). 1 Tree (669) identified within revision A for removal is assessed within revision B for retention. In total, **8** trees are required to be removed detailed within Revision B of the Urban Arbor Report and not accounted for within the Plateau tree report.	694, 707 & 708 in the Urban Arbor report are required for removal along with **4** additional trees (Tree 1-4) detailed in Plateau Report {Appendix 4.1} **1** tree, tree 711 assessed in the Urban Arbor report is required for removal and detailed in Plateau Report – hasn't been reassessed, simply identified for removal). {Appendix 4.2} **12** trees (additional trees not assessed in the Urban Arbor report are required for removal and assessed in the Aura Tree Services Report for removal). {Appendix 4.3}	

Hurlstone Park	Document location in this report: **Superseded** 14 trees and one group, G3 comprising of 6 trees.	Document location in this report: **Appendix 5** Revision C of the Urban Arbor arborist report identifies 29 trees and one group, G3 comprising of 6 trees for removal (15 additional trees not assessed for removal in revision A; tree 194, 196, 198, 199, 183, 184, 185, 186, 189,190, 191, 192, 193, 195, 197, 200, 201, 202, 203, 204, 205). Revision C of the Urban Arbor arborist report identifies 3 trees not assessed for removal in revision A; tree 203, 204 & 205. In total **17** trees and one group, G3 comprising of **6** trees assessed within the Urban Arbor reports are not assessed for clearing by the Plateau Arborist reports and are required for removal.	Document location in this report: **Appendix 6 & Appendix 6.1** **56** trees plus (**3** additional trees not assessed for removal 194,198 & 199 in the Urban Arbor report are required for removal and detailed in Plateau Report). **6** trees to be pruned. {Appendix 6} **2** Additional trees not assessed for removal (Tree 1 & 2) in the Urban Arbor report are required for removal and detailed within the Plateau Report. **1** tree to be pruned. {Appendix 6.1} **1** tree to be pruned. {Appendix 6.2}	**84** trees **8** trees to be pruned (excluded from total tree count) Total vegetation to be impacted: 496m2 (vegetation includes all trees and shrubs)

Campsie	Document location in this report: **Superseded** 0 trees identified for clearing in Appendix 7.	Document location in this report: **Appendix 7** Revision C (Superseded) of the Urban Arbor arborist report identifies 6 trees not assessed for removal in revision A; tree 523, 524, 637, 638, 639 & 640. Trees 637, 638, 639 & 640 have not been assessed for removal within the gap analysis completed by Plateau Trees. In total, **4** trees are required to be removed detailed within Revision C of the Urban Arbor Report and not accounted for within the Plateau tree report (637, 638, 639 & 640). Revision D of the Urban Arbor arborist report identifies **1** tree not assessed for removal in revision C; tree 611.	Document location in this report: **Appendix 8, Appendix 8.1 & Appendix 8.2** **3** additional trees, trees not assessed for removal 523, 524 & 525 in the Urban Arbor report are required for removal and detailed within the Plateau report. {Appendix 8} **21** additional trees, trees not assessed for removal 515, 516, 517, 519, 615, 616, 620, 621, 622, 623, 624, 625, 626, 628, 629, 630, 631, 633, 634, 635 & 636 in the Urban Arbor report are required for removal and detailed within the Plateau Report. {Appendix 8.1} **6** additional trees, trees not assessed for removal 614, 627 & 632 in the Urban Arbor report are required for removal along with **3** additional trees (Tree 1-3) detailed in the Plateau Report.	**35** trees **1** tree to be pruned (excluded from total tree count) Total vegetation to be impacted: 1044 m2 (vegetation includes all trees and shrubs)

			{Appendix 8.2} 1 tree to be pruned. {Appendix 8.3}	
Dulwich Hill	Document location in this report: **Superseded** 9 trees	Document location in this report: **Appendix 9** Revision C of the Urban Arbor arborist report identifies 12 trees for removal (3 additional trees not assessed for removal in revision A; tree 93, 564, 565). 1 tree, tree 565 hasn't been assessed for removal within the gap analysis completed by Plateau Trees. In total, **10** trees are required to be removed detailed within Revision C of the Urban Arbor Report and not accounted for within the Plateau Arborist tree reports.	Document location in this report: **Appendix 10, Appendix 10.1, Appendix 10.2 & Appendix 10.4** **5** trees **1** tree to be relocated under IW endorsement was unable to be relocated and will be removed. {Appendix 10} **1** additional tree not assessed for removal 573 (Tree A Plateau Report) in the Urban Arbor report are required for removal along with **1** additional tree (Tree B) detailed in Plateau Report. {Appendix 10.1} **1** tree (additional tree assessed in the Urban Arbor report are required for removal and detailed in Plateau Report –	**23** trees Total vegetation to be impacted: 339m2 (vegetation includes all trees and shrubs)

			these have not been reassessed, simply identified for removal). {Appendix 10.2} **4** trees (additional trees not assessed in the Urban Arbor report are required for removal and assessed in the Active Green Services Report for removal). {Appendix 10.4}	
Punchbowl	Document location in this report: **Superseded** 4 trees	Document location in this report: **Appendix 11** Revision B of the Urban Arbor arborist report identifies 18 trees and one group, G15 comprising of 5 trees for removal (14 additional trees and one group not assessed for removal in revision A; tree 730, 731, G15, 3346, 3347, 3349, 3350, 3352, 3355, 3359, 3361, 3363, 3356, 3360, 3365). All trees identified within revision B of the Urban Arbor	Document location in this report: **Appendix 12, Appendix 12.1, Appendix 12.2, Appendix 12.3 & Appendix 12.4** **2** trees (additional trees not assessed for removal 729 and 730 in Urban Arbor report are required for removal and detailed in Plateau Report – these have not been reassessed, simply identified for removal with data reflected in Urban Arbor reports) {Appendix 12}	**36** trees 1 tree to be pruned (excluded from total tree count) Total vegetation to be impacted: 1388 m2 (vegetation includes all trees and shrubs)

		arborist report have been identified for removal within the existing Plateau reports. 1 Tree (733) identified within revision B for removal is assessed within revision C for retention. In total, **3** trees are required to be removed detailed within Revision C of the Urban Arbor Report and not accounted for within the Plateau Arborist tree reports.	**15** trees (additional trees not assessed in the Urban Arbor report are required for removal and assessed in the Plateau Report for removal). {Appendix 12.1} **8** trees (additional trees assessed in the Urban Arbor report are required for removal and detailed in Plateau Report – these have not been reassessed, simply identified for removal). {Appendix 12.2} **1** tree (additional tree assessed in the Urban Arbor report are required for removal and detailed in Plateau Report – these have not been reassessed, simply identified for removal). {Appendix 12.3} **5** trees as part of group G15 (additional trees assessed in the Urban Arbor report are	

			required for removal and detailed in Plateau Report – these have not been reassessed, simply identified for removal). {Appendix 12.4} **2** trees (additional trees not assessed in the Urban Arbor report are required for removal and assessed in the Plateau Report for removal). {Appendix 12.5} **1** tree to be pruned. {Appendix 12.6} **1** tree (additional tree not assessed in the Urban Arbor report are required for removal and assessed in the Active Arbor report for removal). {Appendix 12.7}	
	Aggregated total trees and vegetation across all stations and MSB locations.			**315 trees**

		Total vegetation removal: ~5228 m2 (vegetation includes all trees and shrubs)

6 ALTERNATIVES TO DESIGN

Section 8 and Section 9 of each Station specific Urban Arbor Arboricultural Impact Assessment as detailed within Appendix 1,3,5,7,9 and 11 of this Report identifies why these trees and vegetation must be removed. This is further supported by the main body of text for each Plateau Trees report.
The majority of tree removal for the Project sites predominately relates to the designed locations for the Metro Service Buildings with minor amounts relating to general station wide service relocations and or installations. These design components are integral to the functionality of the new Sydney Metro line and have been subject to evaluation and assessment by others (Sydney Metro design contract).
Due to limited space within the project boundary, existing services and the access track, it is not feasible or reasonable to move these design components to accommodate the existing trees and vegetation.

In accordance with the Sydney Metro Sydenham to Bankstown Tree Management Strategy tree and vegetation removal has been limited through detailed design and construction planning.

Avoidance of impacts to trees and vegetation on the project during the detailed design phase has been undertaken based on the following hierarchy;
1. Avoid impacts to tree, ensuring design and construction falls outside the tree protection zone
2. Impacts within the tree protection zone, but no trimming or removal
3. Trimming of trees with visual or amenity value (including privacy screening)
4. Removal of trees with visual or amenity value (including privacy screening)
5. Trimming of trees with ecological value (habitat, threatened vegetation communities, threatened flora species)
6. Removal of trees with ecological value (habitat, threatened vegetation communities, threatened flora species)

It is noted that a number of trees within the corridor and at access gates will be trimmed to accommodate the design components and construction requirements. Where trenching may impact trees, tree sensitive service installation methods will be reviewed to determine if alternative methods of service installation (such as non-destructive digging trench excavation of underbores) are practicable and feasible to undertake. Further investigation of these methods will be undertaken for trees located adjacent to proposed services buildings locations. Some tree roots may be removed in consultation with an Arborist as required.

6.1 Considerations and restrictions

It is noted that the considerations, restrictions and design optioneering for the total impact of trees per station Project site has been reviewed and implemented by others. Trees are all generally within the existing stations precinct as assessed in the EIS and SPIR and detailed in **Figure 7** and **Figure 9** of this report and or within the adjacent corridor networks as assessed in the EIS and detailed in **Figure 8** of this report. There is no departure from the total trees assessed (by tree count) and cumulative impacts as presented in this report in comparison to the EIS; GHD report: *Sydney Metro: Sydenham to Bankstown tree count dated 21 August 2017* and the total impact assessed in SPIR Appendix B, demonstrating compliance to the CSSI 8256.

6.1.1 Hurlstone Park Station

Two trees as assessed in the Urban Arbor report and Plateau reports at Hurlstone Park is not within the Project boundary or the rail corridor. The trees are identified as tree 198 & 199 and must be removed to accommodate the new MSB permanent access road. The design optioneering to realign this access road to retain the trees is understood to have been

considered and deemed unachievable during the detailed design stage, hence the unavoidable need for removal. The trees have been identified for removal in accordance with the Stage 3 Demolition Plans for Hurlstone Park: SMCSWSWM-MTM-WHP-LA-PKG-131000. As the trees sit within CCBC owned land, approval was sought and obtained from the CCBC on the 20th May 2021 for the removal of the two trees, see Appendix 6.1 of this document.

6.1.2 Wiley Park Station

Additionally, three trees have been identified in the Wiley Park Plateau reports (Tree 2-4) for removal outside of the Project boundary and rail corridor. These trees were not assessed in the Urban Arbor reports provided by Sydney Metro design contract, however, have been identified for removal in the Stage 3 Demolition Plans for Wiley Park: SMCSWSWM-MTM-WWP-LA-DWG-231703 & SMCSWSWM-MTM-WWP-LA-DWG-231704. As the trees sit within CCBC owned land, approval was sought and obtained from the CCBC on the 15th May 2021 for the removal of the three trees, see Appendix 4.2 of this document.

6.1.3 Dulwich Hill Station

Seven trees at Dulwich Hill are additionally located outside of the rail corridor, five of which are also outside the Project boundary. These trees were not assessed in the Urban Arbor reports provided by Sydney Metro design contract, however, have been identified for removal in the landscape design package Stage 3 Dulwich Hill Station Landscape Drawing Package SMCSWSWM-MTM-WDH-LA-PKG-121000. The design optioneering to retain these trees is understood to of been considered and deemed unachievable during the detailed design stage, hence the unavoidable need for removal. To capture this omission the two Plateau reports for Dulwich Hill: *Downer Group - Southwest Metro Package - additional tree removals Dulwich Hill Station* has identified these six trees (Appendix 10 & 10.1). As the trees sit within Inner West owned land, approval was sought and obtained from the Inner West Council on the 28th May 2021 & 15th of June 2021 for the removal of all trees except tree 2 (Appendix 10), see Appendix 10.3 of this document. Further council approval will be required prior to any impact to Tree 2. As the trees were assessed as part of the "stations precinct" in GHD's report: Sydney Metro: Sydenham to Bankstown tree count dated 21 August 2017 and noted in **Figure 7** of this document, they are consistent with the EIS in terms of assessed impacts. The impact to these trees would also maintain consistency with the total number as assessed in the subsequent SPIR "estimated number of trees to be removed per station" as detailed in **Figure 9.**

6.1.4 Belmore Station

Moreover, Belmore has identified a number of trees which are required for removal which all sit within CCBC owned and managed land. This consists of seven trees, five of which are the five trees identified in the Urban Arbor in Appendix 1. Two additional trees are identified in the Plateau arborist report in Appendix 2.1. Whist they are in the Project boundary and consistent with the CSSI8256, approval from CCBC would be required prior to any impact. Approval from CCBC was obtained on the 23rd April 2021 for the removal of the five trees identified in the Urban Arbor report, see Appendix 2.1 of this document. In regard to the remaining trees residing within CCBC owned land, further council approvals and all other authority approvals shall be sought prior to any impact to the trees.

In addition, one tree is required to be pruned at Belmore. The tree requiring pruning is identified in the Plateau Report in Appendix 2 of this document and identified as Tree 14 (T14).

T14 is situated directly outside the existing Project boundary (three meters from the Project boundary). Whilst it is outside of the Project boundary it is within the "station precinct" consistent with the tree count and those assessed as part of the station precinct in the GHD report Sydney

Metro: Sydenham to Bankstown tree count dated 21 August 2017 and noted in Figure 7 of this document.

The pruning of the limb of T14 would not impact or contribute to the total tree loss count for Belmore as identified in the EIS. T14 is consistent with the EIS in terms of assessed impacts against CSSI8256. As T14 sits within CCBC owned and managed land, approval from CCBC would be required prior to any pruning. Approval was obtained from CCBC on the 23rd April 2021, see Appendix 2.1 of this document.

The requirement of the pruning is to provide sufficient clearance for heavy goods vehicles to safely access the site through the pre-existing Sydney Trains rail corridor access gate on Redman Parade at the entrance of Metro Service Building. Currently the limb identified for pruning sits at two meters in height from ground level and crosses the access gate. The required clearance to facilitate the safe access and egress into the MSB for oversized machinery (cranes, frannas etc) is 3.2 meters. An alternative option has been explored to gain access to the site for oversized vehicles however this option is only via a small access gate in the corner of the Redman Parade commuter car park. This option would require the ongoing closure of the car park and the access gate is directly adjacent to a sensitive receiver by way of the Australian Foundation for Disability.

This potential alternative option is not considered reasonable or feasible based on the significant disturbance through lack of amenity of the car park and increased noise impacts to the Australian Foundation for Disability. The option to maintain access through the already established Sydney trains rail corridor is considered the least impactful method of safe access and egress into the site for oversized vehicles.

Tree 14 is a Eucalyptus Robusta (Swamp Mahogany) the identified pruning involves the removal of one first order branch at 2m height. The branch is approximately 300mm in diameter and constitutes 30% of the total canopy volume of the tree. The removal of the branch is not considered to significantly affect local amenity or have any increase impact to visual impact to the rail corridor. The pruning of the limb identified as T14 would not have any impact on any fauna as it does not provide any existing habitat or foraging opportunities.

T14 is situated outside of the Belmore SHR curtilage posing no impacts from a heritage perspective and further impacts such as waste, water, noise, air quality, land contamination, socio-economic impacts are considered inconsequential.

Further to the original scope of pruning required at Belmore Station, an additional five trees requiring pruning have been identified in the Plateau Report in Appendix 21 of this document and identified as Tree 4, 5, 6, 7 & 8.

All branches assessed for pruning in Appendix 2.1 will be pruned in accordance with Australian Standard AS 4373-2007, the branches are 150 mm or less in diameter. As such, pruning works to be conducted by Downer EDI & its associated sub-contractors are exempt from the Bankstown & Canterbury Council Tree Management Orders, under exemption 2.4 (g), (Bankstown Development Control Plan 2015–Part B11 5 March 2015 (Amended December 2019)) and B3.4 (g), (Tree Management Order – Canterbury Development Control Plan 2012).

6.1.5 Campsie Station

To date no clearing of trees is required outside of the City and Southwest Metro Station Upgrade Works Package 5 and 6 Project Boundary. As such, no additional consideration or restrictions apply for clearing activities at Campsie Station, as all trees identified for clearing are within the Project boundary and accounted for in the original SSI & EIS.

6.1.6 Punchbowl Station

Thirteen additional trees have been identified in the Punchbowl Plateau report (Appendix 12.2 & 12.4) that require removal outside of the Project boundary and rail corridor. These trees were not assessed in the Urban Arbor reports provided by the Sydney Metro design contract,

however, have been identified for removal in the Approved for Construction (AFC) Civil Engineering Plans for Punchbowl: SMCSWSWM-MTM-WPS-CE-DWG-4931560. As the trees reside within CCBC owned land, further council approvals and all other authority approvals shall be sought prior to any impact to the trees.

7 MITIGATION MEASURES

Downer and Sydney Metro design contract will implement a number of measures to ensure the design development and construction processes 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 the appendices of this report (protection measures as stated in Urban Arbor reports and Plateau reports specific to each Project site and detailed in the appendices of this report)
- The project has / will be designed to minimise impacts to trees where possible. This will include a review of design impacts and construction impacts on trees.
- Relevant Councils and the DPIE will be consulted in regard to replacement tree planting locations. Relevant Councils will be consulted in regard to appropriate sizes for replacement trees.
- Downer's Vegetation Disturbance Permit will be implemented in accordance with the Downer EMS and CEMP.
- 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.
- Downer will consult with the relevant Council in regard to the timing of removal of trees on council land, as required. Downer shall implement any conditions of approval as set out by the council as part of any removal or pruning of trees on council land.
- Downer will consult with the relevant landowner's in regard to the trimming of branches that overhang 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.** There is no impact anticipated for the duration of the Project**.**
- 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.**

In addition, Downer 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 Downer Vegetation Disturbance 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.

APPENDIX 12.7 PUNCHBOWL AIA (ACTIVE GREEN SERVICES)

APPENDIX 1 – BELMORE AIA (URBAN ARBOR)

APPENDIX 12.7 PUNCHBOWL AIA (ACTIVE GREEN SERVICES)

APPENDIX 12.7 PUNCHBOWL AIA (ACTIVE GREEN SERVICES)

URBAN ARBOR
The Trusted Name in Tree Management

URBAN ARBOR
The Trusted Name in Tree Management

Arboricultural Impact Assessment Report

Site location:
South West Metro
Belmore Station
Belmore NSW

Prepared for:
Metron T2M

Prepared by: Jack Williams and Bryce Claassens
Urban Arbor Pty Ltd
Date: 23 December 2020
Ref: 201223-SWMBS-AIA
Rev: B

URBAN ARBOR
The Trusted Name in Tree Management

Table of Contents

Document Number: **SMCSWSWM-MTM-WBS-LA-REP-211000**

Revision: B **Status: For Approval**

COPYRIGHT

URBAN ARBOR
The Trusted Name in Tree Management

1. INTRODUCTION

1.1 Urban Arbor have been instructed by Metron T2M to provide an Arboricultural Impact Assessment Report for trees located within the site and adjoining sites in relation to a proposed development.

1.2 Below is a list of all documents and information provided to Urban Arbor to assist in preparing this report.

1.3 Below is a list of all documents and information provided to Urban Arbor to assist in preparing this report.

A) Belmore Landscape Drawings, Metron T2M, Rev E, Including Sheet No: 4, 6 and 7, 9 October 2020.
B) Civil Engineering Package No. 213, Metron T2M, Rev D, 111 Pages in total, 29 May 2020.
C) Belmore Station Service Building, Metron T2M, Rev C, 3 November 2020.

1.4 The trees were inspected on 16 December 2019 and 17 December 2020. Access was available to the subject site and the adjoining public areas only. All tree data contained in this report was collected during these site inspections.

2. SCOPE OF THE REPORT

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

2.1.1 Conduct a visual assessment of all significant trees located within 10 metres of development works from ground level. For the purpose of this report, a significant tree is a tree with a height equal to or greater than 5 metres.

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

2.1.3 Provide an assessment of the potential impact the proposed development is likely to cause to the condition of the subject trees in accordance with AS4970 Protection of trees on development sites (2009).

2.1.4 Specify tree protection measures for trees to be retained in accordance with AS4970-2009.

URBAN ARBOR
The Trusted Name in Tree Management

3. LIMITATIONS

3.1 The observations and recommendations are based on the site inspections identified in the introduction (section 1) and the access available at the time of inspection. Findings of this report are based on the observations and site conditions at the time inspection.

3.2 All of the observations were carried out from ground level and none of the surrounding surfaces were lifted or removed during the inspection. No tests were carried out to the subject trees or surrounding area during the inspection.

3.3 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.

3.4 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.

3.5 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*.

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

3.7 Urban Arbor neither guarantees, nor is it responsible for, the accuracy of information provided by others that is contained within this report.

3.8 While an assessment of the subject trees estimated useful life expectancy is included in this report, no specific tree risk assessment has been undertaken for any of trees at the site.

3.9 The ultimate safety of any tree cannot be categorically guaranteed. Even trees apparently free of defects can collapse or partially collapse in extreme weather conditions. Trees are dynamic, biological entities subject to changes in their environment, the presence of pathogens and the effects of ageing. These factors reinforce the need for regular inspections. It is generally accepted that hazards can only be identified from distinct defects or from other failure-prone characteristics of a tree or its locality.

3.10 Alteration of this report invalidates the entire report.

URBAN ARBOR
The Trusted Name in Tree Management

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 above ground level) - millimetres.

4.1.5 Estimated height - metres

4.1.6 Estimated crown spread (diameter of crown) - metres

4.1.7 Health

4.1.8 Structural condition

4.1.9 Amenity value

4.1.10 Estimated remaining contribution years (SULE)[1]

4.1.11 Retention value (Tree AZ)[2]

4.1.12 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 information was imported into our computerised geographical information system (GIS) PT-mapper pro. This software was used to measure/calculate all encroachment estimates included in this report.

4.5 All DBH measurements, tree protection zones, and structural root zones were calculated in accordance with methods set out in AS4970 Protection of trees on development sites (2009) [4] and in some cases estimated. See appendices for information.

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

---

[1] Barrell Tree Consultancy, *SULE: Its use and status into the New Millennium*, TreeAZ/03/2001, http://www.treeaz.com/.

[2] Barrell Tree Consultancy, *Tree AZ version 10.04-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 (2015).

[4] Council Of Standards Australia, *AS4970 Protection of trees on development sites* (2009).

URBAN ARBOR
The Trusted Name in Tree Management

5. SITE LOCATION AND BRIEF DESCRIPTION

5.1 The site is located in the suburb of Belmore, New South Wales, which is located in the Canterbury Bankstown Local Government Area (LGA). The trees are subject to protection under the Canterbury Local Environmental Plan (LEP) 2012[5] and Development Control Plan (DCP) 2012.[6] The site is identified as a heritage item (I11 and I29) in the LEP heritage maps.[7]

6. GENERAL INFORMATION IN RELATION TO PROTECTING TREES ON DEVELOPMENT SITES

6.1 **Tree protection zone (TPZ):** The TPZ is the principle means of protecting trees on development sites and is an area required to maintain the viability of trees during development. It is commonly observed that tree roots will extend significantly further than the indicative TPZ, however the TPZ is an area identified in AS4970-2009 to be the area where root loss or disturbance will generally 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 TPZ also incorporates the SRZ (see below for more information about the SRZ). The TPZ is calculated by multiplying the DBH by twelve, with the exception of palms, other monocots, cycads and tree ferns, the TPZ of which have been calculated at one metre outside the crown projection. Additional information about the TPZ is included in Appendix 3.

6.2 **Structural Root Zone (SRZ):** 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 needs to be maintained to preserve a viable tree. The SRZ is calculated using the following formula; (DAB x 50) $^{0.42}$ x 0.64. There are several factors that can vary 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. Soil level changes should also generally be avoided inside the SRZ of trees to be retained. Palms, other monocots, cycads and tree ferns do not have an SRZ. See the appendices for more information about the SRZ.

---

5 *Canterbury Local Environmental Plan 2012*, https://www.legislation.nsw.gov.au/#/view/EPI/2012/673, accessed 23 December 2020.

6 *Canterbury Development Control Plan 2012*, https://www.cbcity.nsw.gov.au/development/planning-control-policies/canterbury-development-control-plan-2012, accessed 23 December 2020.

7 *Canterbury Local Environmental Plan Heritage Map - Sheet HER_004*, https://www.legislation.nsw.gov.au/maps/f6a186a6-97fb-6dac-9d90-acfc8774137b/1550_COM_HER_004_010_20121105.pdf, 23 December 2020.

URBAN ARBOR
The Trusted Name in Tree Management

6.3 **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.

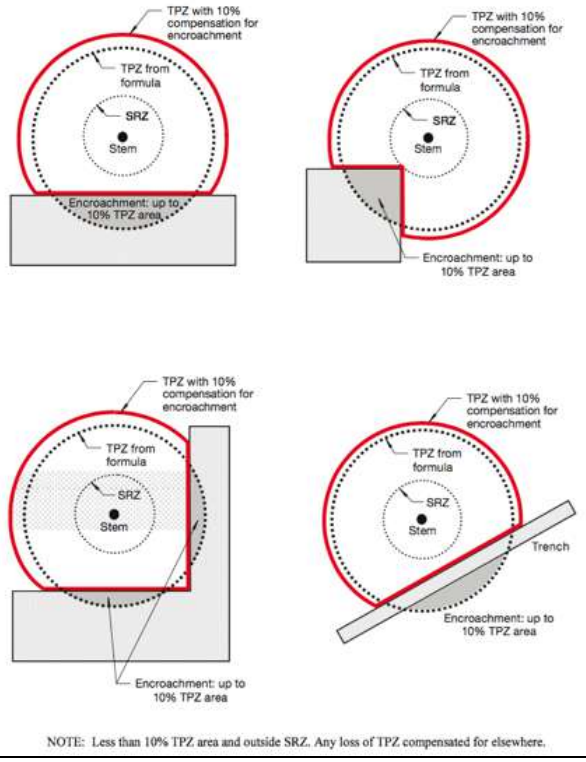


Image 1: Example minor TPZ encroachment from AS4970-2009.

6.4 **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. Root investigations may be required to identify roots that will be impacted during major TPZ encroachment (see Appendix 3 for more information in relation to root investigations).

URBAN ARBOR
The Trusted Name in Tree Management

7. OBSERVATIONS

7.1 **Tree information:** Details of each individual tree assessed, including the observations taken during the site inspection can be found in the tree inspection schedule in Appendix 2, where the indicative tree protection zone (TPZ) for the subject trees has been calculated. The TPZ and SRZ should be measured in radius from the centre of the trunk. The subject trees have been awarded a retention value based on the observations during the site inspection. The system 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 Tree AZ categories sheet (Barrell Tree Consultancy) has been included in the appendices to assist with understanding the retention values. The retention value that has been allocated to the subject trees in this report is not definitive and should only be used as a guideline. This information has been summarised below.

7.2 **Site Plan:** Three site plans have been included in Appendix 1, where the indicative TPZ and SRZ of the trees have been overlaid onto the received plans provided by the client. The following plans are included in Appendix 1;

- Appendix 1A: Proposed Plan North
- Appendix 1B: Proposed Plan South
- Appendix 1C: Proposed Service Building

8. ASSESSMENT OF CONSTRUCTION IMPACTS

8.1 Table 1: In the table below, the impact of the proposed development has been assessed for all trees included in the report. The assessed TPZ encroachments include proposed structures and hard landscaping only. All soft landscaping should be completed in accordance with section 11.10.

Tree ID	Species	Retention value	TPZ radius (m)	TPZ area (m^2)	SRZ radius (m)	TPZ encroachment	Discussion/ Conclusion	Recommendation
646	*Tristaniopsis laurina*	A1	3.3	34.2	2.3	None	No proposed TPZ encroachment.	Retain and protect
647	*Callistemon viminalis*	Z1	2.9	26.4	1.8	None	No proposed TPZ encroachment.	Retain and protect
648	*Tristaniopsis laurina*	A1	3.8	45.4	2.2	None	No proposed TPZ encroachment.	Retain and protect
649	*Tristaniopsis laurina*	A1	3.4	36.3	2.2	None	No proposed TPZ encroachment.	Retain and protect
650	*Callistemon viminalis*	Z1	2.0	12.6	1.7	None	No proposed TPZ encroachment.	Retain and protect
651	*Tristaniopsis laurina*	Z1	2.0	12.6	1.5	None	No proposed TPZ encroachment.	Retain and protect
652	*Tristaniopsis laurina*	Z1	2.0	12.6	1.5	None	No proposed TPZ encroachment.	Retain and protect
653	*Robinia pseudoacacia*	Z3	2.8	24.6	1.9	None	No proposed TPZ encroachment.	Retain and protect
654	*Robinia pseudoacacia*	Z3	2.3	16.6	1.7	None	No proposed TPZ encroachment.	Retain and protect
655	*Cinnamomum camphora*	A1	6.0	113.1	2.6	None	No proposed TPZ encroachment.	Retain and protect
656	*Brachychiton acerifolius*	A1	3.8	45.4	2.1	None	No proposed TPZ encroachment.	Retain and protect

URBAN ARBOR
The Trusted Name in Tree Management

Tree ID	Species	Retention value	TPZ radius (m)	TPZ area (m^2)	SRZ radius (m)	TPZ encroachment	Discussion/ Conclusion	Recommendation
657	*Robinia pseudoacacia*	Z3	2.9	26.4	2.1	None	No proposed TPZ encroachment.	Retain and protect
658	*Cinnamomum camphora*	Z4	10.9	373.3	3.0	Footprint	The tree has been marked for removal in the received plans. The trunk of the tree is located within the footprint of the proposed hard surface pathway.	Remove
659	*Robinia pseudoacacia 'Frisia'*	Z3	2.2	15.2	1.7	Footprint	The tree has been marked for removal in the received plans. The trunk of the tree is located within the footprint of the proposed hard surface pathway.	Remove
660	*Robinia pseudoacacia 'Frisia'*	Z3	2.0	12.6	1.6	Footprint	The tree has been marked for removal in the received plans. The trunk of the tree is located within the footprint of the proposed hard surface pathway.	Remove
661	*Robinia pseudoacacia 'Frisia'*	Z3	2.0	12.6	1.7	Minor	The proposed hard surfacing will encroach into the TPZ by 4% ($0.5m^2$) but not into the SRZ. This is considered to be a minor and acceptable TPZ encroachment and the proposed hard surfacing will not significantly impact the condition of the tree.	Retain and protect
662	*Robinia pseudoacacia 'Frisia'*	Z3	2.4	18.1	1.8	None	No proposed TPZ encroachment.	Retain and protect
663	*Robinia pseudoacacia 'Frisia'*	Z3	2.2	15.2	1.8	Footprint	The trunk of the tree is located within the footprint of the proposed hard surface pathway.	Remove
664	*Eucalyptus spp*	A1	10.4	339.8	3.3	Major	The proposed hard surfacing will encroach into the TPZ by 27% ($92.2m^2$) but not into the SRZ. This is considered to be a major TPZ encroachment and the proposed works could potentially impact the condition of the tree. To reduce the impact to the tree, the proposed hard surfacing must be constructed on or above existing grades and in accordance with section 9.2.1 of this report.	Retain and protect*
665	*Robinia pseudoacacia 'Frisia'*	Z3	2.0	12.6	1.6	None	No proposed TPZ encroachment.	Retain and protect

URBAN ARBOR
The Trusted Name in Tree Management

Tree ID	Species	Retention value	TPZ radius (m)	TPZ area (m^2)	SRZ radius (m)	TPZ encroachment	Discussion/ Conclusion	Recommendation
666	*Robinia pseudoacacia 'Frisia'*	Z3	3.4	36.3	2.0	None	No proposed TPZ encroachment.	Retain and protect
667	*Robinia pseudoacacia 'Frisia'*	Z4	3.9	47.8	2.3	Footprint	The trunk of the tree is located within the footprint of the proposed kiss and ride shelter.	Remove
668	*Lophostemon confertus*	A1	6.2	120.8	2.6	Major	The proposed palisade fencing will encroach into the TPZ by 42% (51.0m^2) and into the SRZ. This is considered to be a major TPZ encroachment and the proposed works could potentially impact the condition and stability of the tree. To reduce the impact to the tree, the proposed fencing must be completed in accordance with section 9.2.2 of this report.	Retain and protect*
669	*Callistemon viminalis*	A2	9.4	277.6	3.3	None	No proposed TPZ encroachment.	Retain and protect
670	*Lophostemon confertus*	A1	3.6	40.7	2.3	Major	The proposed palisade fencing will encroach into the TPZ by 37% (15.0m^2) and into the SRZ. This is considered to be a major TPZ encroachment and the proposed works could potentially impact the condition and stability of the tree. To reduce the impact to the tree, the proposed fencing must be completed in accordance with section 9.2.2 of this report.	Retain and protect*
671	*Callistemon viminalis*	A1	5.0	78.5	2.3	None	No proposed TPZ encroachment.	Retain and protect
672	*Callistemon viminalis*	A1	8.3	216.4	3.0	Minor	The proposed palisade fencing will encroach into the TPZ by 4% (7.9m^2) but not into the SRZ. This is considered to be a minor and acceptable TPZ encroachment and the proposed works will not significantly impact the condition of the tree.	Retain and protect
673	*Leptospermum petersonii*	A1	3.0	28.3	2.0	Major	The proposed palisade fencing will encroach into the TPZ by 47% (13.2m^2) and into the SRZ. This is considered to be a major TPZ encroachment and the proposed works could potentially impact the condition and stability of the tree. To reduce the impact to the tree, the proposed fencing must be completed in accordance with section 9.2.2 of this report.	Retain and protect*

URBAN ARBOR
The Trusted Name in Tree Management

Tree ID	Species	Retention value	TPZ radius (m)	TPZ area (m^2)	SRZ radius (m)	TPZ encroachment	Discussion/ Conclusion	Recommendation
674	*Callistemon viminalis*	A1	9.6	289.5	3.0	Major	The proposed palisade fencing will encroach into the TPZ by 49% (142.6m^2) and into the SRZ. This is considered to be a major TPZ encroachment and the proposed works could potentially impact the condition and stability of the tree. To reduce the impact to the tree, the proposed fencing must be completed in accordance with section 9.2.2 of this report.	Retain and protect*
2260	Unknown spp	Z9	3.8	46.4	2.3	None	No proposed TPZ encroachment.	Retain and protect
2261	Callistemon viminalis	Z1	2.4	18.1	1.7	Major	The tree is located outside the site boundary. The proposed safety rail fence will encroach into the TPZ by 19% (3.4m^2) and into the SRZ. This is considered to be a major TPZ encroachment and the proposed works could potentially impact the condition and stability of the tree. To reduce the impact to the tree, the proposed fencing must be completed in accordance with section 9.2.2 of this report.	Retain and protect*
2262	Unknown spp	Z1	2.0	12.6	1.6	None	No proposed TPZ encroachment.	Retain and protect
2263	Melaleuca styphelioides	A1	5.6	99.9	2.5	Major	The tree is located outside the site boundary. The proposed safety rail fence and hard surfacing will encroach into the TPZ by 34% (33.8m^2) and into the SRZ. This is considered to be a major TPZ encroachment and the proposed works could potentially impact the condition and stability of the tree. To reduce the impact to the tree, the proposed fencing and hard surfacing must be completed in accordance with section 9.2 of this report.	Retain and protect*
2264	Callistemon viminalis	A1	3.1	30.8	2.0	Major	The tree is located outside the site boundary. The proposed safety rail fence and hard surfacing will encroach into the TPZ by 23% (7m^2) and into the SRZ. This is considered to be a major TPZ encroachment and the proposed works could potentially impact the condition and stability of the tree. To reduce the impact to the tree, the proposed fencing and hard surfacing must be completed in accordance with section 9.2 of this report.	Retain and protect*

URBAN ARBOR
The Trusted Name in Tree Management

Tree ID	Species	Retention value	TPZ radius (m)	TPZ area (m^2)	SRZ radius (m)	TPZ encroachment	Discussion/ Conclusion	Recommendation
2265	Melaleuca quinquenervia	A1	10.3	268.2	3.1	Minor	The proposed safety rail fencing and hard surfacing will encroach into the TPZ by less than 10% and not into the SRZ. This is considered to be a minor and acceptable TPZ encroachment and the proposed works will not significantly impact the condition of the tree.	Retain and protect
2266	Eucalyptus botryoides	A1	6.0	113.1	2.6	None	No proposed TPZ encroachment.	Retain and protect
2267	Afrocarpus falcatus	A1	6.0	113.1	2.5	Footprint	The trunk of the tree is located within the footprint of the proposed service building access area.	Remove
2268	Morus nigra	Z1	2.0	12.6	1.5	Footprint	The trunk of the tree is located within the footprint of the proposed service building access area.	Remove
2269	Eucalyptus robusta	A1	7.2	162.9	2.8	Footprint	The trunk of the tree is located within the footprint of the proposed service building access area.	Remove
2270	Eucalyptus spp	Z1	2.0	12.6	2.0	None	No proposed TPZ encroachment.	Retain and protect
3316	*Murraya paniculata*	Z1	3.0	28.3	1.8	Major	Located within the community centre. The proposed fencing, retaining wall and service building construction will encroach into the TPZ by 30% ($8.5m^2$) and into the SRZ. This is considered to be a major TPZ encroachment, however, there is an existing retaining wall located along the boundary. The existing retaining wall appears to be restricting root growth into corridor. Therefore the proposed works will not significantly impact the tree. Canopy reduction pruning may be required to install the new fence. The pruning will result in the removal of less than 10% of the overall live foliage area of the tree and will not significantly impact the tree.	Retain and protect

URBAN ARBOR
The Trusted Name in Tree Management

Tree ID	Species	Retention value	TPZ radius (m)	TPZ area (m^2)	SRZ radius (m)	TPZ encroachment	Discussion/ Conclusion	Recommendation
3317	*Murraya paniculata*	Z1	2.4	18.1	1.7	Major	Located within the community centre. The proposed fencing, retaining wall and service building construction will encroach into the TPZ by 20% (3.6m^2) and into the SRZ. This is considered to be a major TPZ encroachment, however, there is an existing retaining wall located along the boundary. The existing retaining wall appears to be restricting root growth into corridor. Therefore the proposed works will not significantly impact the tree. Canopy reduction pruning may be required to install the new fence. The pruning will result in the removal of less than 10% of the overall live foliage area of the tree and will not significantly impact the tree.	Retain and protect
3318	*Callistemon viminalis*	A1	4.8	72.4	2.5	Major	Located within the community centre. The proposed fencing, retaining wall and service building construction will encroach into the TPZ by 36% (26.1m^2) and into the SRZ. This is considered to be a major TPZ encroachment, however, there is an existing retaining wall located along the boundary. The existing retaining wall appears to be restricting root growth into corridor. Therefore the proposed works will not significantly impact the tree. No canopy pruning will be required.	Retain and protect
3319	*Murraya paniculata*	Z1	2.4	18.1	1.7	Major	Located within the community centre. The proposed fencing, retaining wall and service building construction will encroach into the TPZ by 19% (3.4m^2) and into the SRZ. This is considered to be a major TPZ encroachment, however, there is an existing retaining wall located along the boundary. The existing retaining wall appears to be restricting root growth into corridor. Therefore the proposed works will not significantly impact the tree. Canopy reduction pruning may be required to install the new fence. The pruning will result in the removal of less than 10% of the overall live foliage area of the tree and will not significantly impact the tree.	Retain and protect

URBAN ARBOR
The Trusted Name in Tree Management

Tree ID	Species	Retention value	TPZ radius (m)	TPZ area (m^2)	SRZ radius (m)	TPZ encroachment	Discussion/ Conclusion	Recommendation
3320	*Murraya paniculata*	Z1	3.0	28.3	1.8	Major	Located within the community centre. The proposed fencing, retaining wall and service building construction will encroach into the TPZ by 26% (7.3m^2) and into the SRZ. This is considered to be a major TPZ encroachment, however, there is an existing retaining wall located along the boundary. The existing retaining wall appears to be restricting root growth into corridor. Therefore the proposed works will not significantly impact the tree. Canopy reduction pruning may be required to install the new fence. The pruning will result in the removal of less than 10% of the overall live foliage area of the tree and will not significantly impact the tree.	Retain and protect

Notes

TPZ Encroachment Percentage: TPZ encroachment percentages are based on new structures and hard surfaces only. New soft landscaping, such as turf or amenity planting areas have not been included in the calculation for TPZ encroachment.
Retain and protect*: The proposed construction must be completed in accordance with section 9.2 to reduce the impact to the tree.

9. CONCLUSIONS

9.1 **Table 2:** Summary of the impact to trees during the development;

Impact	Reason	Category A	Category Z	Total
		A	Z	
Trees to be removed	Building construction, new surfacing and/or proximity, or trees in poor condition.	2267, 2269 (Two trees)	658, 659, 660, 663, 667, 2268 (Six trees)	**8 trees**
Trees subject to TPZ encroachment greater than 10% requiring tree sensitive design and construction to be retained	Removal of existing surfacing/structures and/or installation of new surfacing/structures.	664, 668, 670, 673, 674, 2263, 2264 (Seven trees)	2261 (One tree)	**8 trees**
Retained trees subject to TPZ encroachment of 10% or less	Removal of existing surfacing/structures and/or installation of new surfacing/structures.	646, 648, 649, 655, 656, 669, 671, 672, 2265, 2266, 3318 (Eleven trees)	647, 650, 651, 652, 653, 654, 657, 661, 662, 665, 666, 2260, 2262, 2270, 3316, 3317, 3319, 3320 (Eighteen trees)	**29 trees**

URBAN ARBOR
The Trusted Name in Tree Management

9.2 **Construction Design/Specification Requirements:** The proposed construction will encroach into the TPZ and SRZ of seven trees, including tree 664, 668, 670, 673, 674, 2261, 2263 and 2264. To ensure the trees are not adversely impacted by the construction, it must be demonstrated the following design and construction specifications can be implemented within the TPZ of the trees. If the construction cannot be completed in accordance with these specifications, the trees may not be viable for retention.

9.2.1 **Hard Surfacing:** Areas of the proposed hard surfacing will be replacing the existing hard surfacing. To ensure that tree root systems are not significantly impacted, the proposed hard surfacing must be constructed on or above the existing sub base of the existing hard surfacing. Where the proposed hard surfacing is located outside the footprint of the existing hard surfacing, it should be constructed above existing soil grades. Compaction of lowest sub base materials must be minimised, as this can cause soil compaction and impact the health of trees. The diagram below (Image A) gives an example of a no-dig method for constructing hard surfacing close to trees, retaining pegs avoiding significant roots.

If excavations are essential, they must not exceed 100mm below the existing grades. The excavations should be supervised by a project Arborist with a minimum AQF level 5 qualification. All excavations for the hard surfacing should be carried out manually to avoid impacting retained tree roots. All tree roots greater than 40mm in diameter should be retained, unless the project arborist has assessed and advised that the pruning/severing of the root will not impact the condition or stability of the tree. Manual excavation may include the use of pneumatic and hydraulic tools, high-pressure air or a combination of high-pressure water and a vacuum device.

Where tree roots greater than 40mm are encountered that must be retained, the hard surfacing should be elevated over the individual tree root to allow for its retention. Examples of methods that can be used to bridge individual tree roots have been included below (Image B and C). Using pier and beam bridges as per image C is the recommended/preferred method, as it will allow for future growth of the tree roots, reducing future damage to the pavement from the roots.

9.2.2 **Fencing:** The proposed fencing will be installed using the tree sensitive method of post and rail type construction. To ensure the trees are not significantly impacted by the works, all post holes must be excavated manually. The post location must be flexible to avoid the severance of significant roots 40mm and greater in diameter. No posts are to be located within the SRZ or root investigations will be required to determine the post location. See Appendix 3 for more information in regards to root investigations. All rails/horizontal materials are to be located on or above existing soil grades. This will allow for the majority of the root system to be retained between the posts, minimising root loss.

URBAN ARBOR
The Trusted Name in Tree Management

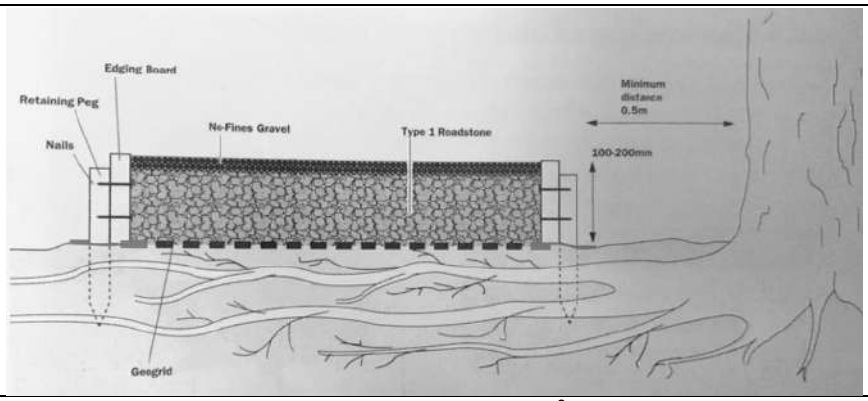


Image A: An image from 'Tree Roots in the Built Environment'[8], showing how to construct hard surfacing above a trees root system without excavation. Type 1 Roadstones are an example of blue metal or crushed sandstone.

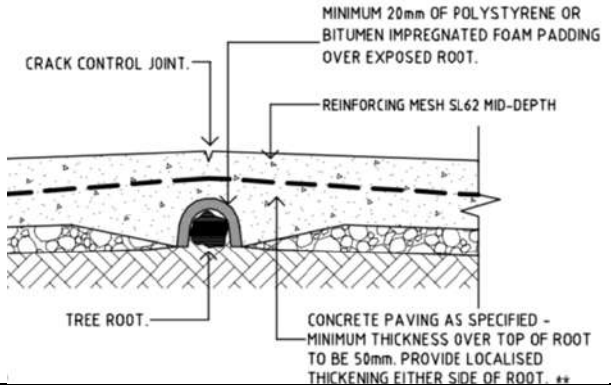


Image B: Example method for bridging concrete footpaths over tree roots provided in the Canterbury Bankstown Council standard drawings.[9]

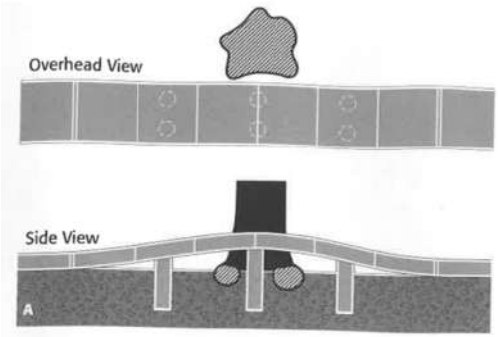


Image C: Example method from Reducing infrastructure damage by tree roots: A compendium of strategies.[10]

8 Roberts, J., Jackson, N., & Smith, M., *Tree Roots in the Built Environment*, The Stationary Office, London, England (2006). Page 305 & 306.

9 *Canterbury Bankstown Council standard drawing S-209 Existing street tree treatments*, https://www.cbcity.nsw.gov.au/development/planning-control-policies/council-standard-drawings, accessed 3 October 2019.

10 Costello, L. R., & Jones, K. S, *Reducing infrastructure damage by tree roots: A compendium of strategies*, Western Chapter of the International Society of Arboriculture, 31883 Success Valley Drive, Porterville, CA (2003), page 27.

URBAN ARBOR
The Trusted Name in Tree Management

9.3 **Photographs**

Image 1: Looking West towards tree 664 and 667. The proposed construction must be completed in accordance with section 9.2 to ensure tree 664 is not significantly impacted by the proposed works. Tree 667 is in poor health/advanced stages of decline and is recommended for removal due to its current condition and impacts from the proposed development.

Image 2: Looking towards tree 3316, 3317, 3318, 3319 and 3320, showing the existing boundary retaining wall. The existing boundary retaining wall appears to be restricting root growth into the corridor, therefore, the proposed works within the corridor will not impact the trees. Minor canopy pruning may be required for tree 3316, 3317, 3319 and 3320. The proposed canopy pruning will result in the removal of less than 10% of the live foliage area of the trees and will not significantly impact the trees.

URBAN ARBOR
The Trusted Name in Tree Management

10. RECOMMENDATIONS

10.1 This report assesses the impact of a proposed development at the subject site to forty-five (45) trees located within the site and adjoining sites, in accordance with AS4970 Protection of trees on development sites (2009).

10.2 Site plans have been included in Appendix 1, where the indicative TPZ and SRZ of the trees have been overlaid onto the received plan provided by the client. The following plans are included in Appendix 1;

- Appendix 1A: Proposed Plan North
- Appendix 1B: Proposed Plan South
- Appendix 1C: Proposed Service Building

10.3 Eight (8) trees have been recommended for removal within this report, including tree 658, 659, 660, 663, 667, 2267, 2268 and 2269. Tree 2267 and 2269 are higher value category A retention value trees. Tree 658, 659, 660, 663, 667 and 2268 are lower value category Z retention value trees that are generally should not be a constraint to development works.

10.4 Eight (8) trees have been recommended to be retained that will be subject to TPZ encroachments greater than 10%, including tree 664, 668, 670, 673, 674, 2261, 2263 and 2264. To reduce the impact to the trees, the proposed construction within the TPZ of the trees must be completed in accordance with section 9.2 of this report.

10.5 The remaining twenty-nine (29) trees will be subject to minor and acceptable TPZ encroachments of 10% or less and can be retained in a viable condition, including tree 646, 647, 648, 649, 650, 651, 652, 653, 654, 655, 656, 657, 661, 662, 665, 666, 669, 671, 672, 2260, 2262, 2265, 2266, 2270, 3316, 3317, 3318, 3319 and 3320.

10.6 All trees to be retained must be protected for the duration of development, (including demolition and landscaping, in accordance with AS4970-2009). See section 11 for more information.

10.7 See section 11.10 for general landscape guidance when working within the TPZ of trees to be retained.

10.8 Where possible underground services must be located outside the TPZ of trees to be retained. All underground services located inside the TPZ of any tree to be retained must be installed in accordance with section 11.11.

10.9 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. This report should be submitted as supporting evidence with any tree removal/pruning or development application.

URBAN ARBOR
The Trusted Name in Tree Management

11. TREE PROTECTION REQUIREMENTS

11.1 **Use of this report:** All contractors must be made aware of the tree protection requirements prior to commencing works at the site. This report and a copy of the site plan (Appendix 1) drawings must also be made available to any contractor prior to works commencing and during any on site operations.

11.2 **Project Arborist:** Prior to any works commencing at the site a project Arborist should be appointed. The project Arborist should be qualified to a minimum AQF level 5 and/or equivalent qualifications and experience, and should assist with any development issues relating to trees that may arise. If at any time it is not feasible to carryout works in accordance with this, an alternative must be agreed in writing with the project Arborist.

11.3 **Tree work:** All tree work must be carried out by a qualified and experienced Arborist with a minimum of AQF level 2 in arboriculture, in accordance with NSW Work Cover Code of Practice for the Amenity Tree Industry (1998) and AS4373 Pruning of amenity trees (2007).

11.4 **Initial site meeting/on-going regular inspections:** The project Arborist is to hold a pre-construction site meeting with principal contractor to discuss methods and importance of tree protection measures and resolve any issues in relation to tree protection that may arise. In accordance with AS4970-2009, the project Arborist should carryout regular site inspections to ensure works are carried out in accordance with this document throughout the development process. Site inspections are recommended on a one-month frequency.

11.5 **Site Specific Tree Protection Recommendations:** The table below provides recommendations for each tree, including site specific tree protection requirements. All trees to be retained must be protected in accordance with general requirements of AS4970-2009 for the duration of the development, details of which are discussed in further details in this section of the report.

Tree ID	Tree Species	TPZ Radius (m)	SRZ Radius (m)	Recommendations
646	*Tristaniopsis laurina*	3.3	2.3	Retain and protect. Tree protection fencing is to create a combined exclusion zone for tree 646, 647, 648, 649, 650 and 651. The fencing is to run along the edge of the existing hard surfacing and is to encompass the garden bed area adjacent to the trees. TPZ signage is required on the fencing and mulch is required within the fenced area. The fencing can only be moved upon the approval of the project arborist.
647	*Callistemon viminalis*	2.9	1.8	Retain and protect. See tree protection for tree 646.
648	*Tristaniopsis laurina*	3.8	2.2	Retain and protect. See tree protection for tree 646.
649	*Tristaniopsis laurina*	3.4	2.2	Retain and protect. See tree protection for tree 646.

URBAN ARBOR
The Trusted Name in Tree Management

650	*Callistemon viminalis*	2.0	1.7	Retain and protect. See tree protection for tree 646.
651	*Tristaniopsis laurina*	2.0	1.5	Retain and protect. See tree protection for tree 646.
652	*Tristaniopsis laurina*	2.0	1.5	Retain and protect. Tree protection fencing is to run along the edge of the existing hard surfacing and is to encompass the garden bed area adjacent to the tree. TPZ signage is required on the fencing and mulch is required within the fenced area. The fencing can only be moved upon the approval of the project arborist.
653	*Robinia pseudoacacia*	2.8	1.9	Retain and protect. Tree protection fencing is to create a combined exclusion zone for tree 653 and 654. The fencing is to run along the edge of the existing hard surfacing and is to encompass the garden bed area adjacent to the trees. TPZ signage is required on the fencing and mulch is required within the fenced area. The fencing can only be moved upon the approval of the project arborist.
654	*Robinia pseudoacacia*	2.3	1.7	Retain and protect. See tree protection for tree 653.
655	*Cinnamomum camphora*	6.0	2.6	Retain. Set back from the proposed works. The existing fence will be sufficient for tree protection.
656	*Brachychiton acerifolius*	3.8	2.1	Retain. Set back from the proposed works. The existing fence will be sufficient for tree protection.
657	*Robinia pseudoacacia*	2.9	2.1	Retain and protect. Tree protection fencing is to encompass the TPZ perimeter within the site. TPZ signage is required on the fencing.
658	*Cinnamomum camphora*	10.9	3.0	Remove.
659	*Robinia pseudoacacia 'Frisia'*	2.2	1.7	Remove.
660	*Robinia pseudoacacia 'Frisia'*	2.0	1.6	Remove.
661	*Robinia pseudoacacia 'Frisia'*	2.0	1.7	Retain and protect. Tree protection fencing is to create a combined exclusion zone for tree 661 and 662. The fencing is to run along the edge of the proposed hard surfacing and is run along the TPZ perimeter of the trees. TPZ signage is required on the fencing and mulch is required within the fenced area. The fencing can only be moved upon the approval of the project arborist.
662	*Robinia pseudoacacia 'Frisia'*	2.4	1.8	Retain and protect. See tree protection for tree 661.
663	*Robinia pseudoacacia 'Frisia'*	2.2	1.8	Remove.

URBAN ARBOR
The Trusted Name in Tree Management

664	*Eucalyptus spp*	10.4	3.3	Retain and protect. Tree protection fencing is to create a combined exclusion zone for tree 664, 665 and 666. The fencing is to run along the edge of the proposed hard surfacing and existing hard surfacing and is to encompass as much of the TPZ area as practical. TPZ signage is required on the fencing and mulch is required within the fenced area. The fencing can only be moved upon the approval of the project arborist.
665	*Robinia pseudoacacia 'Frisia'*	2.0	1.6	Retain and protect. See tree protection for tree 664.
666	*Robinia pseudoacacia 'Frisia'*	3.4	2.0	Retain and protect. See tree protection for tree 664.
667	*Robinia pseudoacacia 'Frisia'*	3.9	2.3	Remove.
668	*Lophostemon confertus*	6.2	2.6	Retain and protect. Tree protection fencing is to run along the edge of the existing hard surfacing and is to encompass the garden bed area adjacent to the tree. TPZ signage is required on the fencing and mulch is required within the fenced area. The fencing can only be moved upon the approval of the project arborist.
669	*Callistemon viminalis*	9.4	3.3	Retain. Set back from works. No tree protection required.
670	*Lophostemon confertus*	3.6	2.3	Retain and protect. Tree protection fencing is to run along the edge of the existing hard surfacing and is to encompass the garden bed area adjacent to the tree. TPZ signage is required on the fencing and mulch is required within the fenced area. The fencing can only be moved upon the approval of the project arborist.
671	*Callistemon viminalis*	5.0	2.3	Retain. Set back from works. No tree protection required.
672	*Callistemon viminalis*	8.3	3.0	Retain and protect. Tree protection fencing is to encompass the drip line of the tree. TPZ signage is required on the fencing and mulch is required within the fenced area. The fencing can only be moved upon the approval of the project arborist.
673	*Leptospermum petersonii*	3.0	2.0	Retain and protect. Tree protection fencing is to create a combined exclusion zone for tree 673 and 674. The fencing is to act as trunk protection during the installation of the palisade fencing. TPZ signage is required on the fencing and mulch is required within the fenced area. The fencing can only be moved upon the approval of the project arborist.
674	*Callistemon viminalis*	9.6	3.0	Retain and protect. See tree protection for tree 673.
2260	*Unknown spp*	3.8	2.3	Retain and protect. Tree protection fencing is to create a combined exclusion zone for tree 2260, 2261 and 2262. The fencing is to encompass as much of the TPZ area as practical. TPZ signage is required on the fencing.
2261	*Callistemon viminalis*	2.4	1.7	Retain and protect. See tree protection for tree 2260.

2262	*Unknown spp*	2.0	1.6	Retain and protect. See tree protection for tree 2260.
2263	*Melaleuca styphelioides*	5.6	2.5	Retain and protect. Tree protection fencing is to create a combined exclusion zone for tree 2263, 2264, 2265 and 2266. The fencing is to encompass as much of the TPZ area as practical. TPZ signage is required on the fencing.
2264	*Callistemon viminalis*	3.1	2.0	Retain and protect. See tree protection for tree 2263.
2265	*Melaleuca quinquenervia*	10.3	3.1	Retain and protect. See tree protection for tree 2263.
2266	*Eucalyptus botryoides*	6.0	2.6	Retain and protect. See tree protection for tree 2263.
2267	*Afrocarpus falcatus*	6.0	2.5	Remove.
2268	*Morus nigra*	2.0	1.5	Remove.
2269	*Eucalyptus robusta*	7.2	2.8	Remove.
2270	*Eucalyptus spp*	2.0	2.0	Retain. Set back from works, no tree protection required.
3316	*Murraya paniculata*	3.0	1.8	Retain. The existing retaining wall and fencing will be sufficient for tree protection.
3317	*Murraya paniculata*	2.4	1.7	Retain. The existing retaining wall and fencing will be sufficient for tree protection.
3318	*Callistemon viminalis*	4.8	2.5	Retain. The existing retaining wall and fencing will be sufficient for tree protection.
3319	*Murraya paniculata*	2.4	1.7	Retain. The existing retaining wall and fencing will be sufficient for tree protection.
3320	*Murraya paniculata*	3.0	1.8	Retain. The existing retaining wall and fencing will be sufficient for tree protection.

11.6 **Tree protection Specifications:** It is the responsibility of the principal contractor to install tree protection prior to works commencing at the site (prior to demolition works) and to ensure that the tree protection remains in adequate condition for the duration of the development. The tree protection must not be moved without prior agreement of the project Arborist. The project Arborist must inspect that the tree protection has been installed in accordance with this document and AS4970-2009 prior to works commencing.

11.6.1 Protective fencing: Site specific tree protection requirements are in section 11.5. Where it is not feasible to install fencing at the specified location due to factors such restricting access to areas of the site or for constructing new structures, an alternative location and protection specification must be agreed with the project Arborist. Where the installation of fencing in unfeasible due to restrictions on space, trunk and branch protection will be required (see below). The protective fencing must be constructed of 1.8 metre 'cyclone chainmesh fence'. The fencing must only be removed for the landscaping phase and must be authorised by the project Arborist. Any modifications to the fencing locations must be approved by the project Arborist.

URBAN ARBOR
The Trusted Name in Tree Management

11.6.2 TPZ signage: Tree protection signage is to be attached to the protective fencing, displayed in a prominent position and the sign repeated at 10 metres intervals or closer where the fence changes direction. Each sign shall contain in a clearly legible form, the following information:

- Tree protection zone/No access.
- This fence has been installed to prevent damage to the tree/s and their growing environment both above and below ground. Do not move fencing or enter TPZ without the agreement of the project Arborist.
- The name, address, and telephone number of the developer/builder and project Arborist

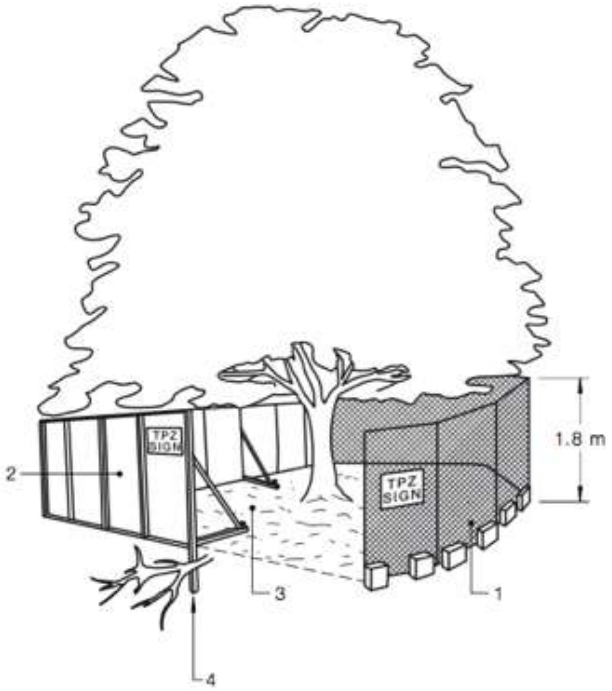
11.6.3 Trunk and Branch Protection: The trunk must be protected by wrapped hessian or similar material to limit damage. Timber planks (50mm x 100mm or similar) should then be placed around tree trunk. The timber planks should be spaced at 100mm intervals, and must be fixed against the trunk with tie wire, or strapping and connections finished or covered to protect pedestrians from injury. The hessian and timber planks must not be fixed to the tree in any instance. The trunk and branch protection shall be installed prior to any work commencing on site and shall be maintained in good condition for the entire development period.

11.6.4 Mulch: Any areas of the TPZ located inside the subject site (only trees to be retained directly adjacent to site works must be mulched to a depth of 75mm with good quality composted wood chip/leaf mulch.

11.6.5 Ground Protection: Ground protection is required to protect the underlying soil structure and root system in areas where it is not practical to restrict access to whole TPZ, while allowing space for construction. Ground protection must consist of good quality composted wood chip/leaf mulch to a depth of between 150-300mm, laid on top of geo textile fabric. If vehicles are to be using the area, additional protection will be required such as rumble boards or track mats to spread the weight of the vehicle and avoid load points. Ground protection is to be specified by the project Arborist as required.

11.6.6 Temporary irrigation: Temporary irrigation should be set up in the TPZ of all trees to be retained, and should distribute water evenly throughout the area of the TPZ. The irrigation should be used for at minimum one hour daily throughout all stages of the development.

URBAN ARBOR
The Trusted Name in Tree Management

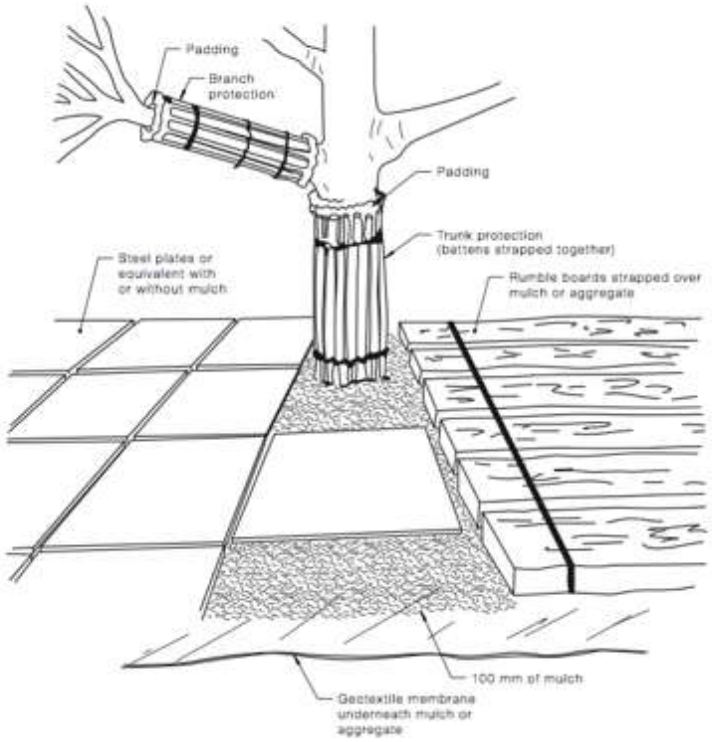


LEGEND:
1 Chain wire mesh panels with shade cloth (if required) attached, held in place with concrete feet.
2 Alternative plywood or wooden paling fence panels. This fencing material also prevents building materials or soil entering the TPZ.
3 Mulch installation across surface of TPZ (at the discretion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

An image from AS4970-2009,[11] with example tree protection.

[11] Council Of Standards Australia, *AS4970 Protection of trees on development sites* (2009), page 16.

URBAN ARBOR
The Trusted Name in Tree Management



NOTES:

1 For trunk and branch protection use boards and padding that will prevent damage to bark. Boards are to be strapped to trees, not nailed or screwed.

2 Rumble boards should be of a suitable thickness to prevent soil compaction and root damage.

An image from AS4970-2009,[12] with example tree protection.

11.7 **Restricted activities inside TPZ:** The following activities must be avoided inside the TPZ of all trees to be retained unless approved by the project Arborist. If at any time these activities cannot be avoided an alternative must be agreed in writing with the project Arborist to minimise the impact to the tree.

A) Machine excavation.
B) Ripping or cultivation of soil.
C) Storage of spoil, soil or any such materials
D) Preparation of chemicals, including preparation of cement products.
E) Refuelling.
F) Dumping of waste.
G) Wash down and cleaning of equipment.
H) Placement of fill.
I) Lighting of fires.
J) Soil level changes.
K) Any physical damage to the crown, trunk, or root system.
L) Parking of vehicles.

[12] Council Of Standards Australia, *AS4970 Protection of trees on development sites* (2009), page 17.

URBAN ARBOR
The Trusted Name in Tree Management

11.8 **Demolition:** The demolition of all existing structures inside or directly adjacent to the TPZ of trees to be retained must be undertaken in consultation with the project Arborist. Any machinery is to work from inside the footprint of the existing structures or outside the TPZ, reaching in to minimise soil disturbance and compaction. If it is not feasible to locate demolition machinery outside the TPZ of trees to be retained, ground protection will be required. The demolition should be undertaken inwards into the footprint of the existing structures, sometimes referred to as the 'top down, pull back' method.

11.9 **Excavations:** The project Arborist must supervise and certify that all excavations and root pruning are in accordance with AS4373-2007 and AS4970-2009. For continuous strip footings, first manual excavation is required along the edge of the structures closest to the subject trees. Manual excavation should be a depth of 1 metre (or to unfavourable root growth conditions such as bed rock or heavy clay, if agreed by project Arborist). Next roots must be pruned back in accordance with AS4373-2007. After all root pruning is completed, machine excavation is permitted within the footprint of the structure. For tree sensitive footings, such as pier and beam, all excavations inside the TPZ must be manual. Manual excavation may include the use of pneumatic and hydraulic tools, high-pressure air or a combination of high-pressure water and a vacuum device. No pruning of roots greater 30mm in diameter is to be carried out without approval of the project arborist. All pruning of roots greater than 30mm in diameter must be carried out by a qualified Arborist/Horticulturalist with a minimum AQF level 3. Root pruning is to be a clean cut with a sharp tool in accordance with AS4373 Pruning of amenity trees (2007).[13] The tree root is to be pruned back to a branch root if possible. Make a clean cut and leave as small a wound as possible.

11.10 **Landscaping:** All landscaping works within the TPZ of trees to be retained are to be undertaken in consultation with a consulting Arborist to minimize the impact to trees. General guidance is provided below to minimise the impact of new landscaping to trees to be retained.

- Level changes should be minimised. The existing ground levels within the landscape areas should not be lowered by more than 100mm or increased by more than 100mm (300mm increase is acceptable if using a coarse free draining material) without assessment by a consulting Arborist.
- New retaining walls should be avoided. Where new retaining walls are proposed inside the TPZ of trees to be retained, they should be constructed from tree sensitive material, such as timber sleepers, that require minimal footings/excavations. If brick retaining walls are proposed inside the TPZ, considerer pier and beam type footings to bridge significant roots that are critical to the trees condition. Retaining walls must be located outside the SRZ and sleepers/beams located above existing soil grades.

[13] Council Of Standards Australia, *AS 4373 Pruning of amenity trees* (2007) page 18

- New footpaths and hard surfaces should be minimised, as they can limit the availability of water, nutrients and air to the trees root system. Where they are proposed, they should be constructed on or above existing soil grades to minimise root disturbance and consider using a permeable surface. Footpaths should be located outside the SRZ where possible.
- Where fill/sub base is used inside the TPZ, fill material should be a coarse granular material that does not restrict the flow of water and air to the root system below. This type of material will also reduce the impact of soil compaction during construction.
- The location of new plantings inside the TPZ of trees to be retained should be flexible to avoid unnecessary damage to tree roots greater than 30mm in diameter.

11.11 **Underground Services:** Where possible underground services should be located outside the TPZ of trees to be retained. All underground services located inside the TPZ of any tree to be retained must be installed via tree sensitive techniques. This should include either directional drilling methods or manual excavations to minimise the impact to trees identified for retention. No roots greater than 40mm in diameter should be severed during the installation of service pipes unless approved in writing by the project Arborist.

11.12 **Sediment and Contamination:** All contamination run off from the development such as but not limited to concrete, sediment and toxic wastes must be prevented from entering the TPZ at all times.

11.13 **Tree Wounding/Injury:** Any wounding or injury that occurs to a tree during the construction process will require the project Arborist to be contacted for an assessment of the injury and provide mitigation/remediation advice. It is generally accepted that trees may take many years to decline and eventually die from root damage. All repair work is to be carried out by the project Arborist, at the contractor's expense.

11.14 **Completion of Development Works:** After all construction works are complete the project Arborist should assess that the subject trees have been retained in the same condition and vigour. If changes to condition are identified the project Arborist should provide recommendations for remediation.

URBAN ARBOR
The Trusted Name in Tree Management

12. CONSTRUCTION HOLD POINTS FOR TREE PROTECTION

12.1 **Hold Points:** Below is a sequence of hold points requiring project Arborist certification throughout the development process**.** It provides a list of hold points that must be checked and certified. All certification must be provided in written format upon completion of the development. The final certification must include details of any instructions for remediation undertaken during the development. The principal contractor should be responsible for implementing all tree protection requirements.

Hold Point	Stage	Date Completed and Signature of Project Arborist Responsible
Project Arborist to hold pre construction site meeting with principal contractor to discuss methods and importance of tree protection measures and resolve any issues in relation to feasibility of tree protection requirements that may arise. Project Arborist to mark all trees approved for removal under DA consent.	Prior to development work commencing	
Project Arborist to assess and certify that tree protection has been installed in accordance with AS4970-2009 prior to works commencing at site.	Prior to development work commencing.	
In accordance with AS4970-2009 the project arborist should carryout regular site inspections to ensure works are carried out in accordance with the recommendations. Site inspections are recommended on a monthly frequency.	On-going throughout the development	
The removal of existing structures inside the TPZ of any tree to be retained, such as the existing buildings and hard surfaces must be supervised by the project Arborist.	Demolition	
Project Arborist to supervise all manual excavations and root pruning inside the TPZ of any tree to be retained. Project Arborist to approve all pruning of roots greater than 30mm inside TPZ. All root pruning of roots greater than 30mm in diameter must be carried out by a qualified Arborist/Horticulturalist with a minimum AQF level 3.	Construction	
Project Arborist to certify that all underground services including storm water inside TPZ of any tree to be retained have been installed in accordance with AS4970-2009.	Construction	
All landscaping works within the TPZ of trees to be retained are to be undertaken in consultation with the project Arborist to minimise the impact to trees.	Construction/ Landscape	
After all demolition, construction and landscaping works are complete the project Arborist should assess that the subject trees have been retained in the same condition and vigour. If changes to condition are identified the project Arborist should provide recommendations for remediation.	Upon completion of development	

URBAN ARBOR
The Trusted Name in Tree Management

13. BIBLIOGRAPHY/REFERENCES

- Council Of Standards Australia, *AS4970 Protection of trees on development sites* (2009).
- Council Of Standards Australia, *AS4373 Pruning of amenity trees* (2007).
- Mattheck, C. & Breloer, H., *The body language of trees - A handbook for failure analysis*, The Stationary Office, London, England (2015).
- Lonsdale, D., *Principles of tree hazard assessment and management*, The Stationary Office, London, England (1999).
- 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).
- 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 Tree Consultancy, *Tree AZ version 10.10-ANZ*, http://www.treeaz.com/.
- *Canterbury Local Environmental Plan 2012*, https://www.legislation.nsw.gov.au/#/view/EPI/2012/673.
- *Canterbury Development Control Plan 2012*, https://www.cbcity.nsw.gov.au/development/planning-control-policies/canterbury-development-control-plan-2012.

14. LIST OF APPENDICES

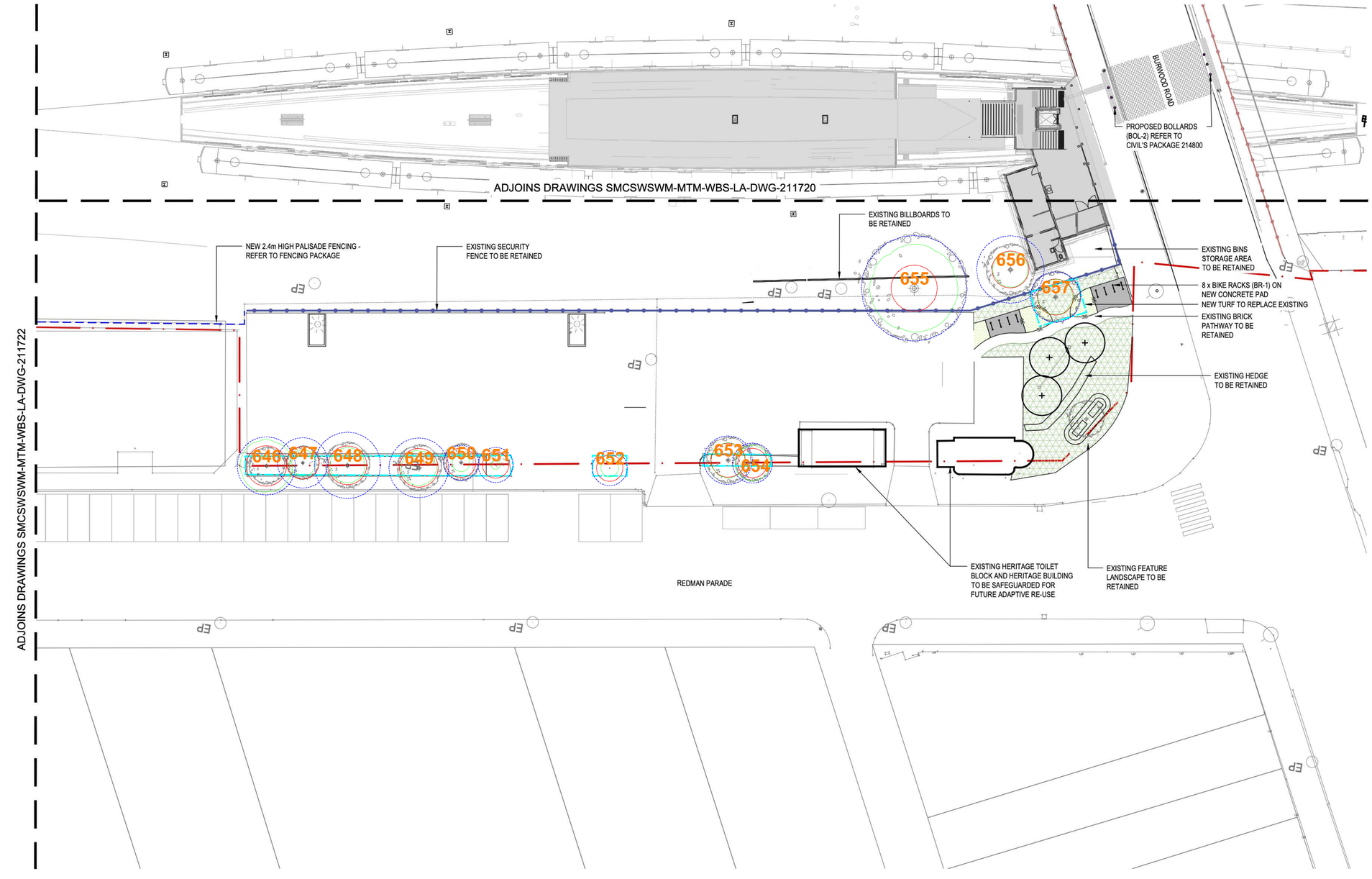
The following are included in the appendices:
Appendix 1A - Proposed Plan North
Appendix 1B - Proposed Plan South
Appendix 1C - Proposed Service Building
Appendix 2 - Tree Inspection Schedule
Appendix 3 - Further information of methodology

Jack Williams
Diploma of Arboriculture (AQF5)
FdSc Arboriculture
Registered Consulting Arborist No. 2556
ISA Member No. 228863
Quantified Tree Risk Assessment (QTRA)
ISA Tree Risk Assessment Qualification (TRAQ)

Bryce Claassens
Diploma of Arboriculture (AQF5)
Cert III Landscape Construction
Member Arboriculture Australia
QTRA
TRAQ

TO SYDNEY

TO BANKSTOWN



LEGEND

GENERAL
- RAILCORP PROPERTY BOUNDARY

FENCING
- NEW 2.4m HIGH PALISADE SECURITY FENCE
- PROPOSED THROW SCREEN REFER TO URBAN DESIGN PACKAGE 211810
- EXISTING PALISADE FENCE

TREES
- EXISTING TREES TO BE RETAINED
- PROPOSED TREES

LANDSCAPE
- PROPOSED PLANTING
- NEW TURF TO REPLACE EXISTING
- EXISTING PLANTING

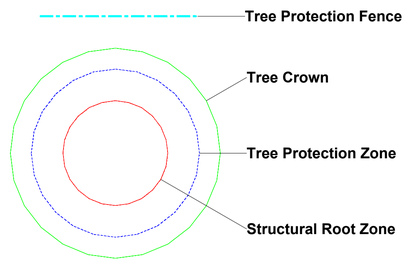
HARDSCAPE
REFER TO MATERIAL SCHEDULE DRAWING NO. SMCSWSWM-MTM-WBS-LA-DWG-211771
- PROPOSED CONCRETE

STREET FURNITURE
- BR-1 PROPOSED BIKE PARKING (RACKS)
- BOL-2 PROPOSED SAFETY BOLLARDS REFER TO THE BRIDGE PACKAGE DWG - 214800

STREETSCAPE
- EXISTING POWER POLES / CCTV POLES

NOTES:
- THE DESIGN IS BASED ON SYDNEY METRO CHAINAGE. PLEASE REFER TO CIVIL DRAWINGS FOR SYDNEY METRO CHAINAGE ALIGNMENT (PACKAGE NO. 103).
- REFER TO CIVIL DESIGN PACKAGE 213 FOR ALL FOOTPATH LEVELS.
- REFER TO FENCING PACKAGE 213 FOR ALL FENCING SET OUT AND LOCATIONS.
- REFER TO UTILITIES PACKAGE 213 FOR ALL SERVICES LAYOUTS.
- REFER TO ARCHITECTURAL PACKAGE 211 FOR ALL STATION

Tree Legend



0 — 40m

DRAWING COLOUR CODED - PRINT ALL COPIES IN COLOUR

Urban Arbor Pty Ltd
PO Box 450, Turramurra, NSW, 2074
sales@urbanarbor.com.au, (02) 8004 2802

Site Location: Belmore Station, Belmore, NSW

SCALE :	DATE :
1 : 250 @ A1	23/12/2020

Appendix 1A: Proposed Plan North

URBAN ARBOR
The Trusted Name in Tree Management

Prepared by: Bryce Claassens

TO SYDNEY

TO BANKSTOWN

NEW COM BOX FOR LIGHTING - REFER TO ENGINEERS PACKAGE 213

TOBRUK AVENUE

01 211723

EXISTING FOOTPATH AND PRAM RAMP TO BE RETAINED

RELOCATED BIN (BIN-1)

NEW PAVING (PAV-2) - REFER TO PAVING PLAN SMCSWSWM-MTM-WBS-LA-DWG-211730

EXISTING BUS SIGN AND TACTILE TO BE RETAINED

PROPOSED TREE GRATES (TG-1) WITH SEATING - REFER TO DETAIL PLAN SMCSWSWM-MTM-WBS-LA-DWG-211760

EXISTING BUS SHELTER TO BE RETAINED AND REPAINTED

PROPOSED DIRECTIONAL TACTILE REFER TO SMCSWSWM-MTM-WBS-LA-DWG-211731

PROPOSED 8 BIKE RACKS

RELOCATED BOOK LIBRARY / BIN

EXISTING ACCESSIBLE PARKING TO BE RETAINED

EXISTING PARKING LINE MARKING TO BE RETAINED

NEW TACTILE AND 2 x BOLLARDS (BOL-1)

NEW 2.4m HIGH PALISADE FENCING - REFER TO FENCING PACKAGE

PROPOSED PLANTING REFER TO PLANTING PLAN SMCSWSWM-MTM-WBS-LA-DWG-211740

EXISTING POWER POLES TO BE RETAINED

THROW SCREEN REFER TO URBAN DESIGN PACKAGE 211810

BURWOOD ROAD

EXISTING THRESHOLD TO BE RETAINED

PROPOSED BOLLARDS (BOL-2) REFER TO CIVIL'S PACKAGE 214800

BRIDGE ROAD

ADJOINS DRAWINGS SMCSWSWM-MTM-WBS-LA-DWG-211721

DRAWING COLOUR CODED - PRINT ALL COPIES IN COLOUR

LEGEND

GENERAL

RAILCORP PROPERTY BOUNDARY

FENCING

NEW 2.4m HIGH PALISADE SECURITY FENCE

PROPOSED THROW SCREEN REFER TO URBAN DESIGN PACKAGE 211810

EXISTING PALISADE FENCE

TREES

EXISTING TREES TO BE RETAINED

PROPOSED TREES

LANDSCAPE

PROPOSED PLANTING

EXISTING PLANTING

HARDSCAPE

REFER TO MATERIAL SCHEDULE DRAWING NO. SMCSWSWM-MTM-WBS-LA-DWG-211771

PAV-1 EXISTING PAVING

PAV-2 CHARCOAL COLOUR UNITPAVING IN STACK BOND TO MATCH EXITING (400 x 400 x 40mm)

EXTENT OF STRATAVAULT

PROPOSED CONCRETE

STREET FURNITURE

REFER TO MATERIAL SCHEDULE DRAWING NO. SMCSWSWM-MTM-WBS-LA-DWG-211771

PROPOSED K&R SHELTER (SHE-1)

PROPOSED SEATING (ST-1)

TG-1 PROPOSED TREE GRATE

BR-1 PROPOSED BIKE PARKING (RACKS)

TACTILE INDICATORS (TI-1 / TI-2)

EXISTING TACTILE INDICATORS

BIN-1 RELOCATED BIN

MOBILE BOOK LIBRARY

Tree Legend

Tree Protection Fence

Tree Crown

Tree Protection Zone

Structural Root Zone

0 40m

Urban Arbor Pty Ltd

PO Box 450, Turramurra, NSW, 2074
sales@urbanarbor.com.au, (02) 8004 2802

Site Location: Belmore Station, Belmore, NSW

SCALE : 1 : 250 @ A1

DATE : 23/12/2020

Appendix 1B: Proposed Plan South

Prepared by: Bryce Claassens

FROM SYDENHAM

TO BANKSTOWN

N

13km 620 | 13km 640 | 13km 660 | 13km 680 | 13km 700 | 13km 720 | 13km 740 | 13km 760

SECURITY FENCE ISOLATION PANEL REFER TO DRAWING SMCSWSWM-MTM-WBS-CE-DWG-463121 FOR DETAILS (TYP).

3.0m HIGH EXTENDED FENCE PANEL. REFER TO DRAWING SMCSWSWM-MTM-WBS-CE-DWG-463123

HEAVY DUTY BOLLARDS. DIA 140mm. MIN HEIGHT 1000mm.

VEGETATED SWALE, REFER TO DETAILS ON ARCHITECT PACKAGE 211 FOR PLANTING DETAILS

FOR FENCE DETAIL REFER TO DRAWING 463124 AND 463125

SECURITY FENCE TIE-IN WITH BUILDING WALL. REFER TO DRAWING 463125

PROPOSED 2.4m HIGH 4m WIDE CORRIDOR SECURITY GATE.

EXISTING KERB TO BE REMOVED. STANDARD RMS KERB LAYBACK TO BE INSTALLED

STANDARD RMS TYPE SO DISH DRAIN. MIN 1% IN 200 FALL TOWARD CULVERT. REFER TO INSET A

BUILDING

PADMOUNT

1% FALL

2270 2269 2268 2267 2264 2263 2262 2261 2260 3319 3317

SECURITY FENCE TIE-IN WITH BUILDING WALL. REFER TO DRAWING 463643

OH POWER ALREADY REMOVED FROM SITE

LANDSCAPE VEGETATION. REFER TO DETAILS ON ARCHITECT PACKAGE 211

FENCE PANELS AT THIS SECTION TO BE MOUNTED ON THE OUTSIDE FLANGE OF FENCE POSTS.

2.4m HIGH EXTENDED FENCE PANEL. REFER TO DRAWING SMCSWSWM-MTM-WBS-CE-DWG-463123

PROPOSED 3m HIGH 6m WIDE SERVICE BUILDING SECURITY GATE. REFER TO DRAWING SMCSWSWM-MTM-WBS-CE-DWG-463122 FOR DETAILS.

2265 2266

EXISTING VEHICLE CROSSING TO BE RETAINED

PROPOSED HANDRAIL REFER TO DETAILS ON ARCHITECT PACKAGE 211

CONTRACTORS TO REMOVE TREE TRUNK BUT LEAVE THE ROOTS IN GROUND, SO AS NOT TO DISTURB PAD ZONE.

EXISTING TREE TRUNK AND STUMP REMOVAL ... AVOID IMPACTS TO ... AL DEPOSIT SITE.

FENCE POST AT BACK OF RETAINING WALL TO BE MOUNTED ON BACK OF WALL FACE. REFER TO DRAWING SMCSWSWM-MTM-WBS-CE-DWG-463641 FOR DETAILS.

GRATE OVER CHANNEL FOR MAINTENANCE ACCESS

FOR GRATE DETAILS REFER TO DRAWINGS SMCSWSWM-MTM-WBS-CE-DWG-463311 TO 463312 .

POTENTIAL ARCHEOLOGICAL DEPOSIT 01 (ABORIGINAL CULTURAL HERITAGE ASSESSMENT REPORT, ARTEFACT 2018). NO WORKS ARE TO BE UNDERTAKEN IN THIS AREA.

REDMAN

REDMAN PDE PARADE

Tree Legend

- Tree Protection Fence
- Tree Crown
- Tree Protection Zone
- Structural Root Zone

0 — 30m

Urban Arbor Pty Ltd

PO Box 450, Turramurra, NSW, 2074
sales@urbanarbor.com.au, (02) 8004 2802

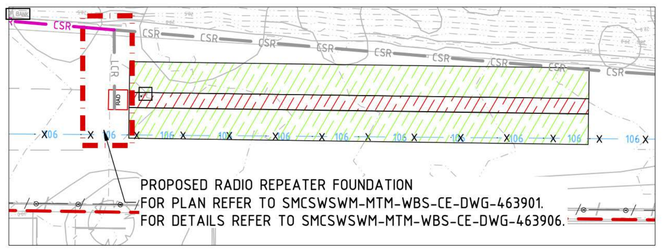
Site Location: Belmore Station, Belmore, NSW

SCALE : 1 : 200 @ A1	DATE : 23/12/2020	URBAN ARBOR The Trusted Name in Tree Management
Appendix 1C: Proposed Service Building		

Prepared by: Bryce Claassens

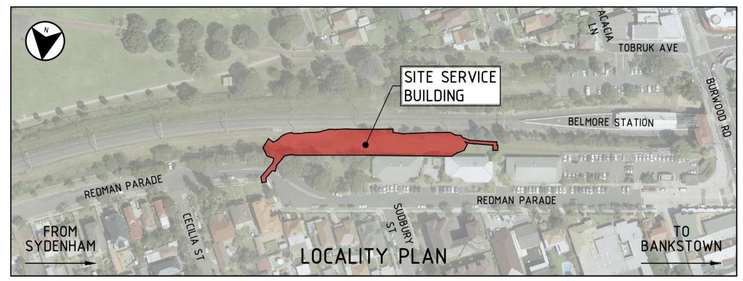
PLAN

SCALE 1:200



INSET A

SCALE 1:200



LOCALITY PLAN

DRAWING COLOUR CODED - PRINT ALL COPIES IN COLOUR

NOT FOR CONSTRUCTION

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
646	Water Gum	*Tristaniopsis laurina*	Mature	5	3	200	100	100	90	90	276	420	Good	Fair	Medium	2. Medium	A1	3.3	2.3	Multi stem tree. Deadwood in lower crown.
647	Weeping Bottlebrush	*Callistemon viminalis*	Semi-mature	2.5	1.5	150	120	100	100		239	250	Good	Good	Low	5. Small/Young	Z1	2.9	1.8	None.
648	Water Gum	*Tristaniopsis laurina*	Mature	5	2	230	160	100	100		314	380	Good	Fair	Medium	2. Medium	A1	3.8	2.2	Multi stem tree. Deadwood in lower crown.
649	Water Gum	*Tristaniopsis laurina*	Mature	5	2	200	200				283	380	Good	Good	Medium	1. Long	A1	3.4	2.2	Co-dominant stems.
650	Weeping Bottlebrush	*Callistemon viminalis*	Young	2	1	120	100				156	200	Good	Good	Low	5. Small/Young	Z1	2.0	1.7	None.
651	Water Gum	*Tristaniopsis laurina*	Young	1	0.5	80					80	90	Good	Good	Low	5. Small/Young	Z1	2.0	1.5	None.
652	Water Gum	*Tristaniopsis laurina*	Young	2	1	100					100	110	Good	Good	Low	5. Small/Young	Z1	2.0	1.5	None.
653	Robinia	*Robinia pseudoacacia*	Mature	5	2	230					230	280	Good	Good	Low	2. Medium	Z3	2.8	1.9	Exempt species.
654	Robinia	*Robinia pseudoacacia*	Semi-mature	5	2	190					190	200	Good	Good	Low	2. Medium	Z3	2.3	1.7	Exempt species.
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.
656	Illawara Flame	*Brachychiton acerifolius*	Mature	8	2	320					320	340	Good	Good	Medium	2. Medium	A1	3.8	2.1	Located within corridor. DBH estimated.
657	Robinia	*Robinia pseudoacacia*	Mature	5	2	200	130				239	320	Good	Good	Low	2. Medium	Z3	2.9	2.1	Exempt species.
658	Camphor Laurel	*Cinnamomum camphora*	Mature	9	8	670	610				906	780	Fair	Fair	Low	3. Short	Z4	10.9	3.0	Apical dieback. Large diameter deadwood. Tree is in decline.
659	Golden Robinia	*Robinia pseudoacacia 'Frisia'*	Semi-mature	5	2	180					180	200	Good	Fair	Low	2. Medium	Z3	2.2	1.7	Exempt species. Co-dominant stems with tight union.
660	Golden Robinia	*Robinia pseudoacacia 'Frisia'*	Semi-mature	4	2	150					150	170	Fair	Fair	Low	2. Medium	Z3	2.0	1.6	Exempt species. Apical dieback.
661	Golden Robinia	*Robinia pseudoacacia 'Frisia'*	Semi-mature	5	2	170					170	200	Good	Good	Low	2. Medium	Z3	2.0	1.7	Exempt species.
662	Golden Robinia	*Robinia pseudoacacia 'Frisia'*	Semi-mature	5	2	200					200	230	Fair	Fair	Low	3. Short	Z3	2.4	1.8	Exempt species. Dieback of S stem.
663	Golden Robinia	*Robinia pseudoacacia 'Frisia'*	Semi-mature	5	2	180					180	220	Good	Fair	Low	2. Medium	Z3	2.2	1.8	Exempt species.
664	Eucalypt	*Eucalyptus spp*	Mature	16	8	870					870	990	Good	Good	Very High	1. Long	A1	10.4	3.3	Minor deadwood.
665	Golden Robinia	*Robinia pseudoacacia 'Frisia'*	Semi-mature	5	2	160					160	180	Good	Fair	Low	2. Medium	Z3	2.0	1.6	Exempt species. Suppressed.
666	Golden Robinia	*Robinia pseudoacacia 'Frisia'*	Mature	5	3	260	110				282	310	Fair	Fair	Low	3. Short	Z3	3.4	2.0	Exempt species. In decline.
667	Golden Robinia	*Robinia pseudoacacia 'Frisia'*	Mature	5	4	240	170	140			326	440	Poor	Poor	Low	4. Remove	Z4	3.9	2.3	Exempt species. Tree is in advanced stages of decline.
668	Queensland Brushbox	*Lophostemon confertus*	Mature	6	4	520					520	580	Good	Good	Medium	1. Long	A1	6.2	2.6	None.
669	Weeping Bottlebrush	*Callistemon viminalis*	Mature	8	4	550	400	250	300		784	1000	Fair	Fair	Medium	2. Medium	A2	9.4	3.3	Minor apical dieback. Monitor tree health.
670	Queensland Brushbox	*Lophostemon confertus*	Mature	4.5	3	300					300	400	Good	Fair	Medium	2. Medium	A1	3.6	2.3	None.
671	Weeping Bottlebrush	*Callistemon viminalis*	Mature	6	3	270	260	180			416	400	Good	Good	Medium	1. Long	A1	5.0	2.3	None.
672	Weeping Bottlebrush	*Callistemon viminalis*	Mature	8	4	550	300	220	200		693	800	Good	Good	Medium	2. Medium	A1	8.3	3.0	Fire damage on trunk.
673	Lemon Scented Tea Tree	*Leptospermum petersonii*	Mature	5	3	190	160				248	300	Good	Fair	Medium	2. Medium	A1	3.0	2.0	Co-dominant stems at base with indicators of instability.
674	Weeping Bottlebrush	*Callistemon viminalis*	Mature	9	5	800					800	800	Good	Good	Medium	1. Long	A1	9.6	3.0	None.
2260	Unknown	*Unknown spp*	Semi-mature	9	3	250	200				320	400	Good	Fair	Medium	3. Short	Z9	3.8	2.3	Loss of cambium and evidence of decay on stems.
2261	Weeping Bottlebrush	*Callistemon viminalis*	Semi-mature	5	1	200					200	200	Good	Fair	Low	5. Small/Young	Z1	2.4	1.7	None.
2262	Unknown	*Unknown spp*	Young	5	1	150					150	180	Good	Fair	Low	5. Small/Young	Z1	1.8	1.6	None.
2263	Prickly Leaved Paperbark	*Melaleuca styphelioides*	Mature	11	5	470					470	500	Good	Good	High	1. Long	A1	5.6	2.5	Canopy extends into corridor.
2264	Weeping Bottlebrush	*Callistemon viminalis*	Mature	7	2	220	140				261	310	Good	Fair	Medium	2. Medium	A1	3.1	2.0	Asymmetric crown shape. Suppressed by adjacent tree.
2265	Broad Leaved Paperbark	*Melaleuca quinquenervia*	Mature	15	7	770					770	850	Good	Good	High	1. Long	A1	9.2	3.1	None.
2266	Bangalay	*Eucalyptus botryoides*	Mature	14	5	500					500	550	Good	Good	High	1. Long	A1	6.0	2.6	None.
2267	Plum Fruited Yew	*Afrocarpus falcatus*	Mature	8	4	500					500	500	Good	Good	Medium	1. Long	A1	6.0	2.5	None.
2268	Common or Black Mulberry	*Morus nigra*	Young	5	1	80					80	100	Good	Fair	Low	5. Small/Young	Z1	1.0	1.5	None.
2269	Swamp Mahogany	*Eucalyptus robusta*	Mature	12	6	600					600	660	Good	Fair	High	2. Medium	A1	7.2	2.8	Asymmetric crown shape.

Appendix 2 - Tree Inspection Schedule

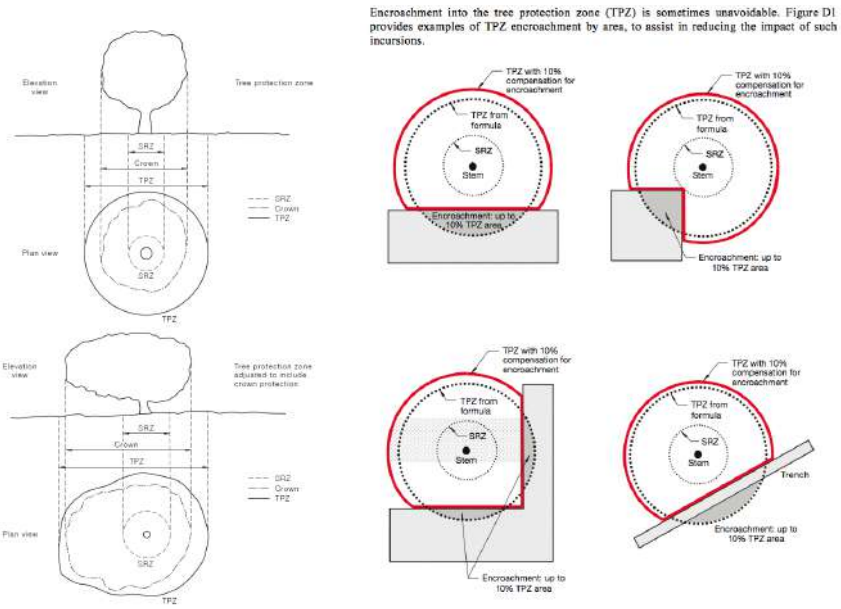
Tree ID	Common Name	Botanical Name	Age Class	Height (m)	Canopy Spread Radius (m)	Stem 1	Stem 2	Stem 3	Stem 4	Stem 5	DBH (mm)	DAB (mm)	Health	Structure	Amenity Value	SULE	Retention Value	TPZ Radius (m)	SRZ Radius (m)	Notes
2270	Eucalypt	*Eucalyptus spp*	Semi-mature	6	2	110	110				156	300	Good	Fair	Low	5. Small/Young	Z1	1.9	2.0	Regrowth from stump.
3316	Murraya	*Murraya paniculata*	Semi-mature	5	2	250					250	250	Good	Fair	Low	5. Small/Young	Z1	3.0	1.8	Located within community center. Retaining wall along boundary is restricting root growth into corridor.
3317	Murraya	*Murraya paniculata*	Young	4	1	200					200	200	Good	Fair	Low	5. Small/Young	Z1	2.4	1.7	Located within community center. Retaining wall along boundary is restricting root growth into corridor.
3318	Weeping Bottlebrush	*Callistemon viminalis*	Mature	9	4	400					400	520	Good	Good	High	1. Long	A1	4.8	2.5	Located within community center. Retaining wall along boundary is restricting root growth into corridor.
3319	Murraya	*Murraya paniculata*	Young	4	1	200					200	200	Good	Fair	Low	5. Small/Young	Z1	2.4	1.7	Located within community center. Retaining wall along boundary is restricting root growth into corridor.
3320	Murraya	*Murraya paniculata*	Semi-mature	4	2	250					250	250	Good	Fair	Low	5. Small/Young	Z1	3.0	1.8	Located within community center. Retaining wall along boundary is restricting root growth into corridor.

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.

URBAN ARBOR
The Trusted Name in Tree Management

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 2 – BELMORE AIA (PLATEAU TREES)

PLATEAUTREES
Safety. Quality. Progress.

Date: 28 September 2021

Re: Additional tree removal and pruning works at Belmore Station as part of the Southwest Metro Package.

At the request of Downer Group an onsite inspection was undertake at Belmore Station. It has been asked to record additional tree removals and selective pruning works as part of the Southwest Metro Package. The assessed trees are not identified within the Arboricultural Impact Assessment (AIA) prepared by Urban Arbor, dated 17 December 2019, Ref 19/12/17/SWMMS. On the 7 April a site walkthrough was undertaken by myself under guidance of a Downer Group representative.

Twelve additional trees were identified for removal. These trees are in direct conflict with proposed pilling (1), excavation works (2,3,4,6,8,9,10,11,12), realignment of the GST (7) and sewer (13). Two trees have been assessed for selective pruning works to create clearances to accommodate the works (5) and allow for site access (14). An aerial image of the site showing approximate tree locations can be found as Image 1. Tree data can be found as Appendix 1 of this report.

Trees identified for removal are considered to have low amenity and visual value given their size and location within the rail corridor. They are likely to be self-seeded specimens or regrowth off old stumps where previous tree removal works have been undertaken. Selective pruning works have been detailed in Appendix 3 of this report. All pruning works are to be undertaken by suitably qualified tree workers and meet the requirements of *AS4373-2007 Pruning of Amenity Trees*.

Plateau Tree Service Pty Ltd
PO BOX 1522, DEE WHY NSW 2099 Australia
P: 02 9939 5350 | F: 02 9905 7569
E: info@plateautrees.com.au | W: www.plateautrees.com.au
ABN : 17 090 798 002

All appropriate approvals and consents are to be obtained prior to tree and vegetation removal works commencing. Given their size and location, it is felt that trees 2, 3, 4, 6, 7, 8, 9, 10, 11, 12 and 13 may be removed using an excavator without significant impact on tree 5.

Image 1: Aerial image of Belmore station showing approximate tree locations. Red dots indicate trees to be removed, green dots indicate trees to be pruned.

Tree 1 *Ligustrum sinensis* (Small-leafed Privet) is an identified species under the *Biosecurity Act 2015*. A general biosecurity duty exists within NSW to prevent, eliminate or minimise any biosecurity risk. The trees and not representative of a threatened or endangered species or ecological community.

Please feel free to contact me should you require any further assistance regarding this matter.

Regards.

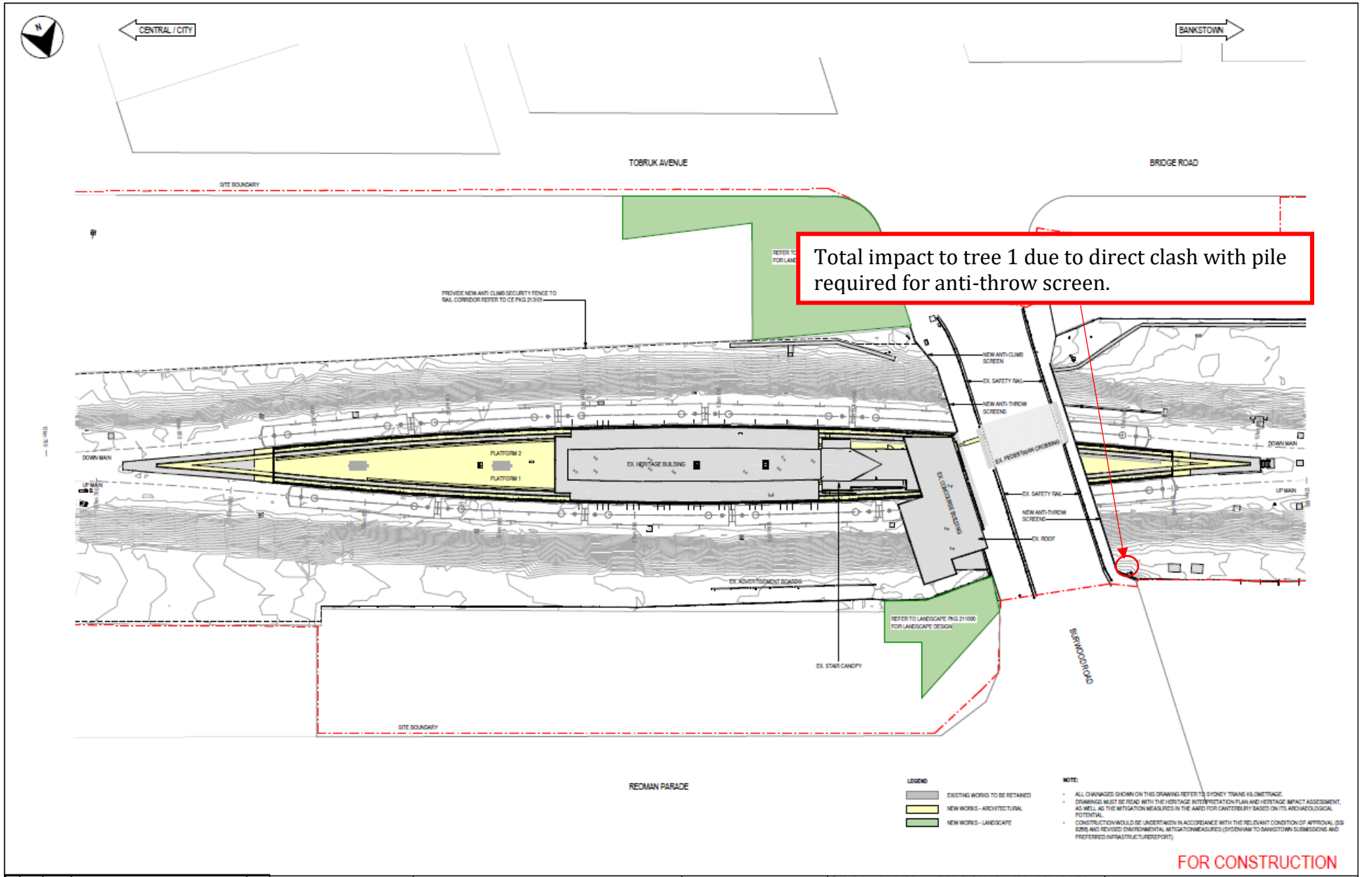
Owen Tebbutt

Plateau Tree Service

Appendix 1: Tree assessment Schedule

PLATEAUTREES
Safety. Quality. Progress.

Tree number	Tree name	Tree dimensions				Vigour	Condition	Age class	ULE	Amenity and Visual Value	Native or Exotic	TPZ (m)	SRZ (m)	Comments	Remove or Retain
	Botanical name Common name	Height (m)	Spread (m)	D.B.H. (mm)	D.A.B. (mm)										
1	*Ligustrum sinensis* (Small-leafed Privet)	5-10	2x2	200	300	N	F	M	R	L	E	2	1.5	Minimum TPZ and SRZ apply. Listed weed under Biosecurity Act 2015. Clash with Piling for anti-throw screens.	Remove
2	*Acacia* sp (Wattle)	<5	1x1	30,30	-	N	G	Y	S	L	N	2	1.5	Direct clash with permanent CSR route.	Remove
3	*Leptospermum* sp (Tee Tree)	<5	1x1	multi	-	N	G	Y	S	L	N	2	1.5	Direct clash with permanent CSR route.	Remove
4	*Unknown species*	<5	1x1	multi	-	N	G	Y	S	L	-	2	1.5	Direct clash with permanent CSR route.	Remove
5	*Acacia* sp (Wattle)	5-10	2x2	40,40,40	-	N	G	Y	S	L	N	2	1.5	Minimum TPZ and SRZ apply.	Retain and prune
6	*Acacia* sp (Wattle)	<5	1x1	20	-	N	G	Y	S	L	N	2	1.5	Direct clash with permanent CSR route.	Remove
7	*Eucalyptus robusta* (Swamp Mahogany)	5-10	2x2	90,90, 60,30,30	-	N	G	Y	S	L	N	2	1.5	Direct clash with permanent GST.	Remove
8	*Acacia* sp (Wattle)	<5	1x1	30,30	-	N	G	Y	S	L	N	2	1.5	Direct clash with permanent CSR route.	Remove
9	*Pittosporum undulatum* (Sweet Pittosporum)	<5	1x1	multi	-	N	G	Y	S	L	N	2	1.5	Direct clash with permanent CSR route.	Remove
10	*Acacia* sp (Wattle)	<5	1x1	20,20,20	-	N	G	Y	S	L	N	2	1.5	Direct clash with permanent CSR route.	Remove
11	*Acacia* sp (Wattle)	<5	1x1	15	-	N	G	Y	S	L	N	2	1.5	Direct clash with permanent CSR route.	Remove
12	*Acacia* sp (Wattle)	<5	1x1	40	-	N	G	Y	S	L	N	2	1.5	Direct clash with permanent CSR route.	Remove
13	*Eucalyptus robusta* (Swamp Mahogany)	5-10	2x2	60,60,40, 40	-	N	G	Y	S	L	N	2	1.5	Direct clash with permanent sewerage service.	Remove
14	*Eucalyptus robusta* (Swamp Mahogany)	10-15	7x7	450	550	N	G	M	M	M	N	5.4	2.57	Tree located within road reserve area adjacent rail corridor access gate	Retain and prune



Total impact to tree 1 due to direct clash with pile required for anti-throw screen.

FOR CONSTRUCTION

REV	BY	DATE	DESCRIPTION	APPD
00	AW	31/03/2021	APPROVED FOR CONSTRUCTION	LP

1:250 FULL SIZE A1

A1 Original | Co-ordinate System: MGA Zone 56 | Height Datum: A.H.D. | This sheet may be prepared using colour and may be incomplete if copied

NOTE: Do not scale from this drawing.

ALT. DRG No. SMCSWSWM-MTM-WBS-AT-DWG-211120

CLIENT: Transport for NSW | Sydney Metro

SERVICE PROVIDERS: METRON T2M

DRAWN: I. ROMO
DESIGNED: G. DAVIES
DRG CHECK: A. MITRAKOSKI
DESIGN CHECK: G. DAVIES
APPROVED: L. DALVEY 31/03/2021

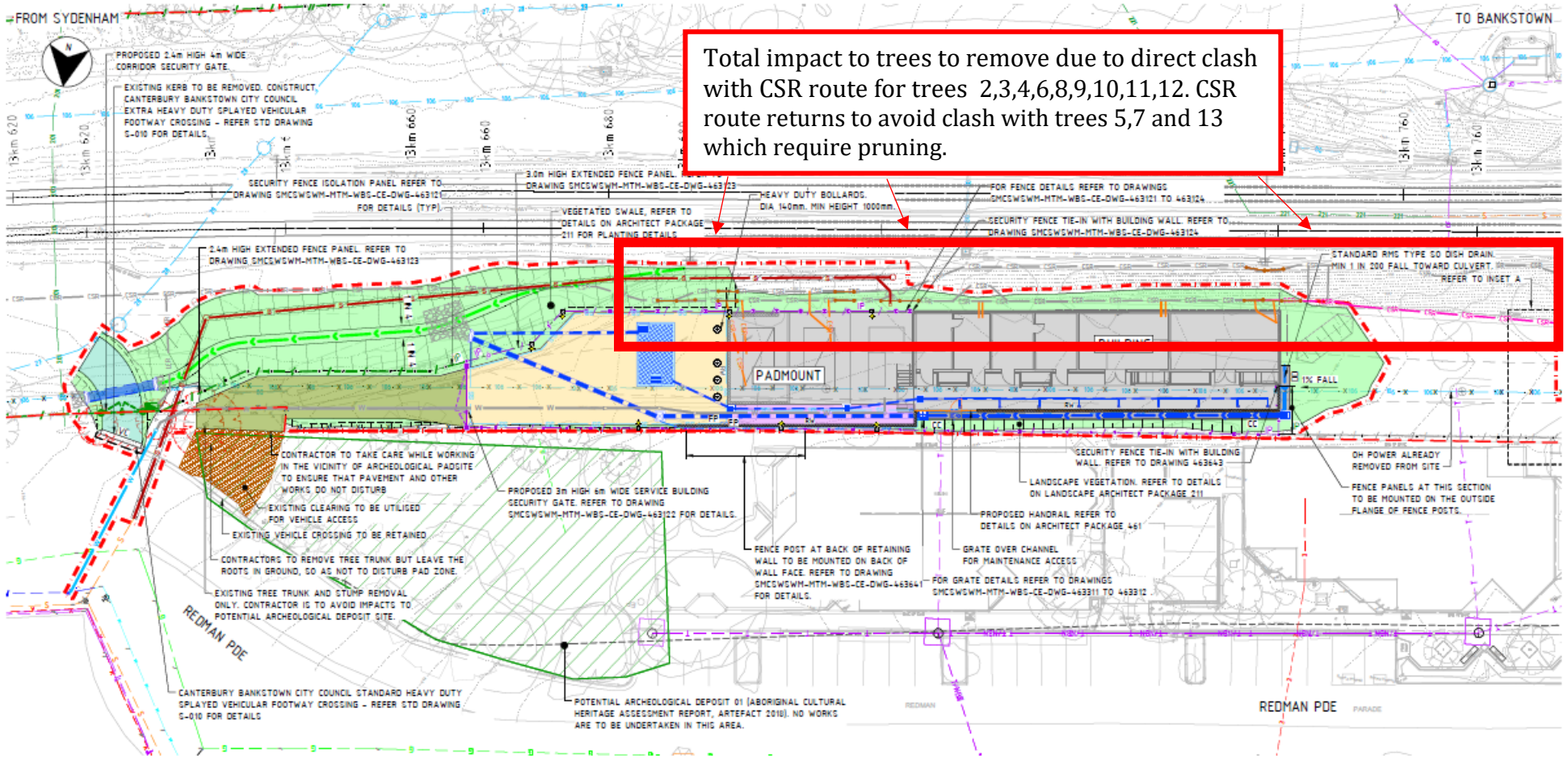
SYDNEY METRO

BELMORE STATION (13.555km to 14.029km Sydney Metro Kilometrage)
ARCHITECTURAL DESIGN
OVERALL ARRANGEMENT
SITE PLAN

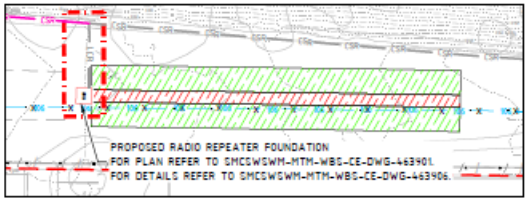
STATUS: FOR CONSTRUCTION | SHEET 1 OF 1

DRG No. SMCSWSWM-MTM-WBS-AT-DWG-211120 | REV. 00

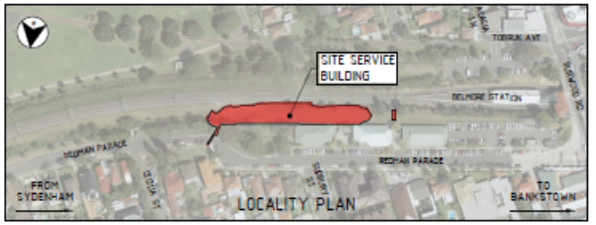
Total impact to trees to remove due to direct clash with CSR route for trees 2,3,4,6,8,9,10,11,12. CSR route returns to avoid clash with trees 5,7 and 13 which require pruning.



PLAN
SCALE 1:200



INSET A
SCALE 1:200



NOTES

1. FOR GENERAL NOTES REFER TO DRAWINGS SMCSWSWM-MTM-WBS-CE-DWG-463104 TO 463107.
2. FOR LEGEND REFER TO DRAWING SMCSWSWM-MTM-WBS-CE-DWG-463108 TO 463109.
3. REFER TO STATION DESIGN PACKAGES FOR PLATFORM AND BUILDING WORKS.
4. FOR PAVEMENT PLAN REFER TO DRAWING SMCSWSWM-MTM-WBS-CE-DWG-463161.
5. FOR BULK EARTHWORKS CUT AND FILL PLAN REFER DRAWING SMCSWSWM-MTM-WBS-CE-DWG-463201.
6. FOR BULK EARTHWORKS GRADING PLAN AND LONGITUDINAL SECTION REFER TO DRAWING SMCSWSWM-MTM-WBS-CE-DWG-463206.
7. FOR DRAINAGE GENERAL ARRANGEMENT PLAN REFER TO DRAWING SMCSWSWM-MTM-WBS-CE-DWG-463301.
8. FOR CSR GENERAL ARRANGEMENT PLAN REFER TO DRAWING SMCSWSWM-MTM-WBS-CE-DWG-463411. DO NOT REFER TO ANY OTHER GENERAL ARRANGEMENT PLANS FOR THE DESIGN AND EXTENTS OF CSR WORKS.
9. FOR UTILITIES GENERAL ARRANGEMENT PLAN REFER TO DRAWING SMCSWSWM-MTM-WBS-CE-DWG-463501.
10. FOR RETAINING WALL PLAN AND DETAILS, INCLUDING HANDRAIL DETAILS, REFER DRAWINGS SMCSWSWM-MTM-WBS-CE-DWG-463611 TO 464643.
11. NO MACHINERY EXCAVATIONS ARE TO BE CARRIED OUT WITHIN 1M OFFSET FROM THE PAD (POTENTIAL ARCHEOLOGICAL DEPOSIT) ZONE.

DRAWING COLOUR CODED - PRINT ALL COPIES IN COLOUR

FOR CONSTRUCTION

REV	BY	DATE	DESCRIPTION	APPD
00	MC	31.03.2021	APPROVED FOR CONSTRUCTION	LP

SCALES: 1:200 FULL SIZE A1

CLIENT: NSW GOVERNMENT | sydney METRO

SERVICE PROVIDERS: METRON T2M

DRAWN: M. FORTU
DESIGNED: G. LUO / C. STANFORD
DRG CHECK: P. ALFORD
DESIGN CHECK: T. LEE
APPROVED: L. PALMER 31.03.2021

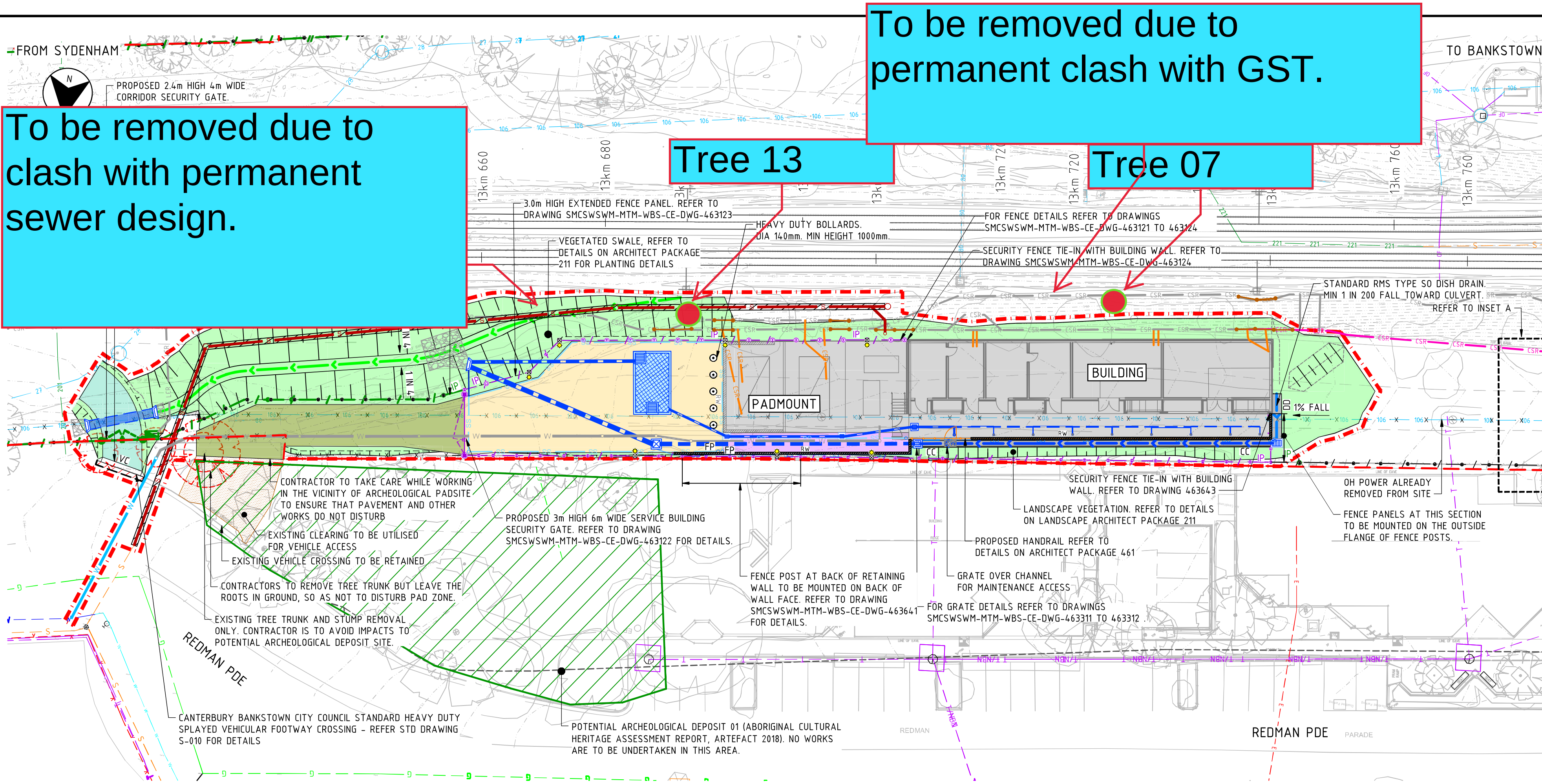
SYDNEY METRO
BELMORE STATION - SERVICE BUILDING
CIVIL ENGINEERING
SERVICE BUILDING - CIVIL
GENERAL ARRANGEMENT PLAN

STATUS: FOR CONSTRUCTION | SHEET 1 OF 1 | ©

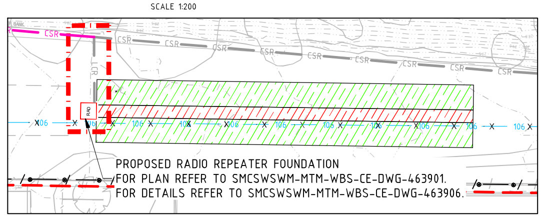
DRG No. SMCSWSWM-MTM-WBS-CE-DWG-463111 | REV. 00

ALT. DRG No. SMCSWSWM-MTM-WBS-CE-DWG-463111 0

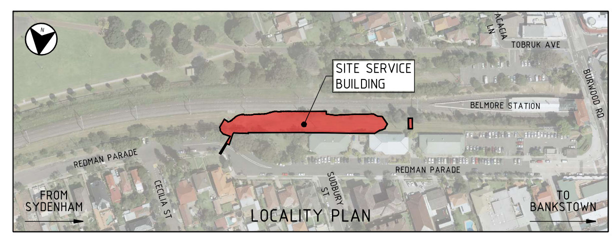
At Original | Co-ordinate System: MGA Zone 56 | Height Datum: A.H.D. | This sheet may be prepared using colour and may be incomplete if copied | NOTE: Do not scale from this drawing.



PLAN
SCALE 1:200



INSET A
SCALE 1:200



LOCALITY PLAN

NOTES

1. FOR GENERAL NOTES REFER TO DRAWINGS SMCSWSWM-MTM-WBS-CE-DWG-463104 TO 463107.
2. FOR LEGEND REFER TO DRAWING SMCSWSWM-MTM-WBS-CE-DWG-463108 TO 463109.
3. REFER TO STATION DESIGN PACKAGES FOR PLATFORM AND BUILDING WORKS.
4. FOR PAVEMENT PLAN REFER TO DRAWING SMCSWSWM-MTM-WBS-CE-DWG-463161.
5. FOR BULK EARTHWORKS CUT AND FILL PLAN REFER DRAWING SMCSWSWM-MTM-WBS-CE-DWG-463201.
6. FOR BULK EARTHWORKS GRADING PLAN AND LONGITUDINAL SECTION REFER TO DRAWING SMCSWSWM-MTM-WBS-CE-DWG-463206.
7. FOR DRAINAGE GENERAL ARRANGEMENT PLAN REFER TO DRAWING SMCSWSWM-MTM-WBS-CE-DWG-463301.
8. FOR CSR GENERAL ARRANGEMENT PLAN REFER TO DRAWING SMCSWSWM-MTM-WBS-CE-DWG-463411. DO NOT REFER TO ANY OTHER GENERAL ARRANGEMENT PLANS FOR THE DESIGN AND EXTENTS OF CSR WORKS.
9. FOR UTILITIES GENERAL ARRANGEMENT PLAN REFER TO DRAWING SMCSWSWM-MTM-WBS-CE-DWG-463501.
10. FOR RETAINING WALL PLAN AND DETAILS, INCLUDING HANDRAIL DETAILS, REFER DRAWINGS SMCSWSWM-MTM-WBS-CE-DWG-463611 TO 464643.
11. NO MACHINERY EXCAVATIONS ARE TO BE CARRIED OUT WITHIN 1M OFFSET FROM THE PAD (POTENTIAL ARCHEOLOGICAL DEPOSIT) ZONE.

DRAWING COLOUR CODED - PRINT ALL COPIES IN COLOUR

FOR CONSTRUCTION

REV.	BY	DATE	DESCRIPTION	APPD.
00	MC	31.03.2021	APPROVED FOR CONSTRUCTION	LP

SCALES: 1 : 200 FULL SIZE A1

CLIENT: NSW GOVERNMENT — sydney METRO

The information shown on this drawing is for the purposes of the Sydney Metro Project only. No warranty is given or implied as to its suitability for any other purpose. The Service Providers accept no liability arising from the use of this drawing and the information shown thereon for any purpose other than the Sydney Metro Project.

SERVICE PROVIDERS: METRON T2M

DRAWN: M. FORTU
DESIGNED: G. LUO / C. STANFORD
DRG CHECK: P. ALFORD
DESIGN CHECK: T. LEE
APPROVED: L. PALMER 31.03.2021

SYDNEY METRO
BELMORE STATION - SERVICE BUILDING
CIVIL ENGINEERING
SERVICE BUILDING - CIVIL
GENERAL ARRANGEMENT PLAN

STATUS: FOR CONSTRUCTION | SHEET 1 OF 1

DRG No. SMCSWSWM-MTM-WBS-CE-DWG-463111 | REV. 00

A1 Original | Co-ordinate System: MGA Zone 56 | Height Datum: A.H.D. | This sheet may be prepared using colour and may be incomplete if copied | NOTE: Do not scale from this drawing. | ALT. DRG No. SMCSWSWM-MTM-WBS-CE-DWG-463111 0

Cad File: C:\projectwise\mm-sydney-metro-usdts-(apne-au)\d0165381\SMCSWSWM-MTM-WBS-CE-DWG-463111.dwg Plot Date: 30/03/21 - 12:10 100mm AT FULL SIZE

Appendix 2: Site Photographs

Photograph 1: Tree 1 *Ligustrum sinensis* (Small-leafed Privet) to be removed for pilling works adjacent rail bridge.

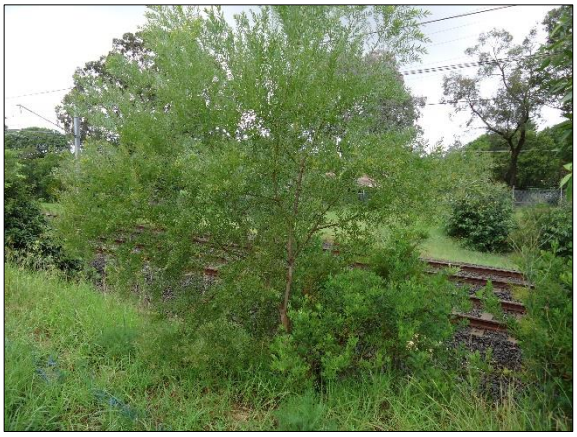
Photograph 2: Trees 2 *Acacia* sp (Wattle), 3 *Leptospurmum* sp (Tee Tree) and 4 Unknown species to be removed for MSB works.

Photograph 3: Tree 5 *Acacia* sp (Wattle) to be selectively pruned for clearance along the embankment.

Photograph 4: Tree 6 *Acacia* sp (Wattle) to be removed for MSB works.

Photograph 5: Tree 7 *Eucalyptus robusta* (Swamp Mahogany) to be removed to accommodate the new GST alignment.

Photograph 6: Tree 8 *Acacia* sp (Wattle) to be removed for MSB works.



Photograph 7: Tree 9 *Pittorporum undulatum* (Sweet Pittosporum) to be removed for MSB works.

Photograph 8: Tree 10 *Acacia* sp (Wattle) to be removed for MSB works.

Photograph 9: Trees 11 and 12 *Acacia* sp (Wattle) to be removed for MSB works.

Photograph 10: Tree 13 *Eucalyptus robusta* (Swamp Mahogany) to be removed to accommodate the new sewer alignment.

Photograph 11: Tree 14 *Eucalyptus robusta* (Swamp Mahogany) located within road reserve to be selectively pruned for site access clearances.

Appendix 3: Identified Selective Pruning Works

Tree 5 Acacia sp (Wattle) identified pruning involves the removal of approximately four branches up to 20mm in diameter and constitutes <10% of the total canopy volume. The pruning is not expected to have a significant impact upon the remaining stems.

Tree 14 *Eucalyptus robusta* (Swamp Mahogany) identified pruning involves the removal of one first order branch at 2m height. The branch is approximately 300mm in diameter and constitutes 30% of the total canopy volume of the tree. A reduction in tree growth and physiological function can be expected as a result of the pruning works. Exposure of internal woody tissues at the site of the final pruning cut shall be susceptible to infection by decay causing fungi. The removal of the branch is not considered to significantly affect vocal amenity.

Appendix 4: Tree Assessment Criteria

Tree number: Identifying number given to individual (or group) trees.
Botanical Name: Latin name for tree showing genus and species.
Common Name: The common name given to the tree.
Tree Dimensions: The physical dimensions of the tree.

- **Height**: Estimated or measured height of tree in meters.
- **Spread**: Estimated or measured radial canopy spread of tree in meters.
- **Diameter at Breast Height (DBH)**: The estimated or measured diameter of trunk given in mm measured at 1.4m from ground.
- **Diameter Above Base (DAB)**: The estimated or measured diameter of trunk given in mm measured above the root flare. Used to calculate the structural root zone of the tree.

Age Class: An estimation of how old the tree is in relation to its life expectancy.

- **Young** – Age less than 20% of life expectancy of tree in situ
- **Mature** – Age 20% - 80% of life expectancy of tree in situ
- **Old** – Age greater than 80% of life expectancy of tree in situ
- **Dead** – Tree is dead

Vigour: Ability of a tree to sustain its life processes. This is independent of the condition of a tree but may impact upon it. Vigour can appear to alter rapidly with change of seasons (seasonality) e.g., dormant, deciduous or semi-deciduous trees. Vigour can be categorised as Dormant, Low, Normal and High.

- **Dormant Vigour** – Determined by the existing turgidity in the lower order branches in the outer extremity of the crow, with good bud set and formation, and where the last extension growth is distinct from those most recently preceding it, evident by bud scale scars. Normal vigour during dormancy is achieved when such growth is evident on a majority of branches throughout the crown.
- **Low Vigour** – Reduced ability of a tree to sustain its life processes. This may be evident by the atypical growth of leaves, reduced crown cover and reduced crown density, branches, roots and trunk, and a deterioration of their functions with reduced resistance to predation. This is independent of the condition of a tree but may impact upon it, and especially the ability of a tree to sustain itself against predation.
- **Normal Vigour** – Ability of a tree to maintain and sustain its life processes. This may be evident by the typical growth of leaves, crown cover and crown density, branches, roots and trunk and resistance to predation. This is independent of the condition of a tree but may impact upon it, and especially the ability of a tree to sustain itself against predation.
- **High Vigour** – Accelerated growth of a tree due to incidental or deliberate artificial changes to its growing environment that are seemingly beneficial, but may result in premature aging or failure if the favourable conditions cease, or promote prolonged senescence if the favourable conditions remain, e.g. water from a leaking pipe, water and nutrients from a leaking or disrupted sewer pipe, nutrients from animal waste, a tree growing next to a chicken coop, or a stock feed lot, or a regularly used stockyard, a tree subject to stringent watering and fertilisation program, or some trees may achieve an extended lifespan from continuous pollarding practices over the life of the tree.

Condition: A tree's crown form and growth habit, as modified by its environment (aspect, suppression by other trees, soils) the stability and viability of the root plate, trunk and structural branches (first (1st) and possibly (2nd) order branches), including structural defects such as wounds, cavities or hollows, crooked trunk or weak trunk/branch junctions and the effects of predation by pests and diseases. These may not be directly connected with vigour and it is possible for a tree to be of normal vigour but in poor condition. Condition can be categorised as Dead, Poor, Fair and Good.

- **Dead Condition** – Tree is no longer capable of performing any of the following processes or is exhibiting any of the following symptoms; Photosynthesis via its foliage crown (as indicated by the presence of moist, green or other coloured leaves), Osmosis (the ability of the roots system to take up water), Turgidity (the ability of the plant to sustain moisture pressure in its cells), Epicormic shoots or epicormic strands in Eucalypts (the production of new shoots as a response to stress, generated from latent or adventitious buds or from a lignotuber), Permanent leaf loss, Permanent leaf wilting (the loss of turgidity which is marked by desiccation of stems leaves and roots), Abscission of the epidermis (bark desiccates and peels off to the beginning of the sap wood).
- **Poor Condition** - Tree is of good habit or misshapen, a form that may be severely restricted for space and light, exhibits symptoms of advanced and irreversible decline such as fungal, or bacterial infestation, major die-back in the branch and foliage crown, structural deterioration from insect damage e.g. termite infestation, or storm damage or lightning strike, ring barking from borer activity in the trunk, root damage or instability of the tree, or damage from physical wounding impacts or abrasion, or from altered local environmental conditions and has been unable to adapt to such changes and may decline further to death regardless of remedial works or other modifications to the local environment that would normally be sufficient to provide for its basic survival if in good to fair condition. Deterioration physically, often characterised by a gradual and continuous reduction in vigour but may be independent of a change in vigour, but characterised by a proportionate increase in susceptibility to, and predation by pests and diseases against which the tree cannot be sustained. Such conditions may also be evident in trees of advanced senescence due to normal phenological processes, without modifications to the growing environment or physical damage having been inflicted upon the tree. This may be independent from, or contributed to by vigour.
- **Fair Condition** - Tree is of good habit or misshapen, a form not severely restricted for space and light, has some physical indication of decline due to the early effects of predation by pests and diseases, fungal, bacterial, or insect infestation, or has suffered physical injury to itself that may be contributing to instability or structural weaknesses, or is faltering due to the modification of the environment essential for its basic survival. Such a tree may recover with remedial works where appropriate, or without intervention may stabilise or improve over time, or in response to the implementation of beneficial changes to its local environment. This may be independent from, or contributed to by vigour.
- **Good Condition** - Tree is of good habit, with crown form not severely restricted for space and light, physically free from the adverse effects of predation by pests and diseases, obvious instability or structural weaknesses, fungal, bacterial or insect infestation and is expected to continue to live in much the same condition as at the time of inspection provided conditions around it for its basic survival do not alter greatly. This may be independent from, or contributed to by vigour.

Useful Life Expectancy (ULE) ULE is the length of time that the arborist assesses an individual tree can be retained with an acceptable level of risk based on the information available at the time of inspection. It is a snapshot in time of the potential an individual tree has for survival in the eyes of the assessor. ULE is not static – it is closely related to tree health and the surrounding conditions. Alterations in these variables may result in changes to the ULE assessment. Consequently, the reliability all ULE assessments have will decrease as time passes from the initial assessment and the potential for changes in variables increases.

- **Remove –** Trees that should be removed within the next 5 years
- **Short –** Trees that appear to be retainable at the time of the assessment for 5-15 years with an acceptable level of risk.
- **Medium –** Trees that appear to be retainable at the time of the assessment for 15-40 years with an acceptable level of risk.
- **Long –** Trees that appear to be retainable at the time of the assessment for 40+ years with an acceptable level of risk.

Amenity and Visual Value – For the purposes of assessing the visual and landscape value of each tree the IACA Significance of a Tree, Assessment Rating System (STARS) © (IACA 2010) © has been adopted. - The landscape significance of a tree is an essential criterion to establish the importance that a particular tree may have on a site. The system uses a scale of High, Medium and Low significance in the landscape.

High significance in landscape

- The tree is in good condition and good vigour
- The tree has a form typical for the species
- The tree is a remnant or is a planted locally indigenous specimen and/or is rare or uncommon in the local area or of botanical interest or of substantial age
- The tree is listed as a heritage item, threatened species or part of an endangered ecological community or listed on council's significant tree register
- The tree is visually prominent and visible from a considerable distance when viewed from most directions within the landscape due to its size and scale and makes a positive contribution to the local amenity
- The tree supports social and cultural sentiments or spiritual associations, reflected by the broader population or community group or has commemorative values
- The tree's growth is unrestricted by above and below ground influences, supporting its ability to reach dimensions typical for the taxa in situ – tree is appropriate to the site conditions

Medium significance in landscape

- The tree is in fair-good condition and good or low vigour
- The tree has form typical or atypical of the species
- The tree is a planted locally indigenous or a common species with its taxa commonly planted in the local area
- The tree is visible from surrounding properties, although not visually prominent as partially obstructed by other vegetation or buildings when viewed from the street
- The tree provides a fair contribution to the visual character and amenity of the local area
- The tree's growth is moderately restricted by above or below ground influences, reducing its ability to reach dimensions typical for the taxa in situ

Low significance in landscape

- The tree is in fair-poor condition and good or low vigour
- The tree has form atypical of the species
- The tree is not visible or is partly visible from the surrounding properties as obstructed by other vegetation or buildings
- The tree provides a minor contribution or has a negative impact on the visual character and amenity of the local area
- The tree is a young specimen which may or may not have reached dimensions to be protected by local Tree Preservation Orders or similar protection mechanisms and can easily be replaced with a suitable specimen
- The tree's growth is severely restricted by above or below ground influences, unlikely to reach dimensions typical for the taxa in situ – tree is inappropriate to the site conditions
- The tree is listed as exempt under the provisions of the local Council Tree Preservation Order or similar protection mechanisms
- The tree has a wound or defect that has the potential to become structurally unsound
- **Environmental Pest / Noxious Weed Species**
- The tree is an environmental pest species due to its invasiveness or poisonous/allergenic properties.
- The tree is a declared noxious weed by legislation
- **Hazardous / Irreversible Decline**
- The tree is structurally unsound and/or unstable and is considered potentially dangerous
- The tree is dead, or is in irreversible decline, or has the potential to fail or collapse in full or in part in the immediate to short term

The tree is to have a minimum of three (3) criteria in a category to be classified in that group.

In the development of this document IACA acknowledges the contribution and original concept of the Footprint Green Tree Significance & Retention Value Matrix, developed by Footprint Green Pty Ltd in June 2010.

The Australian Standard 4970-2009 Protection of Trees on Development Sites defines the requirements for assessing trees with respect to development. It provides the guidance on how to decide which trees are appropriate for retention and on the means of protecting them during construction works. It describes the areas and offsets, referred to as the Tree Protection Zone (TPZ) and Structural Root Zone (SRZ) required to be free from development works to maintain tree vitality and stability. This report has been prepared in accordance with the conditions set out within the standard.

- **Tree Protection Zone** – The tree protection zone is defined as a specified area above and below ground set aside for the protection of the tree's roots and crown. It is expressed as a radial measurement taken from the centre of the trunk at ground level.
- **Structural Root Zone** – The structural root zone is defined as a specified area around the base of a tree required to maintain its stability within the ground. It is expressed as a radial measurement taken from the center of the trunk at ground level. Excavation and development works are not recommended within the structural root zone unless additional investigation as to root size and location is undertaken

APPENDIX 2.1 – BELMORE AIA (PLATEAU TREES)

PLATEAUTREES
Safety. Quality. Progress.

Date: 20 May 2021

Re: Additional tree removal and pruning works at Belmore Station as part of the Southwest Metro Package.

At the request of Downer Group an onsite inspection was undertake at Belmore Station. It has been asked to record additional tree removals and selective pruning works as part of the Southwest Metro Package. The assessed trees are not identified within the Arboricultural Impact Assessment (AIA) prepared by Urban Arbor, dated 17 December 2019, Ref 19/12/17/SWMMS. On the 19 May a site walkthrough was undertaken by myself under guidance of a Downer Group representative.

Eight additional trees were assessed with respects to the proposed works. Their locations are show within Figure 1. Trees 1 and 2 have been identified for removal. Trees 3, 4, 5, 6, 7 and 8 have been identified for selective pruning works. Additional controls with respects to undertaking excavation works within the TPZ of tree 3 have been provided. Tree data can be found as Appendix 1 of this report.

It was advised by Downer Group that two trees being a Swamp Mahogany, tree 1, and a Brown Pine, tree 2, are to be removed. Both trees were considered to be in good health and have medium useful life expectancies of 15 to 40 years. These trees are located within the road reserve area adjacent to the rail corridor and form part of the existing streetscape. Their removal, in particular the Swamp Mahogany is likely to be visually significant. The Swamp Mahogany and Brown Pine are not representative of an endangered or threatened species or ecological community. Photographs 1 and 2 show these trees.

Plateau Tree Service Pty Ltd
PO BOX 1522, DEE WHY NSW 2099 Australia
P: 02 9939 5350 | F: 02 9905 7569
E: info@plateautrees.com.au | W: www.plateautrees.com.au
ABN : 17 090 798 002

Image 1: Aerial image of Belmore station showing the approximate locations of assessed trees. (*Source: Six Maps accessed 20/05/2021*).

The new GST is aligned past tree 3, Camphor Laurel and shall require the removal of the suckers and epicormics from around the base of its trunk. Any excavation within 6m of the trunk (refer to **Appendix 1** Tree Assessment Schedule for TPZ offset) to install the troughing posts is to be undertaken using methods that do not damage tree roots. There is to be enough flexibility in the GST's design and alignment to reposition posts if roots greater than 30mm in diameter are exposed within the excavations. Although commonly regarded as a weed species this specimen is protected under local tree preservation controls due to its height. Photographs 3 and 4 show the tree and suckering around the base of the trunk to be removed.

The placement of site sheds and amenities, adjacent the southern side of the rail corridor, is within the protection zones of trees 5, 6, 7, 8 and 9. Whilst their placement is not thought to pose a significant risk to the ongoing health and condition of the trees selective pruning works have been identified to remove and reduce overhanging branches. These pruning works are considered to be minor, require less than 10% of the total canopy volume of each individual tree to be removed and are restricted to branches less than

50mm in diameter. The pruning works shall allow for the removal of the sheds upon completion of the project. Additional selective pruning works are expected to be required to tree 8 to accommodate the installation of overhead electrical services. These pruning works are to be undertaken upon installation of the new pole within the compound area to ensure correct clearance requirements are met. Only the minimal amount of pruning is to be undertaken to achieve the required outcome. Photographs 5 to 9 shows each tree to be pruned. Where possible branches have been identified for removal within the photographs.

All appropriate approvals and consents are to be obtained prior to tree and vegetation removal works commencing. All tree pruning and removal works are to be undertaken by suitably qualified tree workers and in accordance with *AS4373-2007 Pruning of Amenity Trees* and the Safe Work Australia's Guide to Managing Risks of Tree Trimming and Removal Works.

Please feel free to contact me should you require any further assistance regarding this matter.

Regards.
Owen Tebbutt

Consulting Arborist
Plateau Tree Service

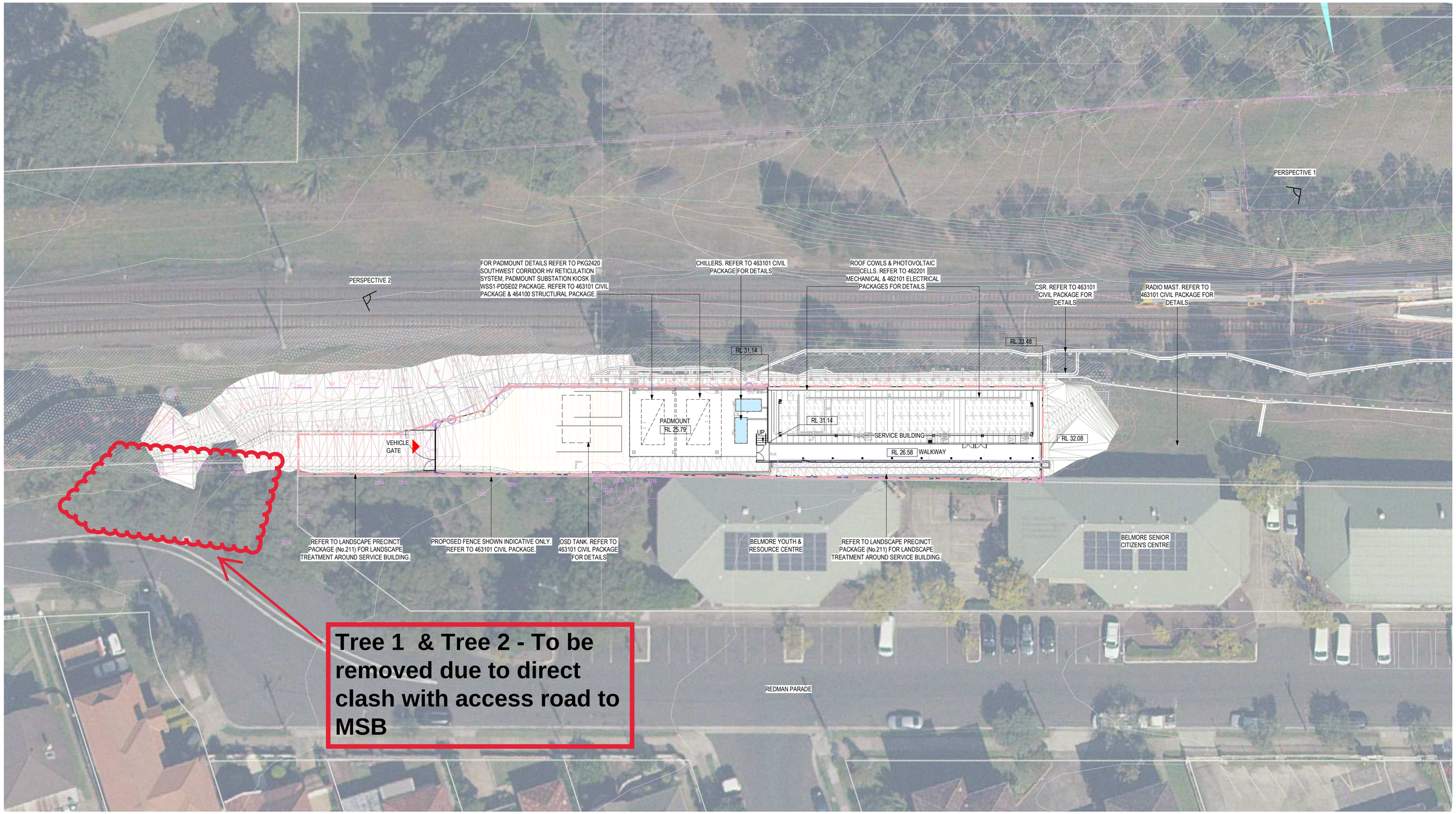
Appendix 1: Tree assessment Schedule

Tree number	Tree name Botanical name Common name	Tree dimensions Height (m)	Spread (m)	D.B.H. (mm)	D.A.B. (mm)	Vigour	Condition	Age class	ULE	Amenity and Visual Value	Native or Exotic	TPZ (m)	SRZ (m)	Comments	Remove or Retain
1	*Eucalyptus robusta* (Swamp Mahogany)	15-20	6x6	600	750	N	G	M	M	M	N	7.2	2.93	Tree located within road reserve area. Tree to be removed due to direct clash with permanent design access road to MSB.	Remove
2	*Podocarpus elatus* (Brown Pine)	10-15	3x3	200 230 250 300	500	N	G	M	M	M	N	6	2.47	Tree located within road reserve area. Tree to be removed due to direct clash with permanent design access road to MSB.	Remove
3	*Cinnamomum camphora* Camphor Laurel)	15-20	6x6	500	600	N	F	M	S	M	E	6	2.67	Negligible impacts of establishing site shed within TPZ.	Retain and prune
4	*Callistemon salignus* (Willow Bottlebrush)	5-10	4x4	300 200 400	800	N	G	M	S	M	N	6.48	3.01	Negligible impacts of establishing site shed within TPZ.	Retain and prune
5	*Leptospermum petersonii* (Lemon-scented Tee Tree)	5-10	3x3	200	300	N	G	M	S	M	N	2.4	2	Negligible impacts of establishing site shed within TPZ.	Retain and prune
6	*Leptospermum petersonii* (Lemon-scented Tee Tree)	5-10	3x3	300	400	N	G	M	S	M	N	3.6	2.25	Negligible impacts of establishing site shed within TPZ.	Retain and prune
7	*Leptospermum petersonii* (Lemon-scented Tee Tree)	5-10	3x3	150 150 150 150 200	500	N	G	M	S	M	N	4.32	2.47	Negligible impacts of establishing site shed within TPZ.	Retain and prune
8	*Leptospermum petersonii* (Lemon-scented Tee Tree)	1-5	2x2	200	250	N	G	M	S	M	N	2.4	1.85	Negligible impacts of establishing site shed within TPZ.	Retain and prune

N

CENTRAL / CITY

BANKSTOWN



FOR CONSTRUCTION

REV.	BY	DATE	DESCRIPTION	APPD.
00	BN	31/03/2021	APPROVED FOR CONSTRUCTION	LP

2.5 0 2.5 5 7.5 10m

1:250 FULL SIZE A1

A1 Original | Co-ordinate System: MGA Zone 56 | Height Datum: A.H.D. | This sheet may be prepared using colour and may be incomplete if copied

NOTE: Do not scale from this drawing. ALT. DRG No. SMCSWSWM-MTM-WBS-AT-DWG-461120

CLIENT

NSW GOVERNMENT | sydney METRO

The information shown on this drawing is for the purposes of the Sydney Metro Project only. No warranty is given or implied as to its suitability for any other purpose. The Service Providers accept no liability arising from the use of this drawing and the information shown thereon for any purpose other than the Sydney Metro Project.

SERVICE PROVIDERS

METRON T2M

DRAWN E. GUYOT

DESIGNED B. NOVANTO

DRG CHECK M. LODGE

DESIGN CHECK G. DAVIES

APPROVED L. PALMER 31/03/2021

SYDNEY METRO

BELMORE
ARCHITECTURAL
OVERALL ARRANGEMENT
SITE PLAN – SERVICE BUILDING

STATUS: FOR CONSTRUCTION | SHEET 1 OF 1 | ©

DRG No. SMCSWSWM-MTM-WBS-AT-DWG-461120 | REV. 00

100mm AT FULL SIZE Plot Date & Time 29/03/2021 8:36:01 PM

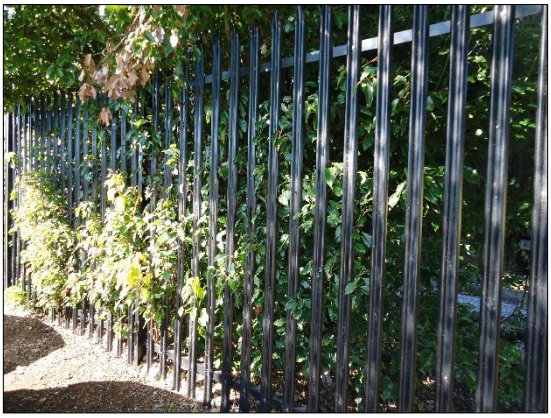
Appendix 2: Site Photographs

Photograph 1: Tree 1 *Eucalyptus robusta* (Swamp Mahogany) to be removed due to direct clash with permanent design access road to MSB.

Photograph 2: Tree 2 *Podocarpus elatus* (Brown Pine) to be removed due to direct clash with permanent design access road to MSB.

Photograph 3: Tree 3 *Cinnamomum camphora* (Camphor Laurel) within northern side of rail corridor.

Photograph 4: Suckering around the base of tree 3 is to be removed to allow for the proposed alignment of the new GST.

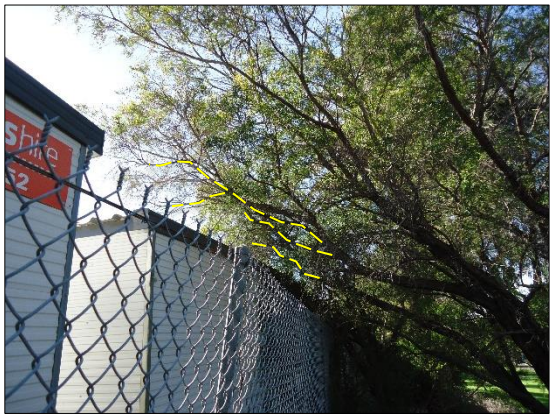


Photograph 5: Tree 4 *Callistemon slaignus* (Weeping Bottlebrush) to be selectively pruned to clear site sheds.

Photograph 6: Tree 5 *Leptospernum petersonii* (Lemon-scented Tee Tree) to be selectively pruned to clear site sheds.

Photograph 7: Tree 6 *Leptospernum petersonii* (Lemon-scented Tee Tree) to be selectively pruned to clear site sheds.

Photograph 8: Tree 7 *Leptospernum petersonii* (Lemon-scented Tee Tree) to be selectively pruned to clear site sheds. Additional pruning shall be required to provide clearances to new over head cabling.



Photograph 9: Tree 8 *Leptospernum petersonii* (Lemon-scented Tee Tree) to be selectively pruned to clear site sheds.

Appendix 3: Tree Assessment Criteria

Tree number: Identifying number given to individual (or group) trees.
Botanical Name: Latin name for tree showing genus and species.
Common Name: The common name given to the tree.
Tree Dimensions: The physical dimensions of the tree.

- **Height**: Estimated or measured height of tree in meters.
- **Spread**: Estimated or measured radial canopy spread of tree in meters.
- **Diameter at Breast Height (DBH)**: The estimated or measured diameter of trunk given in mm measured at 1.4m from ground.
- **Diameter Above Base (DAB)**: The estimated or measured diameter of trunk given in mm measured above the root flare. Used to calculate the structural root zone of the tree.

Age Class: An estimation of how old the tree is in relation to its life expectancy.

- **Young** – Age less than 20% of life expectancy of tree in situ
- **Mature** – Age 20% - 80% of life expectancy of tree in situ
- **Old** – Age greater than 80% of life expectancy of tree in situ
- **Dead** – Tree is dead

Vigour: Ability of a tree to sustain its life processes. This is independent of the condition of a tree but may impact upon it. Vigour can appear to alter rapidly with change of seasons (seasonality) e.g., dormant, deciduous or semi-deciduous trees. Vigour can be categorised as Dormant, Low, Normal and High.

- **Dormant Vigour** – Determined by the existing turgidity in the lower order branches in the outer extremity of the crow, with good bud set and formation, and where the last extension growth is distinct from those most recently preceding it, evident by bud scale scars. Normal vigour during dormancy is achieved when such growth is evident on a majority of branches throughout the crown.
- **Low Vigour** – Reduced ability of a tree to sustain its life processes. This may be evident by the atypical growth of leaves, reduced crown cover and reduced crown density, branches, roots and trunk, and a deterioration of their functions with reduced resistance to predation. This is independent of the condition of a tree but may impact upon it, and especially the ability of a tree to sustain itself against predation.
- **Normal Vigour** – Ability of a tree to maintain and sustain its life processes. This may be evident by the typical growth of leaves, crown cover and crown density, branches, roots and trunk and resistance to predation. This is independent of the condition of a tree but may impact upon it, and especially the ability of a tree to sustain itself against predation.
- **High Vigour** – Accelerated growth of a tree due to incidental or deliberate artificial changes to its growing environment that are seemingly beneficial, but may result in premature aging or failure if the favourable conditions cease, or promote prolonged senescence if the favourable conditions remain, e.g. water from a leaking pipe, water and nutrients from a leaking or disrupted sewer pipe, nutrients from animal waste, a tree growing next to a chicken coop, or a stock feed lot, or a regularly used stockyard, a tree subject to stringent watering and fertilisation program, or some trees may achieve an extended lifespan from continuous pollarding practices over the life of the tree.

Condition: A tree's crown form and growth habit, as modified by its environment (aspect, suppression by other trees, soils) the stability and viability of the root plate, trunk and structural branches (first (1st) and possibly (2nd) order branches), including structural defects such as wounds, cavities or hollows, crooked trunk or weak trunk/branch junctions and the effects of predation by pests and diseases. These may not be directly connected with vigour and it is possible for a tree to be of normal vigour but in poor condition. Condition can be categorised as Dead, Poor, Fair and Good.

- **Dead Condition** – Tree is no longer capable of performing any of the following processes or is exhibiting any of the following symptoms; Photosynthesis via its foliage crown (as indicated by the presence of moist, green or other coloured leaves), Osmosis (the ability of the roots system to take up water), Turgidity (the ability of the plant to sustain moisture pressure in its cells), Epicormic shoots or epicormic strands in Eucalypts (the production of new shoots as a response to stress, generated from latent or adventitious buds or from a lignotuber), Permanent leaf loss, Permanent leaf wilting (the loss of turgidity which is marked by desiccation of stems leaves and roots), Abscission of the epidermis (bark desiccates and peels off to the beginning of the sap wood).
- **Poor Condition** - Tree is of good habit or misshapen, a form that may be severely restricted for space and light, exhibits symptoms of advanced and irreversible decline such as fungal, or bacterial infestation, major die-back in the branch and foliage crown, structural deterioration from insect damage e.g. termite infestation, or storm damage or lightning strike, ring barking from borer activity in the trunk, root damage or instability of the tree, or damage from physical wounding impacts or abrasion, or from altered local environmental conditions and has been unable to adapt to such changes and may decline further to death regardless of remedial works or other modifications to the local environment that would normally be sufficient to provide for its basic survival if in good to fair condition. Deterioration physically, often characterised by a gradual and continuous reduction in vigour but may be independent of a change in vigour, but characterised by a proportionate increase in susceptibility to, and predation by pests and diseases against which the tree cannot be sustained. Such conditions may also be evident in trees of advanced senescence due to normal phenological processes, without modifications to the growing environment or physical damage having been inflicted upon the tree. This may be independent from, or contributed to by vigour.
- **Fair Condition** - Tree is of good habit or misshapen, a form not severely restricted for space and light, has some physical indication of decline due to the early effects of predation by pests and diseases, fungal, bacterial, or insect infestation, or has suffered physical injury to itself that may be contributing to instability or structural weaknesses, or is faltering due to the modification of the environment essential for its basic survival. Such a tree may recover with remedial works where appropriate, or without intervention may stabilise or improve over time, or in response to the implementation of beneficial changes to its local environment. This may be independent from, or contributed to by vigour.
- **Good Condition** - Tree is of good habit, with crown form not severely restricted for space and light, physically free from the adverse effects of predation by pests and diseases, obvious instability or structural weaknesses, fungal, bacterial or insect infestation and is expected to continue to live in much the same condition as at the time of inspection provided conditions around it for its basic survival do not alter greatly. This may be independent from, or contributed to by vigour.

Useful Life Expectancy (ULE) ULE is the length of time that the arborist assesses an individual tree can be retained with an acceptable level of risk based on the information available at the time of inspection. It is a snapshot in time of the potential an individual tree has for survival in the eyes of the assessor. ULE is not static – it is closely related to tree health and the surrounding conditions. Alterations in these variables may result in changes to the ULE assessment. Consequently, the reliability all ULE assessments have will decrease as time passes from the initial assessment and the potential for changes in variables increases.

- **Remove –** Trees that should be removed within the next 5 years
- **Short –** Trees that appear to be retainable at the time of the assessment for 5-15 years with an acceptable level of risk.
- **Medium –** Trees that appear to be retainable at the time of the assessment for 15-40 years with an acceptable level of risk.
- **Long –** Trees that appear to be retainable at the time of the assessment for 40+ years with an acceptable level of risk.

Amenity and Visual Value – For the purposes of assessing the visual and landscape value of each tree the IACA Significance of a Tree, Assessment Rating System (STARS) © (IACA 2010) © has been adopted. - The landscape significance of a tree is an essential criterion to establish the importance that a particular tree may have on a site. The system uses a scale of High, Medium and Low significance in the landscape.

High significance in landscape

- The tree is in good condition and good vigour
- The tree has a form typical for the species
- The tree is a remnant or is a planted locally indigenous specimen and/or is rare or uncommon in the local area or of botanical interest or of substantial age
- The tree is listed as a heritage item, threatened species or part of an endangered ecological community or listed on council's significant tree register
- The tree is visually prominent and visible from a considerable distance when viewed from most directions within the landscape due to its size and scale and makes a positive contribution to the local amenity
- The tree supports social and cultural sentiments or spiritual associations, reflected by the broader population or community group or has commemorative values
- The tree's growth is unrestricted by above and below ground influences, supporting its ability to reach dimensions typical for the taxa in situ – tree is appropriate to the site conditions

Medium significance in landscape

- The tree is in fair-good condition and good or low vigour
- The tree has form typical or atypical of the species
- The tree is a planted locally indigenous or a common species with its taxa commonly planted in the local area
- The tree is visible from surrounding properties, although not visually prominent as partially obstructed by other vegetation or buildings when viewed from the street
- The tree provides a fair contribution to the visual character and amenity of the local area
- The tree's growth is moderately restricted by above or below ground influences, reducing its ability to reach dimensions typical for the taxa in situ

Low significance in landscape

- The tree is in fair-poor condition and good or low vigour
- The tree has form atypical of the species
- The tree is not visible or is partly visible from the surrounding properties as obstructed by other vegetation or buildings
- The tree provides a minor contribution or has a negative impact on the visual character and amenity of the local area
- The tree is a young specimen which may or may not have reached dimensions to be protected by local Tree Preservation Orders or similar protection mechanisms and can easily be replaced with a suitable specimen
- The tree's growth is severely restricted by above or below ground influences, unlikely to reach dimensions typical for the taxa in situ – tree is inappropriate to the site conditions
- The tree is listed as exempt under the provisions of the local Council Tree Preservation Order or similar protection mechanisms
- The tree has a wound or defect that has the potential to become structurally unsound
- **Environmental Pest / Noxious Weed Species**
- The tree is an environmental pest species due to its invasiveness or poisonous/allergenic properties.
- The tree is a declared noxious weed by legislation
- **Hazardous / Irreversible Decline**
- The tree is structurally unsound and/or unstable and is considered potentially dangerous
- The tree is dead, or is in irreversible decline, or has the potential to fail or collapse in full or in part in the immediate to short term

The tree is to have a minimum of three (3) criteria in a category to be classified in that group.

In the development of this document IACA acknowledges the contribution and original concept of the Footprint Green Tree Significance & Retention Value Matrix, developed by Footprint Green Pty Ltd in June 2010.

The Australian Standard 4970-2009 Protection of Trees on Development Sites defines the requirements for assessing trees with respect to development. It provides the guidance on how to decide which trees are appropriate for retention and on the means of protecting them during construction works. It describes the areas and offsets, referred to as the Tree Protection Zone (TPZ) and Structural Root Zone (SRZ) required to be free from development works to maintain tree vitality and stability. This report has been prepared in accordance with the conditions set out within the standard.

- **Tree Protection Zone** – The tree protection zone is defined as a specified area above and below ground set aside for the protection of the tree's roots and crown. It is expressed as a radial measurement taken from the centre of the trunk at ground level.
- **Structural Root Zone** – The structural root zone is defined as a specified area around the base of a tree required to maintain its stability within the ground. It is expressed as a radial measurement taken from the center of the trunk at ground level. Excavation and development works are not recommended within the structural root zone unless additional investigation as to root size and location is undertaken

APPENDIX 2.2 – BELMORE AIA (PLATEAU TREES)

PLATEAUTREES
Safety. Quality. Progress.

Downer
T3 Triniti Business Campus
39 Delhi Road
North Ryde
NSW 2113

Date: 27 April 2022

Re: Additional tree removal works at Belmore Station as part of the Southwest Metro Package.

At the request of Downer Group an onsite inspection was undertake at Belmore Station. It has been asked to record four additional tree removals associated with landscaping works as part of the Southwest Metro Package. Three of the assessed trees (660, 665 and 666) are identified within the Arboricultural Impact Assessment (AIA) prepared by Urban Arbor, dated 17 December 2019, Ref 19/12/17/SWMMS. One of the trees is not identified within the AIA.

On the 26 April a site walkthrough was undertaken by myself under guidance of a Downer Group representative. Trees 660, 665 and 666 were identified as *Robinia pseudoacacia* 'Frisia' (Golden Robinia). The remaining tree was identified as a Grevillea cultivar. The trees are identified for removal within the Landscape Design Demolition Plan, Sheet 1, drawing No SMCSWSWM-MTM-WBS-LA-DWG-21102.

The four trees are located at the corner of Burwood Road and Tobruk Avenue within the existing reserve/parkland area. Trees 660, 665 and 666 all showed indicators of declining health and condition, likely as a result of their species type,

Plateau Tree Service Pty Ltd
PO BOX 1522, DEE WHY NSW 2099 Australia
P: 02 9939 5350 | F: 02 9905 7569
E: info@plateautrees.com.au | W: www.plateautrees.com.au
ABN : 17 090 798 002

age class and growing environment. As such they have been assessed as having a short useful life expectancy of 5 to 15 years. Although showing good health and condition the Grevillea has also been assessed as having a short useful life expectancy based upon its species type. Trees 660, 665 and 666 are considered to have medium amenity and visual value given their size and location. The Grevillea is considered to have low amenity and visual value based upon its size. Data collected during the site inspection can be found as Appendix 1, photographs of. the trees can be found as Appendix 2. The criteria by which the trees have been assessed can be found as Appendix 3. The assessed trees are not representative of a threatened or endangered species or vegetation community.

All appropriate approvals and consents are to be obtained prior to tree and vegetation removal works commencing.

Please feel free to contact me should you require any further assistance regarding this matter.

Regards.
Owen Tebbutt

Plateau Tree Service

Appendix 1: Tree assessment Schedule

Tree number	Tree name Botanical name Common name	Tree dimensions Height (m)	Spread (m)	D.B.H. (mm)	D.A.B. (mm)	Vigour	Condition	Age class	ULE	Amenity and Visual Value	Native or Exotic	TPZ (m)	SRZ (m)	Comments	Remove or Retain
660	*Robinia pseudoacacia* 'Frisia' (Golden Robinia)	5-10	2x2	200	300	N	F	M	S	M	E	2.4	2	Dieback and deadwood indicate tree is under stress conditions and in initial stages of decline.	Remove
665	*Robinia pseudoacacia* 'Frisia' (Golden Robinia)	5-10	3x3	200	300	N	F	M	S	M	E	2.4	2	Dieback and deadwood indicate tree is under stress conditions and in initial stages of decline.	Remove
666	*Robinia pseudoacacia* 'Frisia' (Golden Robinia)	5-10	3x3	200 150	350	N	F	M	S	M	E	3	2.13	Wound are observed within trunk. Degraded and cracked internal woody tissues observed. Dieback and deadwood indicate tree is under stress conditions and is in a state of decline. Damage observed on stems.	Remove
-	*Grevillea* sp (Grevillia)	1-5	2x2	150	180	N	G	M	S	L	N	2	1.5	Tree not identified within existing arboricultural report. To removed due to clash with permanent landscape design.	Remove

Appendix 2: Site Photographs

Photograph 1: Tree 665 and 666 as seen from within the site.

Photograph 2: Tree 660 and the Grevillea as seen from within the site.

TO SYDNEY

TO BANKSTOWN

N

01
SSR44

TOBRUK AVENUE

REMOVE EXISTING TREES AS PER ARBORISTS REPORT (3 x *Robinia pseudoacacia)*

REMOVE TIMBER BOLLARDS, CHAIN FENCE AND EXISTING TIMBER GARDEN EDGING
EXISTING BIN ENCLOSURE TO BE REMOVED - RETURN TO COUNCIL FOR REUSE

REMOVE EXISTING PAVEMENT AND LAWN AREAS
REMOVE ALL EXISTING PLANTING AND GARDEN EDGING FROM WITHIN RED LINE

CUT PAVERS ON THE EDGE ALONG FOOTPATH OF BURWOOD ROAD FRONTAGE AND REMOVE THE PAVERS WITHIN THE PLAZA

REMOVE EXISTING COUNCIL SIGNAGE WITHIN THE HATCHED AREA

REMOVE EXISTING TACTILE

EXISTING 3 x BENCH SEATS TO BE REMOVED - RETURN TO COUNCIL FOR REUSE

1 x EXISTING BIN ENCLOSURE TO BE RELOCATED

EXISTING FENCE AND SANDSTONE GARDEGN EDGING TO BE REMOVED

1 x EXISTING BIN ENCLOSURE TO BE RELOCATED

EXISTING MOBILE BOOK LIBRARY TO BE RELOCATED
EXISTING HERITAGE SIGN TO BE REMOVED

EXISTING FENCE TO BE REMOVED REFER TO URBAN DESIGN PACKAGE

REMOVE EXISTING PATHWAY

EXISTING TACTILE TO BE REMOVED

REMOVE EXISTING TREES
(3 x *Robinia pseudoacacia 'Frisia'* /
1 x Cinnamomum camphora)

BRIDGE ROAD

BURWOOD ROAD

REMOVE EXISTING GARDEN EDGE AND TURF

REMOVE EXISTING CONCRETE PAD / EXISTING BIKE RACK

EXISTING BILLBOARD TO BE REMOVED

BURWOOD ROAD

REDMAN PARADE

ADJOINS DRAWINGS SMCSWSWM-MTM-WCR-LA-DWG-211703

LEGEND

- RAILCORP PROPERTY BOUNDARY
- WORKS TO BE REMOVED
- EXISTING STREET FURNITURE / FENCE TO BE REMOVED
- EXISTING STREET FURNITURE TO BE RELOCATED
- EXISTING TREES TO BE RETAINED
- EXISTING TREES TO BE REMOVED

NOTES:
- THE DESIGN IS BASED ON SYDNEY METRO CHAINAGE. PLEASE REFER TO CIVIL DRAWINGS FOR SYDNEY METRO CHAINAGE ALIGNMENT (PACKAGE NO. 103).
- ALL HOOP STYLE FENCING TO BE REMOVED.
- ALL EXISTING TREES TO BE RETAIN UNLESS STATED ON DRAWINGS
- STRIP EXISTING TOPSOIL TO 200MM DEPTH WHERE VEGETATION IS BEING REMOVED.
- WORKS TO STATION PLATFORMS, BUILDINGS AND CONCOURSE ARE INCLUDED IN THE ARCHITECTURAL PACKAGE - REFER TO ARCHITECTURAL DESIGN PACKAGE 211.
- EXISTING PAVERS FROM THE DEMOLITION AREA SHOULD BE RECYCLED AND REUSED WHERE FEASIBLE TO THE NEW PLAZA PAVING
- REFER TO ARBORIST'S ARBORICULTURAL IMPACT ASSESSMENT REPORT FOR TREE PROTECTION WORKS

DRAWING COLOUR CODED - PRINT ALL COPIES IN COLOUR

FOR CONSTRUCTION

REV.	BY	DATE	DESCRIPTION	APPD.
01	ME	26/11/2021	UPDATED APPROVED FOR CONSTRUCTION - SSR44	LP
00	ME	31/03/2021	APPROVED FOR CONSTRUCTION	LP

SCALES
2.5 0 2.5 5 7.5m
1 : 250 FULL SIZE A1

CLIENT
NSW GOVERNMENT | sydney METRO

SERVICE PROVIDERS
METRON T2M

DRAWN	W.LI	26/11/2021
DESIGNED	M. ENOCH	26/11/2021
DRG CHECK	M. ENOCH	26/11/2021
DESIGN CHECK	G. DAVIES	26/11/2021
APPROVED	L. PALMER	26/11/2021

SYDNEY METRO
BELMORE (13.688km to 14.029km)
LANDSCAPE DESIGN
DEMOLITION PLAN
SHEET 1

STATUS: FOR CONSTRUCTION | SHEET 3 of 25 | ©

DRG No. SMCSWSWM-MTM-WBS-LA-DWG-211702 | REV. 01

A1 Original | Co-ordinate System: MGA Zone 56 | Height Datum: A.H.D. | This sheet may be prepared using colour and may be incomplete if copied | NOTE: Do not scale from this drawing. | ALT. DRG No. SMCSWSWM-MTM-WBS-LA-DWG-211702 P01

Cad File: X:\2. Projects\2018\P18-187 Southwest Metro Design Services\02 CAD\7_WBS_Belmore\Plot\SMCSWSWM-MTM-WBS-LA-DWG-211702.dwg
Plot Date: 26/11/21 - 11:48
100mm AT FULL SIZE

Appendix 3: Tree Assessment Criteria

Tree number: Identifying number given to individual (or group) trees.
Botanical Name: Latin name for tree showing genus and species.
Common Name: The common name given to the tree.
Tree Dimensions: The physical dimensions of the tree.

- **Height**: Estimated or measured height of tree in meters.
- **Spread**: Estimated or measured radial canopy spread of tree in meters.
- **Diameter at Breast Height (DBH)**: The estimated or measured diameter of trunk given in mm measured at 1.4m from ground.
- **Diameter Above Base (DAB)**: The estimated or measured diameter of trunk given in mm measured above the root flare. Used to calculate the structural root zone of the tree.

Age Class: An estimation of how old the tree is in relation to its life expectancy.

- **Young** – Age less than 20% of life expectancy of tree in situ
- **Mature** – Age 20% - 80% of life expectancy of tree in situ
- **Old** – Age greater than 80% of life expectancy of tree in situ
- **Dead** – Tree is dead

Vigour: Ability of a tree to sustain its life processes. This is independent of the condition of a tree but may impact upon it. Vigour can appear to alter rapidly with change of seasons (seasonality) e.g., dormant, deciduous or semi-deciduous trees. Vigour can be categorised as Dormant, Low, Normal and High.

- **Dormant Vigour** – Determined by the existing turgidity in the lower order branches in the outer extremity of the crow, with good bud set and formation, and where the last extension growth is distinct from those most recently preceding it, evident by bud scale scars. Normal vigour during dormancy is achieved when such growth is evident on a majority of branches throughout the crown.
- **Low Vigour** – Reduced ability of a tree to sustain its life processes. This may be evident by the atypical growth of leaves, reduced crown cover and reduced crown density, branches, roots and trunk, and a deterioration of their functions with reduced resistance to predation. This is independent of the condition of a tree but may impact upon it, and especially the ability of a tree to sustain itself against predation.
- **Normal Vigour** – Ability of a tree to maintain and sustain its life processes. This may be evident by the typical growth of leaves, crown cover and crown density, branches, roots and trunk and resistance to predation. This is independent of the condition of a tree but may impact upon it, and especially the ability of a tree to sustain itself against predation.
- **High Vigour** – Accelerated growth of a tree due to incidental or deliberate artificial changes to its growing environment that are seemingly beneficial, but may result in premature aging or failure if the favourable conditions cease, or promote prolonged senescence if the favourable conditions remain, e.g. water from a leaking pipe, water and nutrients from a leaking or disrupted sewer pipe, nutrients from animal waste, a tree growing next to a chicken coop, or a stock feed lot, or a regularly used stockyard, a tree subject to stringent watering and fertilisation program, or some trees may achieve an extended lifespan from continuous pollarding practices over the life of the tree.

Condition: A tree's crown form and growth habit, as modified by its environment (aspect, suppression by other trees, soils) the stability and viability of the root plate, trunk and structural branches (first (1st) and possibly (2nd) order branches), including structural defects such as wounds, cavities or hollows, crooked trunk or weak trunk/branch junctions and the effects of predation by pests and diseases. These may not be directly connected with vigour and it is possible for a tree to be of normal vigour but in poor condition. Condition can be categorised as Dead, Poor, Fair and Good.

- **Dead Condition** – Tree is no longer capable of performing any of the following processes or is exhibiting any of the following symptoms; Photosynthesis via its foliage crown (as indicated by the presence of moist, green or other coloured leaves), Osmosis (the ability of the roots system to take up water), Turgidity (the ability of the plant to sustain moisture pressure in its cells), Epicormic shoots or epicormic strands in Eucalypts (the production of new shoots as a response to stress, generated from latent or adventitious buds or from a lignotuber), Permanent leaf loss, Permanent leaf wilting (the loss of turgidity which is marked by desiccation of stems leaves and roots), Abscission of the epidermis (bark desiccates and peels off to the beginning of the sap wood).
- **Poor Condition** - Tree is of good habit or misshapen, a form that may be severely restricted for space and light, exhibits symptoms of advanced and irreversible decline such as fungal, or bacterial infestation, major die-back in the branch and foliage crown, structural deterioration from insect damage e.g. termite infestation, or storm damage or lightning strike, ring barking from borer activity in the trunk, root damage or instability of the tree, or damage from physical wounding impacts or abrasion, or from altered local environmental conditions and has been unable to adapt to such changes and may decline further to death regardless of remedial works or other modifications to the local environment that would normally be sufficient to provide for its basic survival if in good to fair condition. Deterioration physically, often characterised by a gradual and continuous reduction in vigour but may be independent of a change in vigour, but characterised by a proportionate increase in susceptibility to, and predation by pests and diseases against which the tree cannot be sustained. Such conditions may also be evident in trees of advanced senescence due to normal phenological processes, without modifications to the growing environment or physical damage having been inflicted upon the tree. This may be independent from, or contributed to by vigour.
- **Fair Condition** - Tree is of good habit or misshapen, a form not severely restricted for space and light, has some physical indication of decline due to the early effects of predation by pests and diseases, fungal, bacterial, or insect infestation, or has suffered physical injury to itself that may be contributing to instability or structural weaknesses, or is faltering due to the modification of the environment essential for its basic survival. Such a tree may recover with remedial works where appropriate, or without intervention may stabilise or improve over time, or in response to the implementation of beneficial changes to its local environment. This may be independent from, or contributed to by vigour.
- **Good Condition** - Tree is of good habit, with crown form not severely restricted for space and light, physically free from the adverse effects of predation by pests and diseases, obvious instability or structural weaknesses, fungal, bacterial or insect infestation and is expected to continue to live in much the same condition as at the time of inspection provided conditions around it for its basic survival do not alter greatly. This may be independent from, or contributed to by vigour.

Useful Life Expectancy (ULE) ULE is the length of time that the arborist assesses an individual tree can be retained with an acceptable level of risk based on the information available at the time of inspection. It is a snapshot in time of the potential an individual tree has for survival in the eyes of the assessor. ULE is not static – it is closely related to tree health and the surrounding conditions. Alterations in these variables may result in changes to the ULE assessment. Consequently, the reliability all ULE assessments have will decrease as time passes from the initial assessment and the potential for changes in variables increases.

- **Remove –** Trees that should be removed within the next 5 years
- **Short –** Trees that appear to be retainable at the time of the assessment for 5-15 years with an acceptable level of risk.
- **Medium –** Trees that appear to be retainable at the time of the assessment for 15-40 years with an acceptable level of risk.
- **Long –** Trees that appear to be retainable at the time of the assessment for 40+ years with an acceptable level of risk.

Amenity and Visual Value – For the purposes of assessing the visual and landscape value of each tree the IACA Significance of a Tree, Assessment Rating System (STARS) © (IACA 2010) © has been adopted. - The landscape significance of a tree is an essential criterion to establish the importance that a particular tree may have on a site. The system uses a scale of High, Medium and Low significance in the landscape.

High significance in landscape

- The tree is in good condition and good vigour
- The tree has a form typical for the species
- The tree is a remnant or is a planted locally indigenous specimen and/or is rare or uncommon in the local area or of botanical interest or of substantial age
- The tree is listed as a heritage item, threatened species or part of an endangered ecological community or listed on council's significant tree register
- The tree is visually prominent and visible from a considerable distance when viewed from most directions within the landscape due to its size and scale and makes a positive contribution to the local amenity
- The tree supports social and cultural sentiments or spiritual associations, reflected by the broader population or community group or has commemorative values
- The tree's growth is unrestricted by above and below ground influences, supporting its ability to reach dimensions typical for the taxa in situ – tree is appropriate to the site conditions

Medium significance in landscape

- The tree is in fair-good condition and good or low vigour
- The tree has form typical or atypical of the species
- The tree is a planted locally indigenous or a common species with its taxa commonly planted in the local area
- The tree is visible from surrounding properties, although not visually prominent as partially obstructed by other vegetation or buildings when viewed from the street
- The tree provides a fair contribution to the visual character and amenity of the local area
- The tree's growth is moderately restricted by above or below ground influences, reducing its ability to reach dimensions typical for the taxa in situ

Low significance in landscape

- The tree is in fair-poor condition and good or low vigour
- The tree has form atypical of the species
- The tree is not visible or is partly visible from the surrounding properties as obstructed by other vegetation or buildings
- The tree provides a minor contribution or has a negative impact on the visual character and amenity of the local area
- The tree is a young specimen which may or may not have reached dimensions to be protected by local Tree Preservation Orders or similar protection mechanisms and can easily be replaced with a suitable specimen
- The tree's growth is severely restricted by above or below ground influences, unlikely to reach dimensions typical for the taxa in situ – tree is inappropriate to the site conditions
- The tree is listed as exempt under the provisions of the local Council Tree Preservation Order or similar protection mechanisms
- The tree has a wound or defect that has the potential to become structurally unsound
- **Environmental Pest / Noxious Weed Species**
- The tree is an environmental pest species due to its invasiveness or poisonous/allergenic properties.
- The tree is a declared noxious weed by legislation
- **Hazardous / Irreversible Decline**
- The tree is structurally unsound and/or unstable and is considered potentially dangerous
- The tree is dead, or is in irreversible decline, or has the potential to fail or collapse in full or in part in the immediate to short term

The tree is to have a minimum of three (3) criteria in a category to be classified in that group.

In the development of this document IACA acknowledges the contribution and original concept of the Footprint Green Tree Significance & Retention Value Matrix, developed by Footprint Green Pty Ltd in June 2010.

The Australian Standard 4970-2009 Protection of Trees on Development Sites defines the requirements for assessing trees with respect to development. It provides the guidance on how to decide which trees are appropriate for retention and on the means of protecting them during construction works. It describes the areas and offsets, referred to as the Tree Protection Zone (TPZ) and Structural Root Zone (SRZ) required to be free from development works to maintain tree vitality and stability. This report has been prepared in accordance with the conditions set out within the standard.

- **Tree Protection Zone** – The tree protection zone is defined as a specified area above and below ground set aside for the protection of the tree's roots and crown. It is expressed as a radial measurement taken from the centre of the trunk at ground level.
- **Structural Root Zone** – The structural root zone is defined as a specified area around the base of a tree required to maintain its stability within the ground. It is expressed as a radial measurement taken from the center of the trunk at ground level. Excavation and development works are not recommended within the structural root zone unless additional investigation as to root size and location is undertaken

APPENDIX 2.3 CCBC APPROVAL FOR TREE REMOVAL AND PRUNING AT BELMORE

Gareth O'Brien

From: Peter D'Costa
Sent: Friday, 23 April 2021 4:50 PM
To: Sarah-ann Brennan; Kevin Cao
Cc: Gareth O'Brien; Madush Priyan; William Healy; Julie Henderson; Rachel Leet
Subject: FW: Tree removal and pruning -Belmore station
Attachments: S-201.pdf

Hi All

Please see approval below from council for Tree removal and Pruning at Belmore.

Regards

Peter D'Costa
Senior Project Engineer
Infrastructure Projects

Downer
Relationships creating success

T | 0478 074 294 **M** | 0478 074 294
E | Peter.D'Costa@Downergroup.com
T3, Triniti Business Campus, 39 Delhi Road
North Ryde NSW 2113
www.downergroup.com

From: James Magsipoc <James.Magsipoc@cbcity.nsw.gov.au>
Sent: Friday, 23 April 2021 12:50 PM
To: Peter D'Costa <Peter.D'Costa@Downergroup.com>
Cc: Julie Henderson <Julie.Henderson@Downergroup.com>; Andrew Smith <Andrew.Smith2@downergroup.com>; Ash Jarvis <Ash.Jarvis2@transport.nsw.gov.au>; Ben Webb <Ben.Webb@cbcity.nsw.gov.au>; Peter Anderson <Peter.ANDERSON@cbcity.nsw.gov.au>
Subject: FW: Tree removal and pruning -Belmore station

Hi Peter,

The tree removal and pruning at Redman Parade ,Belmore had been approved subject to the conditions listed below.

Please return email if you had receive this email and its attachment with clarity.

Best regards,

James Magsipoc - Project Officer
T 02 9707 9771
E James.Magsipoc@cbcity.nsw.gov.au
www.cbcity.nsw.gov.au

@ourcbcity
Like & follow us

From: Wayne Bromfield <Wayne.Bromfield@cbcity.nsw.gov.au>
Sent: Friday, 23 April 2021 12:32 PM
To: James Magsipoc <James.Magsipoc@cbcity.nsw.gov.au>
Subject: FW: Tree removal and pruning -Belmore station

Hello James,

Approval for the pruning and removal of the council trees identified in the attachments to facilitate the works required for the Metro project is approved.

Any tress removed will require replacement at councils standard rate of 3:1. The tree/s shall have a container size not less than 75 litres, shall comply with NATSPEC Specifying Trees: a guide to assessment of tree quality (2003) or Australian Standard AS 2303 – 2015 Tree stock for landscape use, and be planted and maintained in accordance with Councils street tree planting specifications Standard Drawing No. S-201.

The tree pruning and removal works are subject to the following conditions:

- All pruning and removal works must be carried out by a qualified arborist (minimum qualifications AQF Level 3 or equivalent);
- All pruning works shall comply with Australian Standard AS4373-2007 Pruning of amenity trees
- The tree pruning work must comply with the Amenity Tree Industry – Code of Practice, 1998 (Workcover, NSW) and the Guide to Managing Risks of Tree Trimming and Removal Work (Safe Work Australia 2016).
- The tree pruning contractor must hold a Public Liability Insurance Certificate of Currency with a minimum indemnity of $20 million, together with a NSW Workers Compensation Insurance Certificate of Currency;
- All tree material shall be removed from site;
- The site must be maintained in a safe condition at all times;
- Appropriate hazard signage to be in place at all times during the tree pruning works.

Regards,

Wayne.

APPENDIX 3 WILEY PARK AIA (URBAN ARBOR)

URBAN ARBOR
The Trusted Name in Tree Management

Arboricultural Impact Assessment Report

Site location:
South West Metro
Wiley Park Station
Wiley Park NSW

Prepared for:
Metron T2M

Prepared by: Jack Williams and Bryce Claassens
Urban Arbor Pty Ltd
Date: 23 December 2020
Ref: 201223-SWMWP-AIA
Rev: B

URBAN ARBOR
The Trusted Name in Tree Management

Table of Contents

COPYRIGHT

URBAN ARBOR
The Trusted Name in Tree Management

1. INTRODUCTION

1.1 Urban Arbor have been instructed by Metron T2M to provide an Arboricultural Impact Assessment Report for trees located within the site and adjoining sites in relation to a proposed development.

1.2 Below is a list of all documents and information provided to Urban Arbor to assist in preparing this report.

A) Wiley Park Landscape Drawings, Metron T2M, Rev D, Including Sheet No: 6, 8, 9 and 11, 23 October 2020.
B) Civil Engineering Package No. 233, Metron T2M, Rev D, 137 Pages in total, 29 May 2020.
C) Wiley Park Station Service Building, Metron T2M, Rev C, 3 November 2020.

1.3 The trees were inspected on 16 December 2019 and 17 December 2020. Access was available to the subject site and the adjoining public areas only. All tree data contained in this report was collected during these site inspections.

2. SCOPE OF THE REPORT

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

2.1.1 Conduct a visual assessment of all significant trees located within 10 metres of development works from ground level. For the purpose of this report, a significant tree is a tree with a height equal to or greater than 5 metres.

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

2.1.3 Provide an assessment of the potential impact the proposed development is likely to cause to the condition of the subject trees in accordance with AS4970 Protection of trees on development sites (2009).

2.1.4 Specify tree protection measures for trees to be retained in accordance with AS4970-2009.

URBAN ARBOR
The Trusted Name in Tree Management

3. LIMITATIONS

3.1 The observations and recommendations are based on the site inspections identified in the introduction (section 1) and the access available at the time of inspection. Findings of this report are based on the observations and site conditions at the time inspection.

3.2 All of the observations were carried out from ground level and none of the surrounding surfaces were lifted or removed during the inspection. No tests were carried out to the subject trees or surrounding area during the inspection.

3.3 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.

3.4 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.

3.5 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*.

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

3.7 Urban Arbor neither guarantees, nor is it responsible for, the accuracy of information provided by others that is contained within this report.

3.8 While an assessment of the subject trees estimated useful life expectancy is included in this report, no specific tree risk assessment has been undertaken for any of trees at the site.

3.9 The ultimate safety of any tree cannot be categorically guaranteed. Even trees apparently free of defects can collapse or partially collapse in extreme weather conditions. Trees are dynamic, biological entities subject to changes in their environment, the presence of pathogens and the effects of ageing. These factors reinforce the need for regular inspections. It is generally accepted that hazards can only be identified from distinct defects or from other failure-prone characteristics of a tree or its locality.

3.10 Alteration of this report invalidates the entire report.

URBAN ARBOR
The Trusted Name in Tree Management

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 above ground level) - millimetres.

4.1.5 Estimated height - metres

4.1.6 Estimated crown spread (diameter of crown) - metres

4.1.7 Health

4.1.8 Structural condition

4.1.9 Amenity value

4.1.10 Estimated remaining contribution years (SULE)[1]

4.1.11 Retention value (Tree AZ)[2]

4.1.12 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 information was imported into our computerised geographical information system (GIS) PT-mapper pro. This software was used to measure/calculate all encroachment estimates included in this report.

4.5 All DBH measurements, tree protection zones, and structural root zones were calculated in accordance with methods set out in AS4970 Protection of trees on development sites (2009) [4] and in some cases estimated. See appendices for information.

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

---

[1] Barrell Tree Consultancy, *SULE: Its use and status into the New Millennium*, TreeAZ/03/2001, http://www.treeaz.com/.

[2] Barrell Tree Consultancy, *Tree AZ version 10.04-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 (2015).

[4] Council Of Standards Australia, *AS4970 Protection of trees on development sites* (2009).

URBAN ARBOR
The Trusted Name in Tree Management

5. SITE LOCATION AND BRIEF DESCRIPTION

5.1 The site is located in the Canterbury Bankstown Local Government Area (LGA). The trees are subject to protection under the Canterbury Local Environmental Plan (LEP) 2012[5] and Development Control Plan (DCP) 2012.[6] The site is identified as a heritage item (number I159) in the LEP heritage maps.[7]

6. GENERAL INFORMATION IN RELATION TO PROTECTING TREES ON DEVELOPMENT SITES

6.1 **Tree protection zone (TPZ):** The TPZ is the principle means of protecting trees on development sites and is an area required to maintain the viability of trees during development. It is commonly observed that tree roots will extend significantly further than the indicative TPZ, however the TPZ is an area identified in AS4970-2009 to be the area where root loss or disturbance will generally 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 TPZ also incorporates the SRZ (see below for more information about the SRZ). The TPZ is calculated by multiplying the DBH by twelve, with the exception of palms, other monocots, cycads and tree ferns, the TPZ of which have been calculated at one metre outside the crown projection. Additional information about the TPZ is included in Appendix 3.

6.2 **Structural Root Zone (SRZ):** 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 needs to be maintained to preserve a viable tree. The SRZ is calculated using the following formula; (DAB x 50) $^{0.42}$ x 0.64. There are several factors that can vary 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. Soil level changes should also generally be avoided inside the SRZ of trees to be retained. Palms, other monocots, cycads and tree ferns do not have an SRZ. See the appendices for more information about the SRZ.

---

5 *Canterbury Local Environmental Plan 2012*, https://www.legislation.nsw.gov.au/#/view/EPI/2012/673, accessed 23 December 2020.

6 *Canterbury Development Control Plan 2012*, https://www.cbcity.nsw.gov.au/development/planning-control-policies/canterbury-development-control-plan-2012, accessed 23 December 2020.

7 *Canterbury Local Environmental Plan Heritage Map - Sheet HER_004*, https://www.legislation.nsw.gov.au/maps/f6a186a6-97fb-6dac-9d90-acfc8774137b/1550_COM_HER_004_010_20121105.pdf, 23 December 2020.

URBAN ARBOR
The Trusted Name in Tree Management

6.3 **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.

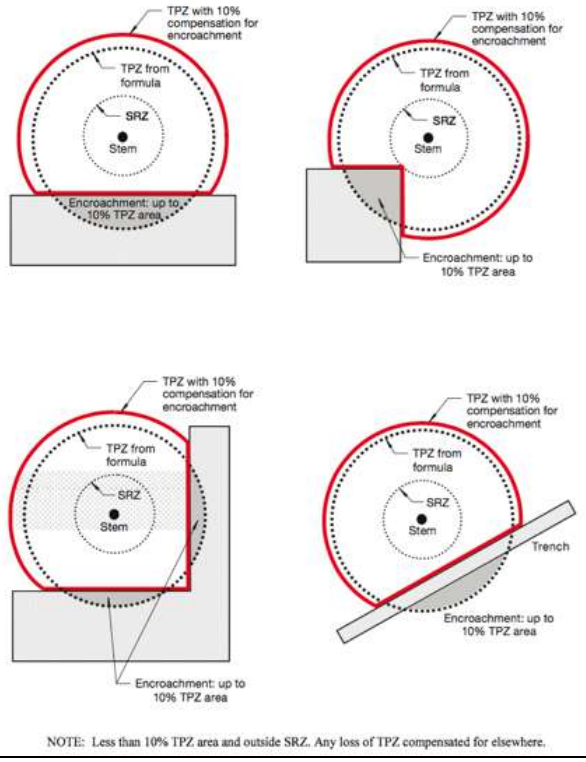


Image 1: Example minor TPZ encroachment from AS4970-2009.

6.4 **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. Root investigations may be required to identify roots that will be impacted during major TPZ encroachment (see Appendix 3 for more information in relation to root investigations).

URBAN ARBOR
The Trusted Name in Tree Management

7. OBSERVATIONS

7.1 **Tree information:** Details of each individual tree assessed, including the observations taken during the site inspection can be found in the tree inspection schedule in Appendix 2, where the indicative tree protection zone (TPZ) for the subject trees has been calculated. The TPZ and SRZ should be measured in radius from the centre of the trunk. The subject trees have been awarded a retention value based on the observations during the site inspection. The system 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 Tree AZ categories sheet (Barrell Tree Consultancy) has been included in the appendices to assist with understanding the retention values. The retention value that has been allocated to the subject trees in this report is not definitive and should only be used as a guideline. This information has been summarised below.

7.2 **Site Plan:** Site plans have been included in Appendix 1, where the indicative TPZ and SRZ of the trees have been overlaid onto the proposed plans provided by the client. The following plans are included in Appendix 1;

- Appendix 1A: Proposed Site Plan Overview
- Appendix 1B: Proposed Service Building

8. ASSESSMENT OF CONSTRUCTION IMPACTS

8.1 Table 1: In the table below, the impact of the proposed development has been assessed for all trees included in the report. The assessed TPZ encroachments include proposed structures and hard landscaping only. All soft landscaping should be completed in accordance with section 11.10.

Tree ID	Species	Retention value	TPZ radius (m)	TPZ area (m^2)	SRZ radius (m)	TPZ encroachment	Discussion/ Conclusion	Recommendation
683	*Ficus spp*	Z1	2.2	14.7	1.7	Footprint	The trunk is located within the footprint of new hard surfacing.	Remove
684	*Pittosporum undulatum*	Z1	2.4	18.1	1.7	Footprint	The trunk is within the footprint of new wire mesh area and the tree is proposed to be removed.	Remove
685	*Grevillea spp*	Z1	2.0	12.6	1.8	None	No encroachment into the TPZ.	Retain and protect
686	*Leptospermum petersonii*	A1	2.6	21.9	1.8	None	No encroachment into the TPZ.	Retain and protect
687	*Quercus robur*	A1	5.5	95.7	2.5	Footprint	The trunk is located within the footprint of a proposed platform building.	Remove
688	*Unknown spp*	Z4	2.6	21.2	2.1	Footprint	The trunk is located within the footprint of new hard surfacing.	Remove
689	*Nerium oleander*	Z1	2.4	18.1	1.7	Footprint	The trunk is located within the footprint of a proposed platform building.	Remove
690	*Pittosporum undulatum*	Z1	2.0	12.6	1.6	Footprint	The trunk is located directly adjacent to a proposed platform building and new hard surfacing.	Remove
691	*Quercus robur*	A1	2.3	16.3	1.8	Footprint	The trunk is located directly adjacent to a proposed platform building.	Remove

URBAN ARBOR
The Trusted Name in Tree Management

Tree ID	Species	Retention value	TPZ radius (m)	TPZ area (m^2)	SRZ radius (m)	TPZ encroachment	Discussion/ Conclusion	Recommendation
692	*Schinus molle*	A1	12.6	498.8	3.6	Major	The proposed fencing and service installation will encroach into the TPZ and SRZ. This is considered to be a major TPZ encroachment and the proposed works could potentially impact the condition and stability of the tree. To reduce the impact to the tree, the proposed fencing and services must be installed in accordance with section 9.2 of this report.	Retain and protect*
693	*Triadica sebifera*	A1	3.3	34.7	2.4	Footprint	The trunk of the tree is located within the footprint of the proposed service installation.	Remove
694	*Triadica sebifera*	A1	4.1	52.3	2.3	Footprint	The trunk of the tree is located within the footprint of the proposed service installation.	Remove
695	*Schinus molle*	A1	5.7	103.0	2.8	Footprint	The trunk of the tree is located within the footprint of the proposed service building.	Remove
696	*Schinus molle*	A1	7.5	175.3	3.0	Footprint	The trunk of the tree is located within the footprint of the proposed service building.	Remove
697	*Schinus molle*	A1	6.0	113.1	2.6	Footprint	The trunk of the tree is located within the footprint of the proposed service building.	Remove
698	*Callistemon viminalis*	A1	3.1	30.6	2.0	Major	A proposed welded mesh fence encroaches into the TPZ by 7% ($2m^2$) and into the SRZ. If significant roots are severed in the SRZ, the stability of the tree could be impacted. To retain the tree in a viable condition, the fence must be installed in accordance with section 9.2.	Retain and protect*
699	*Auranticarpa rhombifolia*	Z4	2.0	12.0	1.7	None	No proposed TPZ encroachment.	Retain and protect
700	*Auranticarpa rhombifolia*	Z9	2.8	23.9	1.8	None	No proposed TPZ encroachment.	Retain and protect
701	*Quercus robur*	A1	6.5	131.9	2.7	Major	A proposed welded mesh fence will encroach into the TPZ and SRZ. This is considered to be a major TPZ encroachment and the proposed works could potentially impact the condition and stability of the tree. To reduce the impact to the tree, the proposed fencing must be installed in accordance with section 9.2 of this report.	Retain and protect*

URBAN ARBOR
The Trusted Name in Tree Management

Tree ID	Species	Retention value	TPZ radius (m)	TPZ area (m^2)	SRZ radius (m)	TPZ encroachment	Discussion/ Conclusion	Recommendation
702	*Auranticarpa rhombifolia*	A1	2.4	18.1	1.8	None	No proposed TPZ encroachment.	Retain and protect
703	*Arbutus unedo*	Z1	3.6	40.7	2.4	Major	A proposed welded mesh fence will encroach into the TPZ and SRZ. This is considered to be a major TPZ encroachment and the proposed works could potentially impact the condition and stability of the tree. To reduce the impact to the tree, the proposed fencing must be installed in accordance with section 9.2 of this report.	Retain and protect*
704	*Quercus robur*	A2	7.9	197.1	3.0	Major	A proposed welded mesh fence will encroach into the TPZ and SRZ. This is considered to be a major TPZ encroachment and the proposed works could potentially impact the condition and stability of the tree. To reduce the impact to the tree, the proposed fencing must be installed in accordance with section 9.2 of this report.	Retain and protect*
705	*Quercus robur*	A1	4.1	52.1	2.6	Major	A proposed welded mesh fence will encroach into the TPZ and SRZ. This is considered to be a major TPZ encroachment and the proposed works could potentially impact the condition and stability of the tree. To reduce the impact to the tree, the proposed fencing must be installed in accordance with section 9.2 of this report.	Retain and protect*
706	*Quercus robur*	A1	5.9	108.6	2.6	Major	A proposed awning encroaches into the TPZ by 38% (41.6m^2) and into the SRZ. The impact to trees root system within this area could be mitigated through tree sensitive measures. However, more than 30% of the overall crown will need to be removed to accommodate the awning, which will significantly modify the shape/form of the tree and adversely impact the tree condition. The tree is therefore recommended to be removed.	Remove
707	*Quercus robur*	A1	3.1	30.6	2.0	Footprint	The trunk/crown of the tree is located within the footprint of the proposed awning.	Remove
708	*Quercus robur*	A1	3.8	46.3	2.2	Footprint	The trunk/crown of the tree is located within the footprint of the proposed awning.	Remove

URBAN ARBOR
The Trusted Name in Tree Management

Tree ID	Species	Retention value	TPZ radius (m)	TPZ area (m^2)	SRZ radius (m)	TPZ encroachment	Discussion/ Conclusion	Recommendation
709	*Quercus robur*	A1	2.3	16.3	1.8	Major	The proposed fencing and service installation will encroach into the TPZ and SRZ. This is considered to be a major TPZ encroachment and the proposed works could potentially impact the condition and stability of the tree. To reduce the impact to the tree, the proposed fencing and services must be installed in accordance with section 9.2 of this report.	Retain and protect*
710	*Quercus robur*	A1	2.6	21.9	2.0	Major	The proposed fencing and service installation will encroach into the TPZ and SRZ. This is considered to be a major TPZ encroachment and the proposed works could potentially impact the condition and stability of the tree. To reduce the impact to the tree, the proposed fencing and services must be installed in accordance with section 9.2 of this report.	Retain and protect*
711	*Quercus robur*	A1	4.9	74.0	2.5	Major	The proposed fencing and service installation will encroach into the TPZ and SRZ. This is considered to be a major TPZ encroachment and the proposed works could potentially impact the condition and stability of the tree. To reduce the impact to the tree, the proposed fencing and services must be installed in accordance with section 9.2 of this report.	Retain and protect*
712	*Quercus robur*	A1	4.2	56.1	2.5	Major	The proposed fencing and service installation will encroach into the TPZ and SRZ. This is considered to be a major TPZ encroachment and the proposed works could potentially impact the condition and stability of the tree. To reduce the impact to the tree, the proposed fencing and services must be installed in accordance with section 9.2 of this report.	Retain and protect*
713	*Quercus robur*	A1	3.6	40.7	2.1	Major	The proposed fencing and service installation will encroach into the TPZ and SRZ. This is considered to be a major TPZ encroachment and the proposed works could potentially impact the condition and stability of the tree. To reduce the impact to the tree, the proposed fencing and services must be installed in accordance with section 9.2 of this report.	Retain and protect*

URBAN ARBOR
The Trusted Name in Tree Management

Tree ID	Species	Retention value	TPZ radius (m)	TPZ area (m^2)	SRZ radius (m)	TPZ encroachment	Discussion/ Conclusion	Recommendation
714	*Quercus robur*	A1	2.6	21.9	1.9	Major	The proposed fencing and service installation will encroach into the TPZ and SRZ. This is considered to be a major TPZ encroachment and the proposed works could potentially impact the condition and stability of the tree. To reduce the impact to the tree, the proposed fencing and services must be installed in accordance with section 9.2 of this report.	Retain and protect*
715	*Quercus robur*	A1	5.0	79.8	2.5	Major	The proposed fencing and service installation will encroach into the TPZ and SRZ. This is considered to be a major TPZ encroachment and the proposed works could potentially impact the condition and stability of the tree. To reduce the impact to the tree, the proposed fencing and services must be installed in accordance with section 9.2 of this report.	Retain and protect*
716	*Corymbia eximia*	A1	3.7	43.5	2.2	None	No encroachment into the TPZ.	Retain and protect
717	*Quercus robur*	Z9	4.8	72.6	2.4	Major	The proposed fencing and service installation will encroach into the TPZ and SRZ. This is considered to be a major TPZ encroachment and the proposed works could potentially impact the condition and stability of the tree. To reduce the impact to the tree, the proposed fencing and services must be installed in accordance with section 9.2 of this report.	Retain and protect*
718	*Eucalyptus paniculata*	A1	10.2	326.9	3.4	Major	The proposed fencing and service installation will encroach into the TPZ and SRZ. This is considered to be a major TPZ encroachment and the proposed works could potentially impact the condition and stability of the tree. To reduce the impact to the tree, the proposed fencing and services must be installed in accordance with section 9.2 of this report.	Retain and protect*
719	*Quercus robur*	A1	5.0	78.3	2.5	Major	The proposed fencing and service installation will encroach into the TPZ and SRZ. This is considered to be a major TPZ encroachment and the proposed works could potentially impact the condition and stability of the tree. To reduce the impact to the tree, the proposed fencing and services must be installed in accordance with section 9.2 of this report.	Retain and protect*

URBAN ARBOR
The Trusted Name in Tree Management

Tree ID	Species	Retention value	TPZ radius (m)	TPZ area (m^2)	SRZ radius (m)	TPZ encroachment	Discussion/ Conclusion	Recommendation
720	*Eucalyptus saligna*	A1	8.3	215.4	3.1	Major	A proposed welded mesh fence will encroach into the TPZ and SRZ. This is considered to be a major TPZ encroachment and the proposed works could potentially impact the condition and stability of the tree. To reduce the impact to the tree, the proposed fencing must be installed in accordance with section 9.2 of this report.	Retain and protect*
721	*Populus nigra*	Z3	4.8	72.4	2.4	None	No encroachment into the TPZ.	Retain and protect
3286	*Eucalyptus saligna*	Z10	7.1	158.4	2.8	Major	The proposed service installation and services building construction will encroach into the TPZ by 29% (45.5m^2) and into the SRZ. This is considered to be a major TPZ encroachment and the proposed works could potentially impact the condition and stability of the tree. The canopy of the tree is asymmetric in shape due to significant powerline clearance. The whole canopy is weighted to the North. The proposed service installation will be completed to the South side of the tree, where roots under tensile loading force are likely to be severed. These roots are critical to the stability of the tree. Therefore, the tree has been recommended for removal due to impacts from the proposed development.	Remove
3287	*Eucalyptus botryoides*	Z10	6.6	136.8	2.6	Major	The proposed service installation, heavy duty crossover and services building construction will encroach into the TPZ by 45% (61.3m^2) and into the SRZ. This is considered to be a major TPZ encroachment and the proposed works could potentially impact the condition and stability of the tree. The canopy of the tree is asymmetric in shape due to significant powerline clearance. The whole canopy is weighted to the North. The proposed service installation will be completed to the South side of the tree, where roots under tensile loading force are likely to be severed. These roots are critical to the stability of the tree. Therefore, the tree has been recommended for removal due to impacts from the proposed development.	Remove
3288	*Eucalyptus scoparia*	Z10	4.8	72.4	2.4	Footprint	The trunk of the tree is located within the footprint of the proposed heavy duty crossover hard surfacing.	Remove

URBAN ARBOR
The Trusted Name in Tree Management

Tree ID	Species	Retention value	TPZ radius (m)	TPZ area (m^2)	SRZ radius (m)	TPZ encroachment	Discussion/ Conclusion	Recommendation
3289	*Eucalyptus botryoides*	Z10	5.0	78.5	2.4	Major	The proposed service installation, heavy duty crossover and services building construction will encroach into the TPZ by 33% (25.8m^2) and into the SRZ. This is considered to be a major TPZ encroachment and the proposed works could potentially impact the condition and stability of the tree. The canopy of the tree is asymmetric in shape due to significant powerline clearance. The whole canopy is weighted to the North. The proposed service installation will be completed to the South side of the tree, where roots under tensile loading force are likely to be severed. These roots are critical to the stability of the tree. Therefore, the tree has been recommended for removal due to impacts from the proposed development.	Remove
3321	*Ligustrum lucidum*	Z3	6.0	113.1	2.5	Footprint	The trunk of the tree is located within the footprint of the proposed service building construction.	Remove
3322	*Phoenix canariensis*	Z3	3.0	28.3	NA	Footprint	The trunk of the tree is located within the footprint of the proposed service building construction.	Remove
3323	*Ligustrum lucidum*	Z3	6.0	113.1	2.5	Footprint	The trunk of the tree is located within the footprint of the proposed service building construction.	Remove
3324	*Ligustrum lucidum*	Z3	5.4	91.6	2.4	Footprint	The trunk of the tree is located within the footprint of the proposed service building construction.	Remove
3325	*Schinus molle*	A1	5.5	95.0	2.7	Footprint	The trunk of the tree is located within the footprint of the proposed service building construction.	Remove
3326	*Ligustrum lucidum*	Z3	2.4	18.1	2.3	Footprint	The trunk of the tree is located within the footprint of the proposed service building construction.	Remove
3327	*Ligustrum lucidum*	Z3	5.4	91.6	2.4	Footprint	The trunk of the tree is located within the footprint of the proposed service building construction.	Remove
3328	*Schinus molle*	Z10	5.2	84.9	2.5	Footprint	The trunk of the tree is located within the footprint of the proposed service building construction.	Remove
3329	*Ligustrum lucidum*	Z3	2.1	13.9	2.3	Footprint	The trunk of the tree is located within the footprint of the proposed service building construction.	Remove

URBAN ARBOR
The Trusted Name in Tree Management

Tree ID	Species	Retention value	TPZ radius (m)	TPZ area (m^2)	SRZ radius (m)	TPZ encroachment	Discussion/ Conclusion	Recommendation
3330	*Angophora costata*	A2	5.0	78.5	2.5	Footprint	The trunk of the tree is located within the footprint of the proposed service building construction.	Remove
3331	*Ligustrum lucidum*	Z3	4.8	72.4	2.3	Footprint	The trunk of the tree is located within the footprint of the proposed service building construction.	Remove
3332	*Ligustrum lucidum*	Z3	6.0	113.1	2.5	Footprint	The trunk of the tree is located within the footprint of the proposed service building construction.	Remove
3333	*Ligustrum lucidum*	Z3	4.8	72.4	2.3	Footprint	The trunk of the tree is located within the footprint of the proposed service building construction.	Remove
3334	*Ligustrum lucidum*	Z3	6.0	113.1	2.5	Footprint	The trunk of the tree is located within the footprint of the proposed service building construction.	Remove
3335	*Schinus molle*	Z10	7.8	191.1	2.8	Footprint	The trunk of the tree is located within the footprint of the proposed service building construction.	Remove
3336	*Ligustrum lucidum*	Z3	3.6	40.7	2.0	Footprint	The trunk of the tree is located within the footprint of the proposed service building construction.	Remove
3337	*Schinus molle*	A1	7.4	172.0	4.0	Footprint	The trunk of the tree is located within the footprint of the proposed service building construction, service and retaining wall area.	Remove
3338	*Ligustrum lucidum*	Z3	4.2	55.4	2.1	Footprint	The trunk of the tree is located within the footprint of the proposed service building construction and retaining wall area.	Remove
3339	*Schinus molle*	A1	6.7	141.0	3.2	Footprint	The trunk of the tree is located within the footprint of the proposed service building construction and retaining wall area.	Remove
3340	*Ligustrum lucidum*	Z3	5.4	91.6	2.4	Footprint	The trunk of the tree is located within the footprint of the proposed service building construction and retaining wall area.	Remove
3341	*Schinus molle*	Z10	6.8	145.3	2.8	Footprint	The trunk of the tree is located within the footprint of the proposed service building construction and retaining wall area.	Remove
3342	*Phoenix canariensis*	Z3	2.0	12.6	NA	Footprint	The trunk of the tree is located within the footprint of the proposed service building construction and retaining wall area.	Remove

URBAN ARBOR
The Trusted Name in Tree Management

Tree ID	Species	Retention value	TPZ radius (m)	TPZ area (m^2)	SRZ radius (m)	TPZ encroachment	Discussion/ Conclusion	Recommendation
3343	*Ligustrum lucidum*	Z3	7.2	162.9	2.7	Footprint	The trunk of the tree is located within the footprint of the proposed service building construction and retaining wall area.	Remove
3344	*Schinus molle*	Z10	7.2	162.9	2.8	Footprint	The trunk of the tree is located within the footprint of the proposed service building construction and retaining wall area.	Remove
3345	*Schinus molle*	A1	11.0	380.1	4.0	Footprint	The trunk of the tree is located within the footprint of the proposed service building construction and retaining wall area.	Remove

Notes

TPZ Encroachment Percentage: TPZ encroachment percentages are based on new structures and hard surfaces only. New soft landscaping, such as turf or amenity planting areas have not been included in the calculation for TPZ encroachment.
Retain and protect*: The proposed construction must be completed in accordance with section 9.2 to reduce the impact to the tree.

9. CONCLUSIONS

9.1 **Table 2:** Summary of the impact to trees during the development;

Impact	Reason	Category A	Category Z	Total
		A	Z	
Trees to be removed	Building construction, new surfacing and/or proximity, or trees in poor condition.	687, 691, 693, 694, 695, 696, 697, 706, 707, 708, 3325, 3330, 3337, 3339, 3345 (Fifteen trees)	683, 684, 688, 689, 690, 3286, 3287, 3288, 3289, 3321, 3322, 3323, 3324, 3326, 3327, 3328, 3329, 3331, 3332, 3333, 3334, 3335, 3336, 3338, 3340, 3341, 3342, 3343, 3344 (Twenty-nine trees)	**44 trees**
Trees subject to TPZ encroachment greater than 10% requiring tree sensitive design and construction to be retained	Removal of existing surfacing/structures and/or installation of new surfacing/structures.	692, 698, 701, 704, 705, 709, 710, 711, 712, 713, 714, 715, 718, 719, 720 (Fifteen trees)	703, 707 (Two trees)	**17 trees**
Retained trees subject to TPZ encroachment of 10% or less	Removal of existing surfacing/structures and/or installation of new surfacing/structures.	686, 702, 716 (Three trees)	685, 699, 700, 721 (Four trees)	**7 trees**

URBAN ARBOR
The Trusted Name in Tree Management

9.2 **Construction Design/Specification Requirements:** The proposed construction will encroach into the TPZ and SRZ of fourteen trees, including tree 692, 698, 701, 703, 704, 705, 709, 710, 711, 712, 713, 714, 715, 717, 718, 719 and 720. To ensure the trees are not adversely impacted by the construction, it must be demonstrated the following design and construction specifications can be implemented within the TPZ of the trees. If the construction cannot be completed in accordance with these specifications, the trees may not be viable for retention.

9.2.1 **Welded mesh Fence:** The proposed welded mesh fence will be installed using the tree sensitive method of post and rail type construction. To ensure the trees are not significantly impacted by the works, all post holes must be excavated manually. The post location must be flexible to avoid the severance of significant roots 40mm and greater in diameter. No posts are to be located within the SRZ or root investigations will be required to determine the post location. See Appendix 3 for more information in regards to root investigations. All rails/horizontal materials are to be located on or above existing soil grades. This will allow for the majority of the root system to be retained between the posts, minimising root loss.

9.2.2 **Underground Services:** AS4970 Protection of trees on development sites (2009) recommends that all underground services located inside the TPZ of any tree to be retained should be installed via tree sensitive techniques. This should include either directional drilling methods or manual excavations to minimise the impact to trees identified for retention.

If directional drilling is proposed, section 4.5.5 of AS4970-2009 says that 'The directional drilling bore should be at least 600 mm deep. The project Arborist should assess the likely impacts of boring and bore pits on retained trees'.[8] The feasibility of sub-surface boring/directional drilling will need to be investigated by a sub-surface boring/directional drilling specialist. The project Arborist should provide advice and supervise excavations for bore pits, which must be carried out manually if located within the TPZ. The top of the pipe must be at least 600mm below the existing soil grade. The location of bore pits should be flexible in the TPZ to avoid significant roots, the project Arborist should assess and advise in writing the impact of any significant root severance to the condition of the tree.

If manual excavations are proposed, all excavations for the services should be carried out manually under the supervision of the project Arborist (minimum qualification AQF 5). Manual excavation may include the use of pneumatic and hydraulic tools, high-pressure air or a combination of high-pressure water and a vacuum device. All roots greater than 40mm in diameter should be retained in the service trench. The service pipe should then be threaded below the retained roots where practical. Roots greater than 40mm within the alignment of the service pipe should only be severed/pruned under the approval of the project Arborist. All root pruning should be in accordance with AS4373 Pruning of amenity trees (2007).

[8] Council Of Standards Australia, *AS 4970 Protection of trees on development sites* (2009) page 18.

URBAN ARBOR
The Trusted Name in Tree Management

10. RECOMMENDATIONS

10.1 This report assesses the impact of a proposed development at the subject site to sixty-eight (68) trees located within the site and adjoining sites, in accordance with AS4970 Protection of trees on development sites (2009).

10.2 Site plans have been included in Appendix 1, where the indicative TPZ and SRZ of the trees have been overlaid onto the proposed plans provided by the client. The following plans are included in Appendix 1;

- Appendix 1A: Proposed Site Plan Overview
- Appendix 1B: Proposed Service Building

10.3 Forty-four (44) trees have been recommended for removal within this report, including tree 683, 684, 687, 688, 689, 690, 691, 693, 694, 695, 696, 697, 706, 707, 708, 3286, 3287, 3288, 3289, 3321, 3322, 3323, 3324, 3325, 3326, 3327, 3328, 3329, 3330, 3331, 3332, 3333, 3334, 3335, 3336, 3337, 3338, 3339, 3340, 3341, 3342, 3343, 3344 and 3345. Tree 687, 691, 693, 694, 695, 696, 697, 706, 707, 708, 3325, 3330, 3337, 3339 and 3345 are higher value category A retention value trees. Tree 683, 684, 688, 689, 690, 3286, 3287, 3288, 3289, 3321, 3322, 3323, 3324, 3326, 3327, 3328, 3329, 3331, 3332, 3333, 3334, 3335, 3336, 3338, 3340, 3341, 3342, 3343 and 3344 are lower value category Z retention value trees that generally should not be a constraint to development works.

10.4 Seventeen (17) trees have been recommended to be retained and will be subject to TPZ encroachments greater than 10%, including tree 692, 698, 701, 703, 704, 705, 709, 710, 711, 712, 713, 714, 715, 717, 718, 719 and 720. To reduce the impact to trees, the proposed construction within the TPZ of the trees must be completed in accordance with section 9.2 of this report.

10.5 The remaining seven (7) trees will be subject to minor and acceptable TPZ encroachments of 10% or less and can be retained in a viable condition, including tree 685, 686, 699, 700, 702, 716 and 721.

10.6 All trees to be retained must be protected for the duration of development, (including demolition and landscaping, in accordance with AS4970-2009). See section 11 for more information.

10.7 See section 11.10 for general landscape guidance when working within the TPZ of trees to be retained.

10.8 Where possible underground services must be located outside the TPZ of trees to be retained. All underground services located inside the TPZ of any tree to be retained must be installed in accordance with section 11.11.

10.9 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. This report should be submitted as supporting evidence with any tree removal/pruning or development application.

URBAN ARBOR
The Trusted Name in Tree Management

11. TREE PROTECTION REQUIREMENTS

11.1 **Use of this report:** All contractors must be made aware of the tree protection requirements prior to commencing works at the site. This report and a copy of the site plan (Appendix 1) drawings must also be made available to any contractor prior to works commencing and during any on site operations.

11.2 **Project Arborist:** Prior to any works commencing at the site a project Arborist should be appointed. The project Arborist should be qualified to a minimum AQF level 5 and/or equivalent qualifications and experience, and should assist with any development issues relating to trees that may arise. If at any time it is not feasible to carryout works in accordance with this, an alternative must be agreed in writing with the project Arborist.

11.3 **Tree work:** All tree work must be carried out by a qualified and experienced Arborist with a minimum of AQF level 2 in arboriculture, in accordance with NSW Work Cover Code of Practice for the Amenity Tree Industry (1998) and AS4373 Pruning of amenity trees (2007).

11.4 **Initial site meeting/on-going regular inspections:** The project Arborist is to hold a pre-construction site meeting with principal contractor to discuss methods and importance of tree protection measures and resolve any issues in relation to tree protection that may arise. In accordance with AS4970-2009, the project Arborist should carryout regular site inspections to ensure works are carried out in accordance with this document throughout the development process. Site inspections are recommended on a one-month frequency.

11.5 **Site Specific Tree Protection Recommendations:** The table below provides recommendations for each tree, including site specific tree protection requirements. All trees to be retained must be protected in accordance with general requirements of AS4970-2009 for the duration of the development, details of which are discussed in further details in this section of the report.

Tree ID	Tree Species	TPZ Radius (m)	SRZ Radius (m)	Recommendations
683	*Ficus spp*	2.2	1.7	Remove.
684	*Pittosporum undulatum*	2.4	1.7	Remove.
685	*Grevillea spp*	2.0	1.8	Retain and protect. Tree protection fencing is to encompass the TPZ perimeter. TPZ signage is required on the fencing.
686	*Leptospermum petersonii*	2.6	1.8	Retain. Set back from works. No tree protection required.
687	*Quercus robur*	5.5	2.5	Remove.
688	*Unknown spp*	2.6	2.1	Remove.
689	*Nerium oleander*	2.4	1.7	Remove.
690	*Pittosporum undulatum*	2.0	1.6	Remove.
691	*Quercus robur*	2.3	1.8	Remove.

URBAN ARBOR
The Trusted Name in Tree Management

692	*Schinus molle*	12.6	3.6	Retain and protect. Tree protection fencing is to encompass the TPZ perimeter where practical and is to be set back from the proposed construction by 1m. TPZ signage is required on the fencing.
693	*Triadica sebifera*	3.3	2.4	Remove.
694	*Triadica sebifera*	4.1	2.3	Remove.
695	*Schinus molle*	5.7	2.8	Remove.
696	*Schinus molle*	7.5	3.0	Remove.
697	*Schinus molle*	6.0	2.6	Remove.
698	*Callistemon viminalis*	3.1	2.0	Retain and protect. Tree protection fencing is to encompass the TPZ perimeter where practical and is to be set back from the proposed construction by 1m. TPZ signage is required on the fencing.
699	*Auranticarpa rhombifolia*	2.0	1.7	Retain and protect. Tree protection fencing is to encompass the TPZ perimeter. TPZ signage is required on the fencing.
700	*Auranticarpa rhombifolia*	2.8	1.8	Retain and protect. Tree protection fencing is to encompass the TPZ perimeter. TPZ signage is required on the fencing.
701	*Quercus robur*	6.5	2.7	Retain and protect. Protective fencing should be installed to create a combined TPZ exclusion zone for tree 701, 702 and 703. Protective fencing should be aligned at the extent of the TPZ radius of each tree or as close to the proposed fence as practical. TPZ signage on fencing.
702	*Auranticarpa rhombifolia*	2.4	1.8	Retain and protect. See tree 701 for tree protection requirements.
703	*Arbutus unedo*	3.6	2.4	Retain and protect. See tree 701 for tree protection requirements.
704	*Quercus robur*	7.9	3.0	Retain and protect. Protective fencing should be installed to create a combined TPZ exclusion zone for tree 704 and 705. Protective fencing should be aligned at the extent of the TPZ radius of each tree or as close to the proposed fence as practical. TPZ signage on fencing.
705	*Quercus robur*	4.1	2.6	Retain and protect. See tree 704 for tree protection requirements.
706	*Quercus robur*	5.9	2.6	Remove.
707	*Quercus robur*	3.1	2.0	Remove.
708	*Quercus robur*	3.8	2.2	Remove.
709	*Quercus robur*	2.3	1.8	Retain and protect. Protective fencing should be installed to create a combined TPZ exclusion zone for tree 709-719. Protective fencing should be aligned at the extent of the TPZ radius of each tree or as close to the proposed fence as practical. TPZ signage on fencing.
710	*Quercus robur*	2.6	2.0	Retain and protect. See tree 709 for tree protection requirements.
711	*Quercus robur*	4.9	2.5	Retain and protect. See tree 709 for tree protection requirements.
712	*Quercus robur*	4.2	2.5	Retain and protect. See tree 709 for tree protection requirements.

URBAN ARBOR
The Trusted Name in Tree Management

713	*Quercus robur*	3.6	2.1	Retain and protect. See tree 709 for tree protection requirements.
714	*Quercus robur*	2.6	1.9	Retain and protect. See tree 709 for tree protection requirements.
715	*Quercus robur*	5.0	2.5	Retain and protect. See tree 709 for tree protection requirements.
716	*Corymbia eximia*	3.7	2.2	Retain and protect. See tree 709 for tree protection requirements.
717	*Quercus robur*	4.8	2.4	Retain and protect. See tree 709 for tree protection requirements.
718	*Eucalyptus paniculata*	10.2	3.4	Retain and protect. See tree 709 for tree protection requirements.
719	*Quercus robur*	5.0	2.5	Retain and protect. See tree 709 for tree protection requirements.
720	*Eucalyptus saligna*	8.3	3.1	Retain and protect. Tree protection fencing is to encompass the TPZ perimeter where practical and is to be set back from the proposed construction by 1m. TPZ signage is required on the fencing.
721	*Populus nigra*	4.8	2.4	Retain and protect. Tree protection fencing is to encompass the TPZ perimeter. TPZ signage is required on the fencing.
3286	*Eucalyptus saligna*	7.1	2.8	Remove.
3287	*Eucalyptus botryoides*	6.6	2.6	Remove.
3288	*Eucalyptus scoparia*	4.8	2.4	Remove.
3289	*Eucalyptus botryoides*	5.0	2.4	Remove.
3321	*Ligustrum lucidum*	6.0	2.5	Remove.
3322	*Phoenix canariensis*	3.0	NA	Remove.
3323	*Ligustrum lucidum*	6.0	2.5	Remove.
3324	*Ligustrum lucidum*	5.4	2.4	Remove.
3325	*Schinus molle*	5.5	2.7	Remove.
3326	*Ligustrum lucidum*	2.4	2.3	Remove.
3327	*Ligustrum lucidum*	5.4	2.4	Remove.
3328	*Schinus molle*	5.2	2.5	Remove.
3329	*Ligustrum lucidum*	2.1	2.3	Remove.
3330	*Angophora costata*	5.0	2.5	Remove.
3331	*Ligustrum lucidum*	4.8	2.3	Remove.
3332	*Ligustrum lucidum*	6.0	2.5	Remove.
3333	*Ligustrum lucidum*	4.8	2.3	Remove.
3334	*Ligustrum lucidum*	6.0	2.5	Remove.
3335	*Schinus molle*	7.8	2.8	Remove.
3336	*Ligustrum lucidum*	3.6	2.0	Remove.
3337	*Schinus molle*	7.4	4.0	Remove.
3338	*Ligustrum lucidum*	4.2	2.1	Remove.
3339	*Schinus molle*	6.7	3.2	Remove.
3340	*Ligustrum lucidum*	5.4	2.4	Remove.
3341	*Schinus molle*	6.8	2.8	Remove.
3342	*Phoenix canariensis*	2.0	NA	Remove.

URBAN ARBOR
The Trusted Name in Tree Management

3343	*Ligustrum lucidum*	7.2	2.7	Remove.
3344	*Schinus molle*	7.2	2.8	Remove.
3345	*Schinus molle*	11.0	4.0	Remove.

11.6 **Tree protection Specifications:** It is the responsibility of the principal contractor to install tree protection prior to works commencing at the site (prior to demolition works) and to ensure that the tree protection remains in adequate condition for the duration of the development. The tree protection must not be moved without prior agreement of the project Arborist. The project Arborist must inspect that the tree protection has been installed in accordance with this document and AS4970-2009 prior to works commencing.

11.6.1 Protective fencing: Site specific tree protection requirements are in section 11.5. Where it is not feasible to install fencing at the specified location due to factors such restricting access to areas of the site or for constructing new structures, an alternative location and protection specification must be agreed with the project Arborist. Where the installation of fencing in unfeasible due to restrictions on space, trunk and branch protection will be required (see below). The protective fencing must be constructed of 1.8 metre 'cyclone chainmesh fence'. The fencing must only be removed for the landscaping phase and must be authorised by the project Arborist. Any modifications to the fencing locations must be approved by the project Arborist.

11.6.2 TPZ signage: Tree protection signage is to be attached to the protective fencing, displayed in a prominent position and the sign repeated at 10 metres intervals or closer where the fence changes direction. Each sign shall contain in a clearly legible form, the following information:

- Tree protection zone/No access.
- This fence has been installed to prevent damage to the tree/s and their growing environment both above and below ground. Do not move fencing or enter TPZ without the agreement of the project Arborist.
- The name, address, and telephone number of the developer/builder and project Arborist

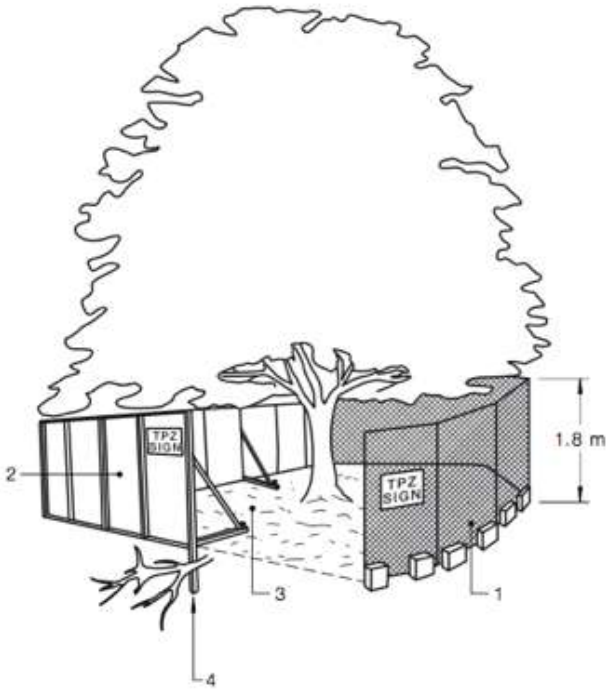
11.6.3 Trunk and Branch Protection: The trunk must be protected by wrapped hessian or similar material to limit damage. Timber planks (50mm x 100mm or similar) should then be placed around tree trunk. The timber planks should be spaced at 100mm intervals, and must be fixed against the trunk with tie wire, or strapping and connections finished or covered to protect pedestrians from injury. The hessian and timber planks must not be fixed to the tree in any instance. The trunk and branch protection shall be installed prior to any work commencing on site and shall be maintained in good condition for the entire development period.

11.6.4 Mulch: Any areas of the TPZ located inside the subject site (only trees to be retained directly adjacent to site works must be mulched to a depth of 75mm with good quality composted wood chip/leaf mulch.

URBAN ARBOR
The Trusted Name in Tree Management

11.6.5 Ground Protection: Ground protection is required to protect the underlying soil structure and root system in areas where it is not practical to restrict access to whole TPZ, while allowing space for construction. Ground protection must consist of good quality composted wood chip/leaf mulch to a depth of between 150-300mm, laid on top of geo textile fabric. If vehicles are to be using the area, additional protection will be required such as rumble boards or track mats to spread the weight of the vehicle and avoid load points. Ground protection is to be specified by the project Arborist as required.

11.6.6 Temporary irrigation: Temporary irrigation should be set up in the TPZ of all trees to be retained, and should distribute water evenly throughout the area of the TPZ. The irrigation should be used for at minimum one hour daily throughout all stages of the development.

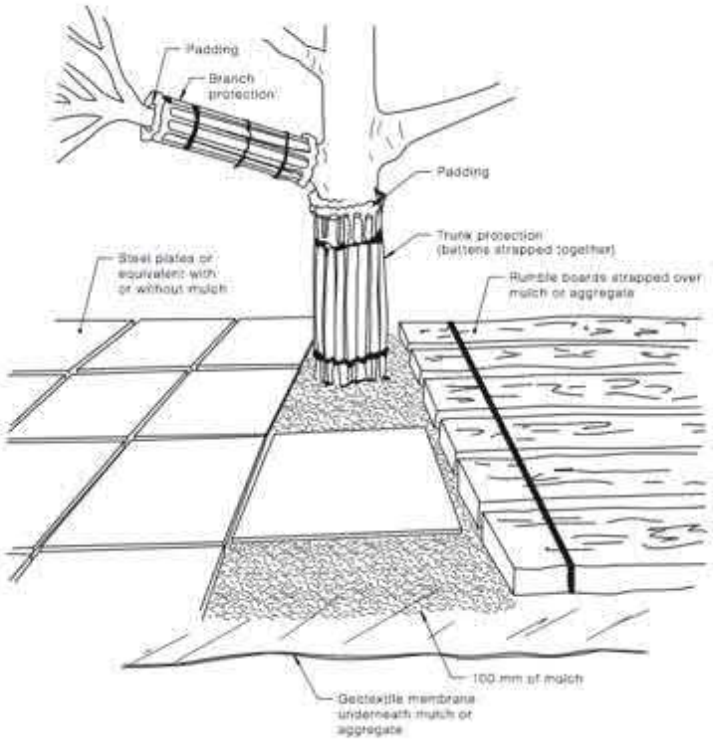


LEGEND:
1 Chain wire mesh panels with shade cloth (if required) attached, held in place with concrete feet.
2 Alternative plywood or wooden paling fence panels. This fencing material also prevents building materials or soil entering the TPZ.
3 Mulch installation across surface of TPZ (at the discretion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

An image from AS4970-2009,[9] with example tree protection.

[9] Council Of Standards Australia, *AS4970 Protection of trees on development sites* (2009), page 16.

URBAN ARBOR
The Trusted Name in Tree Management



NOTES:

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

An image from AS4970-2009,[10] with example tree protection.

11.7 **Restricted activities inside TPZ:** The following activities must be avoided inside the TPZ of all trees to be retained unless approved by the project Arborist. If at any time these activities cannot be avoided an alternative must be agreed in writing with the project Arborist to minimise the impact to the tree.

A) Machine excavation.
B) Ripping or cultivation of soil.
C) Storage of spoil, soil or any such materials
D) Preparation of chemicals, including preparation of cement products.
E) Refuelling.
F) Dumping of waste.
G) Wash down and cleaning of equipment.
H) Placement of fill.
I) Lighting of fires.
J) Soil level changes.
K) Any physical damage to the crown, trunk, or root system.
L) Parking of vehicles.

[10] Council Of Standards Australia, *AS4970 Protection of trees on development sites* (2009), page 17.

URBAN ARBOR
The Trusted Name in Tree Management

11.8 **Demolition:** The demolition of all existing structures inside or directly adjacent to the TPZ of trees to be retained must be undertaken in consultation with the project Arborist. Any machinery is to work from inside the footprint of the existing structures or outside the TPZ, reaching in to minimise soil disturbance and compaction. If it is not feasible to locate demolition machinery outside the TPZ of trees to be retained, ground protection will be required. The demolition should be undertaken inwards into the footprint of the existing structures, sometimes referred to as the 'top down, pull back' method.

11.9 **Excavations:** The project Arborist must supervise and certify that all excavations and root pruning are in accordance with AS4373-2007 and AS4970-2009. For continuous strip footings, first manual excavation is required along the edge of the structures closest to the subject trees. Manual excavation should be a depth of 1 metre (or to unfavourable root growth conditions such as bed rock or heavy clay, if agreed by project Arborist). Next roots must be pruned back in accordance with AS4373-2007. After all root pruning is completed, machine excavation is permitted within the footprint of the structure. For tree sensitive footings, such as pier and beam, all excavations inside the TPZ must be manual. Manual excavation may include the use of pneumatic and hydraulic tools, high-pressure air or a combination of high-pressure water and a vacuum device. No pruning of roots greater 30mm in diameter is to be carried out without approval of the project arborist. All pruning of roots greater than 30mm in diameter must be carried out by a qualified Arborist/Horticulturalist with a minimum AQF level 3. Root pruning is to be a clean cut with a sharp tool in accordance with AS4373 Pruning of amenity trees (2007).[11] The tree root is to be pruned back to a branch root if possible. Make a clean cut and leave as small a wound as possible.

11.10 **Landscaping:** All landscaping works within the TPZ of trees to be retained are to be undertaken in consultation with a consulting Arborist to minimize the impact to trees. General guidance is provided below to minimise the impact of new landscaping to trees to be retained.

- Level changes should be minimised. The existing ground levels within the landscape areas should not be lowered by more than 100mm or increased by more than 100mm (300mm increase is acceptable if using a coarse free draining material) without assessment by a consulting Arborist.
- New retaining walls should be avoided. Where new retaining walls are proposed inside the TPZ of trees to be retained, they should be constructed from tree sensitive material, such as timber sleepers, that require minimal footings/excavations. If brick retaining walls are proposed inside the TPZ, considerer pier and beam type footings to bridge significant roots that are critical to the trees condition. Retaining walls must be located outside the SRZ and sleepers/beams located above existing soil grades.

[11] Council Of Standards Australia, *AS 4373 Pruning of amenity trees* (2007) page 18

URBAN ARBOR
The Trusted Name in Tree Management

- New footpaths and hard surfaces should be minimised, as they can limit the availability of water, nutrients and air to the trees root system. Where they are proposed, they should be constructed on or above existing soil grades to minimise root disturbance and consider using a permeable surface. Footpaths should be located outside the SRZ where possible.
- Where fill/sub base is used inside the TPZ, fill material should be a coarse granular material that does not restrict the flow of water and air to the root system below. This type of material will also reduce the impact of soil compaction during construction.
- The location of new plantings inside the TPZ of trees to be retained should be flexible to avoid unnecessary damage to tree roots greater than 30mm in diameter.

11.11 **Underground Services:** Where possible underground services should be located outside the TPZ of trees to be retained. All underground services located inside the TPZ of any tree to be retained must be installed via tree sensitive techniques. This should include either directional drilling methods or manual excavations to minimise the impact to trees identified for retention. No roots greater than 40mm in diameter should be severed during the installation of service pipes unless approved in writing by the project Arborist.

11.12 **Sediment and Contamination:** All contamination run off from the development such as but not limited to concrete, sediment and toxic wastes must be prevented from entering the TPZ at all times.

11.13 **Tree Wounding/Injury:** Any wounding or injury that occurs to a tree during the construction process will require the project Arborist to be contacted for an assessment of the injury and provide mitigation/remediation advice. It is generally accepted that trees may take many years to decline and eventually die from root damage. All repair work is to be carried out by the project Arborist, at the contractor's expense.

11.14 **Completion of Development Works:** After all construction works are complete the project Arborist should assess that the subject trees have been retained in the same condition and vigour. If changes to condition are identified the project Arborist should provide recommendations for remediation.

URBAN ARBOR
The Trusted Name in Tree Management

12. CONSTRUCTION HOLD POINTS FOR TREE PROTECTION

12.1 **Hold Points:** Below is a sequence of hold points requiring project Arborist certification throughout the development process**.** It provides a list of hold points that must be checked and certified. All certification must be provided in written format upon completion of the development. The final certification must include details of any instructions for remediation undertaken during the development. The principal contractor should be responsible for implementing all tree protection requirements.

Hold Point	Stage	Date Completed and Signature of Project Arborist Responsible
Project Arborist to hold pre construction site meeting with principal contractor to discuss methods and importance of tree protection measures and resolve any issues in relation to feasibility of tree protection requirements that may arise. Project Arborist to mark all trees approved for removal under DA consent.	Prior to development work commencing	
Project Arborist to assess and certify that tree protection has been installed in accordance with AS4970-2009 prior to works commencing at site.	Prior to development work commencing.	
In accordance with AS4970-2009 the project arborist should carryout regular site inspections to ensure works are carried out in accordance with the recommendations. Site inspections are recommended on a monthly frequency.	On-going throughout the development	
The removal of existing structures inside the TPZ of any tree to be retained, such as the existing buildings and hard surfaces must be supervised by the project Arborist.	Demolition	
Project Arborist to supervise all manual excavations and root pruning inside the TPZ of any tree to be retained. Project Arborist to approve all pruning of roots greater than 30mm inside TPZ. All root pruning of roots greater than 30mm in diameter must be carried out by a qualified Arborist/Horticulturalist with a minimum AQF level 3.	Construction	
Project Arborist to certify that all underground services including storm water inside TPZ of any tree to be retained have been installed in accordance with AS4970-2009.	Construction	
All landscaping works within the TPZ of trees to be retained are to be undertaken in consultation with the project Arborist to minimise the impact to trees.	Construction/ Landscape	
After all demolition, construction and landscaping works are complete the project Arborist should assess that the subject trees have been retained in the same condition and vigour. If changes to condition are identified the project Arborist should provide recommendations for remediation.	Upon completion of development	

URBAN ARBOR
The Trusted Name in Tree Management

13. BIBLIOGRAPHY/REFERENCES

- Council Of Standards Australia, *AS4970 Protection of trees on development sites* (2009).
- Council Of Standards Australia, *AS4373 Pruning of amenity trees* (2007).
- Mattheck, C. & Breloer, H., *The body language of trees - A handbook for failure analysis*, The Stationary Office, London, England (2015).
- Lonsdale, D., *Principles of tree hazard assessment and management*, The Stationary Office, London, England (1999).
- 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).
- 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 Tree Consultancy, *Tree AZ version 10.10-ANZ*, http://www.treeaz.com/.
- *Canterbury Local Environmental Plan 2012*, https://www.legislation.nsw.gov.au/#/view/EPI/2012/673.
- *Canterbury Development Control Plan 2012*, https://www.cbcity.nsw.gov.au/development/planning-control-policies/canterbury-development-control-plan-2012.

14. LIST OF APPENDICES

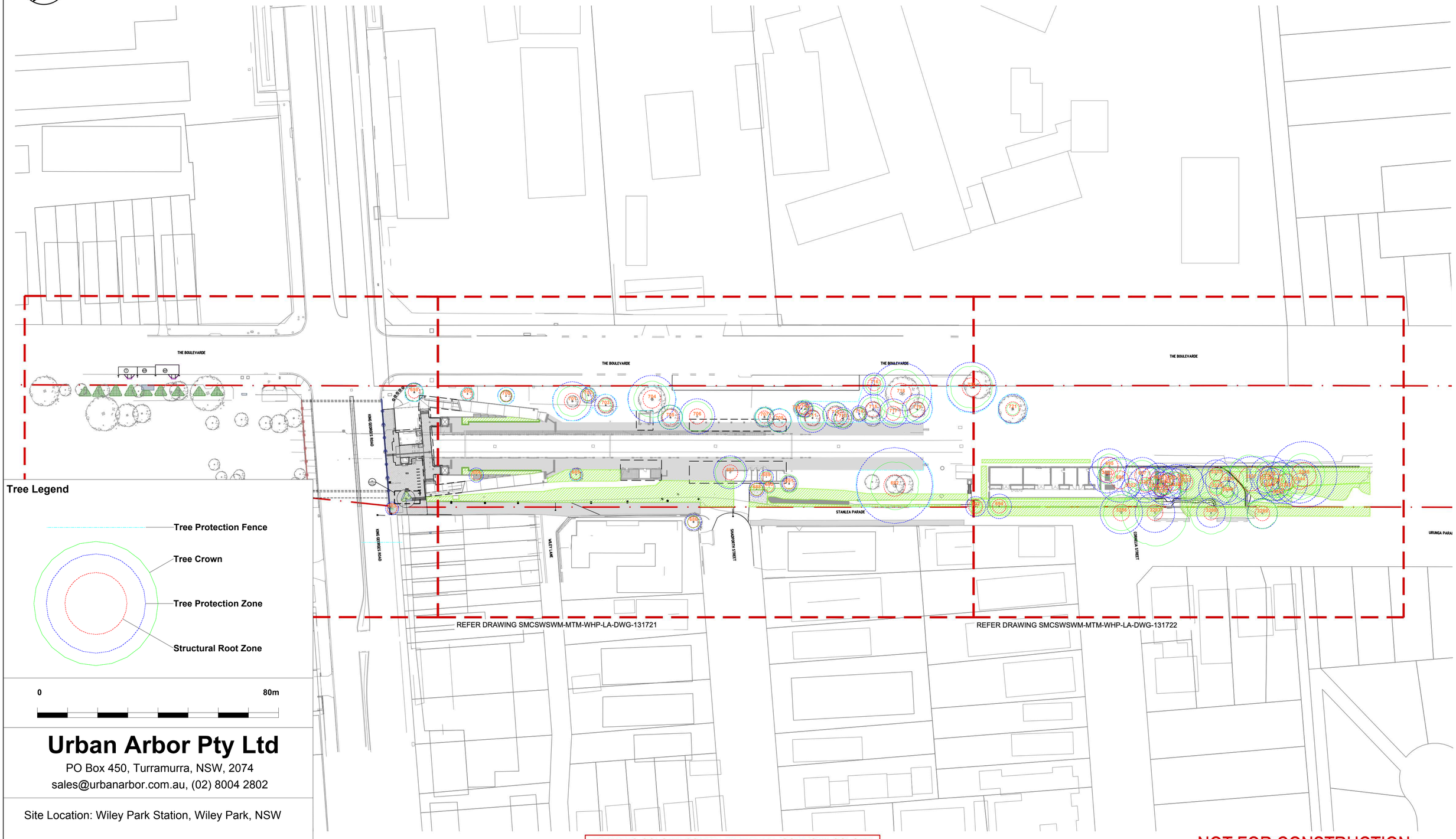
The following are included in the appendices:
Appendix 1A - Proposed Site Plan Overview
Appendix 1B - Proposed Service Building
Appendix 2 - Tree Inspection Schedule
Appendix 3 - Further information of methodology

Jack Williams
Diploma of Arboriculture (AQF5)
FdSc Arboriculture
Registered Consulting Arborist No. 2556
ISA Member No. 228863
Quantified Tree Risk Assessment (QTRA)
ISA Tree Risk Assessment Qualification (TRAQ)

Bryce Claassens
Diploma of Arboriculture (AQF5)
Cert III Landscape Construction
Member Arboriculture Australia
QTRA
TRAQ

TO SYDNEY

TO BANKSTOWN



Tree Legend

- Tree Protection Fence
- Tree Crown
- Tree Protection Zone
- Structural Root Zone

0 80m

Urban Arbor Pty Ltd

PO Box 450, Turramurra, NSW, 2074
sales@urbanarbor.com.au, (02) 8004 2802

Site Location: Wiley Park Station, Wiley Park, NSW

SCALE :	DATE :
1 : 600 @ A1	23/12/2020

URBAN ARBOR
The Trusted Name in Tree Management

Appendix 1A: Proposed Site Plan Overview

Prepared by: Bryce Claassens

DRAWING COLOUR CODED - PRINT ALL COPIES IN COLOUR

NOT FOR CONSTRUCTION

FROM SYDENHAM

TO BANKSTOWN

16km 060 | 16km 080 | 16km 080 | 16km 100 | 16km 100 | 16km 120 | 16km 120 | 16km 140 | 16km 140 | 16km 160 | 16km 160 | 16km 180 | 16km 180 | 16km 200 | 16km 200 | 16KM 220

CSR BRIDGES OVER WATER MAINS. REFER TO CSR DRAWINGS FOR DETAILS

FENCE MOUNTED ON PADMOUNT RETAINING WALL. REFER TO STRUCTURAL PACKAGE 484 FOR DETAILS.

SECURITY FENCE TIE-IN WITH BUILDING WALL

PROPOSED CONCRETE ENCASEMENT AROUND WATER MAINS. REFER TO UTILITIES DRAWINGS FOR DETAILS

FENCE LOCATED ON 400mm WIDE 150mm HIGH UPSTAND

OHWS TO BE PROPPED DURING SSB CONSTRUCTION

SIGNAL AND COMMS TO BE RELOCATED. REFER TO THE ENABLING WORKS PACKAGE 050

OSD TANK - REFER TO NOTE 10

FOR RETAINING WALL LAYOUT AND DETAILS REFER TO THE 600 SERIES RETAINING WALL DRAWINGS.

HANDRAIL

BUILDING

PADMOUNT

EXISTING HV AERIAL POLE TO BE PROTECTED DURING CONSTRUCTION

SECURITY FENCE TIE-IN WITH BUILDING WALL

REFER TO DRAINAGE PACKAGE FOR DISH DRAIN DETAILS

SIGNAL AND COMMS TO BE RELOCATED. REFER TO ENABLING WORKS PACKAGE 050

PROPOSED RELOCATED ACCESS TO SYDNEY TRAINS SIGNALLING HUT. REFER TO WILEY PARK CIVIL STATION PACKAGE 243

MTE

MTE

PROPOSED 5m WIDE GATE.

PROPOSED SWALE CONNECTION TO EXISTING OPEN CHANNEL

PROPOSED 4m WIDE GATE FOR MAINTENANCE ACCESS TO OSD TANK

EXISTING ULX CULVERT

EXISTING FENCE TO BE REPLACED

EXISTING ULX CULVERT

URUNGA PARADE

EX DN750 & DN900 STEEL CEMENT LINED WATERMAINS

CANTERBURY BANKSTOWN CITY COUNCIL STANDARD HEAVY DUTY SPLAYED VEHICULAR FOOTWAY CROSSING - REFER STD DRAWING S-010A FOR DETAILS

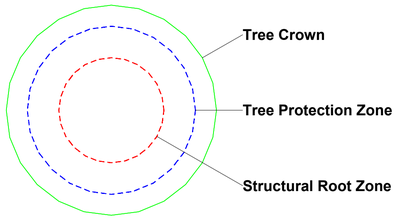
REFER TO CANTERBURY BANKSTOWN CITY COUNCIL DRAWING S-010A FOR DETAILS. NOTE THAT CROSSING TO BE GRASSED INSTEAD OF BEING CONSTRUCTED WITH CONCRETE

SAWCUT, SCABBLE AND PROVIDE FULL DEPTH PAVEMENT REINSTATEMENT IN ACCORDANCE WITH CITY OF CANTERBURY COUNCIL STANDARD DRAWING S-010A

CORNELIA ST

PLAN
SCALE 1:200

Tree Legend



0 30m

DRAWING COLOUR CODED - PRINT ALL COPIES IN COLOUR

NOT FOR CONSTRUCTION

Urban Arbor Pty Ltd
PO Box 450, Turramurra, NSW, 2074
sales@urbanarbor.com.au, (02) 8004 2802

Site Location: Wiley Park Station, Wiley Park, NSW

SCALE :	DATE :
1 : 200 @ A1	23/12/2020

URBAN ARBOR
The Trusted Name in Tree Management

Appendix 1B: Proposed Service Building

Prepared by: Bryce Claassens

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
683	Fig	*Ficus spp*	Semi-mature	2	0.5	180					180	200	Good	Fair	Low	5. Small/Young	Z1	2.2	1.7	Leaning on tree guard.
684	Sweet Pittosporum	*Pittosporum undulatum*	Semi-mature	4	2	200					200	200	Good	Fair	Low	5. Small/Young	Z1	2.4	1.7	Located within corridor.
685	Grevillea 'Moonlight'	*Grevillea spp*	Semi-mature	3	1.5	100	50				112	220	Good	Good	Low	5. Small/Young	Z1	2.0	1.8	None.
686	Lemon Scented Tea Tree	*Leptospermum petersonii*	Mature	6	2	220					220	250	Good	Good	Medium	1. Long	A1	2.6	1.8	None.
687	Common Oak	*Quercus robur*	Mature	10	5	460					460	520	Good	Good	Medium	1. Long	A1	5.5	2.5	None.
688	Unknown	*Unknown spp*	Dead	5	2	120	180				216	350	Dead	Poor	Low	4. Remove	Z4	2.6	2.1	Dead tree.
689	Oleander	*Nerium oleander*	Semi-mature	5	2	200					200	200	Good	Fair	Low	5. Small/Young	Z1	2.4	1.7	Located within corridor.
690	Sweet Pittosporum	*Pittosporum undulatum*	Semi-mature	5	2	150					150	180	Good	Fair	Low	5. Small/Young	Z1	2.0	1.6	Located within corridor.
691	Common Oak	*Quercus robur*	Semi-mature	7	3	190					190	220	Good	Good	Medium	1. Long	A1	2.3	1.8	Located within corridor.
692	Peppercorn	*Schinus molle*	Mature	10	8	1050					1050	1200	Good	Good	Medium	1. Long	A1	12.6	3.6	Located within corridor.
693	Chinese Tallo	*Triadica sebifera*	Mature	5	2	160	160	160			277	450	Good	Good	Medium	2. Medium	A1	3.3	2.4	Located within corridor.
694	Chinese Tallo	*Triadica sebifera*	Mature	6	3	340					340	410	Good	Good	Medium	1. Long	A1	4.1	2.3	Located within corridor.
695	Peppercorn	*Schinus molle*	Mature	9	4	260	400				477	700	Good	Fair	Medium	2. Medium	A1	5.7	2.8	Located within corridor. DBH estimated. Surrounded by weed species.
696	Peppercorn	*Schinus molle*	Mature	9	7	450	430				622	800	Good	Fair	Medium	2. Medium	A1	7.5	3.0	Located within corridor. DBH estimated. Surrounded by weed species.
697	Peppercorn	*Schinus molle*	Mature	9	5	500					500	550	Good	Fair	Medium	2. Medium	A1	6.0	2.6	Located within corridor. DBH estimated. Surrounded by weed species.
698	Weeping Bottlebrush	*Callistemon viminalis*	Mature	7	3	260					260	290	Good	Good	Medium	1. Long	A1	3.1	2.0	None.
699	Diamond Leaf Pittosporum	*Auranticarpa rhombifolia*	Semi-mature	6	2	120	110				163	200	Fair	Fair	Low	3. Short	Z4	2.0	1.7	Low foliage density for power. Tree in decline. Rhombifolia.
700	Diamond Leaf Pittosporum	*Auranticarpa rhombifolia*	Mature	5	2	230					230	250	Good	Fair	Medium	3. Short	Z9	2.8	1.8	Large cambium wound to north.
701	Common Oak	*Quercus robur*	Mature	10	5	540					540	590	Good	Good	Medium	1. Long	A1	6.5	2.7	None.
702	Diamond Leaf Pittosporum	*Auranticarpa rhombifolia*	Mature	6	2	200					200	250	Good	Good	Medium	1. Long	A1	2.4	1.8	None.
703	Strawberry Tree	*Arbutus unedo*	Mature	4	2	240	180				300	450	Good	Fair	Medium	5. Small/Young	Z1	3.6	2.4	Wound on trunk.
704	Common Oak	*Quercus robur*	Mature	9	6	660					660	780	Good	Fair	Medium	2. Medium	A2	7.9	3.0	Loss of central leader.
705	Common Oak	*Quercus robur*	Mature	9	4	240	240				339	560	Good	Good	Medium	1. Long	A1	4.1	2.6	Co-dominant stems.
706	Common Oak	*Quercus robur*	Mature	10	5	490					490	540	Good	Good	Medium	1. Long	A1	5.9	2.6	None.
707	Common Oak	*Quercus robur*	Semi-mature	8	3	260					260	300	Good	Good	Medium	1. Long	A1	3.1	2.0	Located within corridor.
708	Common Oak	*Quercus robur*	Mature	9	4	320					320	390	Good	Good	Medium	1. Long	A1	3.8	2.2	Located within corridor. DBH estimated.
709	Common Oak	*Quercus robur*	Semi-mature	6	2	190					190	220	Good	Fair	Medium	2. Medium	A1	2.3	1.8	Located within corridor. DBH estimated. Suppressed by adjacent trees.
710	Common Oak	*Quercus robur*	Semi-mature	8	3	220					220	290	Good	Good	Medium	1. Long	A1	2.6	2.0	Located within corridor. DBH estimated.
711	Common Oak	*Quercus robur*	Mature	9	4	220	240	240			404	500	Good	Good	Medium	1. Long	A1	4.9	2.5	Located within corridor. DBH estimated.
712	Common Oak	*Quercus robur*	Mature	9	4	200	210	200			352	500	Good	Fair	Medium	2. Medium	A1	4.2	2.5	Located within corridor. DBH estimated. Co-dominant stems with bark inclusion.
713	Common Oak	*Quercus robur*	Mature	9	3	300					300	330	Good	Good	Medium	1. Long	A1	3.6	2.1	Located within corridor. DBH estimated.
714	Common Oak	*Quercus robur*	Semi-mature	7	2	220					220	280	Good	Good	Medium	1. Long	A1	2.6	1.9	Located within corridor. DBH estimated.
715	Common Oak	*Quercus robur*	Mature	9	4	420					420	490	Good	Good	Medium	1. Long	A1	5.0	2.5	Located within corridor. DBH estimated.
716	Yellow Bloodwood	*Corymbia eximia*	Mature	9	3	310					310	360	Good	Good	High	1. Long	A1	3.7	2.2	None.
717	Common Oak	*Quercus robur*	Mature	9	4	160	180	320			400	450	Fair	Fair	Medium	3. Short	Z9	4.8	2.4	Located within corridor. DBH estimated. Dieback with large deadwood.
718	Grey Ironbark	*Eucalyptus paniculata*	Mature	25	8	850					850	1050	Good	Good	Very High	1. Long	A1	10.2	3.4	Located within corridor. DBH estimated.
719	Common 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.
720	Sydney Blue Gum	*Eucalyptus saligna*	Mature	19	7	690					690	840	Good	Good	Very High	1. Long	A1	8.3	3.1	None.
721	Lombardy Poplar	*Populus nigra*	Mature	19	2	400					400	450	Good	Fair	Low	2. Medium	Z3	4.8	2.4	Located within corridor. DBH estimated. Exempt species.

Appendix 2 - Tree Inspection Schedule

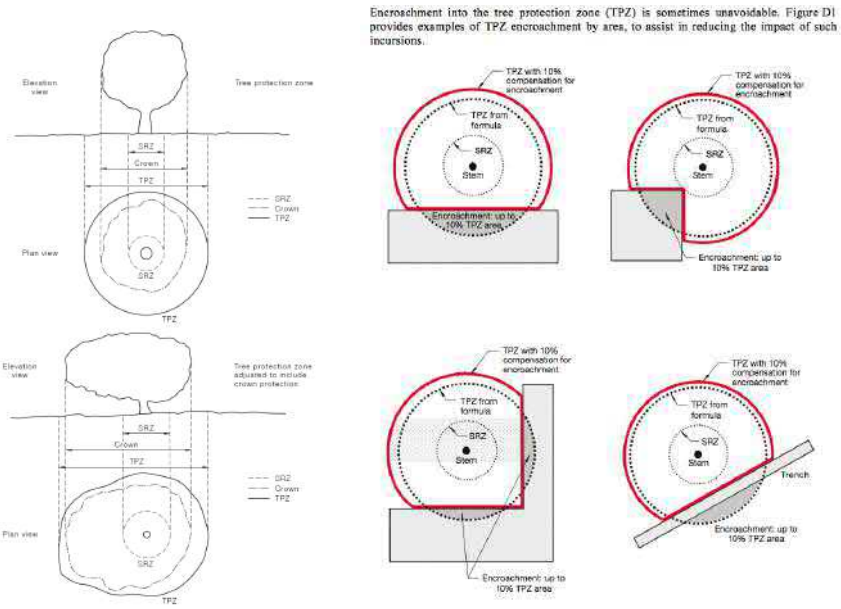
Tree ID	Common Name	Botanical Name	Age Class	Height (m)	Canopy Spread Radius (m)	Stem 1	Stem 2	Stem 3	Stem 4	Stem 5	DBH (mm)	DAB (mm)	Health	Structure	Amenity Value	SULE	Retention Value	TPZ Radius (m)	SRZ Radius (m)	Notes
3286	Sydney Blue Gum	*Eucalyptus saligna*	Mature	14	6	590					590	650	Good	Fair	High	3. Short	Z10	7.1	2.8	Located within nature strip. Significantly pruned for power line clearance. Asymmetric crown shape. Low potential for recovery.
3287	Bangalay	*Eucalyptus botryoides*	Mature	11	6	550					550	580	Good	Fair	High	3. Short	Z10	6.6	2.6	Located within nature strip. Significantly pruned for power line clearance. Asymmetric crown shape. Low potential for recovery.
3288	Wallangarra White Gum	*Eucalyptus scoparia*	Mature	11	7	400					400	450	Good	Fair	High	3. Short	Z10	4.8	2.4	Located within nature strip. Significantly pruned for power line clearance. Asymmetric crown shape. Low potential for recovery.
3289	Bangalay	*Eucalyptus botryoides*	Mature	10	5	420					420	480	Good	Fair	High	3. Short	Z10	5.0	2.4	Located within nature strip. Significantly pruned for power line clearance. Asymmetric crown shape. Low potential for recovery.
3321	Broad Leaved Privet	*Ligustrum lucidum*	Mature	6	3	500					500	500	Good	Fair	Very Low	2. Medium	Z3	6.0	2.5	Noxious weed.
3322	Canary Palm	*Phoenix canariensis*	Semi-mature	4	2	250					250	NA	Good	Good	Low	5. Small/Young	Z3	3.0	NA	Exempt species.
3323	Broad Leaved Privet	*Ligustrum lucidum*	Mature	6	2	500					500	500	Good	Fair	Very Low	2. Medium	Z3	6.0	2.5	Noxious weed. DBH measured at base. Ibis nest.
3324	Broad Leaved Privet	*Ligustrum lucidum*	Mature	6	2	450					450	450	Good	Fair	Very Low	2. Medium	Z3	5.4	2.4	Noxious weed. DBH measured at base.
3325	Peppercorn Tree	*Schinus molle*	Mature	10	4	460					460	600	Good	Good	Medium	1. Long	A1	5.5	2.7	None.
3326	Broad Leaved Privet	*Ligustrum lucidum*	Semi-mature	7	2	100	100	100	100		200	400	Good	Fair	Very Low	2. Medium	Z3	2.4	2.3	Noxious weed.
3327	Broad Leaved Privet	*Ligustrum lucidum*	Mature	6	2	450					450	450	Good	Fair	Very Low	2. Medium	Z3	5.4	2.4	Noxious weed. DBH measured at base.
3328	Peppercorn Tree	*Schinus molle*	Mature	9	4	430					430	510	Fair	Fair	Medium	3. Short	Z10	5.2	2.5	Pruned for power line clearance. Poor overall form.
3329	Broad Leaved Privet	*Ligustrum lucidum*	Semi-mature	5	2	110	100	90			174	400	Good	Fair	Very Low	5. Small/Young	Z3	2.1	2.3	Noxious weed.
3330	Smooth Barked Apple	*Angophora costata*	Mature	17	4	420					420	530	Good	Fair	High	2. Medium	A2	5.0	2.5	Cambium damage to trunk and base. Monitor wounding.
3331	Broad Leaved Privet	*Ligustrum lucidum*	Semi-mature	5	2	400					400	400	Good	Fair	Very Low	5. Small/Young	Z3	4.8	2.3	Noxious weed. DBH measured at base.
3332	Broad Leaved Privet	*Ligustrum lucidum*	Mature	8	3	500					500	500	Good	Fair	Very Low	2. Medium	Z3	6.0	2.5	Noxious weed. DBH measured at base.
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.
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.
3335	Peppercorn 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.
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.
3337	Peppercorn 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.
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.
3339	Peppercorn 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.
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.
3341	Peppercorn 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.
3342	Canary Palm	*Phoenix canariensis*	Young	3	1	400					400	NA	Good	Fair	Low	5. Small/Young	Z3	2.0	NA	Exempt species.
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.
3344	Peppercorn 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.
3345	Peppercorn Tree	*Schinus molle*	Mature	10	7	700	420	420			918	1600	Good	Fair	Medium	2. Medium	A1	11.0	4.0	Peppercorn. Large deformity on primary stem.

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 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.

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.

URBAN ARBOR
The Trusted Name in Tree Management

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 4 WILEY PARK AIA (PLATEAU TREES)

PLATEAUTREES
Safety. Quality. Progress.

Date: 17 March 2021

Re: Additional tree removals at Wiley Park Station as part of the Southwest Metro Package.

At the request of Downer Group an onsite inspection was undertake at Wiley Park Station. It has been asked to identify and record additional tree removals beyond those recommended within the Arboricultural Impact Assessment (AIA) prepared by Urban Arbor, dated 15 January 2020, Ref20/01/15/SWMWP. On the 1 March a site walkthrough was undertaken by myself and representatives from Downer Group. Additional tree removals were identified with respects to the proposed Southwest Metro Package works. The data for these additional trees can be found as Appendix 1 of this report.

Based upon the information, rational and justification provided within the AIA Report I can confirm that trees 683, 684, 687, 688, 695, 696, 697, 699 and 706 shall require removal to accommodate the proposed works. Reference should be made to the AIA report for their respective tree data.

The additional tree removals where there is a direct design clash and 100% encroachment into the TPZ and SRZ consist of seventeen *Schinus molle* (Peppercorn Tree), one *Eucalyptus scoparia* (Wallangarra White Gum) which constitute the significant trees within the site. Understory plants totaling sixty-two individual specimens were also identified. All trees are located along the rail embankment adjacent Urunga Parade. Image 1 shows the area of assessment and approximate locations of significant trees (trees 1-18). The Peppercorn trees are typically arranged in a line suggesting a landscape planting. The Wallangarra White Gum is likely to be a self- seeded specimen.

Plateau Tree Service Pty Ltd
PO BOX 1522, DEE WHY NSW 2099 Australia
P: 02 9939 5350 | F: 02 9905 7569
E: info@plateautrees.com.au | W: www.plateautrees.com.au
ABN : 17 090 798 002

The understory consists of forty-five *Ligustrum lucidum* (Broad-leafed Privet) trees 19 to 63, ten *Pittosporum undultaum* (Sweet Pittosporum) trees 64 to 73, four *Phoenix canariensis* (Canary Island Date Palm) trees 74 to 77 and three *Camellia* sp (Camellia) trees 78 to 80. Although meeting the requirement of a tree under the *Sydney Metro City & Southwest Sydenham to Bankstown Instrument of Approval* these species are commonly considered to be weeds or have low retention value with respects to the proposed works. Broad-leafed Privet is an identified species under the *Biosecurity Act 2015*. A general biosecurity duty exists within NSW to prevent, eliminate or minimise any biosecurity risk. The understory generally ranges in height between 3 and 10m and has been previously managed through selective pruning, lopping and removal works. Its significance has been assessed under the Pre-clearance Assessment prepared by Cumberland Ecology dated 14 March 2021.

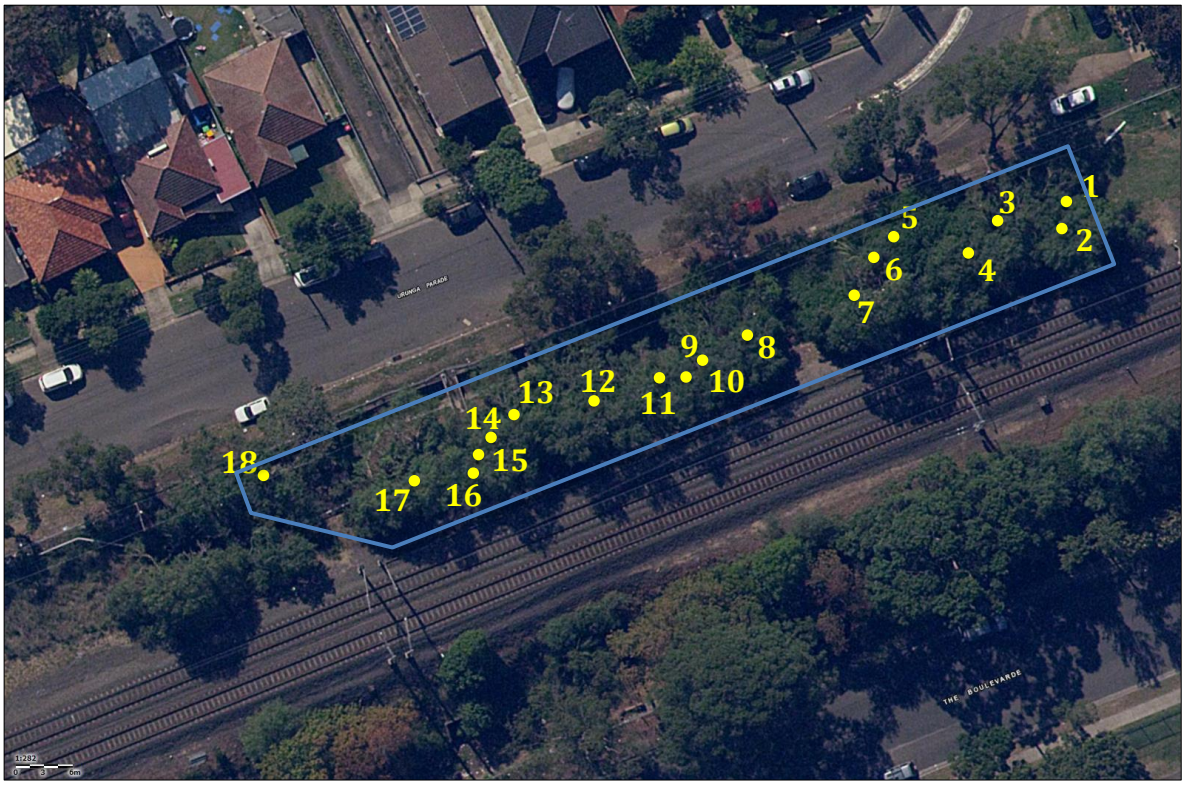


Image 1: Aerial image showing the proposed vegetation clearance area (blue outline) and approximate locations of significant trees (1 to 18).

The Peppercorn trees are considered to have a medium useful life expectancy of 15 to 40 years and medium landscape significance they are readily seen from the eastern end of Urunga Parade and the immediate surrounds. They provide screening from the rail corridor and its associated infrastructure. Each of these trees has been photographed and

can be found as Appendix 2 of this report. The understory species would generally be considered as having a short useful life expectancy and low landscape significance. It provides minor screening from the rail corridor.

Based on an assessment of the provided plans:

- Trees 1, 2 and 3 are positioned within the footprint of the pad mounted substation kiosk and cannot be retained
- Trees 4 and 5 are located within the footprint of the car park and cannot be retained
- Trees 6 and 7 are located within the area of the proposed OSD tank and access for retaining wall works and cannot be retained
- Trees 8, 9, 10, 11, 12, 13, 14, 15, 16 and 17 are located within the footprint required to undertake access, battering and pilling works associated with the retaining wall and cannot be retained
- The canopy of tree 18 potentially encroaches within the proposed works area due to the lean of the tree. The removal of a significant portion of the trees live canopy is likely to affect its health and condition reducing its useful life expectancy necessitating its removal
- Associated understory plants, trees 19 to 80, are within the footprint of works and cannot be retained

Pruning works were identified to be undertaken on tree 692 *Schinus molle* (Peppercorn Tree) to provide clearance along the rail corridor access track for plant and equipment. It is envisioned that pruning works shall involve the reduction and removal of selected branches up to 100mm in diameter and constitute approximately 25-30% of the total live canopy volume of the tree. Based upon the current health and condition of the tree these pruning works are considered to be significant and shall likely result in a reduction of tree growth and physiological function. All pruning works are to be undertaken by suitably qualified tree workers and meet the requirements of *AS4373-2007 Pruning of Amenity Trees*. Image 2 shows the tree and branches that overhang the access road.

Image 2: Yellow outline indicates branches from Tree 692, *Schinus molle* (Peppercorn Tree), that shall require selective removal to provide clearances along the rail corridor access track.

The additional Peppercorn trees are not representative of an endangered or threatened species or ecological community. The single Wallangarra White Gum is located out of its natural range and is not considered to be significant (refer to Pre-clearance Assessment prepared by Cumberland Ecology).

All appropriate approvals and consents are to be obtained prior to tree and vegetation removal works commencing. All tree removal works are to be undertaken by suitably qualified tree workers and in accordance with Safe Work Australia's Guide to Managing Risks of Tree Trimming and Removal Works.

Please feel free to contact me should you require any further assistance regarding this matter.

Regards.
Owen Tebbutt

O. Tebbutt

Consulting Arborist
Plateau Tree Service

Tree number	Tree name Botanical name Common name	Tree dimensions Height (m)	Spread (m)	D.B.H. (mm)	D.A.B. (mm)	Vigour	Condition	Age class	ULE	Amenity and Visual Value	Native or Exotic	TPZ (m)	SRZ (m)	Comments	Remove or Retain
1	*Schinus molle* (Peppercorn Tree)	10-15	6x6	450 300	600	N	F	M	M	M	E	6.48	2.67	Direct clash with MSB	Remove
2	*Schinus molle* (Peppercorn Tree)	10-15	5x5	400	500	N	F	M	M	M	E	4.80	2.47	Direct clash with MSB	Remove
3	*Schinus molle* (Peppercorn Tree)	10-15	3x3	450 300	550 400	N	F	M	M	M	E	6.48	2.87	Twin-stemmed specimen. Cavity observed within trunk. Direct clash with MSB.	Remove
4	*Schinus molle* (Peppercorn Tree)	10-15	4x4	400	500	N	F	M	M	M	E	4.80	2.47	Direct clash with MSB	Remove
5	*Schinus molle* (Peppercorn Tree)	10-15	5x5	400	500	N	F	M	M	M	E	4.80	2.47	Direct clash with MSB	Remove
6	*Schinus molle* (Peppercorn Tree)	10-15	6x6	400	500	N	F	M	M	M	N	3.60	2.37	Direct clash with MSB	Remove
7	*Eucalyptus scoparia* (Wallangarra White Gum)	15-20	9x9	300	450	N	F	M	M	M	E	5.16	2.57	Pruning for overhead electrical wires has resulted in a flattened skewed canopy. Direct clash with MSB	Remove
8	*Schinus molle* (Peppercorn Tree)	10-15	5x5	350 250	550	N	F	M	M	M	E	6.24	2.71	A portion of the canopy appears dead. Direct clash with MSB.	Remove
9	*Schinus molle* (Peppercorn Tree)	10-15	5x5	200 150	-	N	F	M	M	M	E	6.00	-	Twin-stemmed specimen. Direct clash with MSB	Remove
10	*Schinus molle* (Peppercorn Tree)	10-15	5x5	350 300	-	N	F	M	M	M	E	5.52	-	Twin-stemmed specimen. Direct clash with MSB	
11	*Schinus molle* (Peppercorn Tree)	10-15	4x4	300 400	-	N	F	M	M	M	E	5.40	-	Direct clash with MSB	Remove
12	*Schinus molle* (Peppercorn Tree)	10-15	4x4	450	550	N	F	M	M	M	E	4.80	2.47	Direct clash with MSB	Remove
13	*Schinus molle* (Peppercorn Tree)	5-10	6x6	400	500	N	F	M	M	M	E	7.20	2.85	Direct clash with MSB	Remove

Tree number	Tree name	Tree dimensions				Vigour	Condition	Age class	ULE	Amenity and Visual Value	Native or Exotic	TPZ (m)	SRZ (m)	Comments	Remove or Retain
	Botanical name Common name	Height (m)	Spread (m)	D.B.H. (mm)	D.A.B. (mm)										
14	*Schinus molle* (Peppercorn Tree)	10-15	6x6	600	700	N	F	M	M	M	E	5.88	2.65	Direct clash with MSB	Remove
15	*Schinus molle* (Peppercorn Tree)	10-15	4x4	350 350	-	N	F	M	M	M	E	3.60	-	Twin-stemmed specimen. Direct clash with MSB	Remove
16	*Schinus molle* (Peppercorn Tree)	5-10	3x3	300	400	N	F	M	M	M	E	6.00	2.67	Direct clash with MSB	Remove
17	*Schinus molle* (Peppercorn Tree)	10-15	5x5	500	600	N	F	M	M	M	E	7.68	2.67	Direct clash with MSB	Remove
18	*Schinus molle* (Peppercorn Tree)	10-15	5x5	450 450	600	N	F	M	M	M	E	6.48	2.67	Direct clash with MSB	Remove
19	*Ligustrum lucidim* (Broad-leafed Privet)	5-10	1x1	100	200	N	G	M	S	L	E	2	1.5	Understorey specimen. Listed noxious weed under Biosecurity Act 2015 – Direct clash with MSB	Remove
20	*Ligustrum lucidim* (Broad-leafed Privet)	5-10	1x1	100	200	N	G	M	S	L	E	2	1.5	Understorey specimen. Listed noxious weed under Biosecurity Act 2015 – Direct clash with MSB	Remove
21	*Ligustrum lucidim* (Broad-leafed Privet)	5-10	1x1	100	200	N	G	M	S	L	E	2	1.5	Understorey specimen. Listed noxious weed under Biosecurity Act 2015 – Direct clash with MSB	Remove
22	*Ligustrum lucidim* (Broad-leafed Privet)	5-10	1x1	100	200	N	G	M	S	L	E	2	1.5	Understorey specimen. Listed noxious weed under Biosecurity Act 2015 – Direct clash with MSB	Remove
23	*Ligustrum lucidim* (Broad-leafed Privet)	5-10	1x1	100	200	N	G	M	S	L	E	2	1.5	Understorey specimen. Listed noxious weed under Biosecurity Act 2015 – Direct clash with MSB	Remove
24	*Ligustrum lucidim* (Broad-leafed Privet)	5-10	1x1	100	200	N	G	M	S	L	E	2	1.5	Understorey specimen. Listed noxious weed under Biosecurity Act 2015 – Direct clash with MSB	Remove
25	*Ligustrum lucidim* (Broad-leafed Privet)	5-10	1x1	50	80	N	G	M	S	L	E	2	1.5	Understorey specimen. Listed noxious weed under Biosecurity Act 2015 – Direct clash with MSB	Remove
26	*Ligustrum lucidim* (Broad-leafed Privet)	5-10	1x1	50	80	N	G	M	S	L	E	2	1.5	Understorey specimen. Listed noxious weed under Biosecurity Act 2015 – Direct clash with MSB	Remove

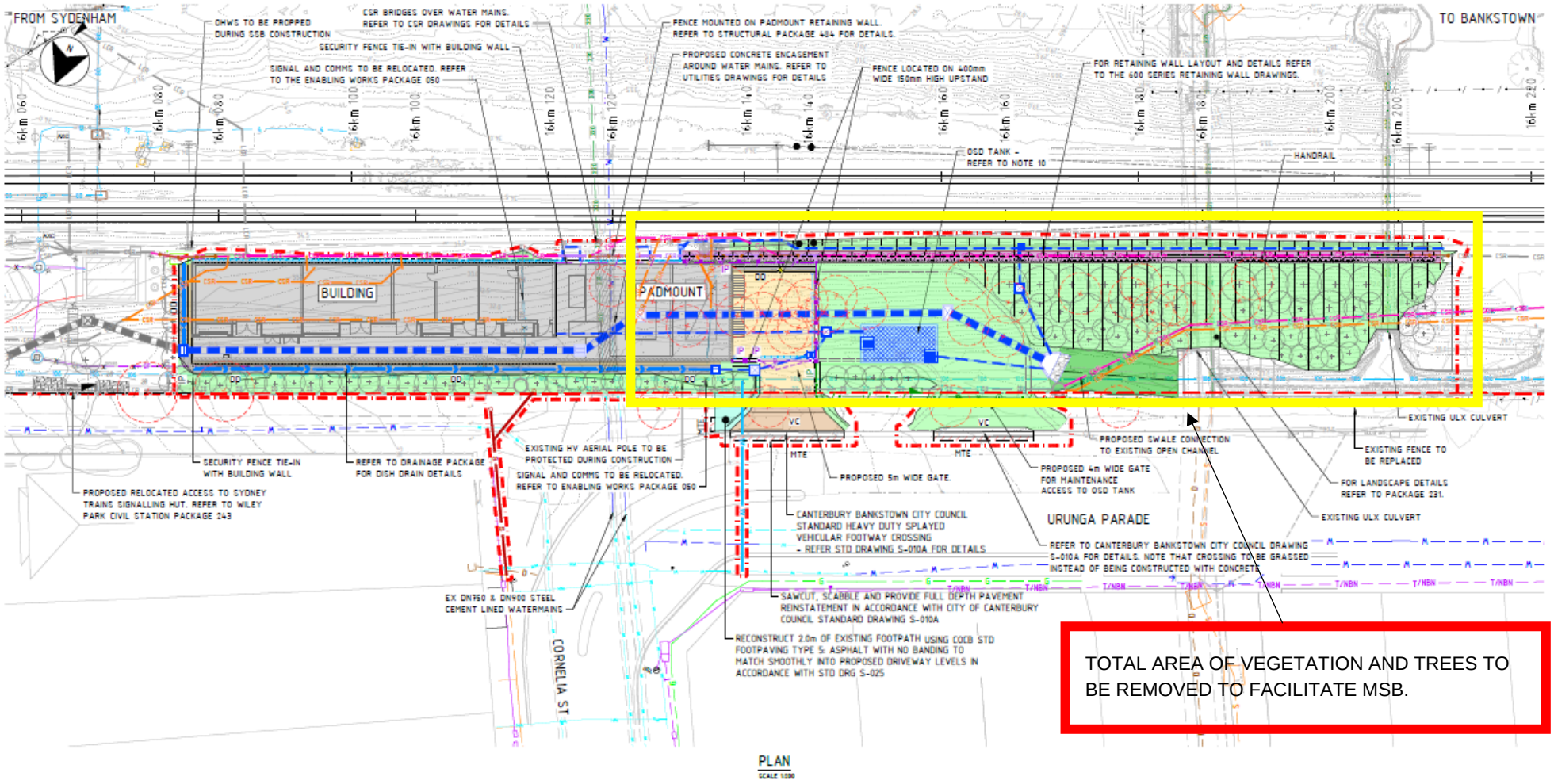
Tree number	Tree name	Tree dimensions				Vigour	Condition	Age class	ULE	Amenity and Visual Value	Native or Exotic	TPZ (m)	SRZ (m)	Comments	Remove or Retain
	Botanical name Common name	Height (m)	Spread (m)	D.B.H. (mm)	D.A.B. (mm)										
27	*Ligustrum lucidim* (Broad-leafed Privet)	5-10	1x1	50	80	N	G	M	S	L	E	2	1.5	Understorey specimen. Listed noxious weed under Biosecurity Act 2015 – Direct clash with MSB	Remove
28	*Ligustrum lucidim* (Broad-leafed Privet)	5-10	1x1	50	80	N	G	M	S	L	E	2	1.5	Understorey specimen. Listed noxious weed under Biosecurity Act 2015 – Direct clash with MSB	Remove
29	*Ligustrum lucidim* (Broad-leafed Privet)	5-10	1x1	50	80	N	G	M	S	L	E	2	1.5	Understorey specimen. Listed noxious weed under Biosecurity Act 2015 – Direct clash with MSB	Remove
30	*Ligustrum lucidim* (Broad-leafed Privet)	5-10	1x1	50	80	N	G	M	S	L	E	2	1.5	Understorey specimen. Listed noxious weed under Biosecurity Act 2015 – Direct clash with MSB	Remove
31	*Ligustrum lucidim* (Broad-leafed Privet)	5-10	1x1	50	80	N	G	M	S	L	E	2	1.5	Understorey specimen. Listed noxious weed under Biosecurity Act 2015 – Direct clash with MSB	Remove
32	*Ligustrum lucidim* (Broad-leafed Privet)	5-10	1x1	50	80	N	G	M	S	L	E	2	1.5	Understorey specimen. Listed noxious weed under Biosecurity Act 2015 – Direct clash with MSB	Remove
33	*Ligustrum lucidim* (Broad-leafed Privet)	5-10	1x1	50	80	N	G	M	S	L	E	2	1.5	Understorey specimen. Listed noxious weed under Biosecurity Act 2015 – Direct clash with MSB	Remove
34	*Ligustrum lucidim* (Broad-leafed Privet)	5-10	1x1	50	80	N	G	M	S	L	E	2	1.5	Understorey specimen. Listed noxious weed under Biosecurity Act 2015 – Direct clash with MSB	Remove
35	*Ligustrum lucidim* (Broad-leafed Privet)	5-10	1x1	50	80	N	G	M	S	L	E	2	1.5	Understorey specimen. Listed noxious weed under Biosecurity Act 2015 – Direct clash with MSB	Remove
36	*Ligustrum lucidim* (Broad-leafed Privet)	5-10	1x1	50	80	N	G	M	S	L	E	2	1.5	Understorey specimen. Listed noxious weed under Biosecurity Act 2015 – Direct clash with MSB	Remove
37	*Ligustrum lucidim* (Broad-leafed Privet)	5-10	1x1	50	80	N	G	M	S	L	E	2	1.5	Understorey specimen. Listed noxious weed under Biosecurity Act 2015 – Direct clash with MSB	Remove
38	*Ligustrum lucidim* (Broad-leafed Privet)	5-10	1x1	50	80	N	G	M	S	L	E	2	1.5	Understorey specimen. Listed noxious weed under Biosecurity Act 2015 – Direct clash with MSB	Remove
39	*Ligustrum lucidim* (Broad-leafed Privet)	5-10	1x1	50	80	N	G	M	S	L	E	2	1.5	Understorey specimen. Listed noxious weed under Biosecurity Act 2015 – Direct clash with MSB	Remove

Tree number	Tree name	Tree dimensions				Vigour	Condition	Age class	ULE	Amenity and Visual Value	Native or Exotic	TPZ (m)	SRZ (m)	Comments	Remove or Retain
	Botanical name Common name	Height (m)	Spread (m)	D.B.H. (mm)	D.A.B. (mm)										
40	*Ligustrum lucidim* (Broad-leafed Privet)	5-10	1x1	50	80	N	G	M	S	L	E	2	1.5	Understorey specimen. Listed noxious weed under Biosecurity Act 2015 – Direct clash with MSB	Remove
41	*Ligustrum lucidim* (Broad-leafed Privet)	5-10	1x1	50	80	N	G	M	S	L	E	2	1.5	Understorey specimen. Listed noxious weed under Biosecurity Act 2015 – Direct clash with MSB	Remove
42	*Ligustrum lucidim* (Broad-leafed Privet)	5-10	1x1	50	80	N	G	M	S	L	E	2	1.5	Understorey specimen. Listed noxious weed under Biosecurity Act 2015 – Direct clash with MSB	Remove
43	*Ligustrum lucidim* (Broad-leafed Privet)	5-10	1x1	50	80	N	G	M	S	L	E	2	1.5	Understorey specimen. Listed noxious weed under Biosecurity Act 2015 – Direct clash with MSB	Remove
44	*Ligustrum lucidim* (Broad-leafed Privet)	5-10	1x1	50	80	N	G	M	S	L	E	2	1.5	Understorey specimen. Listed noxious weed under Biosecurity Act 2015 – Direct clash with MSB	Remove
45	*Ligustrum lucidim* (Broad-leafed Privet)	5-10	1x1	100	200	N	G	M	S	L	E	2	1.5	Understorey specimen. Listed noxious weed under Biosecurity Act 2015 – Direct clash with MSB	Remove
46	*Ligustrum lucidim* (Broad-leafed Privet)	5-10	1x1	100	200	N	G	M	S	L	E	2	1.5	Understorey specimen. Listed noxious weed under Biosecurity Act 2015 – Direct clash with MSB	Remove
47	*Ligustrum lucidim* (Broad-leafed Privet)	5-10	1x1	100	200	N	G	M	S	L	E	2	1.5	Understorey specimen. Listed noxious weed under Biosecurity Act 2015 – Direct clash with MSB	Remove
48	*Ligustrum lucidim* (Broad-leafed Privet)	5-10	1x1	100	200	N	G	M	S	L	E	2	1.5	Understorey specimen. Listed noxious weed under Biosecurity Act 2015 – Direct clash with MSB	Remove
49	*Ligustrum lucidim* (Broad-leafed Privet)	5-10	1x1	100	200	N	G	M	S	L	E	2	1.5	Understorey specimen. Listed noxious weed under Biosecurity Act 2015 – Direct clash with MSB	Remove
50	*Ligustrum lucidim* (Broad-leafed Privet)	5-10	1x1	100	200	N	G	M	S	L	E	2	1.5	Understorey specimen. Listed noxious weed under Biosecurity Act 2015 – Direct clash with MSB	Remove
51	*Ligustrum lucidim* (Broad-leafed Privet)	5-10	1x1	100	200	N	G	M	S	L	E	2	1.5	Understorey specimen. Listed noxious weed under Biosecurity Act 2015 – Direct clash with MSB	Remove
52	*Ligustrum lucidim* (Broad-leafed Privet)	5-10	1x1	100	200	N	G	M	S	L	E	2	1.5	Understorey specimen. Listed noxious weed under Biosecurity Act 2015 – Direct clash with MSB	Remove

Tree number	Tree name	Tree dimensions				Vigour	Condition	Age class	ULE	Amenity and Visual Value	Native or Exotic	TPZ (m)	SRZ (m)	Comments	Remove or Retain
	Botanical name Common name	Height (m)	Spread (m)	D.B.H. (mm)	D.A.B. (mm)										
53	*Ligustrum lucidim* (Broad-leafed Privet)	5-10	1x1	100	200	N	G	M	S	L	E	2	1.5	Understorey specimen. Listed noxious weed under Biosecurity Act 2015 – Direct clash with MSB	Remove
54	*Ligustrum lucidim* (Broad-leafed Privet)	5-10	1x1	100	200	N	G	M	S	L	E	2	1.5	Understorey specimen. Listed noxious weed under Biosecurity Act 2015 – Direct clash with MSB	Remove
55	*Ligustrum lucidim* (Broad-leafed Privet)	5-10	1x1	100	200	N	G	M	S	L	E	2	1.5	Understorey specimen. Listed noxious weed under Biosecurity Act 2015 – Direct clash with MSB	Remove
56	*Ligustrum lucidim* (Broad-leafed Privet)	5-10	1x1	100	200	N	G	M	S	L	E	2	1.5	Understorey specimen. Listed noxious weed under Biosecurity Act 2015 – Direct clash with MSB	Remove
57	*Ligustrum lucidim* (Broad-leafed Privet)	5-10	1x1	100	200	N	G	M	S	L	E	2	1.5	Understorey specimen. Listed noxious weed under Biosecurity Act 2015 – Direct clash with MSB	Remove
58	*Ligustrum lucidim* (Broad-leafed Privet)	5-10	1x1	50	80	N	G	M	S	L	E	2	1.5	Understorey specimen. Listed noxious weed under Biosecurity Act 2015 – Direct clash with MSB	Remove
59	*Ligustrum lucidim* (Broad-leafed Privet)	5-10	1x1	50	80	N	G	M	S	L	E	2	1.5	Understorey specimen. Listed noxious weed under Biosecurity Act 2015 – Direct clash with MSB	Remove
60	*Ligustrum lucidim* (Broad-leafed Privet)	5-10	1x1	50	80	N	G	M	S	L	E	2	1.5	Understorey specimen. Listed noxious weed under Biosecurity Act 2015 – Direct clash with MSB	Remove
61	*Ligustrum lucidim* (Broad-leafed Privet)	5-10	1x1	50	80	N	G	M	S	L	E	2	1.5	Understorey specimen. Listed noxious weed under Biosecurity Act 2015 – Direct clash with MSB	Remove
62	*Ligustrum lucidim* (Broad-leafed Privet)	5-10	1x1	50	80	N	G	M	S	L	E	2	1.5	Understorey specimen. Listed noxious weed under Biosecurity Act 2015 – Direct clash with MSB	Remove
63	*Ligustrum lucidim* (Broad-leafed Privet)	5-10	1x1	50	80	N	G	M	S	L	E	2	1.5	Understorey specimen. Listed noxious weed under Biosecurity Act 2015 – Direct clash with MSB	Remove
64	*Pittosporum undulatum* (Sweet pittosporum)	1-5	2x2	50	80	N	G	M	S	L	N	2	1.5	Understorey specimen. Direct clash with MSB	Remove
65	*Pittosporum undulatum* (Sweet pittosporum)	1-5	2x2	50	80	N	G	M	S	L	N	2	1.5	Understorey specimen. Direct clash with MSB	Remove

Tree number	Tree name	Tree dimensions				Vigour	Condition	Age class	ULE	Amenity and Visual Value	Native or Exotic	TPZ (m)	SRZ (m)	Comments	Remove or Retain
	Botanical name Common name	Height (m)	Spread (m)	D.B.H. (mm)	D.A.B. (mm)										
66	*Pittosporum undulatum* (Sweet pittosporum)	1-5	2x2	50	80	N	G	M	S	L	N	2	1.5	Understorey specimen. Direct clash with MSB	Remove
67	*Pittosporum undulatum* (Sweet pittosporum)	5-10	2x2	50	80	N	G	M	S	L	N	2	1.5	Understorey specimen. Direct clash with MSB	Remove
68	*Pittosporum undulatum* (Sweet pittosporum)	5-10	2x2	50	80	N	G	M	S	L	N	2	1.5	Understorey specimen. Direct clash with MSB	Remove
69	*Pittosporum undulatum* (Sweet pittosporum)	5-10	2x2	100	200	N	G	M	S	L	N	2	1.5	Understorey specimen. Direct clash with MSB	Remove
70	*Pittosporum undulatum* (Sweet pittosporum)	5-10	2x2	100	200	N	G	M	S	L	N	2	1.5	Understorey specimen. Direct clash with MSB	Remove
71	*Pittosporum undulatum* (Sweet pittosporum)	5-10	2x2	150	250	N	G	M	S	L	N	2	1.5	Understorey specimen. Direct clash with MSB	Remove
72	*Pittosporum undulatum* (Sweet pittosporum)	5-10	2x2	50	80	N	G	M	S	L	N	2	1.5	Understorey specimen. Direct clash with MSB	Remove
73	*Pittosporum undulatum* (Sweet pittosporum)	5-10	2x2	50	80	N	G	M	S	L	N	2	1.5	Understorey specimen. Direct clash with MSB	Remove
74	*Phoenix canariensis* (Canary Island Date Palm)	1-5	3x3	400	500	N	G	M	M	L	E	4	1.5	Understorey specimen. Direct clash with MSB	Remove
75	*Phoenix canariensis* (Canary Island Date Palm)	1-5	3x3	400	500	N	G	M	M	L	E	4	1.5	Understorey specimen. Direct clash with MSB	Remove
76	*Phoenix canariensis* (Canary Island Date Palm)	1-5	3x3	150	250	N	G	M	M	L	E	4	1.5	Understorey specimen. Direct clash with MSB	Remove
77	*Phoenix canariensis* (Canary Island Date Palm)	1-5	3x3	150	250	N	G	M	M	L	E	4	1.5	Understorey specimen. Direct clash with MSB	Remove
78	*Camellia* sp (Camellia)	1-5	1x1	50	80	N	G	M	S	L	E	2	1.5	Understorey specimen. Direct clash with MSB	Remove

Tree number	Tree name	Tree dimensions				Vigour	Condition	Age class	ULE	Amenity and Visual Value	Native or Exotic	TPZ (m)	SRZ (m)	Comments	Remove or Retain
	Botanical name Common name	Height (m)	Spread (m)	D.B.H. (mm)	D.A.B. (mm)										
79	*Camellia* sp (Camellia)	1-5	1x1	50	80	N	G	M	S	L	E	2	1.5	Understorey specimen. Direct clash with MSB	Remove
80	*Camellia* sp (Camellia)	1-5	1x1	50	80	N	G	M	S	L	E	2	1.5	Understorey specimen. Direct clash with MSB	Remove



PLAN
SCALE 1:200

NOTES

1. FOR GENERAL NOTES REFER TO DRAWINGS SMCSWSWM-MTM-WWP-CE-DWG-403104 TO 403107.
2. FOR LEGEND REFER TO DRAWINGS SMCSWSWM-MTM-WWP-CE-DWG-403108 TO 403109.
3. FOR PAVEMENT PLAN REFER TO DRAWING SMCSWSWM-MTM-WWP-CE-DWG-403161.
4. FOR FINISHED SURFACE PLAN REFER TO DRAWING SMCSWSWM-MTM-WWP-CE-DWG-403137.
5. FOR BULK EARTHWORKS CUT AND FILL PLAN REFER DRAWING SMCSWSWM-MTM-WWP-CE-DWG-403201.
6. FOR BULK EARTHWORKS GRADING PLAN AND LONGITUDINAL SECTION REFER TO DRAWING SMCSWSWM-MTM-WWP-CE-DWG-403206.
7. FOR DRAINAGE GENERAL ARRANGEMENT PLAN REFER TO DRAWING SMCSWSWM-MTM-WWP-CE-DWG-403301.
8. FOR CGR GENERAL ARRANGEMENT PLAN REFER TO DRAWINGS SMCSWSWM-MTM-WWP-CE-DWG-403411 TO 403412. DO NOT REFER TO ANY OTHER GENERAL ARRANGEMENT PLANS FOR THE DESIGN AND EXTENTS OF CGR WORKS.
9. FOR UTILITIES GENERAL ARRANGEMENT PLAN REFER TO DRAWING SMCSWSWM-MTM-WWP-CE-DWG-403501.
10. FOR RETAINING WALL GENERAL ARRANGEMENT PLAN AND DETAILS, INCLUDING HANDRAIL DETAILS, REFER DRAWINGS SMCSWSWM-MTM-WWP-CE-DWG-403601 TO 404633.
11. FOR OSD DETAILS REFER TO DRAINAGE DRAWING SMCSWSWM-MTM-WWP-CE-DWG-403321.
12. FOR MEP CONDUITS REFER TO PACKAGE 402. NOTE THAT MEP CONDUITS ARE NOT SHOWN ON CIVIL GA.

DRAWING COLOUR CODED - PRINT ALL COPIES IN COLOUR

FOR CONSTRUCTION

REV.	BY	DATE	DESCRIPTION	APPD
00	MC	31.03.2021	APPROVED FOR CONSTRUCTION	LP

SCALES: 1 : 200 FULL SIZE A1

CLIENT: NSW GOVERNMENT | sydney METRO

SERVICE PROVIDERS: METRON T2M

DRAWN: M. FORTU
DESIGNED: C. STANFORD
DRG CHECK: P. ALFORD
DESIGN CHECK: T. LEE
APPROVED: L. PALMER 31.03.2021

SYDNEY METRO
WILEY PARK STATION - SERVICE BUILDING
CIVIL ENGINEERING
SERVICE BUILDING - CIVIL
GENERAL ARRANGEMENT PLAN

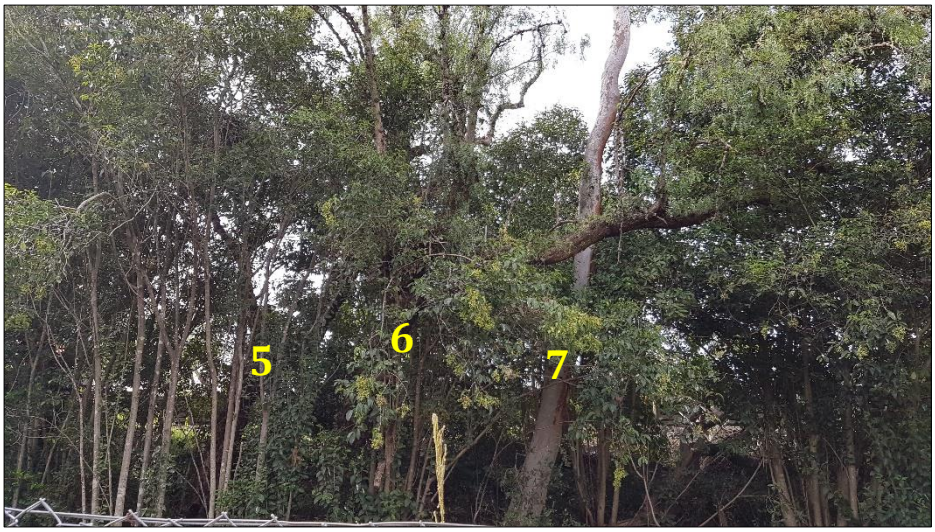
STATUS: FOR CONSTRUCTION | SHEET 1 OF 1 | (G)
DRG No: SMCSWSWM-MTM-WWP-CE-DWG-403111 | REV: 00

At Original	Co-ordinate System: MGA Zone 56	Height Datum: A.H.D.	This sheet may be prepared using colour and may be incomplete if copied	NOTE: Do not scale from this drawing.	ALT. DRG No: SMCSWSWM-MTM-WWP-CE-DWG-403111 0

Appendix 2: Site Photographs

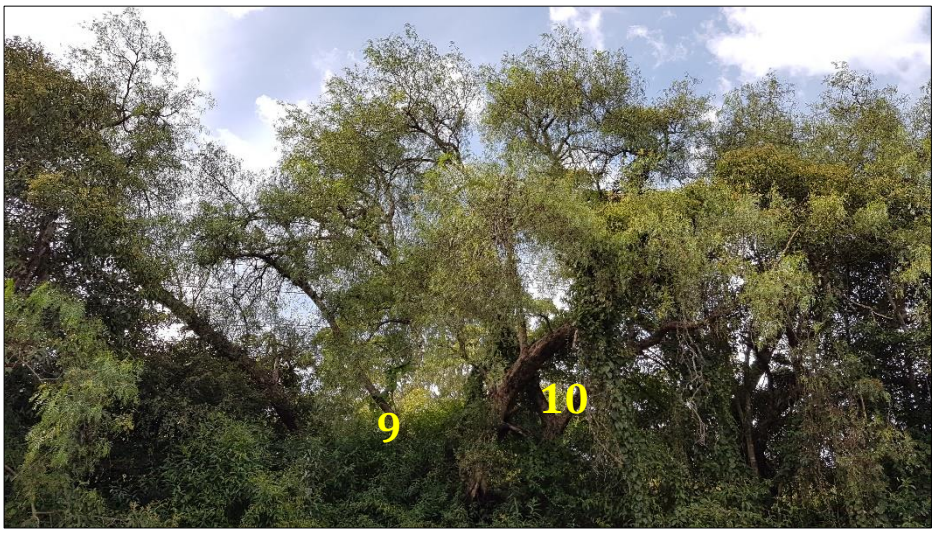
Photograph 1: Trees 1 and 2 *Schinus molle* (Peppercorn Tree) to be removed.

Photograph 2: Trees 3 and 4D *Schinus molle* (Peppercorn Tree) to be removed.

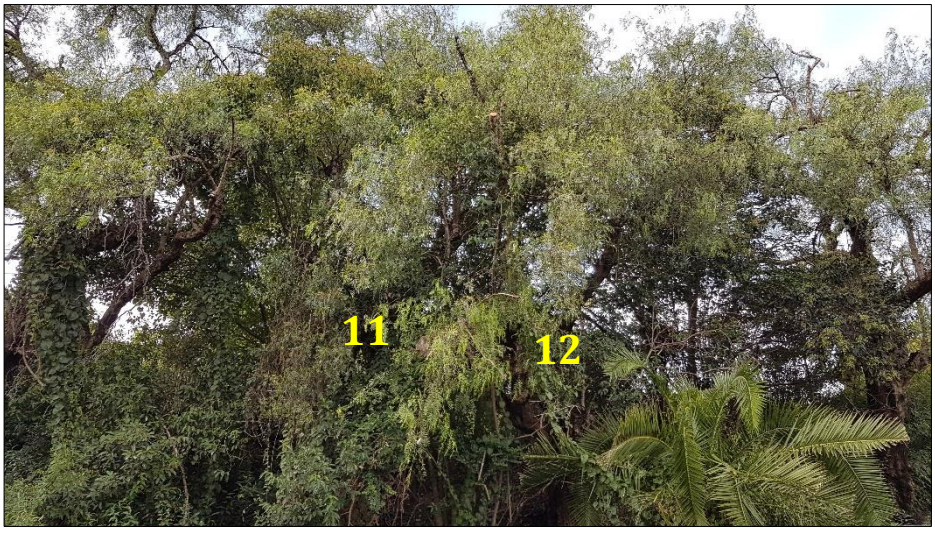


Photograph 3: Trees 5, 6 and 7 *Schinus molle* (Peppercorn Tree) to be removed.

Photograph 4: Tree 8 *Schinus molle* (Peppercorn Tree) to be removed.



Photograph 5: Trees 9 and 10 *Schinus molle* (Peppercorn Tree) to be removed.



Photograph 6: Trees 11 and 12 *Schinus molle* (Peppercorn Tree) to be removed.

Photograph 7: Trees 13, 14, 15 and 16 *Schinus molle* (Peppercorn Tree) to be removed.

Photograph 8: Tree 17 *Schinus molle* (Peppercorn Tree) to be removed.

Photograph 9: Tree 18 *Schinus molle* (Peppercorn Tree) to be removed.

Appendix 3: Tree Assessment Criteria

Tree number: Identifying number given to individual (or group) trees.
Botanical Name: Latin name for tree showing genus and species.
Common Name: The common name given to the tree.
Tree Dimensions: The physical dimensions of the tree.

- **Height**: Estimated or measured height of tree in meters.
- **Spread**: Estimated or measured radial canopy spread of tree in meters.
- **Diameter at Breast Height (DBH)**: The estimated or measured diameter of trunk given in mm measured at 1.4m from ground.
- **Diameter Above Base (DAB)**: The estimated or measured diameter of trunk given in mm measured above the root flare. Used to calculate the structural root zone of the tree.

Age Class: An estimation of how old the tree is in relation to its life expectancy.

- **Young** – Age less than 20% of life expectancy of tree in situ
- **Mature** – Age 20% - 80% of life expectancy of tree in situ
- **Old** – Age greater than 80% of life expectancy of tree in situ
- **Dead** – Tree is dead

Vigour: Ability of a tree to sustain its life processes. This is independent of the condition of a tree but may impact upon it. Vigour can appear to alter rapidly with change of seasons (seasonality) e.g., dormant, deciduous or semi-deciduous trees. Vigour can be categorised as Dormant, Low, Normal and High.

- **Dormant Vigour** – Determined by the existing turgidity in the lower order branches in the outer extremity of the crow, with good bud set and formation, and where the last extension growth is distinct from those most recently preceding it, evident by bud scale scars. Normal vigour during dormancy is achieved when such growth is evident on a majority of branches throughout the crown.
- **Low Vigour** – Reduced ability of a tree to sustain its life processes. This may be evident by the atypical growth of leaves, reduced crown cover and reduced crown density, branches, roots and trunk, and a deterioration of their functions with reduced resistance to predation. This is independent of the condition of a tree but may impact upon it, and especially the ability of a tree to sustain itself against predation.
- **Normal Vigour** – Ability of a tree to maintain and sustain its life processes. This may be evident by the typical growth of leaves, crown cover and crown density, branches, roots and trunk and resistance to predation. This is independent of the condition of a tree but may impact upon it, and especially the ability of a tree to sustain itself against predation.
- **High Vigour** – Accelerated growth of a tree due to incidental or deliberate artificial changes to its growing environment that are seemingly beneficial, but may result in premature aging or failure if the favourable conditions cease, or promote prolonged senescence if the favourable conditions remain, e.g. water from a leaking pipe, water and nutrients from a leaking or disrupted sewer pipe, nutrients from animal waste, a tree growing next to a chicken coop, or a stock feed lot, or a regularly used stockyard, a tree subject to stringent watering and fertilisation program, or some trees may achieve an extended lifespan from continuous pollarding practices over the life of the tree.

Condition: A tree's crown form and growth habit, as modified by its environment (aspect, suppression by other trees, soils) the stability and viability of the root plate, trunk and structural branches (first (1st) and possibly (2nd) order branches), including structural defects such as wounds, cavities or hollows, crooked trunk or weak trunk/branch junctions and the effects of predation by pests and diseases. These may not be directly connected with vigour and it is possible for a tree to be of normal vigour but in poor condition. Condition can be categorised as Dead, Poor, Fair and Good.

- **Dead Condition** – Tree is no longer capable of performing any of the following processes or is exhibiting any of the following symptoms; Photosynthesis via its foliage crown (as indicated by the presence of moist, green or other coloured leaves), Osmosis (the ability of the roots system to take up water), Turgidity (the ability of the plant to sustain moisture pressure in its cells), Epicormic shoots or epicormic strands in Eucalypts (the production of new shoots as a response to stress, generated from latent or adventitious buds or from a lignotuber), Permanent leaf loss, Permanent leaf wilting (the loss of turgidity which is marked by desiccation of stems leaves and roots), Abscission of the epidermis (bark desiccates and peels off to the beginning of the sap wood).
- **Poor Condition** - Tree is of good habit or misshapen, a form that may be severely restricted for space and light, exhibits symptoms of advanced and irreversible decline such as fungal, or bacterial infestation, major die-back in the branch and foliage crown, structural deterioration from insect damage e.g. termite infestation, or storm damage or lightning strike, ring barking from borer activity in the trunk, root damage or instability of the tree, or damage from physical wounding impacts or abrasion, or from altered local environmental conditions and has been unable to adapt to such changes and may decline further to death regardless of remedial works or other modifications to the local environment that would normally be sufficient to provide for its basic survival if in good to fair condition. Deterioration physically, often characterised by a gradual and continuous reduction in vigour but may be independent of a change in vigour, but characterised by a proportionate increase in susceptibility to, and predation by pests and diseases against which the tree cannot be sustained. Such conditions may also be evident in trees of advanced senescence due to normal phenological processes, without modifications to the growing environment or physical damage having been inflicted upon the tree. This may be independent from, or contributed to by vigour.
- **Fair Condition** - Tree is of good habit or misshapen, a form not severely restricted for space and light, has some physical indication of decline due to the early effects of predation by pests and diseases, fungal, bacterial, or insect infestation, or has suffered physical injury to itself that may be contributing to instability or structural weaknesses, or is faltering due to the modification of the environment essential for its basic survival. Such a tree may recover with remedial works where appropriate, or without intervention may stabilise or improve over time, or in response to the implementation of beneficial changes to its local environment. This may be independent from, or contributed to by vigour.
- **Good Condition** - Tree is of good habit, with crown form not severely restricted for space and light, physically free from the adverse effects of predation by pests and diseases, obvious instability or structural weaknesses, fungal, bacterial or insect infestation and is expected to continue to live in much the same condition as at the time of inspection provided conditions around it for its basic survival do not alter greatly. This may be independent from, or contributed to by vigour.

Useful Life Expectancy (ULE) ULE is the length of time that the arborist assesses an individual tree can be retained with an acceptable level of risk based on the information available at the time of inspection. It is a snapshot in time of the potential an individual tree has for survival in the eyes of the assessor. ULE is not static – it is closely related to tree health and the surrounding conditions. Alterations in these variables may result in changes to the ULE assessment. Consequently, the reliability all ULE assessments have will decrease as time passes from the initial assessment and the potential for changes in variables increases.

- **Remove –** Trees that should be removed within the next 5 years
- **Short –** Trees that appear to be retainable at the time of the assessment for 5-15 years with an acceptable level of risk.
- **Medium –** Trees that appear to be retainable at the time of the assessment for 15-40 years with an acceptable level of risk.
- **Long –** Trees that appear to be retainable at the time of the assessment for 40+ years with an acceptable level of risk.

Amenity and Visual Value – For the purposes of assessing the visual and landscape value of each tree the IACA Significance of a Tree, Assessment Rating System (STARS) © (IACA 2010) © has been adopted. - The landscape significance of a tree is an essential criterion to establish the importance that a particular tree may have on a site. The system uses a scale of High, Medium and Low significance in the landscape.

High significance in landscape

- The tree is in good condition and good vigour
- The tree has a form typical for the species
- The tree is a remnant or is a planted locally indigenous specimen and/or is rare or uncommon in the local area or of botanical interest or of substantial age
- The tree is listed as a heritage item, threatened species or part of an endangered ecological community or listed on council's significant tree register
- The tree is visually prominent and visible from a considerable distance when viewed from most directions within the landscape due to its size and scale and makes a positive contribution to the local amenity
- The tree supports social and cultural sentiments or spiritual associations, reflected by the broader population or community group or has commemorative values
- The tree's growth is unrestricted by above and below ground influences, supporting its ability to reach dimensions typical for the taxa in situ – tree is appropriate to the site conditions

Medium significance in landscape

- The tree is in fair-good condition and good or low vigour
- The tree has form typical or atypical of the species
- The tree is a planted locally indigenous or a common species with its taxa commonly planted in the local area
- The tree is visible from surrounding properties, although not visually prominent as partially obstructed by other vegetation or buildings when viewed from the street
- The tree provides a fair contribution to the visual character and amenity of the local area
- The tree's growth is moderately restricted by above or below ground influences, reducing its ability to reach dimensions typical for the taxa in situ

Low significance in landscape

- The tree is in fair-poor condition and good or low vigour
- The tree has form atypical of the species
- The tree is not visible or is partly visible from the surrounding properties as obstructed by other vegetation or buildings
- The tree provides a minor contribution or has a negative impact on the visual character and amenity of the local area
- The tree is a young specimen which may or may not have reached dimensions to be protected by local Tree Preservation Orders or similar protection mechanisms and can easily be replaced with a suitable specimen
- The tree's growth is severely restricted by above or below ground influences, unlikely to reach dimensions typical for the taxa in situ – tree is inappropriate to the site conditions
- The tree is listed as exempt under the provisions of the local Council Tree Preservation Order or similar protection mechanisms
- The tree has a wound or defect that has the potential to become structurally unsound
- **Environmental Pest / Noxious Weed Species**
- The tree is an environmental pest species due to its invasiveness or poisonous/allergenic properties.
- The tree is a declared noxious weed by legislation
- **Hazardous / Irreversible Decline**
- The tree is structurally unsound and/or unstable and is considered potentially dangerous
- The tree is dead, or is in irreversible decline, or has the potential to fail or collapse in full or in part in the immediate to short term

The tree is to have a minimum of three (3) criteria in a category to be classified in that group.

In the development of this document IACA acknowledges the contribution and original concept of the Footprint Green Tree Significance & Retention Value Matrix, developed by Footprint Green Pty Ltd in June 2010.

The Australian Standard 4970-2009 Protection of Trees on Development Sites defines the requirements for assessing trees with respect to development. It provides the guidance on how to decide which trees are appropriate for retention and on the means of protecting them during construction works. It describes the areas and offsets, referred to as the Tree Protection Zone (TPZ) and Structural Root Zone (SRZ) required to be free from development works to maintain tree vitality and stability. This report has been prepared in accordance with the conditions set out within the standard.

- **Tree Protection Zone** – The tree protection zone is defined as a specified area above and below ground set aside for the protection of the tree's roots and crown. It is expressed as a radial measurement taken from the centre of the trunk at ground level.
- **Structural Root Zone** – The structural root zone is defined as a specified area around the base of a tree required to maintain its stability within the ground. It is expressed as a radial measurement taken from the center of the trunk at ground level. Excavation and development works are not recommended within the structural root zone unless additional investigation as to root size and location is undertaken

APPENDIX 4.1 WILEY PARK AIA (PLATEAU TREES)

PLATEAUTREES
Safety. Quality. Progress.

Date: 30 April 2021

Re: Additional tree removals at Wiley Park Station as part of the Southwest Metro Package.

At the request of Downer Group an onsite inspection was undertake at Wiley Park Station. It has been asked to confirm existing tree removals as recommended within the Arboricultural Impact Assessment (AIA) prepared by Urban Arbor, dated 15 January 2020, Ref 20/01/15/SWMPB and record additional trees to be removed as part of the proposed works package. On the 30 April a site walkthrough was undertaken by myself and a representative from Downer Group.

As stated within the existing AIA report trees 684, 687, 688 and 706 shall require removal to accommodate the proposed works. Trees 689, 690, 691, 693, 694, 707 and 708, previously identified for retention, are now to be removed. Trees 689, 690 and 691 are located within the footprint of works for the station services building adjacent platform 1 and cannot be retained. Trees 693 and 694 are located within the footprint of a permanent staircase to the signal hut and drainage line and cannot be retained. Trees 707 and 708 are located within the footprint of works for the station services building adjacent platform 2 and cannot be retained. Reference should be made to the AIA report for their respective tree data.

An additional four trees were identified for removal as part of the works. These consist of one *Pittosporum undulatum* (Sweet Pittosporum) tree 1 located adjacent platform 2 and one *Eucalyptus pilularis* (Blackbutt) tree 2, one *Eucalyptus robusta* (Swamp Mahogany) tree 3, one *Eucalyptus scoparia* (Wallangarra White Gum) tree 4 located adjacent the southern side of Urunga Parade. These additional trees are

Plateau Tree Service Pty Ltd
PO BOX 1522, DEE WHY NSW 2099 Australia
P: 02 9939 5350 | F: 02 9905 7569
E: info@plateautrees.com.au | W: www.plateautrees.com.au
ABN : 17 090 798 002

located within the footprint of the proposed works and cannot be retained under the current design. The Sweet Pittosporum is considered to have low landscape significance. Its removal is not expected to have a significant impact upon the local amenity. The Blackbutt, Swamp Mahogany and Wallangarra White Gum are considered to have medium landscape significance. Their removal shall expose the northern end of Urunga parade to the new Metro Services Building, rail corridor and associated infrastructure. The locations of the additional trees to be removed can be found as Image 1. Tree data collected during the site inspection can be found as Appendix 1. Each additional tree for removal has been photographed and can be found as Appendix 2.

The Wallangarra White Gum (tree 4) is listed as Endangered under the Biodiversity Conservation Act 2016 and Vulnerable under the Environmental Protection Biodiversity Conservation Act 1999. However, the subject specimen is located outside of its naturally occurring range and appears to have been planted as part of the streetscape.

Image 1: Aerial image of Wiley Park Station Station showing the location of additional trees to be removed.

All appropriate approvals and consents are to be obtained prior to tree and vegetation removal works commencing. All tree removal works are to be undertaken by suitably qualified tree workers and in accordance with Safe Work Australia's Guide to Managing Risks of Tree Trimming and Removal Works.

Please feel free to contact me should you require any further assistance regarding this matter.

Regards.
Owen Tebbutt

Consulting Arborist
Plateau Tree Service

Appendix 1: Tree Assessment Schedule

Tree number	Tree name	Tree dimensions				Vigour	Condition	Age class	ULE	Amenity and Visual Value	Native or Exotic	TPZ (m)	SRZ (m)	Comments	Remove or Retain
	Botanical name Common name	Height (m)	Spread (m)	D.B.H. (mm)	D.A.B. (mm)										
1	*Pittosporum undulatum* (Sweet Pittosporum)	1-5	2x2	90	150	N	G	M	S	L	N	2	1.5	Growing at base of adjacent tree 706. Tree to be removed to accommodate the proposed station services building adjacent platform 2.	Remove
2	*Eucalyptus pilularis* (Blackbutt)	15-20	7x7	600	700	N	F	M	M	M	N	7.2	2.85	Council owned street tree located within road reserve. Tree has poor form due to regular pruning to clear overhead power lines. Epicormics and dead wood within canopy. Tree to be removed to accommodate driveway access to proposed Metro Services Building.	Remove
3	*Eucalyptus robusta* (Swamp mahogany)	15-20	6x6	550	550	N	F	M	M	M	N	6.6	2.57	Council owned street tree located within road reserve. Tree has poor form due to regular pruning to clear overhead power lines. Epicormics and dead wood within canopy. Exposed surface roots around base of trunk. Tree to be removed to accommodate ULX and permanent fencing.	Remove
4	*Eucalyptus scoparia* (Wallangarra White Gum)	15-20	7x7	400	500	N	F	M	M	M	N	4.8	2.47	Council owned street tree located within road reserve. Tree has poor form due to regular pruning to clear overhead power lines. Epicormics and dead wood within canopy. Tree to be removed to accommodate ULX and permanent fencing.	Remove

Appendix 1: Site Photographs

Photograph 1: Tree 1 *Pittosporum undulatum* (Sweet Pittosporum) identified for removal to accommodate Station Services Building adjacent platform 2.

Photograph 2: Tree 2 *Eucalyptus pilularis* (Blackbutt) identified for removal to accommodate Metro services Building driveway and access.

Photograph 3: Tree 3 *Eucalyptus robusta* (Swamp Mahogany) identified for removal to accommodate ULX and permanent fencing.

Photograph 4: Tree 4 *Eucalyptus scoparia* (Wallangarra White Gum) identified for removal to accommodate ULX and permanent fencing.

TO SYDNEY

TO BANKSTOWN

THE BOULEVARDE

TREE 1, 706, 707 & 708 TO BE REMOVED DUE TO DIRECT CLASH WITH PERMANENT PLATFORM SERVICE BUILDING

REMOVE EXISTING SECURITY FENCE

REMOVE EXISTING HOOP STYLE FENCE

EXISTING PLATFORM 2 BUILDING

REMOVE EXISTING TREE

706

Tree 1

707

708

PLATFORM 2

TREES 693 & 694, TO BE REMOVED DUE TO DIRECT CLASH WITH PERMANENT STAIRWAY TO SIGNAL HUT AND DRAINAGE LINE

LOCALISED DEMOLITION REFER TO ARCHITECTURAL PACKAGE

REMOVE EXISTING TIMBER SLEEPER EDGES

SMCSWSWM-MTM-WWP-LA-DWG-231702 ADJOINS DRAWING

SMCSWSWM-MTM-WWP-LA-DWG-231704 ADJOINS DRAWING

PLATFORM 1

EXISTING PLATFORM 1 BUILDING

TREES 693 & 694, TO BE REMOVED DUE TO DIRECT CLASH WITH PERMANENT STAIRWAY TO SIGNAL HUT AND DRAINAGE LINE

684

687

689

688

690

691

REMOVE EXISTING HOOP STYLE FENCE

REMOVE EXISTING SECURITY FENCE

REMOVE EXISTING CONCRETE FOOTPATH TO BIN PAD

REMOVE EXISTING TREES

TREE 687, 688, 689, 690 & 691 TO BE REMOVED DUE TO DIRECT CLASH WITH PERMANENT PLATFORM SERVICE BUILDING

WILEY LANE

TREET

LEGEND

- RAILCORP PROPERTY BOUNDARY
- EXISTING TREES TO BE PROTECTED AND RETAINED
- EXISTING TREES TO BE REMOVED
- EXISTING HOOP FENCE TO BE REMOVED
- EXISTING SECURITY FENCE TO BE REMOVED
- WORKS TO BE DEMOLISHED
- WATER
- TELSTRA
- LOW PRESSURE GAS MAIN
- HV CABLE
- ELECTRIC

DRAWING COLOUR CODED - PRINT ALL COPIES IN COLOUR

NOT FOR CONSTRUCTION

REV.	BY	DATE	DESCRIPTION	APPD.
C	ME	23/10/2020	UPDATED STAGE 3 ISSUE	LP
B	ME	06/05/2020	ISSUED FOR STAGE 3	LP
A	ME	25/10/2019	ISSUED FOR STAGE 2	LP

SCALES 2 0 2 4 6 8m

1 : 200 FULL SIZE A1

CLIENT

NSW GOVERNMENT | sydney METRO

SERVICE PROVIDERS

METRON T2M

DRAWN	D.LEE	23/10/2020
DESIGNED	M. ENOCH	23/10/2020
DRG CHECK	M. ENOCH	23/10/2020
DESIGN CHECK	G. DAVIES	23/10/2020
APPROVED	L. PALMER	23/10/2020

SYDNEY METRO

WILEY PARK (15.846km to 16.211km)

LANDSCAPE DESIGN

DEMOLITION PLAN

SHARED PATH

STATUS: STAGE 3 | SHEET 4 of 24 | ©

DRG No. SMCSWSWM-MTM-WWP-LA-DWG-231703 | REV. C

A1 Original | Co-ordinate System: MGA Zone 56 | Height Datum: A.H.D. | This sheet may be prepared using colour and may be incomplete if copied | NOTE: Do not scale from this drawing. | ALT. DRG No. SMCSWSWM-MTM-WWP-LA-DWG-231703 P01

TO SYDNEY

TO BANKSTOWN

LEGEND

- RAILCORP PROPERTY BOUNDARY
- EXISTING TREES TO BE PROTECTED AND RETAINED
- EXISTING TREES TO BE REMOVED
- EXISTING HOOP FENCE TO BE REMOVED
- EXISTING SECURITY FENCE TO BE REMOVED
- WORKS TO BE DEMOLISHED
- WATER
- TELSTRA
- 202 LOW PRESSURE GAS MAIN
- 106 HV CABLE
- ELECTRIC

NOTES:

- THE DESIGN IS BASED ON SYDNEY METRO CHAINAGE. PLEASE REFER TO CIVIL DRAWINGS FOR SYDNEY METRO CHAINAGE ALIGNMENT (PACKAGE NO. 103).
- ALL HOOP STYLE FENCING TO BE REMOVED.
- ALL EXISTING TREES TO BE RETAIN UNLESS STATED ON DRAWINGS
- STRIP EXISTING TOPSOIL TO 200mm DEPTH WHERE VEGETATION IS BEING REMOVED.
- WORKS TO STATION PLATFORMS, BUILDINGS AND CONCOURSE ARE INCLUDED IN THE ARCHITECTURAL PACKAGE - REFER TO ARCHITECTURAL DESIGN PACKAGE 231.
- REFER TO ARBORIST'S ARBORICULTUAL IMPACT ASSESSMENT REPORT FOR TREE PROTECTION WORKS.

THE BOULEVARDE

THE BOULEVARDE

ADJOINS DRAWING SMCSWSWM-MTM-WWP-LA-DWG-231703

PLATFORM 2

PLATFORM 1

EXISTING SIGNAL BUILDING

REMOVE EXISTING HOOP STYLE FENCE

REMOVE EXISTING TREES

REMOVE EXISTING VEGETATION AND TOPSOIL. REFER TO SOIL REPORT FOR TREATMENT OF TOPSOIL AT WILEY PARK.

ARADE

REPLACE EXISTING CONCRETE CHANNEL WITH NEW ALIGNMENT REFER TO ENGINEER PACKAGE

REMOVE EXISTING SECURITY FENCE

693

694

REMOVE EXISTING TREES

TREES 693 & 694, TO BE REMOVED DUE TO DIRECT CLASH WITH PERMANENT STAIRWAY TO SIGNAL HUT AND DRAINAGE LINE

REMOVE EXISTING TREES. REFER TO ARBORIST'S REPORT

REMOVE EXISTING VEGETATION AND TOPSOIL. REFER TO SOIL REPORT FOR TREATMENT OF TOPSOIL AT WILEY PARK.

Tree 2

Tree 3

Tree 4

CORNELIA STREET

TREES 693 & 694, TO BE REMOVED DUE TO DIRECT CLASH WITH ULX & PERMANENT FENCE

TREE 3, TO BE REMOVED DUE TO DIRECT CLASH WITH PERMANENT DRIVEWAY

DRAWING COLOUR CODED - PRINT ALL COPIES IN COLOUR

FOR CONSTRUCTION

REV.	BY	DATE	DESCRIPTION	APPD.
00	ME	31/03/2021	APPROVED FOR CONSTRUCTION	LP

SCALES

CLIENT

NSW GOVERNMENT | sydney METRO

SERVICE PROVIDERS

METRON T2M

DRAWN	D.LEE	31/03/2021
DESIGNED	M. ENOCH	31/03/2021
DRG CHECK	M. ENOCH	31/03/2021
DESIGN CHECK	G. DAVIES	31/03/2021
APPROVED	L. PALMER	31/03/2021

SYDNEY METRO

WILEY PARK (15.846km to 16.211km)
LANDSCAPE DESIGN
DEMOLITION PLAN
STANLEA PARADE

STATUS: FOR CONSTRUCTION APPROVAL | SHEET 5 of 25 | ©

DRG No. SMCSWSWM-MTM-WWP-LA-DWG-231704 | REV. 00

A1 Original | Co-ordinate System: MGA Zone 56 | Height Datum: A.H.D. | This sheet may be prepared using colour and may be incomplete if copied | NOTE: Do not scale from this drawing. | ALT. DRG No. SMCSWSWM-MTM-WWP-LA-DWG-231704 P01

Appendix 3: Tree Assessment Criteria

Tree number: Identifying number given to individual (or group) trees.
Botanical Name: Latin name for tree showing genus and species.
Common Name: The common name given to the tree.
Tree Dimensions: The physical dimensions of the tree.

- **Height**: Estimated or measured height of tree in meters.
- **Spread**: Estimated or measured radial canopy spread of tree in meters.
- **Diameter at Breast Height (DBH)**: The estimated or measured diameter of trunk given in mm measured at 1.4m from ground.
- **Diameter Above Base (DAB)**: The estimated or measured diameter of trunk given in mm measured above the root flare. Used to calculate the structural root zone of the tree.

Age Class: An estimation of how old the tree is in relation to its life expectancy.

- **Young** – Age less than 20% of life expectancy of tree in situ
- **Mature** – Age 20% - 80% of life expectancy of tree in situ
- **Old** – Age greater than 80% of life expectancy of tree in situ
- **Dead** – Tree is dead

Vigour: Ability of a tree to sustain its life processes. This is independent of the condition of a tree but may impact upon it. Vigour can appear to alter rapidly with change of seasons (seasonality) e.g., dormant, deciduous or semi-deciduous trees. Vigour can be categorised as Dormant, Low, Normal and High.

- **Dormant Vigour** – Determined by the existing turgidity in the lower order branches in the outer extremity of the crow, with good bud set and formation, and where the last extension growth is distinct from those most recently preceding it, evident by bud scale scars. Normal vigour during dormancy is achieved when such growth is evident on a majority of branches throughout the crown.
- **Low Vigour** – Reduced ability of a tree to sustain its life processes. This may be evident by the atypical growth of leaves, reduced crown cover and reduced crown density, branches, roots and trunk, and a deterioration of their functions with reduced resistance to predation. This is independent of the condition of a tree but may impact upon it, and especially the ability of a tree to sustain itself against predation.
- **Normal Vigour** – Ability of a tree to maintain and sustain its life processes. This may be evident by the typical growth of leaves, crown cover and crown density, branches, roots and trunk and resistance to predation. This is independent of the condition of a tree but may impact upon it, and especially the ability of a tree to sustain itself against predation.
- **High Vigour** – Accelerated growth of a tree due to incidental or deliberate artificial changes to its growing environment that are seemingly beneficial, but may result in premature aging or failure if the favourable conditions cease, or promote prolonged senescence if the favourable conditions remain, e.g. water from a leaking pipe, water and nutrients from a leaking or disrupted sewer pipe, nutrients from animal waste, a tree growing next to a chicken coop, or a stock feed lot, or a regularly used stockyard, a tree subject to stringent watering and fertilisation program, or some trees may achieve an extended lifespan from continuous pollarding practices over the life of the tree.

Condition: A tree's crown form and growth habit, as modified by its environment (aspect, suppression by other trees, soils) the stability and viability of the root plate, trunk and structural branches (first (1st) and possibly (2nd) order branches), including structural defects such as wounds, cavities or hollows, crooked trunk or weak trunk/branch junctions and the effects of predation by pests and diseases. These may not be directly connected with vigour and it is possible for a tree to be of normal vigour but in poor condition. Condition can be categorised as Dead, Poor, Fair and Good.

- **Dead Condition** – Tree is no longer capable of performing any of the following processes or is exhibiting any of the following symptoms; Photosynthesis via its foliage crown (as indicated by the presence of moist, green or other coloured leaves), Osmosis (the ability of the roots system to take up water), Turgidity (the ability of the plant to sustain moisture pressure in its cells), Epicormic shoots or epicormic strands in Eucalypts (the production of new shoots as a response to stress, generated from latent or adventitious buds or from a lignotuber), Permanent leaf loss, Permanent leaf wilting (the loss of turgidity which is marked by desiccation of stems leaves and roots), Abscission of the epidermis (bark desiccates and peels off to the beginning of the sap wood).
- **Poor Condition** - Tree is of good habit or misshapen, a form that may be severely restricted for space and light, exhibits symptoms of advanced and irreversible decline such as fungal, or bacterial infestation, major die-back in the branch and foliage crown, structural deterioration from insect damage e.g. termite infestation, or storm damage or lightning strike, ring barking from borer activity in the trunk, root damage or instability of the tree, or damage from physical wounding impacts or abrasion, or from altered local environmental conditions and has been unable to adapt to such changes and may decline further to death regardless of remedial works or other modifications to the local environment that would normally be sufficient to provide for its basic survival if in good to fair condition. Deterioration physically, often characterised by a gradual and continuous reduction in vigour but may be independent of a change in vigour, but characterised by a proportionate increase in susceptibility to, and predation by pests and diseases against which the tree cannot be sustained. Such conditions may also be evident in trees of advanced senescence due to normal phenological processes, without modifications to the growing environment or physical damage having been inflicted upon the tree. This may be independent from, or contributed to by vigour.
- **Fair Condition** - Tree is of good habit or misshapen, a form not severely restricted for space and light, has some physical indication of decline due to the early effects of predation by pests and diseases, fungal, bacterial, or insect infestation, or has suffered physical injury to itself that may be contributing to instability or structural weaknesses, or is faltering due to the modification of the environment essential for its basic survival. Such a tree may recover with remedial works where appropriate, or without intervention may stabilise or improve over time, or in response to the implementation of beneficial changes to its local environment. This may be independent from, or contributed to by vigour.
- **Good Condition** - Tree is of good habit, with crown form not severely restricted for space and light, physically free from the adverse effects of predation by pests and diseases, obvious instability or structural weaknesses, fungal, bacterial or insect infestation and is expected to continue to live in much the same condition as at the time of inspection provided conditions around it for its basic survival do not alter greatly. This may be independent from, or contributed to by vigour.

Useful Life Expectancy (ULE) ULE is the length of time that the arborist assesses an individual tree can be retained with an acceptable level of risk based on the information available at the time of inspection. It is a snapshot in time of the potential an individual tree has for survival in the eyes of the assessor. ULE is not static – it is closely related to tree health and the surrounding conditions. Alterations in these variables may result in changes to the ULE assessment. Consequently, the reliability all ULE assessments have will decrease as time passes from the initial assessment and the potential for changes in variables increases.

- **Remove –** Trees that should be removed within the next 5 years
- **Short –** Trees that appear to be retainable at the time of the assessment for 5-15 years with an acceptable level of risk.
- **Medium –** Trees that appear to be retainable at the time of the assessment for 15-40 years with an acceptable level of risk.
- **Long –** Trees that appear to be retainable at the time of the assessment for 40+ years with an acceptable level of risk.

Amenity and Visual Value – For the purposes of assessing the visual and landscape value of each tree the IACA Significance of a Tree, Assessment Rating System (STARS) © (IACA 2010) © has been adopted. - The landscape significance of a tree is an essential criterion to establish the importance that a particular tree may have on a site. The system uses a scale of High, Medium and Low significance in the landscape.

High significance in landscape

- The tree is in good condition and good vigour
- The tree has a form typical for the species
- The tree is a remnant or is a planted locally indigenous specimen and/or is rare or uncommon in the local area or of botanical interest or of substantial age
- The tree is listed as a heritage item, threatened species or part of an endangered ecological community or listed on council's significant tree register
- The tree is visually prominent and visible from a considerable distance when viewed from most directions within the landscape due to its size and scale and makes a positive contribution to the local amenity
- The tree supports social and cultural sentiments or spiritual associations, reflected by the broader population or community group or has commemorative values
- The tree's growth is unrestricted by above and below ground influences, supporting its ability to reach dimensions typical for the taxa in situ – tree is appropriate to the site conditions

Medium significance in landscape

- The tree is in fair-good condition and good or low vigour
- The tree has form typical or atypical of the species
- The tree is a planted locally indigenous or a common species with its taxa commonly planted in the local area
- The tree is visible from surrounding properties, although not visually prominent as partially obstructed by other vegetation or buildings when viewed from the street
- The tree provides a fair contribution to the visual character and amenity of the local area
- The tree's growth is moderately restricted by above or below ground influences, reducing its ability to reach dimensions typical for the taxa in situ

Low significance in landscape

- The tree is in fair-poor condition and good or low vigour
- The tree has form atypical of the species
- The tree is not visible or is partly visible from the surrounding properties as obstructed by other vegetation or buildings
- The tree provides a minor contribution or has a negative impact on the visual character and amenity of the local area
- The tree is a young specimen which may or may not have reached dimensions to be protected by local Tree Preservation Orders or similar protection mechanisms and can easily be replaced with a suitable specimen
- The tree's growth is severely restricted by above or below ground influences, unlikely to reach dimensions typical for the taxa in situ – tree is inappropriate to the site conditions
- The tree is listed as exempt under the provisions of the local Council Tree Preservation Order or similar protection mechanisms
- The tree has a wound or defect that has the potential to become structurally unsound
- **Environmental Pest / Noxious Weed Species**
- The tree is an environmental pest species due to its invasiveness or poisonous/allergenic properties.
- The tree is a declared noxious weed by legislation
- **Hazardous / Irreversible Decline**
- The tree is structurally unsound and/or unstable and is considered potentially dangerous
- The tree is dead, or is in irreversible decline, or has the potential to fail or collapse in full or in part in the immediate to short term

The tree is to have a minimum of three (3) criteria in a category to be classified in that group.

In the development of this document IACA acknowledges the contribution and original concept of the Footprint Green Tree Significance & Retention Value Matrix, developed by Footprint Green Pty Ltd in June 2010.

The Australian Standard 4970-2009 Protection of Trees on Development Sites defines the requirements for assessing trees with respect to development. It provides the guidance on how to decide which trees are appropriate for retention and on the means of protecting them during construction works. It describes the areas and offsets, referred to as the Tree Protection Zone (TPZ) and Structural Root Zone (SRZ) required to be free from development works to maintain tree vitality and stability. This report has been prepared in accordance with the conditions set out within the standard.

- **Tree Protection Zone** – The tree protection zone is defined as a specified area above and below ground set aside for the protection of the tree's roots and crown. It is expressed as a radial measurement taken from the centre of the trunk at ground level.
- **Structural Root Zone** – The structural root zone is defined as a specified area around the base of a tree required to maintain its stability within the ground. It is expressed as a radial measurement taken from the center of the trunk at ground level. Excavation and development works are not recommended within the structural root zone unless additional investigation as to root size and location is undertaken

APPENDIX 4.2 WILEY PARK AIA (PLATEAU TREES)

PLATEAUTREES
Safety. Quality. Progress.

Date: 28 September 2021

Re: Additional tree removal at Wiley Park Station as part of the Southwest Metro Package.

At the request of Downer Group an onsite inspection was undertake at Wiley Park Station. It has been asked to identify and record additional tree removals beyond those recommended within the Arboricultural Impact Assessment (AIA) prepared by Urban Arbor, dated 15 January 2020, ref 20/01/15/SWMPB. On the 17 September a site walkthrough was undertaken by myself. Additional tree removals were identified under guidance of a Downer Group representative.

The subject tree consists of one *Quercus robur* (Common Oak) located adjacent the rear of Platform 2. It is identified as tree 711 within the AIA report.

At the time of the inspection the trees were found to be in good health and condition, consistent with their species type, age class and growing environment.

It was advised that the tree is located within the direct alignment of a proposed platform footprint & fence to be installed along the rear of Platform 2. As such, the tree cannot be retained under the current design. Its removal is not thought to pose a significant impact upon local amenity when taking into consideration the wider station upgrade works. Replacement planting with advanced tree stock is to be undertaken to offset the tree removals.

Photographs 1 and 2 of Appendix 1 shows the tree and its position with respects to Platform 2 and the proposed alignment of the fence. Appendix 2 Tree Assessment Schedule details the data relating to the tree.

Plateau Tree Service Pty Ltd
PO BOX 1522, DEE WHY NSW 2099 Australia
P: 02 9939 5350 | F: 02 9905 7569
E: info@plateautrees.com.au | W: www.plateautrees.com.au
ABN : 17 090 798 002

All appropriate approvals and consents are to be obtained prior to tree and vegetation removal works commencing. All tree removal works are to be undertaken by suitably qualified tree workers and in accordance with Safe Work Australia's Guide to Managing Risks of Tree Trimming and Removal Works.

Please feel free to contact me should you require any further assistance regarding this matter.

Regards.

Owen Tebbutt

Consulting Arborist
Plateau Tree Service

Appendix 1: Site Photographs

Photograph 1: Tree 711 *Quercus robur* (Common Oak).

Photograph 2: The position of tree 711 with regards to the alignment of Platform 2 and proposed fence.

Appendix 2: Tree Assessment Schedule

Tree number	Tree name	Tree dimensions				Vigour	Condition	Age class	ULE	Amenity and Visual Value	Native or Exotic	TPZ (m)	SRZ (m)	Comments	Remove or Retain
	Botanical name Common name	Height (m)	Spread (m)	D.B.H. (mm)	D.A.B. (mm)										
711	Quercus robur (Common Oak)	15-10	4x4	220 240 240	500	N	G	M	L	M	E	4.9	2.5	Trunk of tree located within the footprint of the permanent Platform 2 and the platform security fence.	Remove

TO SYDNEY

TO BANKSTOWN

LEGEND

- RAILCORP PROPERTY BOUNDARY
- EXISTING TREES TO BE PROTECTED AND RETAINED
- EXISTING TREES TO BE REMOVED
- EXISTING HOOP FENCE TO BE REMOVED
- EXISTING SECURITY FENCE TO BE REMOVED
- WORKS TO BE DEMOLISHED
- W — WATER
- T — TELSTRA
- 202 — LOW PRESSURE GAS MAIN
- 106 — HV CABLE
- E — ELECTRIC

NOTES:

- THE DESIGN IS BASED ON SYDNEY METRO CHAINAGE. PLEASE REFER TO CIVIL DRAWINGS FOR SYDNEY METRO CHAINAGE ALIGNMENT (PACKAGE NO. 103).
- ALL HOOP STYLE FENCING TO BE REMOVED.
- ALL EXISTING TREES TO BE RETAIN UNLESS STATED ON DRAWINGS
- STRIP EXISTING TOPSOIL TO 200mm DEPTH WHERE VEGETATION IS BEING REMOVED.
- WORKS TO STATION PLATFORMS, BUILDINGS AND CONCOURSE ARE INCLUDED IN THE ARCHITECTURAL PACKAGE - REFER TO ARCHITECTURAL DESIGN PACKAGE 231.
- REFER TO ARBORIST'S ARBORICULTUAL IMPACT ASSESSMENT REPORT FOR TREE PROTECTION WORKS.

THE BOULEVARDE

THE BOULEVARDE

ADJOINS DRAWING SMCSWSWM-MTM-WWP-LA-DWG-231703

PLATFORM 2

Tree 1 to be removed due to direct clash with permanent platform 2 footprint and security fencing along edge of platform.

EXISTING SIGNAL BUILDING

REMOVE EXISTING HOOP STYLE FENCE

REMOVE EXISTING TREES.
REFER TO ARBORIST'S REPORT

REMOVE EXISTING TREES

REMOVE EXISTING VEGETATION AND TOPSOIL. REFER TO SOIL REPORT FOR TREATMENT OF TOPSOIL AT WILEY PARK.

ARADE

REPLACE EXISTING CONCRETE CHANNEL WITH NEW ALIGNMENT REFER TO ENGINEER PACKAGE

REMOVE EXISTING SECURITY FENCE

REMOVE EXISTING TREES

REMOVE EXISTING VEGETATION AND TOPSOIL. REFER TO SOIL REPORT FOR TREATMENT OF TOPSOIL AT WILEY PARK.

CORNELIA STREET

DRAWING COLOUR CODED - PRINT ALL COPIES IN COLOUR

FOR CONSTRUCTION

REV.	BY	DATE	DESCRIPTION	APPD.
00	ME	31/03/2021	APPROVED FOR CONSTRUCTION	LP

SCALES

CLIENT

NSW GOVERNMENT | sydney METRO

SERVICE PROVIDERS

METRON T2M

DRAWN	D.LEE	31/03/2021
DESIGNED	M. ENOCH	31/03/2021
DRG CHECK	M. ENOCH	31/03/2021
DESIGN CHECK	G. DAVIES	31/03/2021
APPROVED	L. PALMER	31/03/2021

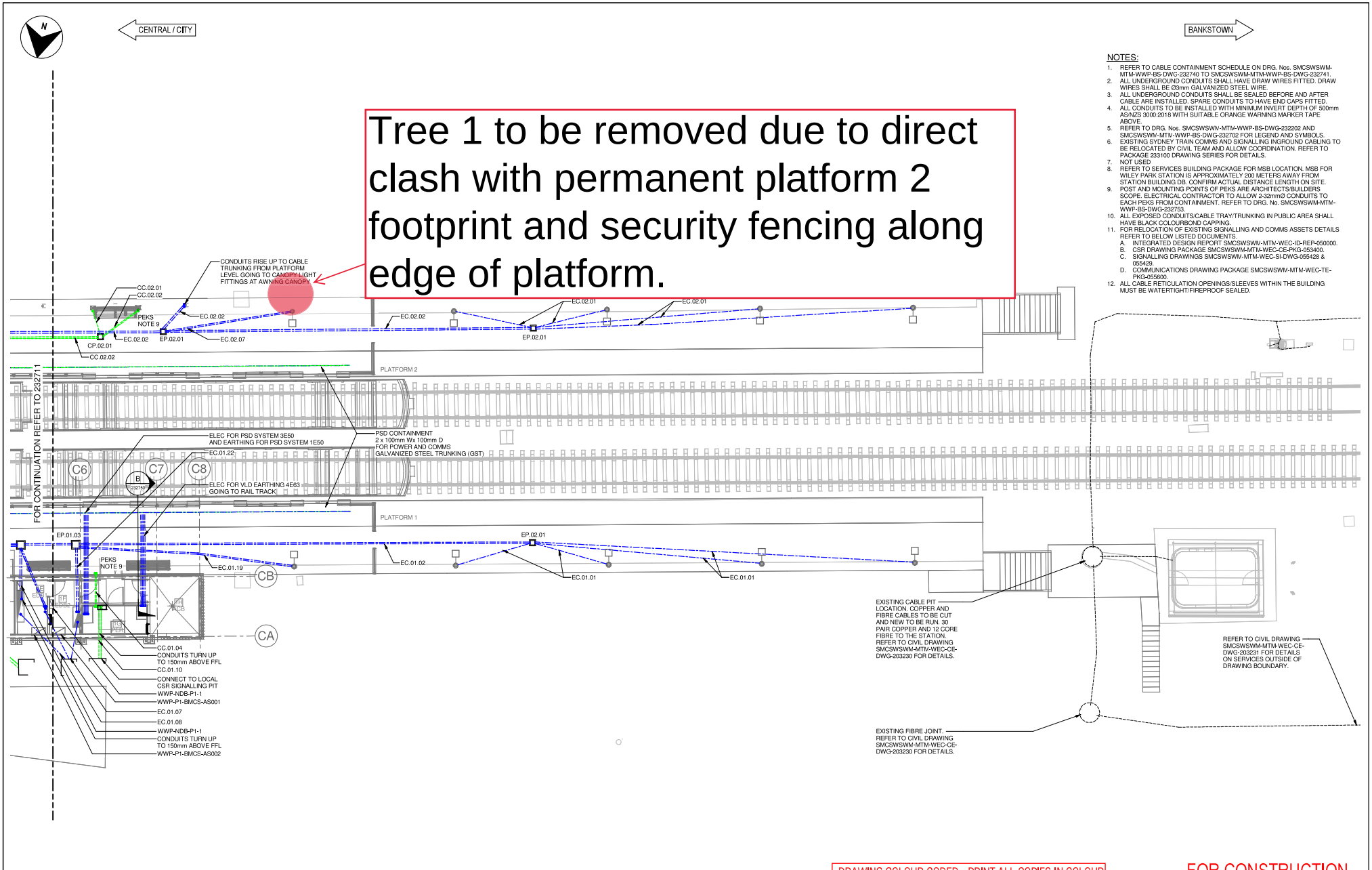
SYDNEY METRO

WILEY PARK (15.846km to 16.211km)
LANDSCAPE DESIGN
DEMOLITION PLAN
STANLEA PARADE

STATUS: FOR CONSTRUCTION APPROVAL | SHEET 5 of 25 | ©

DRG No. SMCSWSWM-MTM-WWP-LA-DWG-231704 | REV. 00

A1 Original | Co-ordinate System: MGA Zone 56 | Height Datum: A.H.D. | This sheet may be prepared using colour and may be incomplete if copied | NOTE: Do not scale from this drawing. | ALT. DRG No. SMCSWSWM-MTM-WWP-LA-DWG-231704 P01



NOTES:

1. REFER TO CABLE CONTAINMENT SCHEDULE ON DRG. Nos. SMCSWSWM-MTM-WWP-BS-DWG-232740 TO SMCSWSWM-MTM-WWP-BS-DWG-232741.
2. ALL UNDERGROUND CONDUITS SHALL HAVE DRAW WIRES FITTED. DRAW WIRES SHALL BE Ø3mm GALVANIZED STEEL WIRE.
3. ALL UNDERGROUND CONDUITS SHALL BE SEALED BEFORE AND AFTER CABLE ARE INSTALLED. SPARE CONDUITS TO HAVE END CAPS FITTED.
4. ALL CONDUITS TO BE INSTALLED WITH MINIMUM INVERT. DEPTH OF 500mm AS/NZS 3000:2018 WITH SUITABLE ORANGE WARNING MARKER TAPE ABOVE.
5. REFER TO DRG. Nos. SMCSWSWM-MTM-WWP-BS-DWG-232202 AND SMCSWSWM-MTM-WWP-BS-DWG-232702 FOR LEGEND AND SYMBOLS.
6. EXISTING SYDNEY TRAIN COMMS AND SIGNALLING INGROUND CABLING TO BE RELOCATED BY CIVIL TEAM AND ALLOW COORDINATION. REFER TO PACKAGE 233100 DRAWING SERIES FOR DETAILS.
7. NOT USED
8. REFER TO SERVICES BUILDING PACKAGE FOR MSB LOCATION. MSB FOR WILEY PARK STATION IS APPROXIMATELY 200 METERS AWAY FROM STATION BUILDING DB. CONFIRM ACTUAL DISTANCE LENGTH ON SITE.
9. POST AND MOUNTING POINTS OF PEKS ARE ARCHITECTS/BUILDERS SCOPE. ELECTRICAL CONTRACTOR TO ALLOW 2-32mmØ CONDUITS TO EACH PEKS FROM CONTAINMENT. REFER TO DRG. No. SMCSWSWM-MTM-WWP-BS-DWG-232753.
10. ALL EXPOSED CONDUITS/CABLE TRAY/TRUNKING IN PUBLIC AREA SHALL HAVE BLACK COLOURBOND CAPPING.
11. FOR RELOCATION OF EXISTING SIGNALLING AND COMMS ASSETS DETAILS REFER TO BELOW LISTED DOCUMENTS.
    A. INTEGRATED DESIGN REPORT SMCSWSWM-MTM-WEC-ID-REP-050000.
    B. CSR DRAWING PACKAGE SMCSWSWM-MTM-WEC-CE-PKG-053400.
    C. SIGNALLING DRAWINGS SMCSWSWM-MTM-WEC-SI-DWG-055428 & 055429.
    D. COMMUNICATIONS DRAWING PACKAGE SMCSWSWM-MTM-WEC-TE-PKG-055600.
12. ALL CABLE RETICULATION OPENINGS/SLEEVES WITHIN THE BUILDING MUST BE WATERTIGHT/FIREPROOF SEALED.

DRAWING COLOUR CODED - PRINT ALL COPIES IN COLOUR

FOR CONSTRUCTION

REV.	BY	DATE	DESCRIPTION	APPD.
00	AC / CA	31/03/2021	APPROVED FOR CONSTRUCTION	LP

1:100 FULL SIZE A1

A1 Original | Co-ordinate System: MGA Zone 56 | Height Datum: A.H.D. | This sheet may be prepared using colour and may be incomplete if copied | NOTE: Do not scale from this drawing. | ALT. DRG No. SMCSWSWM-MTM-WWP-BS-DWG-232712 P01

CLIENT

SERVICE PROVIDERS

METRON T2M

DRAWN R.DEBIQUITO
DESIGNED A.CHIKKA / C.ASIS
DRG CHECK C. ROSENBERG
DESIGN CHECK R.PATHAK
APPROVED L. PALMER 31/03/2021

SYDNEY METRO

WILEY PARK (15.846km to 16.21km SYDNEY METRO KILOMETRAGE)
CABLE CONTAINMENT
STATION PLATFORM LAYOUT PLAN 3 - INGROUND

STATUS: FOR CONSTRUCTION | SHEET 3 OF 3 | ©

DRG No. SMCSWSWM-MTM-WWP-BS-DWG-232712 | REV. 00

100mm AT FULL SIZE Plot Date & Time 3/29/2021 1:09:35 PM

APPENDIX 4.3 WILEY PARK AIA (AURA TREE SERVICES)

Report

Arboricultural Impact Assessment

SYDNEY METRO PROJECT
WILEY PARK TRAIN STATION, NSW

Prepared For – DOWNER c/o AURA TREE SERVICES

25 June 2022

ArborScan Report Reference: R1027
Version: 1.0

AURA
TREE SERVICES

ArborScan
ARBORICULTURAL CONSULTING

Document Details & Record Of Revisions

Company	**ArborScan Pty Ltd**
ABN	ABN 26 651 625 400
Phone	0417 305 514
Email	info@arborscan.com.au

Client Type	Commercial
Client	Downer c/o Aura Tree Services
Site Location	Wiley Park Train Station, NSW

Document Type	Arboricultural Impact Assessment (AIA)
Report Reference	R1027
Report Prepared By / Author	Marc Fisher I Arboricultural Consultant AQF5
Qualifications	Certificate level 5 in Arboriculture (AQF5) ISA Tree Risk Assessment Qualification (TRAQ) Advanced Quantified Tree Risk Assessment (QTRA) Visual Tree Assessment (QTRA) VALID Tree Risk-Benefit Management & Assessment

Version Number	Date	Revision Description
Version 1	25 June 2022	Final Version

25 June 2022

Downer C/O Aura Tree Services
Raghad Oudah
Cadet Engineer - Sydney Metro Project
Infrastructure Projects
Wiley Park Train Station, NSW

Arboricultural Impact Assessment and Report for Sydney Metro Project Wiley Park Train Station, NSW

Dear Raghad,

We are pleased to provide you with the following report for a Sydney Metro Project covering the proposed development works at property Wiley Park Train Station.

Complete use of this report is authorised under the conditions limiting its use as stated in the Arboricultural Reporting Assumptions, Limiting Conditions & Copyright Clause. This assessment and report is supplied strictly in accordance with the inclusions, conditions, terms and exclusions as detailed within our most recent quotation.

The recommendations of this report do not constitute consent to carry out works. Approval is required in the form of Development Consent to prune or remove trees, as well as the consent of the tree owner where trees are on neighbouring properties.

ArborScan Pty Ltd declares that it has no affiliation with any private contractors, associations or nurseries involved in the tree removal, pruning & tree supply business. This ensures an impartial approach to the recommendations given within this report.

Should you have any queries relating to this report or its recommendations, please do not hesitate to contact us on 0417 305 514.

Regards,

Marc Fisher
Consulting Arborist
ArborScan Pty Ltd

Table of contents

1 Introduction

1.1 Report Purpose

1.1.1 ArborScan Pty Ltd was engaged by Downer C/O Aura Tree Services (The Client) to complete an Arboricultural Impact Assessment (AIA) on nineteen (19) trees at Wiley Park Train Station, NSW (The Site).

1.1.2 The AIA report has been requested as part of a wider upgrade of the Wiley Park Train Station site that involves various levels of construction and refurbishment of site infrastructure. The report is intended to focus specifically on the installation of new security fencing and associated tree removal & pruning works.

1.1.3 Information on the site trees and assessment of the development constraints imposed by the trees is needed with recommendations to minimise tree conflicts and injury where possible.

1.2 Scope

1.2.1 Carry out a visual examination of the trees within the areas that have been identified by/with the client for inspection.

1.2.2 Inspect the trees and their growing environment and provide an objective appraisal of the subject trees in relation to their species, estimated age, useful life expectancy, health, structural condition, and viability within the landscape.

1.2.3 Measure tree stems in order to identify the Tree Protection Zones (TPZ) & Structural Root Zones (SRZ).

1.2.4 Provide independent recommendations on the retention value of the trees using a recognised tree significance rating system.

1.2.5 Number the trees on aerial mapping to aid with the identification of their location on the site. Tree numbering, where it is known, is to remain consistent with any existing reports and plans.

1.2.6 Identify hollows/cavities and other nesting features that may benefit native Fauna.

1.2.7 Include a schedule, documenting tree attributes, calculated Tree Protection Zone (TPZ), Structural Root Zone (SRZ), calculated development incursions (if any) and recommendations in relation to retention values in accordance with AS4970-2009 Protection of Trees on Development Sites.

1.2.8 Create a site plan identifying trees that are proposed to be retained or removed, identify the tree protection area for each tree, clearly identify the development encroachment to the TPZ and further markup an approximate location for tree protection fence installation where applicable. The plan will be site-specific and will relate to the proposed development works. The provided plan is intended to be used as a reporting guide only, and it is not intended to be used for construction/development.

1.2.9 Identify limitations and further reporting requirements.

1.2.10 Provide supporting evidence in the form of a PDF report to aid with the applicable approval process.

2 Methodology

2.1.1 Marc Fisher (The Author) of ArborScan Pty Ltd carried out a site inspection of the subject trees on 21 June 2022.

2.1.2 Trees that are the subject of this report were identified during discussions with the client at the time of the requested site consultation and tree assessment.

2.1.3 The subject trees were inspected from the ground using the initial component of the recognised ground-based Visual Tree Assessment (VTA) technique (without the use of binoculars) developed by Mattheck and Breloer (1994), without the use of aerial or internal investigation, foliage, wood or soil sample analysis nor an underground investigation of the root plate(s).

2.1.4 Tree height was estimated, as was canopy spread.

2.1.5 Where access to the tree stem was not restricted, diameter measurements were taken with forestry callipers. Where tree stems were not accessible, an estimated size for the stem was recorded. A notation has been made within the data table for any trees where the tree stem size was not measured and was estimated only.

2.1.6 Tree protection zones (TPZ) and structural root zones (SRZ) were calculated in accordance with the Australian Standard AS 4970–2009: Protection of Trees on Development Sites.

2.1.7 Any tree protection zone (TPZ) encroachment and root loss has been calculated in line with section 3 of AS 4970:2009.

2.1.8 Tree retention/significance values were determined using the Institute of Australian Consulting Arboriculturists, Australia (IACA) Significance of a Tree, Assessment Rating System (STARS).

2.1.9 Tree locations and data have been collected by the arborist using a Trimble Handheld Data Collector with a GNSS Accuracy of +/- 1 m. The Trimble Catalyst™ on-demand GNSS positioning service was used to aid in the improvement of tree location accuracy.

2.1.10 The subject trees have been tagged (with the exception of trees 18 & 19) and mapped on high-resolution aerial imagery, with their number and location readily identifiable on the plan.

2.1.11 Any photographs that were taken at the time of the site inspection by the Author and have not been altered for brightness or contrast, nor have they been cropped.

2.1.12 A visual inspection from ground level for hollows/cavities and features that may benefit native Fauna has been performed by the Author on the day of the assessment. A licenced and trained ecological consultant has not been commissioned.

2.1.13 A risk assessment has not been performed for the purpose of this report.

2.1.14 Data collected on site was analysed by the Author, collated into report format, and relevant recommendations were formulated.

3 Observations

3.1 The Site

3.1.1 The Wiley Park station is part of the Southwest Metro line between the existing Lakemba & Punchbowl stations. Located at 91-93 King Georges Road Wiley Park 2195, the precincts surrounding the Site include a small retail strip immediately adjacent to the station, three schools on the southern side of the rail corridor, and mostly three-storey residential flat buildings make up the balance of the area. King Georges Road, immediately outside the station, is a wide, heavily trafficked arterial road. The Site falls within the City of Canterbury-Bankstown Council Local Government Area (LGA) and under the Canterbury Local Environmental Plan 2012. The location of the trees referred to in this Tree Report are highlighted in a coloured outline, as shown in Figure 1 below. The remaining vegetation consists of medium-large trees which contain a mixture of native and non-native varieties. The trees subject to this report are considered to offer a medium to high landscape contribution, with the trees forming along much of the property and platforms perimeter.

Figure 1. Aerial image of the subject assessment area highlighted in coloured outline. (ArborScan, 25 June 2022)

3.2 Heritage

3.2.1 The Site is a listed heritage item or within a heritage conservation area. Wiley Park Station was opened on 19 June 1938 as part of the extension to the Belmore line but was completed much later than all other stations. The overhead booking office (1938) and brick waiting room on Platform 2 (1938) are representative of the suburban growth in the inter-war period and the need for an interchange at King Georges Road. Wiley Park station group (overhead booking office, platform buildings and footbridge) is on the Railcorp S170 Register and the Local Heritage Register. Despite modifications, the overhead bookings office and brick waiting room are an example of Inter-War Railway Domestic style in use by NSW Railways during the inter-war period. The Lakemba pumping station, which sits between Wiley Park Public School and Wiley Park Girls High School, is an example of an inter-war electrically driven pumping station. It is still in operation but not visible from the street and is the only other locally listed heritage item in the area. The 1974 concrete overbridge is excluded from the Railcorp S170 Register, no specific mention of the adjoining vegetation was found, and the predominant species assessed, which form an avenue along the station's platform (English Oak) are neither native nor endemic. These are, however, considered consistent with common landscape plantings of this time period.

3.3 Significant Tree Register

3.3.1 No trees pertaining to this survey at the Site were identified as significant on any identifiable state or local tree registers.

3.4 Threatened Species & Ecological Communities

3.4.1 Threatened Ecological Community is a term used in Australia for ecosystems that are in danger of being lost due to some threatening processes. These areas are a naturally occurring group of native plants, animals and other organisms that are interacting in a unique habitat. Its structure, composition and distribution are determined by environmental factors such as soil type, position in the landscape, altitude, climate and water availability. The purpose of listing threatened ecosystems is primarily to reduce the rate of an ecosystem and species extinction. This includes preventing further degradation and loss of structure, function and composition of threatened ecosystems (Northern Beaches Council, 2022).

3.4.2 A desktop review was performed using available vegetation layers over high-resolution aerial imagery; in this process, no Threatened Tree Species & Ecological Tree Communities were identified at the site.

3.4.3 Critically endangered Sydney Turpentine-Ironbark Forest in the Sydney Basin Bioregion was identified on aerial mapping at nearby parkland 'Wiley Park' located between King Georges Road & Clio Street.

3.5 Vegetation Biodiversity Values Map

3.5.1 The Biodiversity Values Map (BV Map) identifies land with high biodiversity value that is particularly sensitive to impacts from development and clearing. The BV Map is one of the triggers for determining whether the Biodiversity Offset Scheme (BOS) applies to a clearing or development proposal.

3.5.2 A desktop review was performed using available vegetation layers over high-resolution aerial imagery; in this process, no mapped Biodiversity Values land was identified at the site.

3.5.3 Threatened species or communities with potential for serious and irreversible impacts was identified on aerial mapping at nearby parkland 'Wiley Park' located between King Georges Road & Clio Street.

3.6 Fauna / Wildlife

3.6.1 Hollow-bearing parts capable of supporting medium-large Fauna were not observed within the trees surveyed on the day of the ground-based VTA inspection. A stick nest was, however, sighted within the canopy of tree 1 during the assessment. Interaction between Fauna and the trees is, however, considered possible considering their fruiting/flowering and their dense, bushy habit.

3.7 Site Soils

3.7.1 Site soils may deviate from their natural state due to past development or farming activities. Based on a desktop analysis alone, the soil-landscape is classified as the Blacktown Residual soil group. This soil type occurs extensively on the Cumberland Lowlands between the Georges and Parramatta Rivers in the south-west. Examples include Strathfield, Auburn and Belmore. Isolated examples are found north of Parramatta River on the Hornsby Plateau at Chatswood, Crows Nest, Duffys Forest, Dundas, Naremburn, Neutral Bay, St. Ives and St. Leonards. The vegetation consists of almost completely cleared tall open-forest (wet sclerophyll forest) and open-woodland (dry sclerophyll forest). Remaining traces of the original wet sclerophyll forest containing Sydney blue gum *Eucalyptus saligna* and Blackbutt *E. pilularis* are located at Ashfield Park. The original woodland and open-forest in drier areas to the west were dominated by forest red gum *E. tereticornis*, narrow-leaved ironbark *E. crebra* and grey box *E. moluccana*. This has been almost completely cleared (Department of Planning, Industry and Environment, 2020).

3.7.2 The site vegetation which is directly impacted by the associated works is not considered consistent with the common vegetation of the Blacktown Residual soil group and is therefore likely to have been planted.

Figure 2. Soil type overlay mapping. (ArborGIS SOILS SYDNEY, Accessed 25 June 2022)

Figure 3. Heritage overlay mapping. (ArborGIS NSW HERITAGE & ZONING, Accessed 25 June 2022)

Figure 4. Urban exotic/native vegetation. (ArborGIS NSW VEG MAP SYDNEY METRO, Accessed 25 June 2022)

3.8 Proposed Development

3.8.1 A review of the proposed design has been undertaken in the context of tree retention and removal across the site. The proposal includes the construction of a new security fence and the removal of the existing fence. The impacts of landscaping or development beyond that aforementioned have not been assessed as part of this report. By way of aerial mapping review, tree clearing has previously occurred within the subject site area between trees 10-11, no physical building structure or soft/hard landscape exists in the area which has been cleared.

3.8.2 Client plans provided include – 'Trees to be removed from Platform 1'

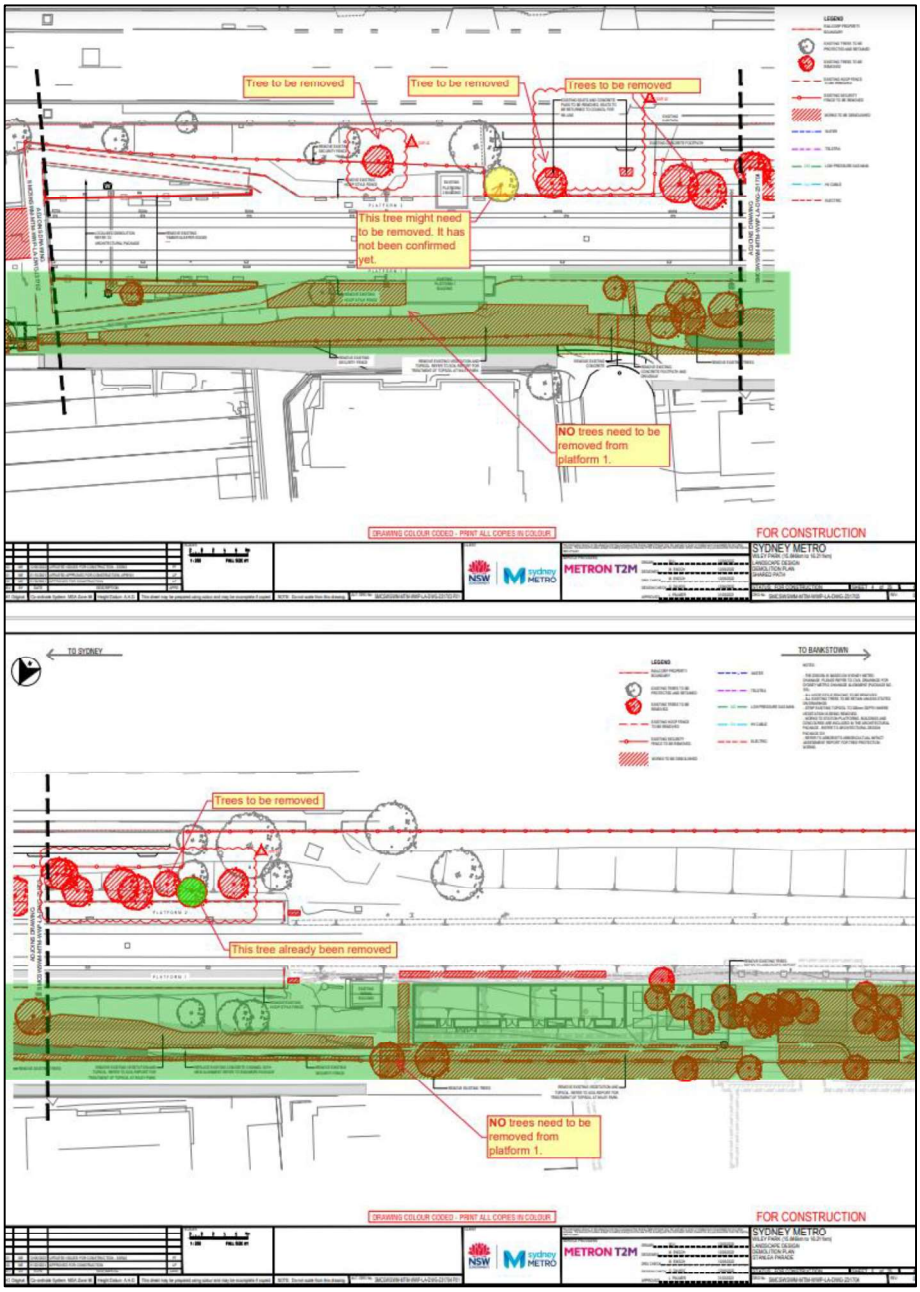


Figure 5. Site tree removal plans Sydney Metro Project Wiley Park Station. (Downer, 25 June 2022)

3.9 Summary of Tree Observations

3.9.1 A total of 19 trees have been assessed as part of this report.

3.9.2 Trees 18 & 19 are assumed to be located on Council land by way of location positioning.

3.9.3 Complete tree attributes and observations can be found in **Appendix 1** - Tree Data Table. Tree locations are shown in **Appendix 2 –** Site Assessment Mapping.

4 Discussion

4.1 Tree Protection Zone

4.1.1 The Tree Protection Zone (TPZ) is a radial distance measured from the centre of the trunk. It is a combination of the root area and crown area requiring protection from construction disturbance so that the tree remains viable.

4.1.2 Incursions into the TPZ may occur due to excavation, modification of existing ground levels, trenching or inverting the soil profile. Such works may damage part or all of the root system or affect soil structure and growing conditions required for long-term growth.

4.1.3 A TPZ should not be less than 2 m nor greater than 15 m (except where crown protection is required).

4.1.4 The TPZ of palms, other monocots, cycads, and tree ferns should not be less than 1 m outside the crown projection.

4.2 Structural Root Zone (SRZ)

4.2.1 The Structural Root Zone (SRZ) defines the area around the base of a tree that is required for the tree's stability in the ground. The woody root growth and soil cohesion in this area is necessary to hold the tree upright. The SRZ is nominally circular with the trunk at its centre and is expressed by its radius in metres. This zone considers a tree's structural stability only, not the root zone required for a tree's vigour and long-term viability, which will usually be a much larger area.

4.2.2 Incursions into the SRZ are not recommended as they are likely to result in loss or damage to woody roots, which may significantly affect stability.

4.3 TPZ & SRZ Setbacks

4.3.1 Trees and their root systems may occupy a substantial part of any development site and, because of their potential size, can have a major influence on planning the use of the Site. Early identification and protection of important trees on development sites is essential from the outset and will minimize the problems of retaining inappropriate trees.

4.3.2 The extent of encroachment within the tree protection zone (greater than 20%) will result in damage to structural roots. The structural roots and structural root zone (SRZ) is the area of the root system required for stability and anchorage of the tree.

4.3.3 The below TPZ & SRZ **radius measurements are to be taken from the centre of the stem at ground level**.

4.4 TPZ Encroachment

4.4.1 It may be possible to encroach into or make variations to the standard TPZ. Encroachment includes excavation, compacted fill and machine trenching. Any area lost to encroachment should be compensated for elsewhere and contiguous to the TPZ.

4.4.2 Tree-sensitive construction measures such as pier and beam, suspended slabs, cantilevered building sections, screw piles and contiguous piling can minimize the impact of encroachment.

4.4.3 The levels of encroachment are below defined:

- **Major encroachment.** As per the Australian Standard AS 4970–2009: Protection of Trees on Development Sites, a major encroachment into the TPZ of any tree is considered to occur when it is beyond 10% of the total TPZ area. Trees with major encroachment may require removal or, in certain instances, be retained with specific protection requirements throughout the construction stage. Exploratory excavation using non-destructive methods such as pneumatic, hydraulic, or hand digging may also be required to evaluate the extent of potential damage to the root system and determine whether the tree(s) will remain viable.
- **Minor encroachment**. Under the aforementioned standard, a minor encroachment is determined as being less than 10% of the total TPZ area. Trees with minor encroachment may be retained with specific, generic or no protection requirements throughout the construction stage.
- **No encroachment**. Trees with no encroachment may be retained with generic or no protection requirements throughout the construction stage.

4.4.4 Thirteen (13) trees will have major encroachments from the proposed development works and will require tree removal, protection or tree-sensitive construction methods. Includes trees 1-10, 12, 13 & 16.

4.4.5 Six (6) Trees will have minor encroachments from the proposed development works and will require tree removal, protection or tree-sensitive construction methods. Includes trees 11, 14, 15, 17, 18 & 19.

4.4.6 There are zero (0) trees identified that do not have proposed development works within their TPZ areas, and will not be impacted, provided that tree protection measures are installed prior to works commencing and all works are excluded from their TPZ areas.

Table 1. Trees Subject To Major Encroachment.

	ENCROACHMENT DESCRIPTION	
	Encroachment Severity	Encroachment
Trees 1-10	Major	Security fence proposed in direct tree alignment.
Tree 12	Major	The security fence is not proposed in the direct tree alignment. The following works are however proposed within the TPZ - Site access, Removal of trees, Stump grinding, Demolition of existing fencing, and Installation of security fencing.
Tree 13	Major	Security fence proposed in direct tree alignment.
Tree 16	Major	Security fence proposed in direct tree alignment.

4.5 Summary Of Tree Retention Values

4.5.1 It is not always possible or reasonably practicable to retain all trees within a proposed development. It can be better to select the higher retention value trees and protect these well, rather than trying to retain all trees and decreasing the quality of tree protection (Matheny & Clark, 1998). A Tree Retention Rating system is designed to assist in the planning processes for proposed works, above and below ground where trees are to be retained on or are adjacent to a development site.

4.5.2 Retention values have been determined using the Retention Value - Priority Matrix of the IACA Significance of a Tree, Assessment Rating System (STARS) © (IACA, 2010).

4.5.3 This method uses a scale of High, Medium and Low significance in the landscape. Once the landscape significance of an individual tree has been defined, the retention value can be determined. Other criteria such as its physical dimensions, age class, location and its Amenity, Heritage and Environmental significance are also considered.

4.5.4 In accordance with the STARS Tree Significance - Assessment Criteria and Tree Retention Value - Priority Matrix, the retention value categories include:

- **High Retention (Priority for Retention)** - These trees are considered important for retention and should be retained and protected. Design modification or relocation of buildings should be considered to accommodate the setbacks as prescribed by the Australian Standards AS4970 Protection of trees on development sites. Tree-sensitive construction measures must be implemented, e.g. pier and beam etc., if works are to proceed within the Tree Protection Zone (TPZ).
- **Medium Retention (Consider for Retention) –** These trees may be retained and protected. These are considered less critical; however, their retention should remain a priority, with removal considered only if adversely affecting the proposed building/works and all other alternatives have been considered and exhausted.
- **Low Retention (Consider for Removal) –** These trees are not considered important for retention nor require special works or design modification to be implemented for their retention.
- **Removal** (Priority for Removal) **–** These trees are considered hazardous, or in irreversible decline, or weeds and should be removed irrespective of development.

4.5.5 A breakdown summary of the Tree Retention Values of the assessment inventory is below listed in the table.

Table 2. Summary Of Tree Retention Values.

	Tree Retention Values	
	Qty	Tree Number(s)
High	1	12
Medium	11	1, 3, 4, 5, 8, 11, 13, 15, 17, 18, 19
Low	6	6, 7, 9, 10, 14, 16
Removal	1	2

4.6 Impacts of Proposed Development

4.6.1 A review of the proposed design has been undertaken in the context of tree retention and removal across the Site. The proposal includes the construction of a new security fence and the removal of the existing one. The impacts of landscaping or development beyond that aforementioned have not been assessed as part of this report.

4.6.2 Trees affected by direct conflict with the proposed construction footprint would require removal under the current design. To retain any of these trees, a redesign or relocation of the development would be required. Refer to Appendix 1 - Tree Data Table & Appendix 2 – Site Assessment Mapping for full details of trees.

4.6.3 The other main development impact which affects trees, but not necessarily to the point of requiring immediate removal, is through significant root damage due to major TPZ encroachment. These can largely be placed into three (3) categories – soil compaction, level changes or direct root severance.

4.6.4 Negative tree impacts can manifest as either a reduction in health and/or vigour due to root loss (absorption and/or transport roots), resulting in a reduction in water and nutrient absorption capability or on tree stability if larger roots are impacted. Ultimately, the outcome for the trees depends on a number of variable factors, including species, age, current health, TPZ encroachment percentage, soil type, topography, previous site use and the proposed design and construction methodology.

4.6.5 The presumption of allowable encroachment and minimal long-term health or structural impacts to trees relies upon a combination of the following being used - root-sensitive construction methods being adhered to within the TPZ, minimal excavation within the TPZ to limit root severance (i.e. construction placed outside the TPZ where possible), fill rather than excavation utilised to affect level changes where possible (i.e. to minimise root severance and allow the trees root system time to adjust), no construction occurring within the SRZ, the compensatory area being available around the unimpacted aspects of the trees and the enhancement of the existing TPZ area (i.e. mulched, soil conditioning and irrigation when required).

4.6.6 The development will affect twelve (12) site trees through encroachment via construction activity into their respective TPZs, and seven (7) trees are to be retained with specific (as well as generic) protection measures.

4.7 **Site Images** (Tree Removal)

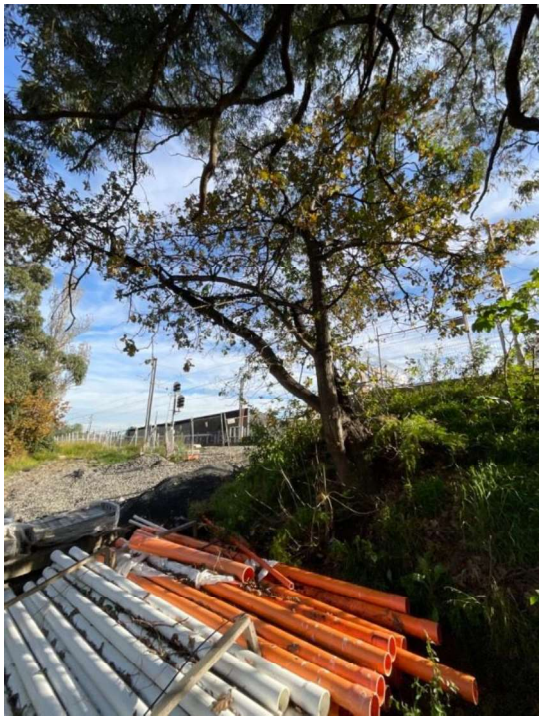


Figure 6. Tree 1. (ArborScan, 2022)

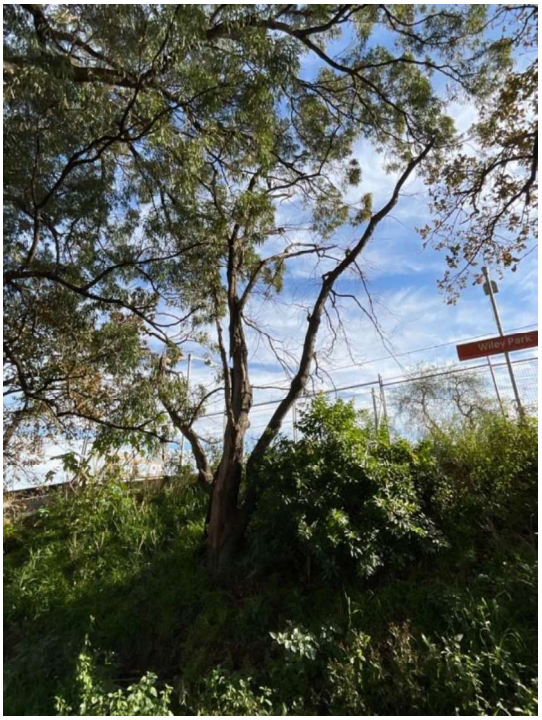


Figure 7. Tree 2 (Dead). (ArborScan, 2022)

Figure 8. Tree 3. (ArborScan, 2022)

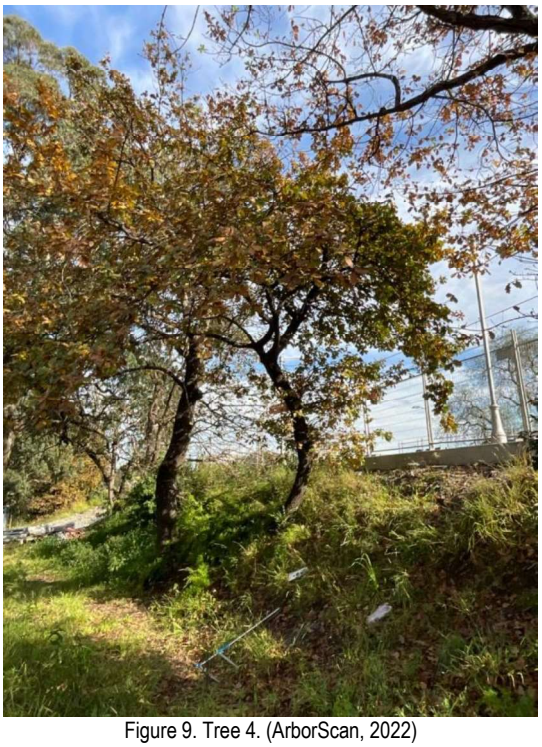


Figure 9. Tree 4. (ArborScan, 2022)

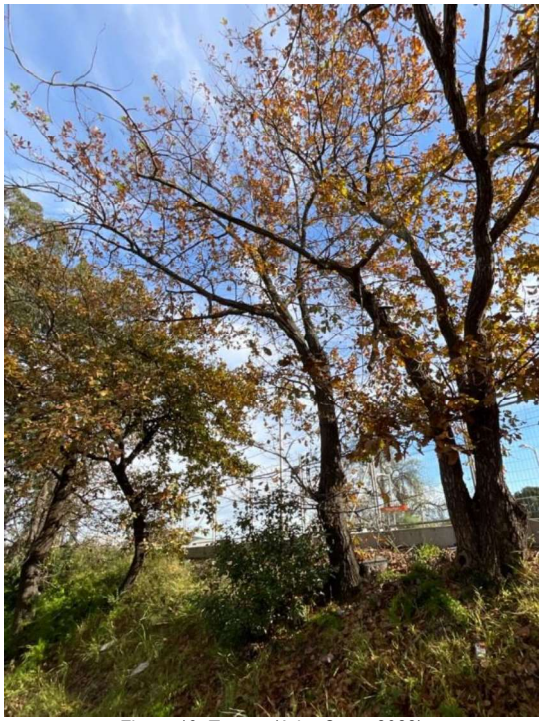


Figure 10. Tree 5. (ArborScan, 2022)

Figure 11. Tree 6. (ArborScan, 2022)

Figure 12. Tree 7. (ArborScan, 2022)

Figure 13. Tree(s) 8-10. (ArborScan, 2022)

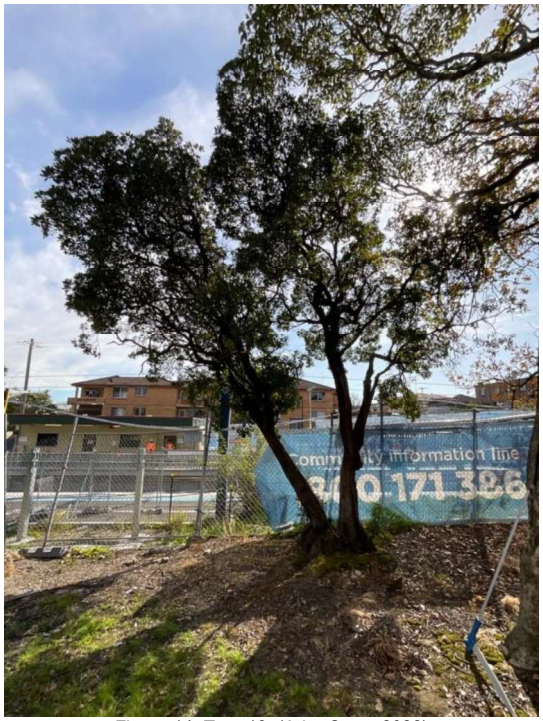


Figure 14. Tree 13. (ArborScan, 2022)

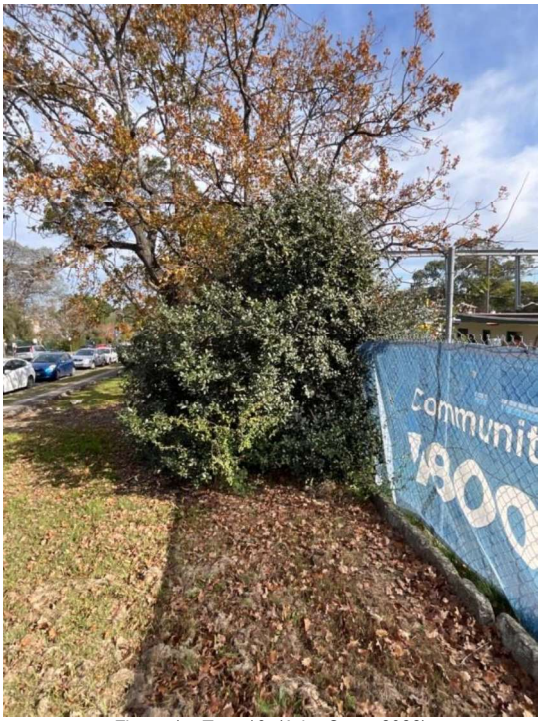


Figure 15. Tree 16. (ArborScan, 2022)

5 Recommendations & Tree Protection

5.1 Tree Removal

5.1.1 Twelve (12) trees have been recommended for removal based on the supplied design proposal. Includes trees 1-10, 13 & 16.

5.1.2 Trees recommended for removal were typically located within the alignment of the proposed security fence installation.

5.1.3 All approved tree removal works shall be carried out by a qualified Arborist, with a minimum Level 3 AQF in arboriculture and in accordance with WorkCover's Code of Practice – Amenity Tree Industry.

5.1.4 The undertaking of tree removal must avoid injury to retained trees.

5.1.5 Stumps located within the TPZs of trees to be retained shall be grubbed-out where required using a mechanical stump grinder (or by hand where less than 150mm in diameter) without damage to the root system of other trees. Stumps within the Tree Protection Zone of other trees to be retained shall not be pulled out using excavation equipment or similar without the prior consent of a project arborist.

5.1.6 Where trees to be removed are within the SRZ of any trees to be retained, consideration should be given to cutting the stump close to ground level and retaining the root crown intact. Grinding or excavating of stumps in the SRZ is not permitted without the prior consent of the project arborist.

5.1.7 Poisoning of any stumps retained post removal is not permitted in TPZs of trees to be retained without the prior consent of the project arborist.

5.2 Tree Retention

5.2.1 Seven (7) trees were recommended for retention and require specific and/or generic protection measures during construction to ensure that they remain viable following the completion of works. Includes trees 11, 12, 14, 15, 17, 18 & 19.

5.3 Site Work Activities

5.3.1 Seven (7) trees have proposed works within or near their respective TPZs; this includes site access, fencing demolition and construction, tree removal and stump grinding. These trees require a combination of specific and generic controls to ensure their viability post-project completion. Includes trees 11, 12, 14, 15, 17, 18 & 19.

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

- Excavation of fence holes using a high-pressure water jet and vacuum truck, Air-Spade with a vacuum truck or dug by hand. Any roots discovered are to be treated with care and minor roots (<40mm diameter) pruned with a sharp, sterile handsaw or secateurs. All significant roots (>40mm diameter) are to be recorded, photographed and reported to the project arborist.

5.3.3 Machine excavation is prohibited within the TPZs of retained trees unless undertaken at the direct consent of, or under supervision from the project arborist.

5.3.4 Machine use in the TPZs of retained trees for tree removal operations is not permitted unless the applicable tree protection has been installed.

5.3.5 Stumps located within the TPZs of trees to be retained shall be grubbed-out where required using a mechanical stump grinder.

5.4 Tree Pruning

5.4.1 Selective tree canopy pruning has been proposed by the client for security fence installation. Includes tree 11.

5.4.2 A 'Pruning Specification Diagram/Instruction' prepared by a qualified Arborist (minimum AQF Level 5) which shall be submitted to and approved by the project arborist prior to the commencement of any pruning works, the diagram/instruction must include –

- Number of branches and orientation, branch diameter, and percentage of the canopy to be pruned/removed.
- Photos with individual branches which are recommended for pruning/removal to be clearly marked and labelled. (Please note reports which include photos with a single vertical line as the area recommended for pruning will not be accepted).

5.4.3 The removal of branches greater than 100mm diameter and/or greater than 10% canopy removal will not be approved.

5.4.4 Pruning work must be specified in accordance with Australian Standard 4373–2007, Pruning of Amenity Trees.

Figure 16. Tree 11. (ArborScan, 2022)

5.5 Protective Fencing Specification

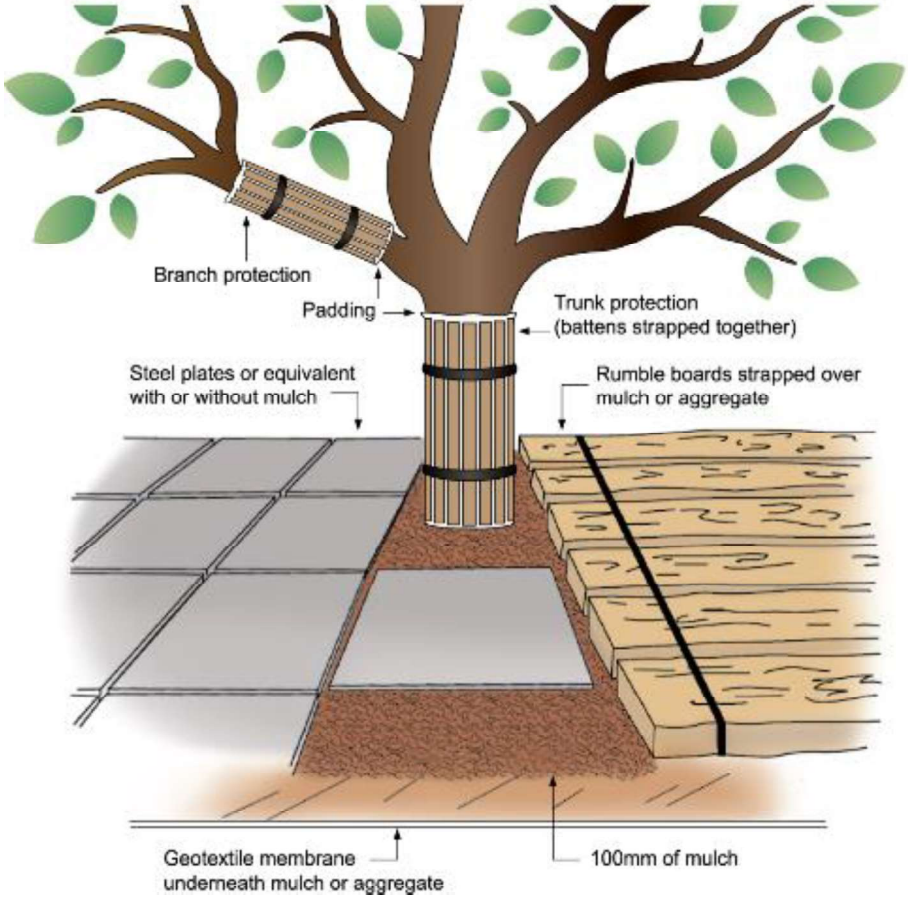
5.5.1 Due to site access limitations, tree protection fencing is not considered relevant for retained trees.

5.6 Trunk and Ground Protection

5.6.1 Given that proposed works are within the TPZs of retained trees, standard protective fencing may not always be a viable method of protection. In these areas, trunk protection and ground protection should be installed prior to the commencement of works and remain in place until after construction works have been completed. Includes trees 11, 12, 14, 15, 17, 18 & 19.

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

5.6.3 Trunk and ground protection should be undertaken in line with Figure 17 and the Australian Standard AS 4790–2009: Protection of Trees on Development Sites.



Notes:

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

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

5.7 Project Arborist

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

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

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

5.8 Project Milestones

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

Table 3. Project Milestones.

Item	Purpose of Visit	Timing of Visit(s)	Prerequisites
1	Pre-start induction	Following sign-off from Item 1. Contractor to provide a minimum of five days advance notice for this visit.	Prior to the commencement of works. All parties involved in the project to attend.
2	Supervision of works in TPZ, including all regrading and excavations	Whenever there is work planned to be performed within the TPZs. Contractor to provide a minimum of five days advance notice for such visits.	
3	Final sign off	Following completion of works.	Practical completion of works prior to tree protection removal.

5.9 Compliance Reporting

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

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

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

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

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

5.10 Offset Tree Planting

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

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

5.10.3 Replacement tree species should have the genetic potential to reach a mature size potential of those trees removed to facilitate the development. As a guide, the potential height will be a minimum of 5m (or more) and produce a spreading canopy so as they may provide amenity value to the property and contribute to the tree canopy of the surrounding area in the future.

5.10.4 Offset planting requirements and species selection are to be specified by the authority.

5.11 Tree Damage

5.11.1 In the event of any tree becoming damaged for any reason during the construction period, a consulting arborist (Australian Qualification Framework Level 5) shall be engaged to inspect and provide advice on any remedial action to minimise any adverse impact. Such remedial action shall be implemented as soon as practicable and certified by the arborist.

6 References

Barrell, J., 2009. Tree AZ - SULE: Its use and status into the New Millenum, London: Barrell Tree Consultancy.

Draper, Danny B. Dictionary for Managing Trees in Urban Environments. CSIRO PUBLISHING. Kindle Edition.

Department of Planning, Industry and Environment, 2020. Soil Landscapes of Central and Eastern NSW - v2.1, Sydney: NSW Office of Environment and Heritage.

eSpade - State Government of NSW and Department of Planning, Industry and Environment, 2015. Soil Landscapes of the Sydney 1:100,000 Sheet, Sydney: State Government of NSW and Department of Planning, Industry and Environment.

IACA, 2010. Significance of a Tree Rating System (STARS), Institute of Australian Consulting Arborists.

Roberts J, Jackson N & Smith M (2006) 'Tree roots in the built environment, research for amenity trees no. 8.' Department for Communities and Local Government. TSO (The Stationery Office), London, UK.

SEED - NSW Government, 2021. SEED – Sharing and Enabling Environmental Data. (Online) Available at: https://geo.seed.nsw.gov.au/Public_Viewer/index.html?viewer=Public_Viewer&locale=en-AU (Accessed February 2022).

Shigo AL (1991) Modern Arboriculture: A Systems Approach to the Care of Trees and Their Associates. Shigo and Trees, Durham, New Hampshire, USA.

Standards Australia, 2007. AS 4373–2007: Pruning of Amenity Trees, Sydney: Standards Australia.

Standards Australia, 2009. AS 4970–2009: Protection of Trees on Development Sites, Sydney: Standards Australia.

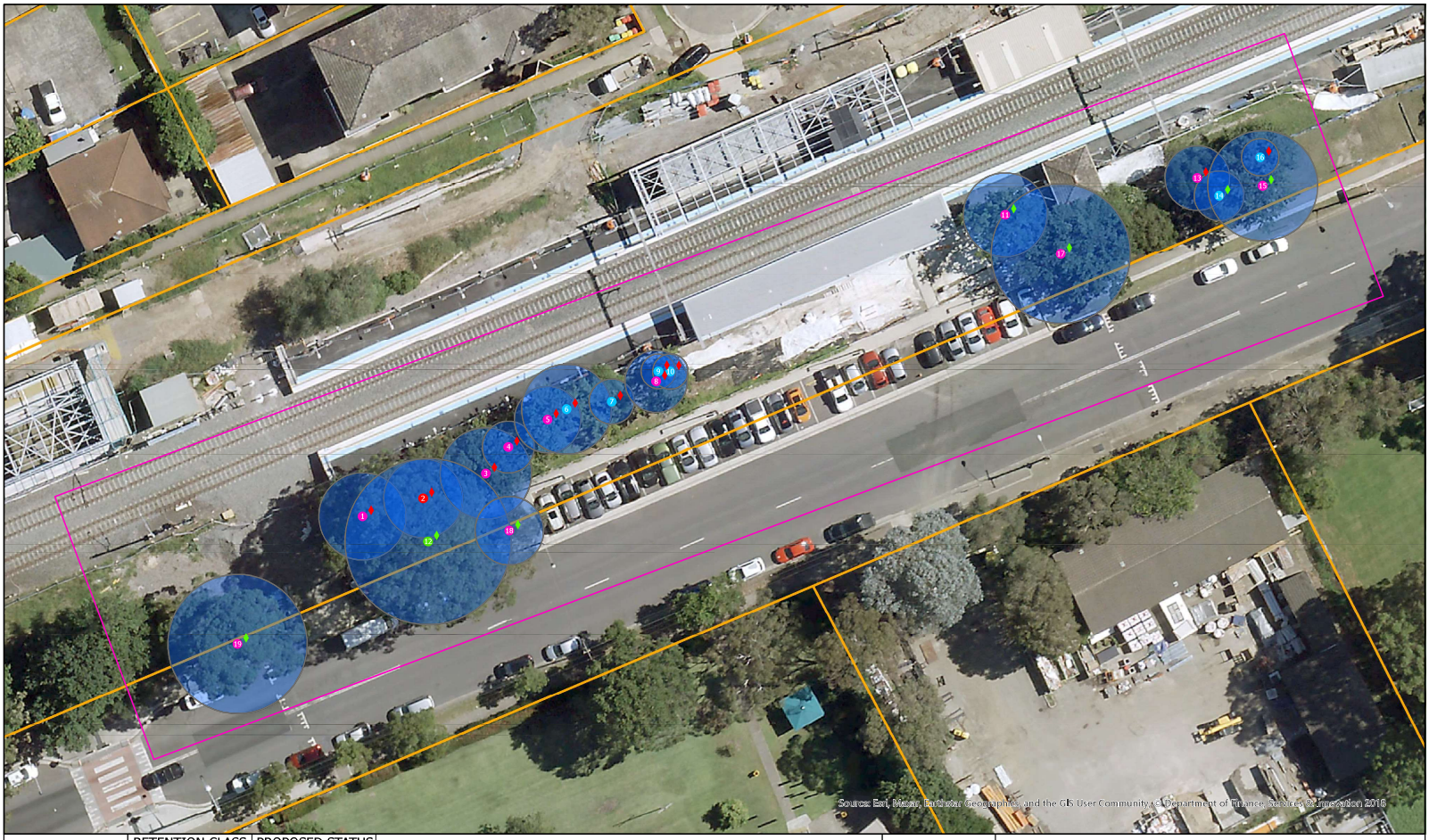
7 Appendix 1 - Tree Data Table

Arboricultural Impact Assessment Schedule
DOWNER C/O AURA TREE SERVICES
WILEY PARK TRAIN STATION, NSW

ArborScan

Tree Id.	Tree Ownership	Botanical Name	Common Name	Trees In Group	DBH [cm]	Number of Stems	Diameter at Root Crown (DRC) [cm]	Tree Protection Zone (TPZ) Radius [m]	TPZ Area [m2]	Structural Root Zone (SRZ) Radius [m]	Tree Height [m]	Canopy Spread [m]	Health	Structure	Tree Age	Useful Life Expectancy [Yrs.]	Habitat Features	Observations-Characteristics	General Significance	Tree Work Recommendations Irrespective Of Development	Arborist Notes	Landscape Significance Rating (STARS)	Retention Value (STARS)	Likely Encroachment	TPZ Encroachment Type	Development Recommendation	Retention Status	Tree Protection Considerations
1	Client site	*Quercus robur*	English Oak	1	42	Multiple Stems	57	5.04	79.76	2.61	8	10	Good	Average	Mature	Medium (15-40 years)	Stick nest(s)	Co-dominant stems, Crossing/rubbing branches, Deadwood > 30mm, Epicormic growth, Suppressed	Amenity value		Stick nest located in NW canopy.	Medium	2. MEDIUM - Consider for Retention	Site access, Removal of trees, Stump grinding, Demolition of existing fencing, Installation of security fencing	Major	Remove - tree inside current proposed development envelope	Remove	
2	Client site	*Dead Tree*	Dead tree	1	38	1	49	4.56	65.29	2.45	8	8	Dead	Poor	Mature	Dead	None sighted	Borers, Crack(s)/split(s), Dead/Missing bark, Deadwood > 100mm, Suppressed, Wound(s)		Removal	Dead tree on embankment.	Medium	4. REMOVAL - Priority for Removal	Site access, Removal of trees, Stump grinding, Demolition of existing fencing, Installation of security fencing	Major	Remove - tree inside current proposed development envelope	Remove	
3	Client site	*Quercus robur*	English Oak	1	44	1	49	5.28	87.54	2.45	13	11	Good	Good	Mature	Medium (15-40 years)	None sighted	Co-dominant stems, Deadwood > 60mm, Epicormic growth, Suppressed	Amenity value			Medium	2. MEDIUM - Consider for Retention	Site access, Removal of trees, Stump grinding, Demolition of existing fencing, Installation of security fencing	Major	Remove - tree inside current proposed development envelope	Remove	
4	Client site	*Quercus robur*	English Oak	1	25	1	28	3.00	28.26	1.94	8	9	Good	Good	Semi-Mature	Medium (15-40 years)	None sighted	Deadwood > 30mm, Epicormic growth, Suppressed	Amenity value			Medium	2. MEDIUM - Consider for Retention	Site access, Removal of trees, Stump grinding, Demolition of existing fencing, Installation of security fencing	Major	Remove - tree inside current proposed development envelope	Remove	
5	Client site	*Quercus robur*	English Oak	1	32	1	38	3.84	46.3	2.2	11	8	Good	Average	Mature	Medium (15-40 years)	None sighted	Borers, Co-dominant stems, Crossing/rubbing branches, Deadwood > 30mm, Epicormic growth, Wound response growth, Wound(s)	Amenity value			Medium	2. MEDIUM - Consider for Retention	Site access, Removal of trees, Stump grinding, Demolition of existing fencing, Installation of security fencing	Major	Remove - tree inside current proposed development envelope	Remove	
6	Client site	*Quercus robur*	English Oak	1	43	Multiple Stems	57	5.20	84.91	2.61	8	8	Good	Poor	Mature	Short (5-15 years)	None sighted	Cavity, Co-dominant stems, Epicormic growth, Hanger(s), Previous failure(s), Wound(s)	Amenity value	Consider removing	Cavity forming in lower central union at location of previous stem removal.	Medium	3. LOW - Consider Removal	Site access, Removal of trees, Stump grinding, Demolition of existing fencing, Installation of security fencing	Major	Remove - tree inside current proposed development envelope	Remove	
7	Client site	*Cotoneaster sp.*	Cotoneaster	1	22	Multiple Stems	25	2.61	21.39	1.85	4	6	Good	Average	Mature	Medium (15-40 years)	None sighted	Co-dominant stems	Amenity value			Low	3. LOW - Consider Removal	Site access, Removal of trees, Stump grinding, Demolition of existing fencing, Installation of security fencing	Major	Remove - tree inside current proposed development envelope	Remove	
8	Client site	*Quercus robur*	English Oak	1	30	1	33	3.60	40.69	2.08	11	5	Good	Good	Semi-Mature	Medium (15-40 years)	None sighted	Co-dominant stems	Amenity value			Medium	2. MEDIUM - Consider for Retention	Site access, Removal of trees, Stump grinding, Demolition of existing fencing, Installation of security fencing	Major	Remove - tree inside current proposed development envelope	Remove	
9	Client site	*Quercus robur*	English Oak	1	16	1	18	2.00	12.56	1.61	7	3	Average	Average	Semi-Mature	Short (5-15 years)	None sighted	Co-dominant stems, Deadwood > 30mm, Epicormic growth, Poor pruning, Suppressed	Amenity value			Medium	3. LOW - Consider Removal	Site access, Removal of trees, Stump grinding, Demolition of existing fencing, Installation of security fencing	Major	Remove - tree inside current proposed development envelope	Remove	
10	Client site	*Quercus robur*	English Oak	1	17	1	18	2.04	13.07	1.61	7	2	Average	Average	Semi-Mature	Short (5-15 years)	None sighted	Deadwood > 30mm, Dieback, Epicormic growth, Suppressed	Amenity value			Medium	3. LOW - Consider Removal	Site access, Removal of trees, Stump grinding, Demolition of existing fencing, Installation of security fencing	Major	Remove - tree inside current proposed development envelope	Remove	
11	Client site	*Quercus robur*	English Oak	1	40	Multiple Stems	57	4.84	73.56	2.61	9	6	Good	Average	Semi-Mature	Medium (15-40 years)	None sighted	Co-dominant stems, Deadwood > 30mm, Flush cuts, Included bark, Mistletoe	Amenity value	Remove deadwood > 30mm, Shape from infrastructure	Prune lower canopy to allow for proposed site infrastructure works.	Medium	2. MEDIUM - Consider for Retention	Site access, Demolition of existing fencing, Installation of security fencing	Minor	Retain tree with specific protection measures during works (i.e. Supervision of works and careful excavation in TPZ plus generic requirements)	Retain	Trunk protection, Digging by hand, Canopy uplift pruning
12	Client site	*Eucalyptus paniculata*	Grey Ironbark	1	80	1	105	9.60	289.38	3.38	23	19	Good	Good	Mature	Long (>40 years)	None sighted	Co-dominant stems, Crossing/rubbing branches, Deadwood > 30mm, Epicormic growth	Agelxize, Amenity value, Landscape feature	Remove deadwood > 30mm, Uplift tree crown height for medium sized vehicle access	Uplift canopy to prevent tree injury during project construction.	High	1. HIGH - Priority for Retention	Site access, Removal of trees, Stump grinding, Demolition of existing fencing, Installation of security fencing	Major	Retain tree with specific protection measures during works (i.e. Supervision of works and careful excavation in TPZ plus generic requirements)	Retain	Ground protection in TPZ, Demolition of structure by hand, Digging by hand
13	Client site	*Arbutus unedo*	Irish Strawberry Tree	1	31	Multiple Stems	45	3.74	43.92	2.37	6	5	Good	Average	Mature	Medium (15-40 years)	None sighted	Co-dominant stems, Deadwood < 30mm, Epicormic growth, Wound response growth, Wound(s)	Amenity value			Medium	2. MEDIUM - Consider for Retention	Demolition of existing fencing, Installation of security fencing	Major	Remove - tree inside current proposed development envelope	Remove	
14	Client site	*Unknown sp.*	Unknown sp.	1	24	1	27	2.88	26.04	1.91	7	6	Good	Average	Mature	Short (5-15 years)	None sighted	Co-dominant stems, Deadwood < 30mm, Wound response growth, Wound(s)	Amenity value			Medium	3. LOW - Consider Removal	Site access, Removal of trees, Stump grinding, Demolition of existing fencing, Installation of security fencing	Minor	Retain tree with generic protection requirements (i.e. protective fencing and restriction of activities within TPZ)	Retain	Trunk protection, Digging by hand
15	Client site	*Quercus robur*	English Oak	1	53	1	53	6.36	127.01	2.53	12	12	Average	Poor	Mature	Medium (15-40 years)	Hollow(s)	Cavity, Co-dominant stems, Crossing/rubbing branches, Decay, Epicormic growth, Hanger(s), Previous failure(s), Structural faults, Wound response growth, Wound(s)	Agelxize, Amenity value	Remove deadwood > 30mm, Remove hanging limb(s)	Defects limit long life expectancy, removal to be considered if target occupancy is altered. Tree is currently away from both platform and roadway.	Medium	2. MEDIUM - Consider for Retention	Site access, Removal of trees, Stump grinding, Demolition of existing fencing, Installation of security fencing	Minor	Retain tree with generic protection requirements (i.e. protective fencing and restriction of activities within TPZ)	Retain	Trunk protection, Digging by hand
16	Client site	*Unknown sp.*	Unknown sp.	1	18	1	20	2.16	14.65	1.68	5	4	Good	Good	Mature	Medium (15-40 years)	None sighted	Infrastructure contact	Amenity value, Screen value		Not tagged. Located 0.5 m from boundary fence.	Medium	3. LOW - Consider Removal	Demolition of existing fencing, Installation of security fencing	Major	Remove - tree inside current proposed development envelope	Remove	
17	Client site	*Quercus robur*	English Oak	1	67	1	76	8.04	202.97	2.95	10	12	Good	Poor	Mature	Medium (15-40 years)	Hollow(s)	Cavity, Co-dominant stems, Epicormic growth, Previous failure(s), Wound response growth, Wound(s)	Agelxize, Amenity value	Remove deadwood > 30mm	Defects limit long life expectancy, removal to be considered if target occupancy is altered. Tree is currently away from both platform and roadway.	Medium	2. MEDIUM - Consider for Retention	Site access, Demolition of existing fencing, Installation of security fencing	Minor	Retain tree with specific protection measures during works (i.e. Supervision of works and careful excavation in TPZ plus generic requirements)	Retain	Trunk protection, Digging by hand
18	Council land	*Corymbia eximia*	Yellow Bloodwood	1	33	1	35	3.96	49.24	2.13	8	7	Average	Good	Semi-Mature	Medium (15-40 years)	None sighted	Co-dominant stems, Deadwood < 30mm, Epicormic growth, Suppressed	Amenity value			Medium	2. MEDIUM - Consider for Retention	Site access, Removal of trees, Installation of security fencing	Minor	Retain tree with specific protection measures during works (i.e. Supervision of works and careful excavation in TPZ plus generic requirements)	Retain	Ground protection in TPZ
19	Council land	*Eucalyptus saligna*	Sydney Blue Gum	1	67	1	75	8.04	202.97	2.93	18	13	Average	Poor	Mature	Short (5-15 years)	None sighted	Bird browsing damage, Co-dominant stems, Dead/Missing bark, Deadwood > 100mm, Epicormic growth, Fungal fruiting body(s), Structural faults, Wound(s)	Agelxize, Amenity value, Landscape feature	Remove deadwood > 100mm	Wound with fungal fruiting body above root crown, minimal response at location of wound margins. Major browsing wound between upper canopy union. Deadwood > 100 mm over car park area. Long life expectancy is limited. Suspected Council tree asset.	High	2. MEDIUM - Consider for Retention	Site access, Removal of trees, Installation of security fencing	Minor	Retain tree with specific protection measures during works (i.e. Supervision of works and careful excavation in TPZ plus generic requirements)	Retain	Ground protection in TPZ

8 Appendix 2 – Site Assessment Mapping



TPZ	RETENTION CLASS	PROPOSED STATUS	
SRZ	HIGH	RETAIN	REMOVE
PROJECT AREA	MEDIUM		
	LOW		
	REMOVE		
	NSW CADASTRE		

IACA Significance of a Tree, Assessment Rating System (STARS)
Priority for Retention (High) - These trees are considered important for retention and should be retained and protected. Design modification or re-location of buildings should be considered to accommodate the setbacks as prescribed by the Australian Standards AS4970 Protection of trees on development sites. Tree sensitive construction measures must be implemented e.g. pier and beam etc if works are to proceed within the Tree Protection Zone (TPZ).
Consider for Retention (Medium) – These trees may be retained and protected. These are considered less critical; however, their retention should remain priority with removal considered only if adversely affecting the proposed building/works and all other alternatives have been considered and exhausted.
Consider for Removal (Low) – These trees are not considered important for retention, nor require special works or design modification to be implemented for their retention.
Priority for Removal – These trees are considered hazardous, or in irreversible decline, or weeds and should be removed irrespective of development.

PROJECT.	WILEY PARK TRAIN STATION, NSW
CLIENT.	DOWNER C/O AURA TREE SERVICES
PLAN TYPE.	TREE RETENTION CLASS
PLAN DETAILS.	V 1.0 | 24.6.2022 | A3 | Scale: 1:400

0 3.75 7.5 15 22.5 30 Meters

ArborScan

RETAIN

REMOVE

RETENTION CLASS
- HIGH
- MEDIUM
- LOW
- REMOVE

NSW CADASTRE

PROJECT AREA

TREE REMOVAL SUMMARY - 12 Trees
The following trees have been recommended for removal - 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 13, 16

IACA Significance of a Tree, Assessment Rating System (STARS)
Priority for Retention (High) - These trees are considered important for retention and should be retained and protected. Design modification or re-location of buildings should be considered to accommodate the setbacks as prescribed by the Australian Standards AS4970 Protection of trees on development sites. Tree sensitive construction measures must be implemented e.g. pier and beam etc if works are to proceed within the Tree Protection Zone (TPZ).
Consider for Retention (Medium) – These trees may be retained and protected. These are considered less critical; however, their retention should remain priority with removal considered only if adversely affecting the proposed building/works and all other alternatives have been considered and exhausted.
Consider for Removal (Low) – These trees are not considered important for retention, nor require special works or design modification to be implemented for their retention.
Priority for Removal – These trees are considered hazardous, or in irreversible decline, or weeds and should be removed irrespective of development.

PROJECT.	WILEY PARK TRAIN STATION, NSW
CLIENT.	DOWNER C/O AURA TREE SERVICES
PLAN TYPE.	TREE RETENTION / REMOVAL PLAN
PLAN DETAILS.	V 1.0 | 24.6.2022 | A3 | Scale: 1:400

0 3.75 7.5 15 22.5 30 Meters

ArborScan

TO SYDNEY

TO BANKSTOWN

N

Tree to be removed

Tree to be removed

REMOVE EXISTING SECURITY FENCE

REMOVE EXISTING HOOP STYLE FENCE

02 SSR 42

EXISTING SEATS AND CONCRETE PADS TO BE REMOVED, SEATS TO BE RETURNED TO COUNCIL FOR RE-USE

02 SSR 42

EXISTING CARPARK

EXISTING CONCRETE FOOTPATH

EXISTING PLATFORM 2 BUILDING

PLATFORM 2

PLATFORM 1

EXISTING PLATFORM 1 BUILDING

LOCALISED DEMOLITION REFER TO ARCHITECTURAL PACKAGE

REMOVE EXISTING TIMBER SLEEPER EDGES

REMOVE EXISTING HOOP STYLE FENCE

REMOVE EXISTING SECURITY FENCE

REMOVE EXISTING VEGETATION AND TOPSOIL. REFER TO SOIL REPORT FOR TREATMENT OF TOPSOIL AT WILEY PARK.

REMOVE EXISTING CONCRETE

REMOVE EXISTING CONCRETE FOOTPATH AND DRIVEWAY

REMOVE EXISTING TREES

ADJOINS DRAWING SMCSWSWM-MTM-WWP-LA-DWG-231702

ADJOINS DRAWING SMCSWSWM-MTM-WWP-LA-DWG-231704

LEGEND

- RAILCORP PROPERTY BOUNDARY
- EXISTING TREES TO BE PROTECTED AND RETAINED
- EXISTING TREES TO BE REMOVED
- EXISTING HOOP FENCE TO BE REMOVED
- EXISTING SECURITY FENCE TO BE REMOVED
- WORKS TO BE DEMOLISHED
- W — WATER
- T — TELSTRA
- 202 — LOW PRESSURE GAS MAIN
- 106 — HV CABLE
- E — ELECTRIC

DRAWING COLOUR CODED - PRINT ALL COPIES IN COLOUR

FOR CONSTRUCTION

REV.	BY	DATE	DESCRIPTION	APPD.
02	ME	12/05/2022	UPDATED ISSUED FOR CONSTRUCTION - SSR42	PT
01	ME	21/10/2021	UPDATED APPROVED FOR CONSTRUCTION -VPR101	LP
00	ME	31/03/2021	APPROVED FOR CONSTRUCTION	LP

SCALES 2 0 2 4 6 8m

1 : 200 FULL SIZE A1

A1 Original | Co-ordinate System: MGA Zone 56 | Height Datum: A.H.D. | This sheet may be prepared using colour and may be incomplete if copied

NOTE: Do not scale from this drawing. ALT. DRG No. SMCSWSWM-MTM-WWP-LA-DWG-231703 P01

CLIENT

NSW GOVERNMENT | sydney METRO

SERVICE PROVIDERS

METRON T2M

DRAWN	W.Li	12/05/2022
DESIGNED	M. ENOCH	12/05/2022
DRG CHECK	M. ENOCH	12/05/2022
DESIGN CHECK	G. DAVIES	12/05/2022
APPROVED	L. PALMER	31/03/2021

SYDNEY METRO

WILEY PARK (15.846km to 16.211km)
LANDSCAPE DESIGN
DEMOLITION PLAN
SHARED PATH

STATUS: FOR CONSTRUCTION | SHEET 4 of 25 | ©

DRG No. SMCSWSWM-MTM-WWP-LA-DWG-231703 | REV. 02

TO SYDNEY

TO BANKSTOWN

LEGEND

- RAILCORP PROPERTY BOUNDARY
- EXISTING TREES TO BE PROTECTED AND RETAINED
- EXISTING TREES TO BE REMOVED
- EXISTING HOOP FENCE TO BE REMOVED
- EXISTING SECURITY FENCE TO BE REMOVED
- WORKS TO BE DEMOLISHED
- WATER
- TELSTRA
- 202 LOW PRESSURE GAS MAIN
- 106 HV CABLE
- ELECTRIC

NOTES:

- THE DESIGN IS BASED ON SYDNEY METRO CHAINAGE. PLEASE REFER TO CIVIL DRAWINGS FOR SYDNEY METRO CHAINAGE ALIGNMENT (PACKAGE NO. 103).
- ALL HOOP STYLE FENCING TO BE REMOVED.
- ALL EXISTING TREES TO BE RETAIN UNLESS STATED ON DRAWINGS
- STRIP EXISTING TOPSOIL TO 200mm DEPTH WHERE VEGETATION IS BEING REMOVED.
- WORKS TO STATION PLATFORMS, BUILDINGS AND CONCOURSE ARE INCLUDED IN THE ARCHITECTURAL PACKAGE - REFER TO ARCHITECTURAL DESIGN PACKAGE 231.
- REFER TO ARBORIST'S ARBORICULTUAL IMPACT ASSESSMENT REPORT FOR TREE PROTECTION WORKS.

Trees to be removed

01 SSR 42

ADJOINS SMCSWSWM-MTM-WWP-LA-DWG-231703

PLATFORM 2

PLATFORM 1

EXISTING SIGNAL BUILDING

REMOVE EXISTING HOOP STYLE FENCE

REMOVE EXISTING TREES.
REFER TO ARBORIST'S REPORT

REMOVE EXISTING TREES

REMOVE EXISTING VEGETATION AND TOPSOIL. REFER TO SOIL REPORT FOR TREATMENT OF TOPSOIL AT WILEY PARK.

REPLACE EXISTING CONCRETE CHANNEL WITH NEW ALIGNMENT REFER TO ENGINEER PACKAGE

REMOVE EXISTING SECURITY FENCE

REMOVE EXISTING TREES

REMOVE EXISTING VEGETATION AND TOPSOIL. REFER TO SOIL REPORT FOR TREATMENT OF TOPSOIL AT WILEY PARK.

DRAWING COLOUR CODED - PRINT ALL COPIES IN COLOUR

FOR CONSTRUCTION

REV.	BY	DATE	DESCRIPTION	APPD.
01	ME	12/05/2022	UPDATED ISSUED FOR CONSTRUCTION - SSR42	PT
00	ME	31/03/2021	APPROVED FOR CONSTRUCTION	LP

SCALES
2 0 2 4 6 8m
1 : 200 FULL SIZE A1

CLIENT

NSW GOVERNMENT | sydney METRO

SERVICE PROVIDERS

METRON T2M

DRAWN	W.Li	12/05/2022
DESIGNED	M. ENOCH	12/05/2022
DRG CHECK	M. ENOCH	12/05/2022
DESIGN CHECK	G. DAVIES	12/05/2022
APPROVED	L. PALMER	31/03/2021

SYDNEY METRO

WILEY PARK (15.846km to 16.211km)
LANDSCAPE DESIGN
DEMOLITION PLAN
STANLEA PARADE

STATUS: FOR CONSTRUCTION | SHEET 5 of 25 | ©

DRG No. SMCSWSWM-MTM-WWP-LA-DWG-231704 | REV. 01

A1 Original | Co-ordinate System: MGA Zone 56 | Height Datum: A.H.D. | This sheet may be prepared using colour and may be incomplete if copied | NOTE: Do not scale from this drawing. | ALT. DRG No. SMCSWSWM-MTM-WWP-LA-DWG-231704 P01

9 Appendix 3 – Arboricultural Reporting Assumptions and Limiting Conditions

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

10 Appendix 4 – Description of Survey Assessment Terms

The trees assessed by visual examination which form the survey reflect an impartial assessment by the assessor and is based on the assessor's arboriculture experience and on the condition of the tree on the day of its survey. The following definitions have been provided to guide a better understanding of the assessment categories included within the issued report. Depending on the report type, all categories may not be applicable.

- Tree Number – Number assigned to the tree, often referenced on an aerial site map, depending on the project scope, a physical tag with the tree's corresponding number may also be installed.
- Tree Location Coordinates - Easting and northing coordinates, Geocentric Datum of Australia 1994 (GDA94) will be collected for each tree surveyed and will be displayed within the report's inventory. Coordinates, unless otherwise specified, are +/- 4 m in accuracy.
- Tree Height & Canopy Spread - Estimated size range in metres on its broadest axis. Where required, tree height and crown spread will be estimated to the nearest metre. Heights and spreads will only be measured where required by the scope.
- Diameter At Root Crown (DBH) - Estimated trunk diameter size range in 'mm' at its broadest axis at 1.4m from ground level for a single-trunked tree. DBH will be accurately measured as per the Australian Standard AS 4970–2009: Protection of Trees on Development Sites when defined in the project's scope.
- Diameter At Root Crown (DRC) - Estimated trunk diameter size range in 'mm' at its broadest axis at immediately above the buttress. The DRC will be accurately measured as per the Australian Standard AS 4970–2009: Protection of Trees on Development Sites when defined in the project's scope.
- Tree Species – The accepted common name and botanical name (genus & species) will be identified and documented in the report, where reproductive material and features of the tree are available to the assessor. Where species cannot be accurately identified, the assessor will identify the genus; where the genus cannot be identified, a family or general identification reference will be otherwise assigned.

Table 4. Definition - Age / Maturity Class.

Term	Age / Maturity Class
	Definition
Young	Establishing tree which has been planted or self-seeded within the last five years, in situ.
Juvenile	Tree aged less than 90% of its life expectancy, in situ.
Semi Mature	Tree aged less than 80% of its life expectancy, in situ.
Mature	Tree aged 20-80% of its life expectancy, in situ.
Over-mature	Tree aged greater than >80% of its life expectancy, in situ, or senescent with or without reduced vigour, and declining gradually or rapidly but irreversibly to death.

Table 5. Definition – Tree Health

Term	Tree Health
	Definition
Excellent	Perfect specimen with excellent form and vigour, along with a well-balanced crown. The trunk is sound and solid. No apparent pest problems. Normal to exceeding shoot length on new growth. Normal leaf size and colour. Exceptional life expectancy for the species.
Good	The tree should exhibit a full canopy of foliage. May lack natural symmetry. Good growth rate and minor deficiency in leaf development. Few pest issues or damage, and controllable if present. Normal branch and stem development with healthy growth. Typical life expectancy for the species.
Average	The tree is in reasonable condition but growing well. Crown decline and dieback up to 25% of the canopy. Average overall symmetry. The leaf size is smaller, and the colour is somewhat chlorotic. There may be some deadwood present in the crown. Minor decay in the trunk and major branches. Minor pathogen damage. Shoot extensions indicate some stunting and stressed growing conditions. Some signs of pest problems contribute to a lesser condition. Moderate life expectancy for the species.
Poor	Lacking a full crown, with more than 50% decline and dieback that especially affects larger branches. Not growing to its full capacity. Stunting obvious, with little evidence of growth on smaller stems. Large amounts of deadwood may be evident throughout the crown. Moderate decay in the trunk and major branches. Moderate pathogen damage. Leaf size and colour reveals overall stress in the plant. Insect or disease infestation may be severe. Low life expectancy for the species.
Very Poor	More than 70% of the canopy is in severe decline or dead. Canopy density is extremely low, with chlorotic and necrotic tissue dominating the canopy. Significant / Severe decay in the trunk and major branches. Significant / Severe pathogen damage. Root plate damage with a majority of roots damaged, diseased, or missing. Very low life expectancy for the species.
Dead	No live plant material observed.

Table 6. Definition – Tree Origin.

Term	Tree Origin
	Definition
Exotic	A plant introduced from another country or region to a place where it was not indigenous. Such plants may become naturalised and often originate as garden escapes.
Native	A plant found to occur as an endemic or indigenous species where it is growing or a plant known to have originated as an endemic or indigenous species from a particular place, e.g. continent, country, region, mountain or island.
Endemic	A native plant usually with a restricted occurrence limited to a particular country, geographic region or area and often further confined to a specific habitat.
Invasive / Noxious weed	A plant species of any taxa declared a weed by legislation. Treatment for the control or eradication of such weeds is usually prescribed by the legislation.

Table 7. Definition - Tree Form

Term	Tree Form
	Definition
Excellent	Ideal tree for that species, including shape and canopy symmetry, health, and density. Outstanding function on the site or location.
Good	Tree of typical crown shape and habit with proportions representative of the taxa considering constraints such as origin, e.g. indigenous or exotic, but does not appear to have been adversely influenced in its development by environmental factors in situ such as soil water availability, prevailing wind, or cultural practices such as lopping and competition for space and light.
Average	Acceptable tree for that species. Tree shape and symmetry are adequate, with some substantial asymmetry in shape and canopy form. May have considerable concerns for its use and function on the site or location.
Poor	Poor tree for that species. Highly irregular canopy shape and undesirable form make it unattractive and dysfunctional on the site or location.
Very Poor	Disagreeable tree for that species, with highly diminished function and aesthetic appeal on the site or location.
Dead	No live plant material observed.

Table 8. Definition – Vigour.

Term	Vigour
	Definition
Good	Accelerated growth of a tree due to incidental or deliberate artificial changes to its growing environment that are seemingly beneficial but may result in premature aging or failure if the favourable conditions cease or promote prolonged senescence if the favourable conditions remain, e.g. water from a leaking pipe; water and nutrients from a leaking or disrupted sewer pipe; nutrients from animal waste, a tree growing next to a chicken coop, or a stock feedlot, or a regularly used stockyard; a tree subject to a stringent watering and fertilising program, or some trees may achieve an extended lifespan from continuous pollarding practices over the life of the tree.
Normal	Ability of a tree to maintain and sustain its life processes. This may be evident by the typical growth of leaves, crown cover and crown density, branches, roots and trunk and resistance to predation. This is independent of the condition of a tree but may impact upon it, and especially the ability of a tree to sustain itself against predation.
Low	Reduced ability of a tree to sustain its life processes. This may be evident by the atypical growth of leaves, reduced crown cover and reduced crown density, branches, roots, and trunk, and a deterioration of their functions with reduced resistance to predation. This is independent of the condition of a tree but may impact upon it, and especially the ability of a tree to sustain itself against predation.

Table 9. Definition – Structure.

Term	Structure
	Definition
Good	Root plate appears normal, with no damage. No trunk defects. Good branch habit and attachment; minor dieback with no visible structural defects. There may be some signs of previous pruning. Minimal deadwood. Codominant stem formation may be present. No fungal pathogens are present.
Average	Root plate reveals previous minor damage or disturbance (Tree Protection Zone (TPZ) Encroachment <10%). Evidence of minor trunk damage or cavities where decay could colonise. Less than 25% of bark sections are missing. Included stems are present with no evidence of cracks or splits. Some branch unions may exhibit minor structural faults. Branching habits and attachments indicate poor pruning or damage, which requires moderate corrections. Minimal previous branch failures have occurred. Fungal pathogens may be present. Removal of surrounding trees and or the removal or the addition of buildings or structures has occurred, partly exposing the tree or its parts to increased wind loads.
Poor	Root plate disturbance and defects indicate major damage (Tree Protection Zone (TPZ) Encroachment >10%). Girdling roots around the trunk flare. Wounding evident with cavities and/or decay present. Trunk reveals more than 50% of bark section missing. Included stems are present and are considered likely to fail in 0-5 years. Branch structure has poor attachments, with several structurally important branches dead or broken. Branch unions may be poor or faulty at the point of attachment. Canopy reveals signs of damage or previous topping or lion-tailing, with major corrective action required. Fungal pathogens are present. Removal of surrounding trees and or the removal or the addition of buildings or structures has occurred, fully exposing the tree or its parts to increased wind loads.
Very Poor	Failure imminent. Severe damage within the root plate and root collar exhibit major defects that could lead to tree death or failure. Partial root plate failure. A majority of the bark or trunk is affected, either decayed or missing. Branching is extremely poor or severely topped, with severe dieback in the canopy. Active splits or partial failure. The tree has a very poorly structured crown. Little or no opportunity for mitigation of any tree parts. Fungal pathogens are severely impacting tree structure. The tree is significantly exposed to increased wind loads as a result of the removal of surrounding trees and or the removal or the addition of buildings or structures.

Table 10. Definition - Estimated Useful Life Expectancy

Term	Estimated Useful Life Expectancy
	Definition
Dead	No live plant material observed
Short Term	A period of time <5
Short Term	A period of time 5-15 years
Medium Term	A period of time 15 – 40 years.
Long Term	A period of time greater than >40 years.

11 Appendix 5 - General Arboricultural Terms

Abrasion wound - Mechanical wound causing laceration of tissue by an abrasive impact episode, e.g. grazed by a motor vehicle or the continuous action of the rubbing of crossed branches or stems where no graft has formed.

Aerial inspection - Assessment of the crown of a tree by climbing within the crown or by the use of an elevating work platform, often to examine a particular defect, e.g. cavity or hollow.

Arboriculture - The science and culture of the growth, planning, management, care and maintenance of trees primarily for amenity and utility purposes.

Asymmetrical - Imbalance within a crown, where there is an uneven distribution of branches and the foliage crown or root plate around the vertical axis of the trunk. This may be due to crown form codominant or crown form suppressed as a result of natural restrictions, e.g. from buildings, or from competition for space and light with other trees, or from exposure to wind, or artificially caused by pruning for clearance of roads, buildings or power lines. An example of an expression of this may be, crown asymmetrical, bias to west.

Basal flare - Swelling at the root crown is usually uniform around the base of the trunk involving tissue from the trunk and root crown. Here first-order roots may not be evident at the root crown.

Basal trunk wound - A wound on the trunk extending to the root crown where the base of the wound is open at the ground and usually truncated. Dependent upon the width of its base, such a wound may not become occluded.

Bracing - Systems of cables and ropes, traditionally using metal wires but generally replaced by polypropylene, used to support and prolong the life of trees in part or full; systems are susceptible to failure due to evident weaknesses in branch unions. Examples of such proprietary systems are Cobra and Yale nylon webbing.

Bracket fungus - The rigid sporophore of some fungus species, especially those associated with live trees or the decay of wood. Structures comprised of hyphae for the dispersal of spores, often bracket-shaped, usually protruding from the roots, trunk or branches of a host tree when the fungus matures. The fruiting body may be ephemeral or persistent and may last for only one season or persist for many years, with the fruiting body growing incrementally larger and continuing to produce new spores. Such fruiting bodies may be solitary or gregarious.

Dormant Tree - Vigour presently indeterminable, assessment to take place at the time of leaf return.

Cavity - A void often localised initiated by a wound and subsequent decay within the trunk, branches or roots, or beneath the bark, and maybe enclosed or have one or more openings.

Deadwooding - Removing of dead branches by pruning. Such pruning may assist in the prevention of the spread of decay from dieback or for reasons of safety near an identifiable target.

Dead Tree - A tree that does not contain any live tissue, i.e., green leaves or live limbs.

Included bark - 1. The bark on the inner side of the branch union or is within a concave crotch that is unable to be lost from the tree and accumulates or is trapped by acutely divergent branches

Decay - Process of degradation of wood by micro-organisms and fungus.

Deciduous - A woody plant, e.g. tree, shrub or vine, that sheds all of its leaves in one season and enters a dormant period, usually during winter.

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 some areas of the crown. Symptoms are leaf drop, bare twigs, dead branches and tree death, respectively. This can be caused by root damage, root disease, bacterial or fungal canker, severe bark damage, intensive grazing by insects, abrupt changes in growth conditions, drought, water-logging or over-maturity. Dieback often implies reduced resistance, stress or decline which may be temporary. Dieback can be categorised as Low volume dieback, Medium volume dieback and High volume dieback.

Emergency removal - Tree removal as a matter of urgency due to its imminent potential to cause damage to people or property as a result of structural defects or modifications to its growing environment rendering it vulnerable to failure in full or part, e.g. a tree in adverse weather conditions suddenly developing a progressive lean and collapsing across a busy road.

End weight - Excessive formation of foliage concentrated at the distal end of a branch.

Epicormic shoots - Juvenile shoots produced at branches or trunk from epicormic strands in some Eucalypts (Burrows 2002, pp. 111–131) or sprouts produced from dormant or latent buds concealed beneath the bark in some trees. Production can be triggered by fire, pruning, wounding, or root damage but may also be as a result of stress or decline. Epicormic shoots can be categorised as low volume epicormic shoots, medium volume epicormic shoots and high volume epicormic shoots.

Epicormic stem - Branch derived from an epicormic shoot.

Flush cut - An incorrect cut that damages or removes the branch collar or branch bark ridge and, as a result, damages stem tissue.

Formative pruning - The pruning of young trees is usually to assist with the development of crown form and shape and to develop strong structure (Australian Standard 2007, p. 7). Such pruning may reduce developmental weaknesses, e.g. crossed branches, branches with branch bark inclusions, or to remove codominant first-order branches to extend the length of a trunk or to guide the crown form of a tree to a single first-order structural branch, or to encourage branching to make a crown shape excurrent or deliquescent, respectively.

Habitat Features - The habitat features described in this report are parts of the environment (living or non-living) that may provide native animals with food and shelter and sites for nesting, migration and social interaction.

forming a compression fork. 2. Growth of bark at the interface of two or more branches on the inner side of a branch union or in the crotch where each branch forms a branch collar, and the collars roll past one another without forming a graft where no one collar is able to subsume the other. The risk of failure is worsened where branching is acutely divergent or acutely convergent and ascending or erect.

Lightning strike wound - A wound from a lightning strike. Such a wound may kill a tree outright or cause it to catch fire or may destroy the tree in full or part, or no injury may be evident, and a tree gradually declines through resulting stress. Bark may be exploded from the tree by pressure radiating from the core of the lightning path resulting in further compounded damage through water heating and steam explosions in the tissues and the electrical disruption of living cells.

Mixed-age population - A population of trees that contains representatives of each age class, i.e., young, mature and over-mature, so that trees in the population will not all mature or become senescent at the same time. This is usually achieved by staggering planting and/or removal of trees in a systematic manner. This also spreads the cost of planting, maintenance and removal over time.

Mulch - Any organic or inorganic material placed over the soil or growing media near cultivated plants primarily to suppress weeds, modify soil temperature and retain soil moisture levels. This artificial process generally imitates the function of leaf litter in a forest environment.

Nesting hollow - A hollow or cavity within any part of a tree utilised as habitat or shelter for any part of the life cycle of Fauna, e.g., birds, reptiles or mammals.

Non-invasive root mapping - Any root mapping process that does not disturb or displace soil or growing media to locate roots, e.g. ground-penetrating radar.

Occlusion Growth - Processes where wound wood develops to enclose the wound face by the merging of wound margins concealing the wound and restoring the growing surface of the structure with each growth increment gradually realigning fibres in the wood longitudinally along the stem to maximise uniform stress loading.

Occupancy rating - The frequency of use of a likely target and the possibility that people will be present when tree failure or collapse occurs.

Pathogen - Any organism is causing disease, e.g. fungus, bacterium, mycoplasma, virus, viriod, nematode or protozoan.

Pruning - Removal of any branch or root, dead or alive, by severance across the stem, back to the intersection of another live stem to a swollen area at the intersection called a branch collar where such a structure exists, with a final cut at the outer edge of the collar leaving no stub, or to undamaged woody tissue for roots. Also, the severing of any part of a tree so as to cause a reduction of the air space occupied by the branches and foliage in the crown or roots in the root plate. Examples of pruning are dead wooding, crown lifting, formative pruning, reduction pruning, selective pruning, crown thinning, and remedial and restorative pruning (Australian Standards 2007, p. 6). Pruning should conform to recognised standards, e.g. Australian Standard® AS 4373 'Pruning of Amenity Trees'. The following are not recognised as pruning: lop, lopping, top, topping, top lopping.

Pruning wound - A wound created by the act of pruning.

Radial trenching - A series of excavated trenches near to the trunk, usually between first-order roots, allowing space for the introduction of improved growing media. This process is designed to stimulate new root growth through reduced compaction, improved aeration and removal of contaminated soil.

Mittigations / Recommendations / Actions - A list of arboricultural and/or plant health care works that are aimed at maintaining or improving the tree's health, structural condition or form. Actions may also directly or indirectly reduce the risk potential of the tree, such as via the removal of a particular branch or the moving of infrastructure from under its canopy.

Resistance Drilling - A self-powered drilling device that operates a thin spade drill bit at a constant forward speed to record soundness of wood by measuring resistance to drilling that is plotted on graph paper or with an electronic unit that gives clear support in taking, documenting and evaluating measurements. Examples of such proprietary devices are the **IML-RESI PowerDrill ® & Resistograph®**

Structural Root Zone (SRZ) - An zone which defines the structural root zone which is an area required for tree stability. The SRZ is located within the TPZ.

Tree Protecion Zone (TPZ) - An exclusion area that allows for protection of canopy and roots. The radius of the TPZ is normally calculated for each tree by multiplying the DBH × 12. The minimum distance will be 2m and maximum 15m as stipulated in the Australian Standard 4970-2009 – Protection of trees on development sites.

Tree significance - Includes environmental, social or historical reasons why the tree is significant to the site. The tree may also be rare under cultivation or have a rare or localised natural distribution.

Ultrasonic tomography - Electronic devices that measure the transmissibility of ultrasound waves through a given section of a tree by detecting pulses through multiple sensors placed around a stem to indicate areas with the same density. An example of such a proprietary device is the Picus® Tomograph.

Visual tree assessment (VTA) - A visual inspection of a tree from the ground-based on the principle that, when a tree exhibits apparently superfluous material in its shape, this represents repair structures to rectify defects or to reinforce weak areas in accordance with the axiom of uniform stress. Such assessments should only be undertaken by suitably competent practitioners.

Weed species - Any plant species exotic or native that is known to spread by the production of viable progeny often in large numbers, outcompeting and disrupting existing vegetation, e.g. in gardens, parks or bushland. The species concerned may be introduced from outside its area of natural distribution to an area where there are few or no natural predators, or it may have an ability to spread due to changes in land use creating a favourable habitat.

Information Source - Draper, Danny B. Dictionary for Managing Trees in Urban Environments. CSIRO PUBLISHING. Kindle Edition.

12 Appendix 6 - STARS© Tree Retention Value Matrix

12.1 IACA Significance of a Tree, Assessment Rating System (STARS) (IACA 2010)©

12.1.1 In the development of this assessment rating system, the Institute of Australian Consulting Arboriculturists (IACA) acknowledges the contribution and original concept of the Footprint Green Tree Significance & Retention Value Matrix, developed by Footprint Green Pty Ltd in June 2001. The landscape significance of a tree is an essential criterion to establish the importance that a particular tree may have on a site. However, rating the significance of a tree becomes subjective and difficult to ascertain in a consistent and repetitive fashion due to assessor bias. It is, therefore, necessary to have a rating system utilising structured qualitative criteria to assist in determining the retention value for a tree. To assist this process, all definitions for terms used in the Tree Significance - Assessment Criteria and Tree Retention Value - Priority Matrix are taken from the IACA Dictionary for Managing Trees in Urban Environments 2009.

12.1.2 This rating system will assist in the planning processes for proposed works, above and below ground, where trees are to be retained on or adjacent to a development site. The system uses a scale of High, Medium and Low significance in the landscape. Once the landscape significance of an individual tree has been defined, the retention value can be determined.

Table 11. Tree Significance - Assessment Criteria

1. High Significance in landscape	2. Medium Significance in landscape	3. Low Significance in landscape
The tree is in good condition and good vigour, The tree has a form typical for the species, The tree is a remnant or is a planted locally indigenous specimen and/or is rare or uncommon in the local area or of botanical interest or of substantial age, The tree is listed as a Heritage Item, Threatened Species or part of an Endangered ecological community or listed on Councils significant Tree Register, The tree is visually prominent and visible from a considerable distance when viewed from most directions within the landscape due to its size and scale and makes a positive contribution to the local amenity, The tree supports social and cultural sentiments or spiritual associations, reflected by the broader population or community group or has commemorative values, The tree's growth is unrestricted by above and below ground influences, supporting its ability to reach dimensions typical for the taxa in situ - the tree is appropriate to the site conditions.	The tree is in fair-good condition and good or low vigour, The tree has form typical or atypical of the species, The tree is a planted locally indigenous or a common species with its taxa commonly planted in the local area, The tree is visible from surrounding properties, although not visually prominent as partially obstructed by other vegetation or buildings when viewed from the street, The tree provides a fair contribution to the visual character and amenity of the local area, The tree's growth is moderately restricted by above or below ground influences, reducing its ability to reach dimensions typical for the taxa in situ.	The tree is in fair-poor condition and good or low vigour, The tree has form atypical of the species, The tree is not visible or is partly visible from surrounding properties as obstructed by other vegetation or buildings, The tree provides a minor contribution or has a negative impact on the visual character and amenity of the local area, The tree is a young specimen that may or may not have reached dimension to be protected by local Tree Preservation orders or similar protection mechanisms and can easily be replaced with a suitable specimen, The tree's growth is severely restricted by above or below ground influences, unlikely to reach dimensions typical for the taxa in situ - the tree is inappropriate to the site conditions, The tree is listed as exempt under the provisions of the local Council Tree Preservation Order or similar protection mechanisms, The tree has a wound or defect that has the potential to become structurally unsound.
		Environmental Pest / Noxious Weed Species The tree is an Environmental Pest Species due to its invasiveness or poisonous/ allergenic properties, The tree is a declared noxious weed by legislation.
		Hazardous/Irreversible Decline The tree is structurally unsound and/or unstable and is considered potentially dangerous, The tree is dead, or is in irreversible decline, or has the potential to fail or collapse in full or part in the immediate to short term.

The tree is to have a minimum of three (3) criteria in a category to be classified in that group. Note: The assessment criteria are for individual trees only; however, they can be applied to a monocultural stand in its entirety

12.2 Tree Retention Value - Priority Matrix

Table 12. Tree Retention Value - Priority Matrix STARS (IACA 2010)©

		Landscape Significance Rating				
		High	Medium	Low		
		Significance in Landscape	Significance in Landscape	Significance in Landscape	Environmental Pest / Noxious Species	Hazardous / Irreversible Decline
Estimated Life Expectancy (Years)	Long >40 Years					
	Medium 15-40 Years					
	Short <1-15 Years					
	Dead					

Table 13. Legend for Matrix Assessment STARS (IACA 2010)©

	Priority for Retention (High) - These trees are considered important for retention and should be retained and protected. Design modification or relocation of buildings should be considered to accommodate the setbacks as prescribed by the Australian Standards AS4970 *Protection of trees on development sites.* Tree sensitive construction measures must be implemented, e.g. pier and beam etc, if works are to proceed within the Tree Protection Zone (TPZ).
	Consider for Retention (Medium) – These trees may be retained and protected. These are considered less critical; however, their retention should remain a priority with removal considered only if adversely affecting the proposed building/works and all other alternatives have been considered and exhausted.
	Consider for Removal (Low) – These trees are not considered important for retention, nor require special works or design modification to be implemented for their retention.
	Priority for Removal – These trees are considered hazardous or in irreversible decline or weeds and should be removed irrespective of development.

IACA, 2010, IACA Significance of a Tree, Assessment Rating System (STARS), Institute of Australian Consulting Arboriculturists, Australia, www.iaca.org.au


ArborScan

APPENDIX 4.4 CCBC APPROAVL FOR TREE REMOVAL AT WILEY PARK

APPROVAL FOR TREE REMOVAL AND TREE PRUNING

Date: 14 May 2021
Location: Urunga Parade, Wiley Park Station
Contractor: Downer

Approval for the removal of the three (3) council street trees identified in the Aboricultural Impact Assessment to facilitate the works required for the Sydney Metro project at the above location is approved subject to the following conditions:

Any tress removed will require replacement at councils standard rate of 3:1. The tree/s shall have a container size not less than 75 litres, shall comply with NATSPEC Specifying Trees: a guide to assessment of tree quality (2003) or Australian Standard AS 2303 – 2015 Tree stock for landscape use, and be planted and maintained in accordance with Councils street tree planting specifications Standard Drawing No. S-201.

The tree pruning and removal works are subject to the following conditions:

- All pruning and removal works must be carried out by a qualified arborist (minimum qualifications AQF Level 3 or equivalent);
- All pruning works shall comply with Australian Standard AS4373-2007 Pruning of amenity trees
- The tree pruning work must comply with the Amenity Tree Industry – Code of Practice, 1998 (Workcover, NSW) and the Guide to Managing Risks of Tree Trimming and Removal Work (Safe Work Australia 2016).
- The tree pruning contractor must hold a Public Liability Insurance Certificate of Currency with a minimum indemnity of $20 million, together with a NSW Workers Compensation Insurance Certificate of Currency;
- All tree material shall be removed from site;
- The site must be maintained in a safe condition at all times;
- Appropriate hazard signage to be in place at all times during the tree pruning works.

Wayne Broomfield
Team Leader Open Space Services

APPENDIX 5 HURLSTONE PARK AIA (URBAN ARBOR)

URBAN ARBOR
The Trusted Name in Tree Management

Arboricultural Impact Assessment Report

Site location:
South West Metro
Hurlstone Park Station
Hurlstone Park NSW

Prepared for:
Metron T2M

Prepared by: Jack Williams and Bryce Claassens
Urban Arbor Pty Ltd
Date: 26 February 2021
Ref: 210226-SWMHP-AIA
Rev: C

URBAN ARBOR
The Trusted Name in Tree Management

Table of Contents

COPYRIGHT

URBAN ARBOR
The Trusted Name in Tree Management

1. INTRODUCTION

1.1 Urban Arbor have been instructed by Metron T2M to provide an Arboricultural Impact Assessment Report for trees located within the site and adjoining sites in relation to a proposed development.

1.2 Below is a list of all documents and information provided to Urban Arbor to assist in preparing this report.

A) Hurlstone Park Landscape Drawings, Metron T2M, Rev E, Including Sheet No: 6, 8, 9 and 10, 16 October 2020.
B) Civil Engineering Package No. 133, Metron T2M, Rev D, 158 Pages in total, 29 May 2020.
C) Hurlstone Park Station Service Building, Metron T2M, Rev C, 16 November 2020

1.3 The trees were inspected on 5 December 2019 and 17 December 2020. Access was available to the subject site and the adjoining public areas only. All tree data contained in this report was collected during these site inspections.

2. SCOPE OF THE REPORT

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

2.1.1 Conduct a visual assessment of all significant trees located within 10 metres of development works from ground level. For the purpose of this report, a significant tree is a tree with a height equal to or greater than 5 metres.

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

2.1.3 Provide an assessment of the potential impact the proposed development is likely to cause to the condition of the subject trees in accordance with AS4970 Protection of trees on development sites (2009).

2.1.4 Specify tree protection measures for trees to be retained in accordance with AS4970-2009.

URBAN ARBOR
The Trusted Name in Tree Management

3. LIMITATIONS

3.1 The observations and recommendations are based on the site inspections identified in the introduction (section 1) and the access available at the time of inspection. Findings of this report are based on the observations and site conditions at the time inspection.

3.2 All of the observations were carried out from ground level and none of the surrounding surfaces were lifted or removed during the inspection. No tests were carried out to the subject trees or surrounding area during the inspection.

3.3 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.

3.4 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.

3.5 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*.

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

3.7 Urban Arbor neither guarantees, nor is it responsible for, the accuracy of information provided by others that is contained within this report.

3.8 While an assessment of the subject trees estimated useful life expectancy is included in this report, no specific tree risk assessment has been undertaken for any of trees at the site.

3.9 The ultimate safety of any tree cannot be categorically guaranteed. Even trees apparently free of defects can collapse or partially collapse in extreme weather conditions. Trees are dynamic, biological entities subject to changes in their environment, the presence of pathogens and the effects of ageing. These factors reinforce the need for regular inspections. It is generally accepted that hazards can only be identified from distinct defects or from other failure-prone characteristics of a tree or its locality.

3.10 Alteration of this report invalidates the entire report.

URBAN ARBOR
The Trusted Name in Tree Management

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 above ground level) - millimetres.

4.1.5 Estimated height - metres

4.1.6 Estimated crown spread (diameter of crown) - metres

4.1.7 Health

4.1.8 Structural condition

4.1.9 Amenity value

4.1.10 Estimated remaining contribution years (SULE)[1]

4.1.11 Retention value (Tree AZ)[2]

4.1.12 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 information was imported into our computerised geographical information system (GIS) PT-mapper pro. This software was used to measure/calculate all encroachment estimates included in this report.

4.5 All DBH measurements, tree protection zones, and structural root zones were calculated in accordance with methods set out in AS4970 Protection of trees on development sites (2009) [4] and in some cases estimated. See appendices for information.

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

[1] Barrell Tree Consultancy, *SULE: Its use and status into the New Millennium*, TreeAZ/03/2001, http://www.treeaz.com/.

[2] Barrell Tree Consultancy, *Tree AZ version 10.04-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 (2015).

[4] Council Of Standards Australia, *AS4970 Protection of trees on development sites* (2009).

URBAN ARBOR
The Trusted Name in Tree Management

5. SITE LOCATION AND BRIEF DESCRIPTION

5.1 The site is located in the suburb of Hurlstone Park, New South Wales, which is located in the Canterbury Bankstown Local Government Area (LGA). All trees within the Canterbury Bankstown LGA are subject to protection under the Canterbury Local Environmental Plan (LEP) 2012[5] and Development Control Plan (DCP) 2012.[6] The site is identified as a heritage item (I124) in the LEP heritage maps.[7]

6. GENERAL INFORMATION IN RELATION TO PROTECTING TREES ON DEVELOPMENT SITES

6.1 **Tree protection zone (TPZ):** The TPZ is the principle means of protecting trees on development sites and is an area required to maintain the viability of trees during development. It is commonly observed that tree roots will extend significantly further than the indicative TPZ, however the TPZ is an area identified in AS4970-2009 to be the area where root loss or disturbance will generally 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 TPZ also incorporates the SRZ (see below for more information about the SRZ). The TPZ is calculated by multiplying the DBH by twelve, with the exception of palms, other monocots, cycads and tree ferns, the TPZ of which have been calculated at one metre outside the crown projection. Additional information about the TPZ is included in Appendix 3.

6.2 **Structural Root Zone (SRZ):** 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 needs to be maintained to preserve a viable tree. The SRZ is calculated using the following formula; (DAB x 50) $^{0.42}$ x 0.64. There are several factors that can vary 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. Soil level changes should also generally be avoided inside the SRZ of trees to be retained. Palms, other monocots, cycads and tree ferns do not have an SRZ. See the appendices for more information about the SRZ.

---

5 *Canterbury Local Environmental Plan 2012*, https://www.legislation.nsw.gov.au/#/view/EPI/2012/673, accessed 21 December 2020.

6 *Canterbury Development Control Plan 2012*, https://www.cbcity.nsw.gov.au/development/planning-control-policies/canterbury-development-control-plan-2012, accessed 21 December 2020.

7 *Canterbury Local Environmental Plan Heritage Map - Sheet HER_009*, https://www.legislation.nsw.gov.au/maps/97a9d84a-cdcf-cf29-ae35-e3dc43c6dc7f/1550_COM_HER_009_010_20121105.pdf, 21 December 2020.

URBAN ARBOR
The Trusted Name in Tree Management

6.3 **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.

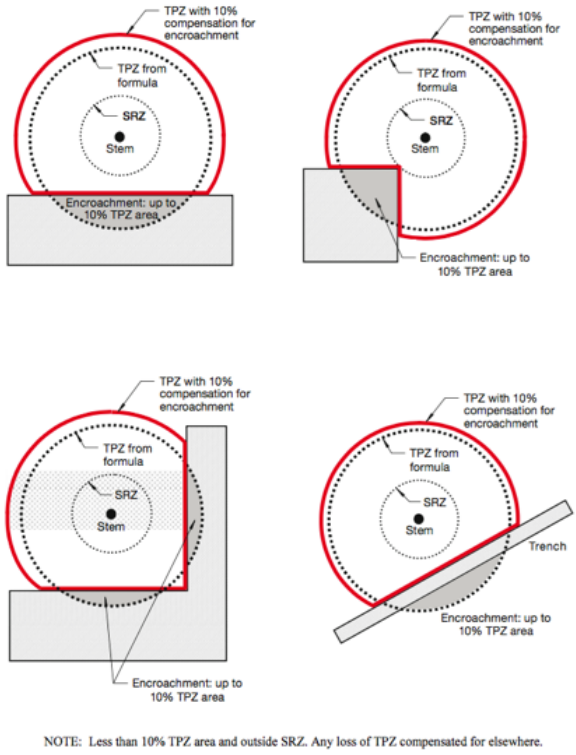


Image 1: Example minor TPZ encroachment from AS4970-2009.

6.4 **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. Root investigations may be required to identify roots that will be impacted during major TPZ encroachment (see Appendix 3 for more information in relation to root investigations).

URBAN ARBOR
The Trusted Name in Tree Management

7. OBSERVATIONS

7.1 **Tree information:** Details of each individual tree assessed, including the observations taken during the site inspection can be found in the tree inspection schedule in Appendix 2, where the indicative tree protection zone (TPZ) for the subject trees has been calculated. The TPZ and SRZ should be measured in radius from the centre of the trunk. The subject trees have been awarded a retention value based on the observations during the site inspection. The system 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 Tree AZ categories sheet (Barrell Tree Consultancy) has been included in the appendices to assist with understanding the retention values. The retention value that has been allocated to the subject trees in this report is not definitive and should only be used as a guideline. This information has been summarised below.

7.2 **Site Plan:** Site plans has been included in Appendix 1, where the indicative TPZ and SRZ of the trees have been overlaid onto the received plan provided by the client. The following plan is included in Appendix 1;

- Appendix 1A: Proposed Site Plan East
- Appendix 1B: Proposed Site Plan West

8. ASSESSMENT OF CONSTRUCTION IMPACTS

8.1 Table 1: In the table below, the impact of the proposed development has been assessed for all trees included in the report. The assessed TPZ encroachments include proposed structures and hard landscaping only. All soft landscaping should be completed in accordance with section 11.10.

Tree ID	Species	Retention value	TPZ radius (m)	TPZ area (m^2)	SRZ radius (m)	TPZ encroachment	Discussion/ Conclusion	Recommendation
166	*Morus nigra*	Z3	2.0	12.6	1.5	Footprint	The trunk is within the footprint of a proposed service building area.	Remove
167	*Morus nigra*	Z3	2.0	12.6	1.7	Footprint	The trunk is within the footprint of a proposed service building area.	Remove
168	*Ligustrum lucidum*	Z3	2.4	18.1	1.8	Major	A proposed fence will encroach significantly into the TPZ and SRZ of the tree. A combined service route (CSR) will also encroach into the TPZ and SRZ. To reduce the impact to the tree, the proposed fence and CSR must be installed in accordance with section 9.2 of this report.	Retain and protect*
169	*Ficus elastica*	Z1	2.0	12.6	1.6	Major	A proposed fence will encroach significantly into the TPZ and SRZ of the tree. A combined service route (CSR) will also encroach into the TPZ and SRZ. To reduce the impact to the tree, the proposed fence and CSR must be installed in accordance with section 9.2 of this report.	Retain and protect*
170	*Ilex spp*	Z1	2.0	12.6	1.5	Major	A proposed fence will encroach significantly into the TPZ and SRZ of the tree. A combined service route (CSR) will also encroach into the TPZ and SRZ. To reduce the impact to the tree, the proposed fence and CSR must be installed in accordance with section 9.2 of this report.	Retain and protect*
G3	*Ailanthus altissima*	Z3	2.0	12.6	1.5	Footprint	The trunk is within the footprint of a proposed service building area.	Remove
171	*Cinnamomum camphora*	A1	13.2	547.4	3.7	Footprint	The trunk is within the footprint of a proposed service building area.	Remove
G4	*Acmena smithii var. minor*	A1	2.2	15.2	1.6	Major	A proposed fence will encroach significantly into the TPZ and SRZ of the tree. To reduce the impact to the tree, the proposed fence must be installed in accordance with section 9.2.2 of this report.	Retain and protect*

URBAN ARBOR
The Trusted Name in Tree Management

Tree ID	Species	Retention value	TPZ radius (m)	TPZ area (m^2)	SRZ radius (m)	TPZ encroachment	Discussion/ Conclusion	Recommendation
172	*Ligustrum lucidum*	Z3	2.0	12.6	1.5	Footprint	The trunk is within the footprint of a proposed service building area.	Remove
173	*Ligustrum lucidum*	Z3	2.0	12.6	1.5	Footprint	The trunk is within the footprint of a proposed service building area.	Remove
174	*Celtis sinensis*	Z3	2.0	12.6	1.5	Footprint	The trunk is within the footprint of a proposed service building area.	Remove
175	*Ligustrum lucidum*	Z3	2.4	18.1	1.8	Footprint	The trunk is within the footprint of a proposed service building area.	Remove
176	*Ligustrum lucidum*	Z3	2.0	12.6	1.5	Footprint	The trunk is within the footprint of a proposed service building area.	Remove
177	*Ailanthus altissima*	Z3	2.0	12.6	N/A	Footprint	The trunk is within the footprint of a proposed service building area.	Remove
178	*Ailanthus altissima*	Z3	2.0	12.6	N/A	Footprint	The trunk is within the footprint of a proposed service building area.	Remove
179	*Cinnamomum camphora*	Z3	2.4	18.1	N/A	Footprint	The trunk is within the footprint of a proposed service building area.	Remove
180	*Eucalyptus saligna*	A1	6.6	136.8	N/A	Footprint	The trunk is within the footprint of a proposed service building area.	Remove
181	*Ligustrum lucidum*	Z3	2.0	12.6	1.5	Footprint	The trunk is within the footprint of a proposed service building area.	Remove
182	*Ligustrum lucidum*	Z3	2.0	12.6	1.6	Footprint	The trunk is within the footprint of a proposed service building area.	Remove
183	*Gleditsia triacanthos*	Z3	2.0	12.6	1.5	Footprint	The trunk is within the footprint of a proposed service building area.	Remove
184	*Robinia pseudoacacia*	Z3	2.6	21.2	1.8	Footprint	The trunk is within the footprint of a proposed service building area.	Remove

URBAN ARBOR
The Trusted Name in Tree Management

Tree ID	Species	Retention value	TPZ radius (m)	TPZ area (m^2)	SRZ radius (m)	TPZ encroachment	Discussion/ Conclusion	Recommendation
185	*Robinia pseudoacacia*	Z3	2.0	12.6	1.5	Footprint	The trunk is within the footprint of a proposed service building area.	Remove
186	*Robinia pseudoacacia*	Z3	2.5	19.6	2.0	Footprint	The trunk is within the footprint of a proposed service building area.	Remove
187	*Eucalyptus botryoides*	A1	7.7	186.3	2.8	Major	The proposed service building driveway will encroach into the TPZ by 20% ($37.5m^2$) but not into the SRZ. This is considered to be a major TPZ encroachment and the proposed works could potentially impact the condition of the tree. To reduce the impact to the tree, the proposed hard surfacing must be installed in accordance with section 9.2 of this report. A proposed fence and combined service route (CSR) will also encroach significantly into the TPZ and SRZ of the tree. To reduce the impact to the tree, the proposed fence and CSR must be installed in accordance with section 9.2 of this report.	Retain and protect*
188	*Callistemon salignus*	A1	4.8	72.4	2.3	Major	A proposed fence and combined service route (CSR) will encroach significantly into the TPZ and SRZ of the tree. To reduce the impact to the tree, the proposed fence and CSR must be installed in accordance with section 9.2 of this report. The proposed service building driveway will encroach into the TPZ by 9% ($6.8m^2$) but not into the SRZ. This is considered to be a major TPZ encroachment, in combination with the impacts from the fence and CSR. The proposed driveway could potentially impact the condition of the tree. To reduce the impact to the tree, the proposed hard surfacing must be installed in accordance with section 9.2 of this report.	Retain and protect*
189	*Ligustrum lucidum*	Z3	2.0	12.6	1.6	Footprint	The trunk is within the footprint of a proposed service building area.	Remove
190	*Robinia pseudoacacia*	Z3	2.0	12.6	1.6	Footprint	The trunk is within the footprint of a proposed service building area.	Remove
191	*Gleditsia triacanthos*	Z3	2.0	12.6	1.5	Footprint	The trunk is within the footprint of a proposed service building area.	Remove

URBAN ARBOR
The Trusted Name in Tree Management

Tree ID	Species	Retention value	TPZ radius (m)	TPZ area (m^2)	SRZ radius (m)	TPZ encroachment	Discussion/ Conclusion	Recommendation
192	*Robinia pseudoacacia*	Z3	2.0	12.6	1.6	Footprint	The trunk is within the footprint of a proposed service building area.	Remove
193	*Robinia pseudoacacia*	Z3	2.1	13.9	1.7	Footprint	The trunk is within the footprint of a proposed service building area.	Remove
194	*Cinnamomum camphora*	A1	15.0	706.9	3.7	Footprint	The trunk is within the footprint of a proposed service building area.	Remove
195	*Robinia pseudoacacia*	Z3	2.0	12.6	1.5	Footprint	The trunk is within the footprint of a proposed service building area.	Remove
196	*Pittosporum undulatum*	A1	2.0	12.6	1.6	Footprint	The trunk is within the footprint of a proposed service building area.	Remove
197	*Cinnamomum camphora*	Z3	2.9	26.4	2.7	Footprint	The trunk is within the footprint of a proposed service building area.	Remove
198	*Jacaranda mimosifolia*	A1	5.9	109.4	2.5	Footprint	The trunk is within the footprint of a proposed service building driveway.	Remove
199	*Lophostemon confertus*	A1	6.1	116.9	2.6	Footprint	The trunk is within the footprint of a proposed service building driveway.	Remove
200	*Ligustrum lucidum*	Z3	2.1	13.9	1.8	Footprint	The trunk is within the footprint of a proposed service building area.	Remove
201	*Robinia pseudoacacia*	Z3	4.7	69.4	2.5	Footprint	The trunk is within the footprint of a proposed service building area.	Remove
202	*Robinia pseudoacacia*	Z3	2.2	15.2	1.7	Footprint	The trunk is within the footprint of a proposed service building area.	Remove
203	*Robinia pseudoacacia*	Z3	2.2	15.2	1.7	Footprint	The trunk is within the footprint of a proposed service building area.	Remove
204	*Robinia pseudoacacia*	Z3	3.0	28.3	1.9	Footprint	The trunk is within the footprint of a proposed service building area.	Remove

URBAN ARBOR
The Trusted Name in Tree Management

Tree ID	Species	Retention value	TPZ radius (m)	TPZ area (m^2)	SRZ radius (m)	TPZ encroachment	Discussion/ Conclusion	Recommendation
205	*Robinia pseudoacacia*	Z3	3.4	36.3	2.1	Footprint	The trunk is within the footprint of a proposed service building area.	Remove
591	*Corymbia ficifolia*	A1	2.8	24.6	1.9	None	No encroachment into the TPZ.	Retain and protect
592	*Camellia japonica*	Z1	2.0	12.6	1.5	None	No encroachment into the TPZ.	Retain and protect
593	*Callistemon viminalis*	A1	3.0	28.3	2.0	None	No encroachment into the TPZ.	Retain and protect
594	*Callistemon viminalis*	A1	4.2	55.4	2.2	None	No encroachment into the TPZ.	Retain and protect

Notes

TPZ Encroachment Percentage: TPZ encroachment percentages are based on new structures and hard surfaces only. New soft landscaping, such as turf or amenity planting areas have not been included in the calculation for TPZ encroachment.
Retain and protect*: The proposed construction must be completed in accordance with section 9.2 to reduce the impact to the tree.

9. CONCLUSIONS

9.1 **Table 2:** Summary of the impact to trees during the development;

Impact	Reason	Category A	Category Z	Total
		A	Z	
Trees to be removed	Building construction, new surfacing and/or proximity, or trees in poor condition.	171, 180, 194, 196, 198, 199 (Six trees)	166, 167, G3, 172, 173, 174, 175, 176, 177, 178, 179, 181, 182, 183, 184, 185, 186, 189, 190, 191, 192, 193, 195, 197, 200, 201, 202, 203, 204, 205 (Twenty-nine trees and one group of trees)	**35 trees + 1 group of trees**
Retained trees subject to TPZ encroachment greater than 10%	Removal of existing surfacing/structures and/or installation of new surfacing/structures.	187, 188, G4 (Two trees and one group of trees)	168, 169, 170 (Three trees)	**5 trees + 1 group of trees**
Retained trees subject to TPZ encroachment of 10% or less	Removal of existing surfacing/structures and/or installation of new surfacing/structures.	591, 593, 594 (Three trees)	592 (One tree)	**4 trees**

9.2 **Construction Design/Specification Requirements:** The proposed construction will encroach into the TPZ of trees 168, 169, 170, 187, 188 and G4 by more than 10%. To ensure the trees are not adversely impacted by the construction, it must be demonstrated the following design and construction specifications can be implemented within the TPZ of the trees. If the construction cannot be completed in accordance with these specifications, the trees may not be viable for retention.

9.2.1 **Tree Sensitive Hard Surfacing Construction – tree 187 and 188:** To retain the trees in a viable condition, the hard surfacing must be constructed in a tree sensitive method. The hard surfacing should be constructed above existing grades in the TPZ of the trees. The diagram below (Image A) gives an example of a no-excavation method for constructing hard surfacing close to trees. The location of retaining pegs should be flexible, avoiding damage to structural roots.

If excavations are essential, they must not exceed 100mm below the existing grades. The excavations should be supervised by a project Arborist with a minimum AQF level 5 qualification. All excavations for the hard surfacing should be carried out manually to avoid impacting retained tree roots. All tree roots greater than 40mm in diameter should be retained, unless the project arborist has assessed and advised that the pruning/severing of the root will not impact the condition or stability of the tree. Manual excavation may include the use of pneumatic and hydraulic tools, high-pressure air or a combination of high-pressure water and a vacuum device.

Where tree roots greater than 40mm are encountered that must be retained, the hard surfacing should be elevated over the individual tree root to allow for its retention. Examples of methods that can be used to bridge individual tree roots have been included below (Image B and C). Using pier and beam bridges as per image C is the recommended/preferred method, as it will allow for future growth of the tree roots, reducing future damage to the surfacing from the roots.

URBAN ARBOR
The Trusted Name in Tree Management

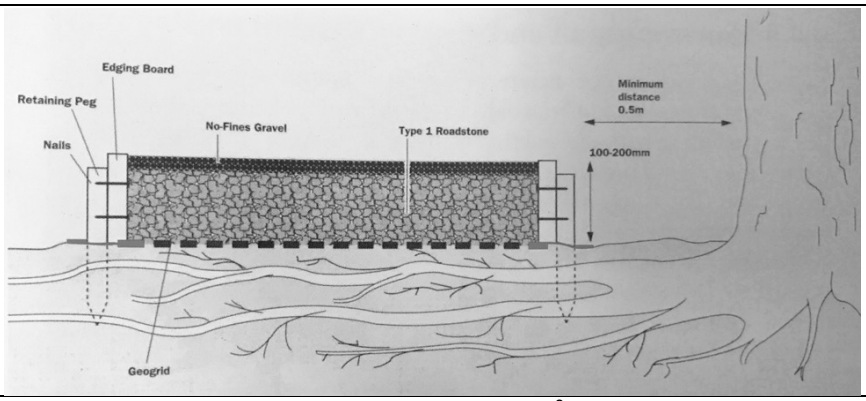


Image A: An image from 'Tree Roots in the Built Environment'[8], showing how to construct hard surfacing above a trees root system without excavation. Type 1 Roadstones are an example of blue metal or crushed sandstone.

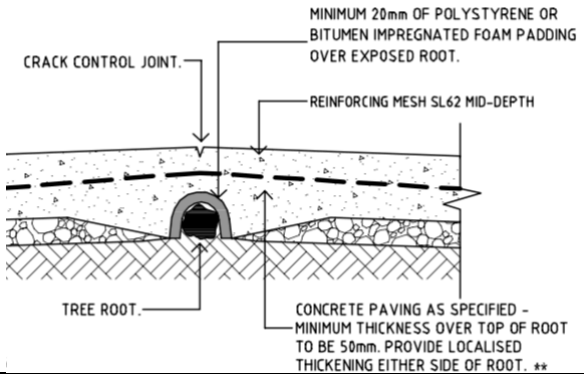


Image B: Example method for bridging concrete surfacing over tree roots provided in the Canterbury Bankstown Council standard drawings.[9]

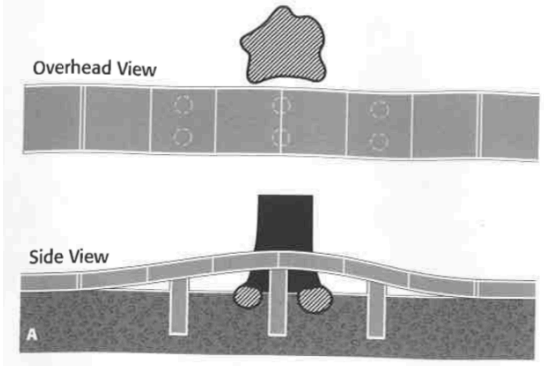


Image C: Example method from Reducing infrastructure damage by tree roots: A compendium of strategies.[10]

8 Roberts, J., Jackson, N., & Smith, M., *Tree Roots in the Built Environment*, The Stationary Office, London, England (2006). Page 305 & 306.

9 *Canterbury Bankstown Council standard drawing S-209 Existing street tree treatments*, https://www.cbcity.nsw.gov.au/development/planning-control-policies/council-standard-drawings, accessed 3 October 2019.

10 Costello, L. R., & Jones, K. S, *Reducing infrastructure damage by tree roots: A compendium of strategies*, Western Chapter of the International Society of Arboriculture, 31883 Success Valley Drive, Porterville, CA (2003), page 27.

URBAN ARBOR
The Trusted Name in Tree Management

9.2.2 **Fencing– tree 168, 169, 170, 187, 188 and G4:** The proposed fencing will be installed using the tree sensitive method of post and rail type construction. To ensure the trees are not significantly impacted by the works, all post holes within the TPZ must be excavated manually. The post location must be flexible to avoid the severance of significant roots 40mm and greater in diameter. No posts are to be located within the SRZ or root investigations will be required to determine the post location. See Appendix 3 for more information in regards to root investigations. All rails/horizontal materials are to be located on or above existing soil grades. This will allow for the majority of the root system to be retained between the posts, minimising root loss.

9.2.3 **CSR – tree 168, 169, 170, 187, 188 and G4:** The proposed CSR will be installed using the tree sensitive method of post and rail type construction. To ensure the trees are not significantly impacted by the works, all post holes within the TPZ must be excavated manually. The post location must be flexible to avoid the severance of significant roots 40mm and greater in diameter. No posts are to be located within the SRZ or root investigations will be required to determine the post location. See Appendix 3 for more information in regards to root investigations. All rails/horizontal materials are to be located on or above existing soil grades. This will allow for the majority of the root system to be retained between the posts, minimising root loss.

URBAN ARBOR
The Trusted Name in Tree Management

10. RECOMMENDATIONS

10.1 This report assesses the impact of a proposed development at the subject site to forty-four (44) trees and two groups of trees located within the site and adjoining sites, in accordance with AS4970 Protection of trees on development sites (2009).

10.2 Two site plans have been included in Appendix 1, where the indicative TPZ and SRZ of the trees have been overlaid onto the received plans provided by the client. The following plans are included in Appendix 1;

- Appendix 1A - Proposed Site Plan East
- Appendix 1B - Proposed Site Plan West

10.3 Thirty-five (35) trees and one (1) group have been recommended for removal to accommodate the development works, including tree 166, 167, G3, 171, 172, 173, 174, 175, 176, 177, 178, 179, 180, 181, 182, 183, 184, 185, 186, 189, 190, 191, 192, 193, 194, 195, 196, 197, 198, 199, 200, 201, 202, 203, 204 and 205. Tree 171, 180, 194, 196, 198 and 199 are higher value category value trees. All other trees to be removed are lower value category Z retention value trees.

10.4 Five (5) trees and one (1) group will be subject to a TPZ encroachment greater than 10% from the proposed construction, including tree to 168, 169, 170, 187, 188 and G4. To reduce the impact to the trees, the proposed construction within the TPZ of the trees must be completed in accordance with section 9.2 of this report.

10.5 The remaining four (4) trees will be subject to minor and acceptable TPZ encroachments of 10% or less and can be retained in a viable condition, including tree 591, 592, 593 and 594.

10.6 All trees to be retained must be protected for the duration of development, (including demolition and landscaping, in accordance with AS4970-2009). See section 11 for more information.

10.7 See section 11.10 for general landscape guidance when working within the TPZ of trees to be retained.

10.8 Where possible underground services must be located outside the TPZ of trees to be retained. All underground services located inside the TPZ of any tree to be retained must be installed via tree sensitive techniques. This should include either directional drilling methods or manual excavations to minimise the impact to trees identified for retention.

10.9 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. This report should be submitted as supporting evidence with any tree removal/pruning or development application.

URBAN ARBOR
The Trusted Name in Tree Management

11. TREE PROTECTION REQUIREMENTS

11.1 **Use of this report:** All contractors must be made aware of the tree protection requirements prior to commencing works at the site. This report and a copy of the site plan (Appendix 1) drawings must also be made available to any contractor prior to works commencing and during any on site operations.

11.2 **Project Arborist:** Prior to any works commencing at the site a project Arborist should be appointed. The project Arborist should be qualified to a minimum AQF level 5 and/or equivalent qualifications and experience, and should assist with any development issues relating to trees that may arise. If at any time it is not feasible to carryout works in accordance with this, an alternative must be agreed in writing with the project Arborist.

11.3 **Tree work:** All tree work must be carried out by a qualified and experienced Arborist with a minimum of AQF level 3 in arboriculture, in accordance with NSW Work Cover Code of Practice for the Amenity Tree Industry (1998) and AS4373 Pruning of amenity trees (2007).

11.4 **Initial site meeting/on-going regular inspections:** The project Arborist is to hold a pre-construction site meeting with principle contractor to discuss methods and importance of tree protection measures and resolve any issues in relation to tree protection that may arise. In accordance with AS4970-2009, the project Arborist should carryout regular site inspections to ensure works are carried out in accordance with this document throughout the development process. Site inspections are recommended on a one-month frequency.

11.5 **Site Specific Tree Protection Recommendations:** The table below provides recommendations for each tree, including site specific tree protection requirements. All trees to be retained must be protected in accordance with general requirements of AS4970-2009 for the duration of the development, details of which are discussed in further details in this section of the report.

Tree ID	Tree Species	TPZ Radius (m)	SRZ Radius (m)	Recommendations
166	*Morus nigra*	2.0	1.5	Remove.
167	*Morus nigra*	2.0	1.7	Remove.
168	*Ligustrum lucidum*	2.4	1.8	Retain and protect. Tree protection fencing is to create a combined exclusion zone for tree 168, 169, 170 and G4. The fencing is to run along the TPZ perimeter within the site and is to be set back from the proposed construction by 1m. TPZ signage is required on the fencing. Mulch is required within the fenced area.
169	*Ficus elastica*	2.0	1.6	Retain and protect. See tree protection recommendations for tree 168.
170	*Ilex spp*	2.0	1.5	Retain and protect. See tree protection recommendations for tree 168.
G3	*Ailanthus altissima*	2.0	1.5	Remove.

URBAN ARBOR
The Trusted Name in Tree Management

171	*Cinnamomum camphora*	13.2	3.7	Remove.
G4	*Acmena smithii var. minor*	2.2	1.6	Retain and protect. See tree protection recommendations for tree 168.
172	*Ligustrum lucidum*	2.0	1.5	Remove.
173	*Ligustrum lucidum*	2.0	1.5	Remove.
174	*Celtis sinensis*	2.0	1.5	Remove.
175	*Ligustrum lucidum*	2.4	1.8	Remove.
176	*Ligustrum lucidum*	2.0	1.5	Remove.
177	*Ailanthus altissima*	2.0	N/A	Remove.
178	*Ailanthus altissima*	2.0	N/A	Remove.
179	*Cinnamomum camphora*	2.4	N/A	Remove.
180	*Eucalyptus saligna*	6.6	N/A	Remove.
181	*Ligustrum lucidum*	2.0	1.5	Remove.
182	*Ligustrum lucidum*	2.0	1.6	Remove.
183	*Gleditsia triacanthos*	2.0	1.5	Remove.
184	*Robinia pseudoacacia*	2.6	1.8	Remove.
185	*Robinia pseudoacacia*	2.0	1.5	Remove.
186	*Robinia pseudoacacia*	2.5	2.0	Remove.
187	*Eucalyptus botryoides*	7.7	2.8	Retain and protect. Tree protection fencing is to create a combined exclusion zone for tree 187 and 188. The fencing is to encompass as much of the TPZ area as practical and is to be set back from the proposed construction by 1m. TPZ signage is required on the fencing. Mulch is required within the fenced area.
188	*Callistemon salignus*	4.8	2.3	Retain and protect. See tree protection recommendations for tree 187.
189	*Ligustrum lucidum*	2.0	1.6	Remove.
190	*Robinia pseudoacacia*	2.0	1.6	Remove.
191	*Gleditsia triacanthos*	2.0	1.5	Remove.
192	*Robinia pseudoacacia*	2.0	1.6	Remove.
193	*Robinia pseudoacacia*	2.1	1.7	Remove.
194	*Cinnamomum camphora*	15.0	3.7	Remove.
195	*Robinia pseudoacacia*	2.0	1.5	Remove.
196	*Pittosporum undulatum*	2.0	1.6	Remove.
197	*Cinnamomum camphora*	2.9	2.7	Remove.
198	*Jacaranda mimosifolia*	5.9	2.5	Remove.
199	*Lophostemon confertus*	6.1	2.6	Remove.

URBAN ARBOR
The Trusted Name in Tree Management

200	*Ligustrum lucidum*	2.1	1.8	Remove.
201	*Robinia pseudoacacia*	4.7	2.5	Remove.
202	*Robinia pseudoacacia*	2.2	1.7	Remove.
203	*Robinia pseudoacacia*	2.2	1.7	Remove.
204	*Robinia pseudoacacia*	3.0	1.9	Remove.
205	*Robinia pseudoacacia*	3.4	2.1	Remove.
591	*Corymbia ficifolia*	2.8	1.9	Retain and protect. Tree protection fencing is to create a combined exclusion zone for tree 591 and 592. The fencing is to encompass as much of the TPZ area as practical. TPZ signage is required on the fencing. Mulch is required within the fenced area.
592	*Camellia japonica*	2.0	1.5	Retain and protect. See tree protection recommendations for tree 591.
593	*Callistemon viminalis*	3.0	2.0	Retain and protect. Tree protection fencing is to create a combined exclusion zone for tree 593 and 594. The fencing is to encompass as much of the TPZ area as practical. TPZ signage is required on the fencing. Mulch is required within the fenced area.
594	*Callistemon viminalis*	4.2	2.2	Retain and protect. See tree protection recommendations for tree 593.

11.6 **Tree protection Specifications:** It is the responsibility of the principle contractor to install tree protection prior to works commencing at the site (prior to demolition works) and to ensure that the tree protection remains in adequate condition for the duration of the development. The tree protection must not be moved without prior agreement of the project Arborist. The project Arborist must inspect that the tree protection has been installed in accordance with this document and AS4970-2009 prior to works commencing.

11.6.1 Protective fencing: Site specific tree protection requirements are in section 11.5. Where it is not feasible to install fencing at the specified location due to factors such restricting access to areas of the site or for constructing new structures, an alternative location and protection specification must be agreed with the project Arborist. Where the installation of fencing in unfeasible due to restrictions on space, trunk and branch protection will be required (see below). The protective fencing must be constructed of 1.8 metre 'cyclone chainmesh fence'. The fencing must only be removed for the landscaping phase and must be authorised by the project Arborist. Any modifications to the fencing locations must be approved by the project Arborist.

11.6.2 TPZ signage: Tree protection signage is to be attached to the protective fencing, displayed in a prominent position and the sign repeated at 10 metres intervals or closer where the fence changes direction. Each sign shall contain in a clearly legible form, the following information:

- Tree protection zone/No access.

- This fence has been installed to prevent damage to the tree/s and their growing environment both above and below ground. Do not move fencing or enter TPZ without the agreement of the project Arborist.
- The name, address, and telephone number of the developer/builder and project Arborist

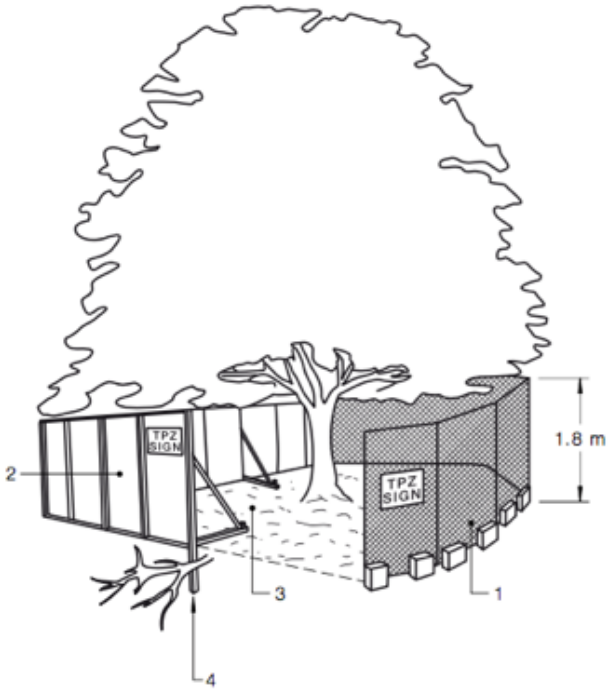
11.6.3 Trunk and Branch Protection: The trunk must be protected by wrapped hessian or similar material to limit damage. Timber planks (50mm x 100mm or similar) should then be placed around tree trunk. The timber planks should be spaced at 100mm intervals, and must be fixed against the trunk with tie wire, or strapping and connections finished or covered to protect pedestrians from injury. The hessian and timber planks must not be fixed to the tree in any instance. The trunk and branch protection shall be installed prior to any work commencing on site and shall be maintained in good condition for the entire development period.

11.6.4 Mulch: Any areas of the TPZ located inside the subject site (only trees to be retained directly adjacent to site works must be mulched to a depth of 75mm with good quality composted wood chip/leaf mulch.

11.6.5 Ground Protection: Ground protection is required to protect the underlying soil structure and root system in areas where it is not practical to restrict access to whole TPZ, while allowing space for construction. Ground protection must consist of good quality composted wood chip/leaf mulch to a depth of between 150-300mm, laid on top of geo textile fabric. If vehicles are to be using the area, additional protection will be required such as rumble boards or track mats to spread the weight of the vehicle and avoid load points. Ground protection is to be specified by the project Arborist as required.

11.6.6 Temporary irrigation: Temporary irrigation should be set up in the TPZ of all trees to be retained, and should distribute water evenly throughout the area of the TPZ. The irrigation should be used for at minimum one hour daily throughout all stages of the development.

URBAN ARBOR
The Trusted Name in Tree Management

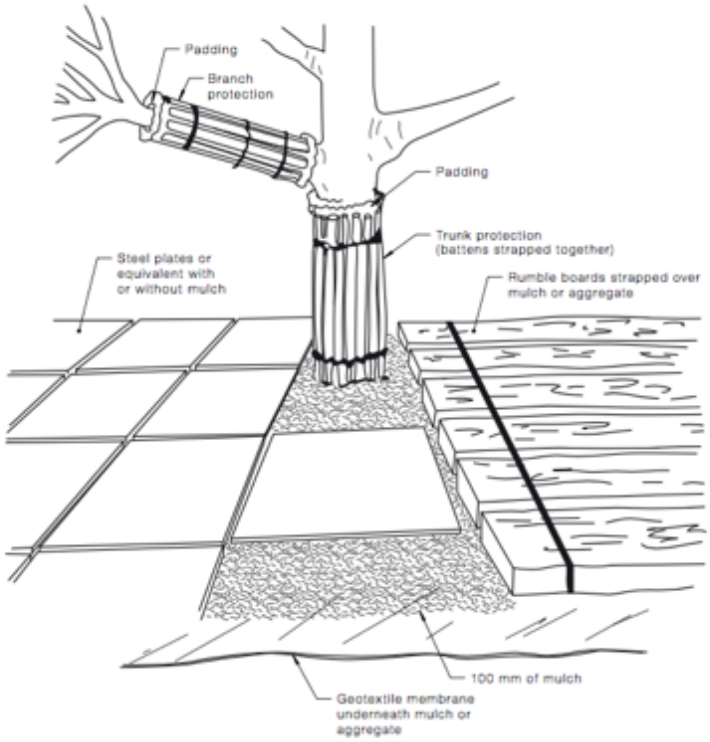


LEGEND:
1 Chain wire mesh panels with shade cloth (if required) attached, held in place with concrete feet.
2 Alternative plywood or wooden paling fence panels. This fencing material also prevents building materials or soil entering the TPZ.
3 Mulch installation across surface of TPZ (at the discretion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

An image from AS4970-2009,[11] with example tree protection.

[11] Council Of Standards Australia, *AS4970 Protection of trees on development sites* (2009), page 16.

URBAN ARBOR
The Trusted Name in Tree Management



NOTES:

1 For trunk and branch protection use boards and padding that will prevent damage to bark. Boards are to be strapped to trees, not nailed or screwed.

2 Rumble boards should be of a suitable thickness to prevent soil compaction and root damage.

An image from AS4970-2009,[12] with example tree protection.

11.7 **Restricted activities inside TPZ:** The following activities must be avoided inside the TPZ of all trees to be retained unless approved by the project Arborist. If at any time these activities cannot be avoided an alternative must be agreed in writing with the project Arborist to minimise the impact to the tree.

A) Machine excavation.
B) Ripping or cultivation of soil.
C) Storage of spoil, soil or any such materials
D) Preparation of chemicals, including preparation of cement products.
E) Refuelling.
F) Dumping of waste.
G) Wash down and cleaning of equipment.
H) Placement of fill.
I) Lighting of fires.
J) Soil level changes.
K) Any physical damage to the crown, trunk, or root system.
L) Parking of vehicles.

[12] Council Of Standards Australia, *AS4970 Protection of trees on development sites* (2009), page 17.

11.8 **Demolition:** The demolition of all existing structures inside or directly adjacent to the TPZ of trees to be retained must be undertaken in consultation with the project Arborist. Any machinery is to work from inside the footprint of the existing structures or outside the TPZ, reaching in to minimise soil disturbance and compaction. If it is not feasible to locate demolition machinery outside the TPZ of trees to be retained, ground protection will be required. The demolition should be undertaken inwards into the footprint of the existing structures, sometimes referred to as the 'top down, pull back' method.

11.9 **Excavations:** The project Arborist must supervise and certify that all excavations and root pruning are in accordance with AS4373-2007 and AS4970-2009. For continuous strip footings, first manual excavation is required along the edge of the structures closest to the subject trees. Manual excavation should be a depth of 1 metre (or to unfavourable root growth conditions such as bed rock or heavy clay, if agreed by project Arborist). Next roots must be pruned back in accordance with AS4373-2007. After all root pruning is completed, machine excavation is permitted within the footprint of the structure. For tree sensitive footings, such as pier and beam, all excavations inside the TPZ must be manual. Manual excavation may include the use of pneumatic and hydraulic tools, high-pressure air or a combination of high-pressure water and a vacuum device. No pruning of roots greater 30mm in diameter is to be carried out without approval of the project arborist. All pruning of roots greater than 30mm in diameter must be carried out by a qualified Arborist/Horticulturalist with a minimum AQF level 3. Root pruning is to be a clean cut with a sharp tool in accordance with AS4373 Pruning of amenity trees (2007).[13] The tree root is to be pruned back to a branch root if possible. Make a clean cut and leave as small a wound as possible.

11.10 **Landscaping:** All landscaping works within the TPZ of trees to be retained are to be undertaken in consultation with a consulting Arborist to minimize the impact to trees. General guidance is provided below to minimise the impact of new landscaping to trees to be retained.

- Level changes should be minimised. The existing ground levels within the landscape areas should not be lowered by more than 100mm or increased by more than 100mm (300mm increase is acceptable if using a coarse free draining material) without assessment by a consulting Arborist.
- New retaining walls should be avoided. Where new retaining walls are proposed inside the TPZ of trees to be retained, they should be constructed from tree sensitive material, such as timber sleepers, that require minimal footings/excavations. If brick retaining walls are proposed inside the TPZ, considerer pier and beam type footings to bridge significant roots that are critical to the trees condition. Retaining walls must be located outside the SRZ and sleepers/beams located above existing soil grades.

[13] Council Of Standards Australia, *AS 4373 Pruning of amenity trees* (2007) page 18

- New footpaths and hard surfaces should be minimised, as they can limit the availability of water, nutrients and air to the trees root system. Where they are proposed, they should be constructed on or above existing soil grades to minimise root disturbance and consider using a permeable surface. Footpaths should be located outside the SRZ where possible.
- Where fill/sub base is used inside the TPZ, fill material should be a coarse granular material that does not restrict the flow of water and air to the root system below. This type of material will also reduce the impact of soil compaction during construction.
- The location of new plantings inside the TPZ of trees to be retained should be flexible to avoid unnecessary damage to tree roots greater than 30mm in diameter.

11.11 **Sediment and Contamination:** All contamination run off from the development such as but not limited to concrete, sediment and toxic wastes must be prevented from entering the TPZ at all times.

11.12 **Tree Wounding/Injury:** Any wounding or injury that occurs to a tree during the construction process will require the project Arborist to be contacted for an assessment of the injury and provide mitigation/remediation advice. It is generally accepted that trees may take many years to decline and eventually die from root damage. All repair work is to be carried out by the project Arborist, at the contractor's expense.

11.13 **Completion of Development Works:** After all construction works are complete the project Arborist should assess that the subject trees have been retained in the same condition and vigour. If changes to condition are identified the project Arborist should provide recommendations for remediation.

URBAN ARBOR
The Trusted Name in Tree Management

12. CONSTRUCTION HOLD POINTS FOR TREE PROTECTION

12.1 **Hold Points:** Below is a sequence of hold points requiring project Arborist certification throughout the development process**.** It provides a list of hold points that must be checked and certified. All certification must be provided in written format upon completion of the development. The final certification must include details of any instructions for remediation undertaken during the development. The principle contractor should be responsible for implementing all tree protection requirements.

Hold Point	Stage	Date Completed and Signature of Project Arborist Responsible
Project Arborist to hold pre construction site meeting with principal contractor to discuss methods and importance of tree protection measures and resolve any issues in relation to feasibility of tree protection requirements that may arise. Project Arborist to mark all trees approved for removal under DA consent.	Prior to development work commencing	
Project Arborist to assess and certify that tree protection has been installed in accordance with AS4970-2009 prior to works commencing at site.	Prior to development work commencing.	
In accordance with AS4970-2009 the project arborist should carryout regular site inspections to ensure works are carried out in accordance with the recommendations. Site inspections are recommended on a monthly frequency.	On-going throughout the development	
The removal of existing structures inside the TPZ of any tree to be retained, such as the existing buildings and hard surfaces must be supervised by the project Arborist.	Demolition	
Project Arborist to supervise all manual excavations and root pruning inside the TPZ of any tree to be retained. Project Arborist to approve all pruning of roots greater than 30mm inside TPZ. All root pruning of roots greater than 30mm in diameter must be carried out by a qualified Arborist/Horticulturalist with a minimum AQF level 3.	Construction	
Project Arborist to certify that all underground services including storm water inside TPZ of any tree to be retained have been installed in accordance with AS4970-2009.	Construction	
All landscaping works within the TPZ of trees to be retained are to be undertaken in consultation with the project Arborist to minimise the impact to trees.	Construction/ Landscape	
After all demolition, construction and landscaping works are complete the project Arborist should assess that the subject trees have been retained in the same condition and vigour. If changes to condition are identified the project Arborist should provide recommendations for remediation.	Upon completion of development	

URBAN ARBOR
The Trusted Name in Tree Management

13. BIBLIOGRAPHY/REFERENCES

- Council Of Standards Australia, *AS4970 Protection of trees on development sites* (2009).
- Council Of Standards Australia, *AS4373 Pruning of amenity trees* (2007).
- Mattheck, C. & Breloer, H., *The body language of trees - A handbook for failure analysis*, The Stationary Office, London, England (2015).
- Lonsdale, D., *Principles of tree hazard assessment and management*, The Stationary Office, London, England (1999).
- 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).
- 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 Tree Consultancy, *Tree AZ version 10.10-ANZ*, http://www.treeaz.com/.
- *Canterbury Local Environmental Plan 2012*, https://www.legislation.nsw.gov.au/#/view/EPI/2012/673.
- *Canterbury Development Control Plan 2012*, https://www.cbcity.nsw.gov.au/development/planning-control-policies/canterbury-development-control-plan-2012.

14. LIST OF APPENDICES

The following are included in the appendices:
Appendix 1A: Proposed Site Plan East
Appendix 1B: Proposed Site Plan West
Appendix 2 - Tree Inspection Schedule
Appendix 3 - Further information of methodology

Jack Williams
Diploma of Arboriculture (AQF5)
FdSc Arboriculture
Registered Consulting Arborist No. 2556
ISA Member No. 228863
Quantified Tree Risk Assessment (QTRA)
ISA Tree Risk Assessment Qualification (TRAQ)

Bryce Claassens
Diploma of Arboriculture (AQF5)
Cert III Landscape Construction
Member Arboriculture Australia
QTRA
TRAQ

TO SYDNEY

TO BANKSTOWN

FLOSS STREET

DUNTROON STREET

CRINAN STREET

ST-1

PROPOSED KISS & RIDE, TAXI STAND AND REFER TO CIVIL PACKAGE 133 FOR LINEMARKING, SETOUT AND LEVEL INFORMATION

PROPOSED PRAM RAMP REFER TO CIVIL PACKAGE 133

EXTENDED PRAM RAMP REFER TO CIVIL PACKAGE 133

PROPOSED ACCESSIBLE PARKING REFER TO ENGINEER'S PACKAGE FOR LINEMARKING, SETOUT AND LEVEL INFORMATION

EXISTING TREES ON EMBANKMENT TO BE RETAINED

BH-1 BIKE HOOP X 4 WITH NEW PADMOUNT

EXISTING CHAIN MESH FENCE TO BE RETAINED / MOVE EXISTING FENCE BACK BY 1m

EXISTING BINS AREA TO BE RETAINED

EXISTING PEDESTRIAN FENCE TO BE REPAIRED AND PAINTED DULUX MONUMNET PA-1

EXISTING EUCALYPTUS TREE AND PLANTING IN GARDEN BED TO BE RETAINED

PROPOSED DRINKING FOUNTAIN DF-1 AND CONCRETE PAD

METRO SIGN LOCATION TO ARCHITECT'S DETAILS

BH-1 BIKE HOOP X 2

UPGRADE FINISHES ON EXISTING CONCRETE REFER TO PAVING PLAN 131730

STATION BUILDING ROOF LINE

BH-1 BIKE HOOP X 5

EXISTING TGSIS AT BUS STOP TO BE RETAINED

EXISTING BUS STOP SIGN TO BE RETAINED

RELOCATED EXISTING BIN

EXISTING BUS SHELTER TO BE RETAINED AND PAINTED DULUX MONUMNET PA-1

NEW BOLLARDS (BOL-1) REFER TO CIVIL PACKAGE 133 FOR SET OUT

EXISTING PEDESTRIAN CROSSING TO BE RETAINED

THROW SCREEN - REFER TO URBAN DESIGN PACKAGE 131800

592 591 593 594

PLATFORM 2

PLATFORM BUILDING 2 REFER ARCHITECT'S PACKAGE

PLATFORM 1

PLATFORM BUILDING 1 REFER ARCHITECT'S PACKAGE

ADJOINS DRAWING SMCSWSWM-MTM-WHP-LA-DWG-131721

EXISTING FLOSS ST CARPARK

LEGEND

EXISTING

- RAILCORP PROPERTY BOUNDARY
- EXISTING TREES TO BE RETAINED
- EXISTING PLANTING TO BE RETAINED

PROPOSED

FENCE/WALLS

- EXISTING PEDESTRIAN FENCE TO BE REPAIRED AND PAINTED
- 2.4m HIGH SECURITY FENCE REFER TO FENCING PACKAGE
- SEGREGATION FENCE REFER TO FENCING PACKAGE
- CHAIN MESH FENCE
- THROW SCREEN REFER TO URBAN DESIGN PACKAGE 131800

PLANTING

- PROPOSED TREES
- MASS PLANTING

PAVING

- TGSIS REFER TO ARCHITECTURAL PACKAGE (TGS-1)

FURNITURE

- ST-1 SEAT AS PER MATERIAL SCHEDULE
- BH-1 - BIKE HOOPS
- BOL-1 -BOLLARD
- BIN-1 RELOCATED BIN
- DF-1 DRINKING FOUNTAIN

NOTE:

- REFER TO CIVIL DESIGN PACKAGE 133 FOR ALL FOOTPATH LEVELS.
- REFER TO FENCING PACKAGE 133 FOR ALL FENCING SET OUT AND LOCATIONS.
- REFER TO UTILITIES PACKAGE 133 FOR ALL SERVICES LAYOUTS.
- REFER TO DRAINAGE PACKAGE 133 FOR ALL DRAINAGE DETAILS
- REFER TO ARCHITECTURAL 131 PACKAGE FOR ALL STATION CONCOURSE, BUILDING AND PLATFORM WORKS.
- REFER TO LIGHTING PACKAGE 133 FOR ALL ELECTRICAL AND LIGHTING LAYOUTS.
- REFER TO ARBORIST'S ARBORICULTURAL IMPACT ASSESSMENT REPORT SMCSWSWM-MTM-WHP-LA-REP-131000 FOR TREE PROTECTION WORKS.
- ENSURE HERITAGE MITIGATION WORKS IS CARRIED OUT IN ACCORDANCE TO REFERENCES OUTLINED IN DRAWING SMCSWSWM-MTM-WHP-LA-DWG-131701 UNDER GENERAL NOTES, ITEM 3 REFERRING TO HERITAGE AND ARCHAEOLOGICAL ASSESSMENTS

KEY PLAN

Map Legend

- Tree Protection Fence
- Tree Crown
- Tree Protection Zone
- Structural Root Zone

0 30m

DRAWING COLOUR CODED - PRINT ALL COPIES IN COLOUR

Urban Arbor Pty Ltd

PO Box 450 Turramurra NSW 2074

sales@urbanarbor.com.au

Site Location: Hulrstone Park Station
Hurlstone Park NSW

SCALE :	DATE :
1 : 200 @ A1	21/12/2020

URBAN ARBOR
The Trusted Name in Tree Management

Appendix 1A - Proposed Site Plan East

Prepared by: Bryce Claassens, Urban Arbor Pty Ltd

FROM SYDENHAM

TO BANKSTOWN

RAILWAY ST

DRAINAGE CONNECTIONS TO EXISTING CULVERT. REFER DRAINAGE DRAWINGS FOR DETAILS

DEMOLISH EXISTING SYDNEY TRAINS ACCESS GATE

EXISTING DRAINAGE CULVERT TO BE PROTECTED AND ASSESSED FOR CONDITION PRIOR TO CONSTRUCTION ACTIVITIES

CONSTRUCT DRIVEWAY (SPECIFICATION A) AND LAYBACK IN ACCORDANCE WITH INNER WEST COUNCIL STANDARD DRAWING "R3"

EXISTING STORMWATER PIT TO BE RETAINED AND PROTECTED

SERVICE CONNECTION TO THE CHILLER WILL EITHER TO BE MOUNTED TO FENCE POSTS OR IN UNDERGROUND CONDUIT AS DETAILED IN PACKAGE 432

PROPOSED G37 DELINEATOR ASSEMBLY. FOR DETAILS REFER TO DRAWING SMCSWSWM-MTM-WHP-CE-DWG-433170

CORRIDOR ACCESS GATE TO BE INSTALLED AS PART OF SERVICE BUILDING WORKS

PROPOSED ERRANT VEHICLE BOLLARD. FOR DETAILS REFER TO DRAWING SMCSWSWM-MTM-WHP-CE-DWG-433169

FOR FENCE SUPPORT AT CHILLER BAY, REFER TO STRUCTURES PACKAGE 434

PROPOSED CHILLER PADS FFL 11.20

FOR FENCE SUPPORT AT PAD MOUNT, REFER TO STRUCTURES PACKAGE 434

CAUTION: EXISTING POWER POLE TO BE RETAINED AND PROTECTED

SURFACE MOUNTED SAFETY BOLLARD. FOR DETAILS REFER TO DRAWING SMCSWSWM-MTM-WHP-CE-DWG-433169

MSSB (REFER TO MEP PACKAGE 432)

SURFACE MOUNTED SAFETY BOLLARD. FOR DETAILS REFER TO DRAWING SMCSWSWM-MTM-WHP-CE-DWG-433169

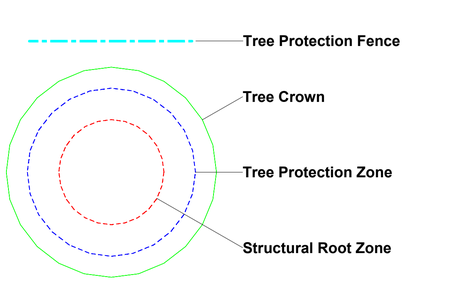
PROPOSED SOIL NAIL RETAINING WALL. REFER TO DRAWING SMCSWSWM-MTM-WHP-CE-DWG-433651 FOR DETAILS.

EXISTING DRAINAGE PIT COVER TO BE RAISED TO NEW DESIGN SURFACE LEVEL

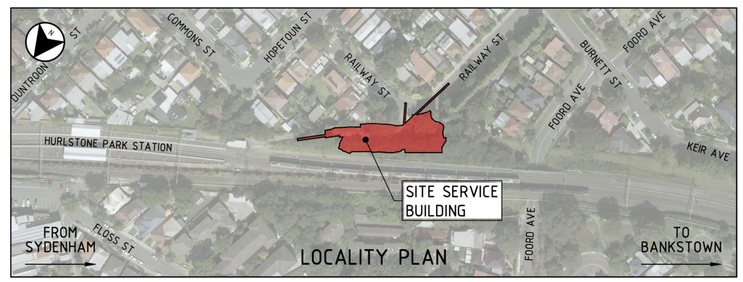
PLAN

SCALE 1:200

Tree Legend



0 30m



LOCALITY PLAN

DRAWING COLOUR CODED - PRINT ALL COPIES IN COLOUR

NOT FOR CONSTRUCTION

Urban Arbor Pty Ltd

PO Box 450 Turramurra NSW 2074

sales@urbanarbor.com.au

Site Location: Hulrstone Park Station
Hurlstone Park NSW

SCALE :	DATE :
1 : 200 @ A1	21/12/2020

URBAN ARBOR
The Trusted Name in Tree Management

Appendix 1B - Proposed Site Plan West

Prepared by: Bryce Claassens, Urban Arbor Pty Ltd

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
166	Common or Black Mulberry	*Morus nigra*	Young	4	2	90					90	100	Good	Fair	Low	5. Small/ Young	Z3	2.0	1.5	Located within corridor. Exempt species.
167	Common or Black Mulberry	*Morus nigra*	Semi-mature	7	2	160					160	200	Good	Good	Low	5. Small/ Young	Z3	2.0	1.7	Located within corridor. Exempt species.
168	Broad Leaved Privet	*Ligustrum lucidum*	Mature	7	2	200					200	220	Good	Fair	Low	2. Medium	Z3	2.4	1.8	Canopy extends into corridor. Exempt species.
169	Rubber Tree	*Ficus elastica*	Semi-mature	6	2	150					150	180	Good	Fair	Low	5. Small/ Young	Z1	2.0	1.6	Canopy extends into corridor.
170	Holly	*Ilex spp*	Mature	5	2	150					150	160	Good	Good	Low	5. Small/ Young	Z1	2.0	1.5	Canopy extends slightly into corridor.
G3	Tree of Heaven	*Ailanthus altissima*	Mature	8	1.5	100					100	120	Fair	Fair	Low	3. Short	Z3	2.0	1.5	Located within corridor. Group of trees in decline. Exempt species. Approximately 6 trees.
171	Camphor Laurel	*Cinnamomum camphora*	Mature	17	7	1100					1100	1300	Good	Good	Medium	1. Long	A1	13.2	3.7	Located within corridor.
G4	Dwarf Lilly Pilly	*Acmena smithii var. minor*	Semi-mature	8	2	180					180	190	Good	Good	Medium	1. Long	A1	2.2	1.6	Canopy extends into corridor. Group of acmena smithii var minor. Approximately 7 trees.
172	Broad Leaved Privet	*Ligustrum lucidum*	Semi-mature	5	1	100					100	120	Good	Fair	Very Low	5. Small/ Young	Z3	2.0	1.5	Located within corridor. Exempt species.
173	Broad Leaved Privet	*Ligustrum lucidum*	Young	4	1	90					90	100	Good	Fair	Very Low	5. Small/ Young	Z3	2.0	1.5	Located within corridor. Exempt species.
174	Chinese Hackberry	*Celtis sinensis*	Semi-mature	4	1	100					100	120	Good	Good	Very Low	5. Small/ Young	Z3	2.0	1.5	Located within corridor. Exempt species.
175	Broad Leaved Privet	*Ligustrum lucidum*	Semi-mature	5	2	100	110	130			197	250	Good	Fair	Very Low	5. Small/ Young	Z3	2.4	1.8	Located within corridor. Exempt species.
176	Broad Leaved Privet	*Ligustrum lucidum*	Young	5	1	100					100	110	Good	Good	Very Low	5. Small/ Young	Z3	2.0	1.5	Located within corridor. Exempt species.
177	Tree of Heaven	*Ailanthus altissima*	Semi-mature	5	2	90	120				150	160	Fair	Fair	Very Low	3. Short	Z3	2.0	1.5	Located within corridor. Exempt species with low foliage density for species and apical dieback.
178	Tree of Heaven	*Ailanthus altissima*	Semi-mature	6	1	100	110				149	200	Fair	Fair	Very Low	3. Short	Z3	2.0	1.7	Located within corridor. Exempt species in decline.
179	Camphor Laurel	*Cinnamomum camphora*	Semi-mature	8	2	200					200	210	Good	Fair	Low	2. Medium	Z3	2.4	1.7	Located within corridor. Exempt species.
180	Sydney Blue Gum	*Eucalyptus saligna*	Mature	22	6	550					550	600	Good	Fair	High	1. Long	A1	6.6	2.7	Located within corridor. Asymmetric crown shape due to power line clearance.
181	Broad Leaved Privet	*Ligustrum lucidum*	Semi-mature	6	2	110					110	120	Good	Fair	Very Low	5. Small/ Young	Z3	2.0	1.5	Located within corridor. Exempt species.
182	Broad Leaved Privet	*Ligustrum lucidum*	Semi-mature	5	1	110	100				149	180	Good	Fair	Very Low	5. Small/ Young	Z3	2.0	1.6	Located within corridor. Exempt species.
183	Honey Locust	*Gleditsia triacanthos*	Young	5	1	100					100	110	Good	Fair	Very Low	5. Small/ Young	Z3	2.0	1.5	Located within corridor. Exempt species.
184	Robinia	*Robinia pseudoacacia*	Mature	9	2.5	190	100				215	240	Good	Fair	Very Low	2. Medium	Z3	2.6	1.8	Located within corridor. Exempt species.
185	Robinia	*Robinia pseudoacacia*	Semi-mature	8	2	140					140	160	Good	Fair	Very Low	5. Small/ Young	Z3	2.0	1.5	Located within corridor. Exempt species.
186	Robinia	*Robinia pseudoacacia*	Mature	7	2.5	210					210	290	Good	Fair	Very Low	2. Medium	Z3	2.5	2.0	Located within corridor. Weed/vine species at base of trunk. Exempt species
187	Bangalay	*Eucalyptus botryoides*	Mature	20	6	640					640	700	Good	Good	High	2. Medium	A1	7.7	2.8	Canopy extends into corridor. DBH estimated.
188	Willow Bottlebrush	*Callistemon salignus*	Mature	10	4	400					400	440	Good	Good	High	1. Long	A1	4.8	2.3	Canopy extends into corridor. DBH estimated.
189	Broad Leaved Privet	*Ligustrum lucidum*	Semi-mature	5	2	150					150	180	Good	Fair	Very Low	5. Small/ Young	Z3	2.0	1.6	Located within corridor. Exempt species.

Appendix 2 - Tree Inspection Schedule

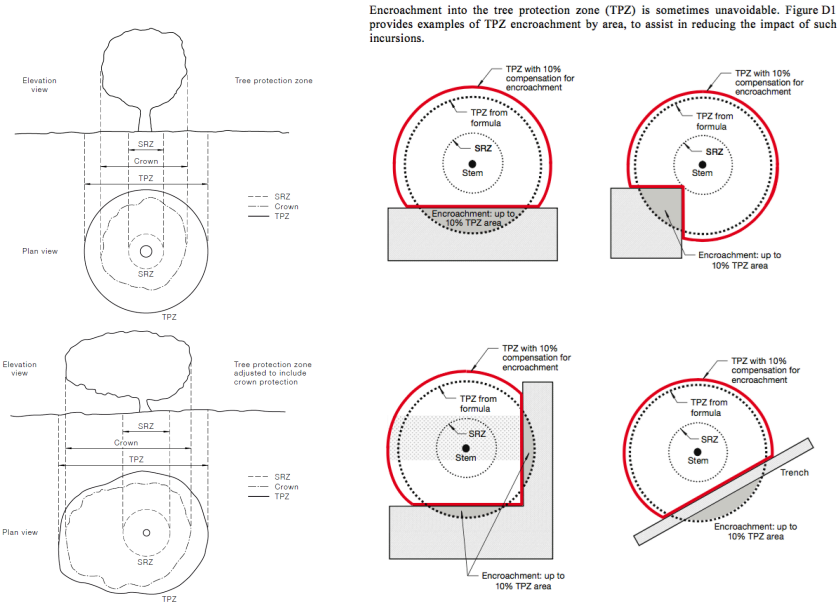
Tree ID	Common Name	Botanical Name	Age Class	Height (m)	Canopy Spread Radius (m)	Stem 1	Stem 2	Stem 3	Stem 4	Stem 5	DBH (mm)	DAB (mm)	Health	Structure	Amenity Value	SULE	Retention Value	TPZ Radius (m)	SRZ Radius (m)	Notes
190	Robinia	*Robinia pseudoacacia*	Semi-mature	6	2	150					150	180	Good	Good	Very Low	2. Medium	Z3	2.0	1.6	Located within corridor. Exempt species.
191	Honey Locust	*Gleditsia triacanthos*	Young	8	1.5	50	100				112	150	Good	Fair	Very Low	5. Small/ Young	Z3	2.0	1.5	Located within corridor. Exempt species.
192	Robinia	*Robinia pseudoacacia*	Semi-mature	9	1.5	170					170	190	Good	Fair	Very Low	2. Medium	Z3	2.0	1.6	Located within corridor. Exempt species.
193	Robinia	*Robinia pseudoacacia*	Semi-mature	8	2	140	100				172	200	Good	Fair	Very Low	2. Medium	Z3	2.1	1.7	Located within corridor. Exempt species.
194	Camphor Laurel	*Cinnamomum camphora*	Mature	17	4	1300					1300	1300	Good	Fair	Medium	2. Medium	A1	15.0	3.7	Located within corridor. DBH measured at base.
195	Robinia	*Robinia pseudoacacia*	Semi-mature	6	1	100					100	120	Good	Fair	Very Low	5. Small/ Young	Z3	2.0	1.5	Located within corridor. Exempt species.
196	Sweet Pittosporum	*Pittosporum undulatum*	Semi-mature	6	1	150					150	180	Good	Good	Medium	1. Long	A1	2.0	1.6	Located within corridor.
197	Camphor Laurel	*Cinnamomum camphora*	Semi-mature	8	2	100	100	100	120	110	238	600	Good	Fair	Low	5. Small/ Young	Z3	2.9	2.7	Located within corridor. Exempt species. Multi stem tree.
198	Blue Jacaranda	*Jacaranda mimosifolia*	Mature	14	5	390	300				492	500	Good	Good	Medium	1. Long	A1	5.9	2.5	Canopy extends into corridor.
199	Queensland Brushbox	*Lophostemon confertus*	Mature	18	5	510					510	580	Good	Good	High	1. Long	A1	6.1	2.6	Upper canopy extends into corridor.
200	Broad Leaved Privet	*Ligustrum lucidum*	Semi-mature	8	2	100	110	100			179	250	Good	Fair	Very Low	5. Small/ Young	Z3	2.1	1.8	Located within corridor. Exempt species.
201	Robinia	*Robinia pseudoacacia*	Mature	9	3	240	310				392	490	Good	Fair	Very Low	2. Medium	Z3	4.7	2.5	Located within corridor. Exempt species.
202	Robinia	*Robinia pseudoacacia*	Semi-mature	8	2	180					180	200	Good	Fair	Very Low	2. Medium	Z3	2.2	1.7	Located within corridor. Exempt species.
203	Robinia	*Robinia pseudoacacia*	Semi-mature	8	2	180					180	200	Good	Fair	Very Low	2. Medium	Z3	2.2	1.7	Located within corridor. Exempt species.
204	Robinia	*Robinia pseudoacacia*	Mature	10	3	250					250	280	Good	Good	Very Low	2. Medium	Z3	3.0	1.9	Located within corridor. Exempt species.
205	Robinia	*Robinia pseudoacacia*	Mature	9	3	100	170	200			281	340	Good	Fair	Very Low	2. Medium	Z3	3.4	2.1	Located within corridor. Exempt species.
591	Red Flowering Gum	*Corymbia ficifolia*	Mature	5	3	230					230	280	Good	Good	Medium	1. Long	A1	2.8	1.9	None
592	Japanese Camellia	*Camellia japonica*	Young	2	0.5	40	40				57	80	Good	Good	Low	5. Small/ Young	Z1	2.0	1.5	None.
593	Weeping Bottlebrush	*Callistemon viminalis*	Mature	5	2.5	250					250	290	Good	Good	Medium	2. Medium	A1	3.0	2.0	Located on steep embankment.
594	Weeping Bottlebrush	*Callistemon viminalis*	Veteran	5	3	350					350	390	Good	Good	Medium	2. Medium	A1	4.2	2.2	Located on steep embankment.

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.

URBAN ARBOR
The Trusted Name in Tree Management

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 6 HURLSTONE PARK AIA (PLATEAU TREES)

PLATEAUTREES
Safety. Quality. Progress.

Date: 17 March 2021

Revision: 10 May 2021

Re: Additional tree removals at Hurlstone Park Station as part of the Southwest Metro Package.

At the request of Downer Group an onsite inspection was undertake at Hurlstone Park Station. It has been asked to identify and record additional tree removals beyond those recommended within the Arboricultural Impact Assessment (AIA) was prepared by Urban Arbor, dated 11 December 2019, Ref19/12/11/SWMMS. On the 5 March a site walkthrough was undertaken by myself and representatives from Downer Group. Additional tree removals were identified with respects to the proposed Southwest Metro Package works. The data for these additional trees can be found as Appendix 1 of this report.

Based upon the information, rational and justification provided within the AIA Report I can confirm that trees G3, 166, 167, 171, 172, 173, 174, 175, 177, 178, 179, 180, 181 and 182 shall require removal to accommodate the proposed works. Reference should be made to the AIA report for respective tree data.

Additional tree removals were identified where there is a direct design clash and 100% encroachment into the TPZ and SRZ at the following locations:

- adjacent the southern side of the rail corridor along Floss Street
- adjacent the southern side of the rail corridor along Railway Street

Plateau Tree Service Pty Ltd
PO BOX 1522, DEE WHY NSW 2099 Australia
P: 02 9939 5350 | F: 02 9905 7569
E: info@plateautrees.com.au | W: www.plateautrees.com.au
ABN : 17 090 798 002

Additional tree removal adjacent Railway Street

Additional tree and vegetation removal adjacent Floss Street involves two Wattles, trees 1 and 2, located adjacent the bridge and woody vegetation along the rail embankment. Image 1 shows their location.

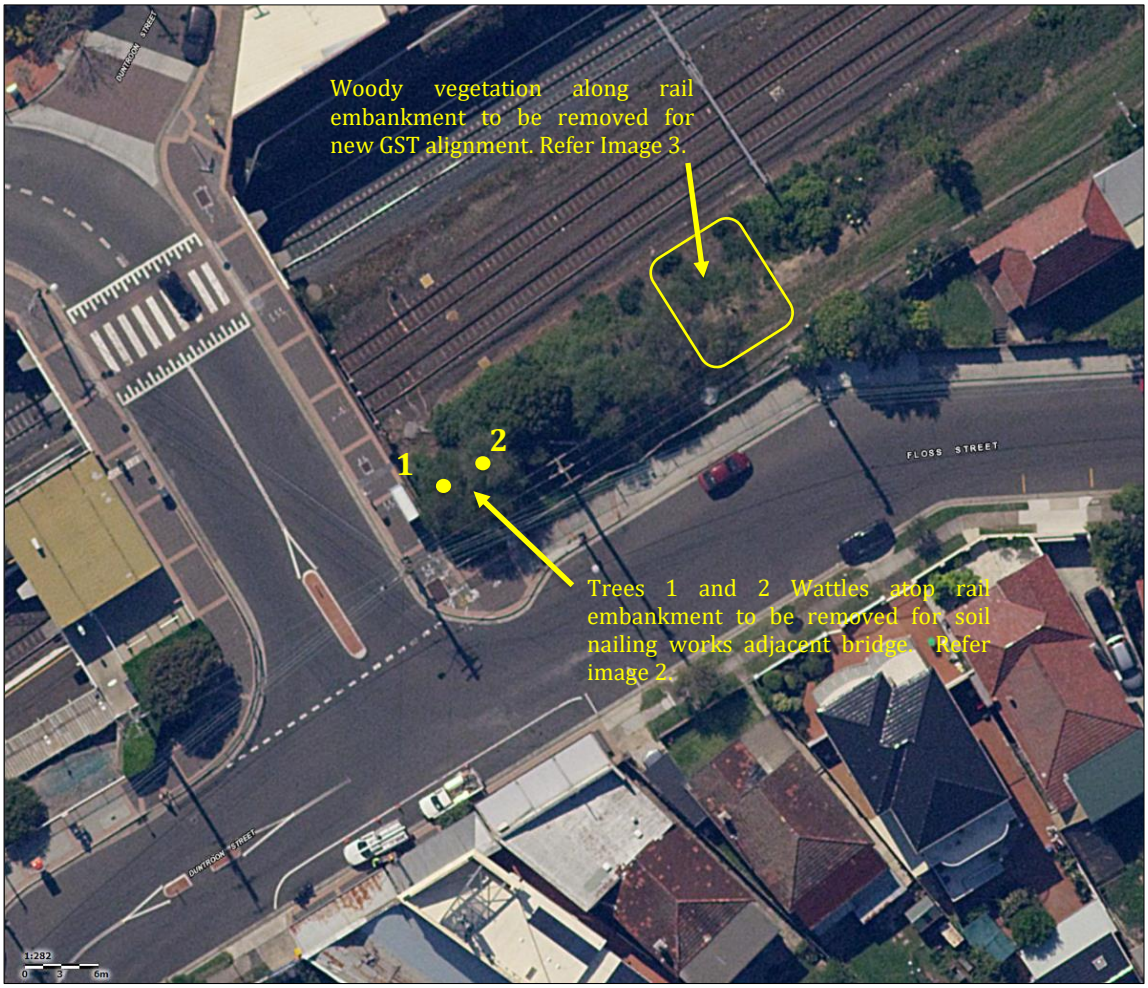


Image 1: Aerial image of Hurlstone Park Station adjacent Floss Street showing additional tree and vegetation removal. *(Source Six Maps accessed 10/03/2021)*.

The two Wattles were identified for removal to accommodate soil nailing works. Image 2 shows the subject trees. The trees were found to have a short useful life expectancy given their species type and medium landscape significance. The trees provide some screening from the rail corridor and its associated infrastructure.

Image 2: Trees 1 and 2, Wattles require removal to accommodate soil pinning works adjacent the bridge.

Woody vegetation located along the rail embankment was identified for removal to align the new GST. No access was gained to the rail corridor to assess the vegetation, but it has been confirmed in consultation with the project Ecologist to consist of; one Pittosporum undultaum (Sweet Pittosporum) tree 13, seven Acacia saligna (Golden Wreath Wattle) trees 47 to 53, one Grevillea sp (Grevillea), tree 54 and two Yucca sp (Yucca) trees 55 and 56. The vegetation is considered to have a short useful life expectancy and low landscape significance given its location within the rail corridor. Image 3 shows the approximate area to be cleared.

Image 3: Approximate area of woody vegetation along the rail embankment to be cleared to align the new GST.

Additional tree removal adjacent Railway Street

Additional tree removals were identified within the rail corridor associated with the construction of the Metro Services Building. A concrete pad is to be relocated from adjacent trees 166 and 167 to overlay the position of tree 194 *Cinnamomum camphora* (Camphor Laurel) requiring its removal. The tree has been identified for removal on demolition documentation viewed during the on-site inspection. Image 4 shows the tree.

Image 4: Tree 194 as identified within the AIA report shall require removal to accommodate the relocation of the concrete pad. Note the rail embankment to the rear of the tree has been cleared of woody vegetation.

Tree 198 *Jacaranda mimosifolia* (Jacaranda) and and 199 *Lophostemon confertus* (Brush Box) is a council owned street tree located within the road reserve area adjacent the rail corridor access gate. These trees are positioned within the footprint of the access road into the proposed Metro Services Building requiring their removal. Image 5 shows the trees. These trees have been identified for removal on demolition documentation viewed during the on-site inspection.

At the time of the inspection, it was found that a portion of the rail embankment had been cleared by others. Trees 181, 182, 183, 184, 185, 186, 189, 190, 191, 192, 193, 195, 196 and 197, as identified within the AIA report and have been removed by others as part of regular rail corridor clearing works.

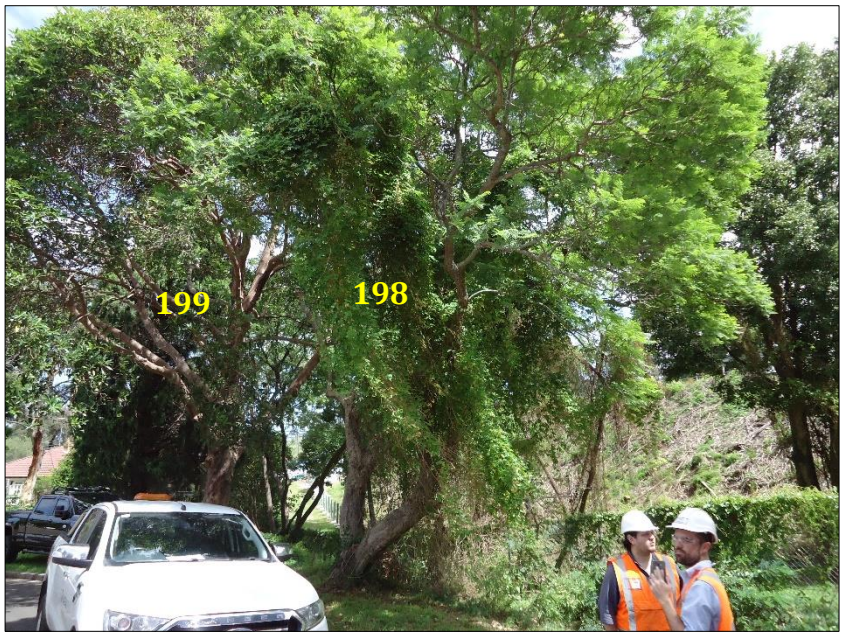


Image 5: Trees 198 and 199 as identified within the AIA report shall require removal for the Metro Services Building access road.

An understory of ten *Ligustrum lucidum* (Broad-leafed Privet) trees 3 to 12, two *Phoenix canariensis* (Canary Island Date Palm) trees 14 and 15, eight *Cinnamomum camphora* (Camphor Laurel) trees 16 to 23, nine *Alianthus altissima* (Tree of Heaven) trees 24 to 32, three *Robinia psuedoacacia* (Black Locust) trees 33 to 35, one *Gleditsia triacanthos* (Honey Locust) tree 36, two *Morus alba* (Mulberry) trees 37 and 38 and eight *Senna pendula* (Easter Cassia) trees 39 to 46 exists along the embankment beneath the canopies of trees 166 to 180. Although meeting the requirement of a tree under the *Sydney Metro City & Southwest Sydenham to Bankstown Instrument of Approval* these species are commonly considered to be weeds. Broad-leafed Privet, Camphor Laurel, Tree of Heaven, Easter Cassia, Black Locust and Honey Locust are identified species under the *Biosecurity Act 2015*. A general biosecurity duty exists within NSW to prevent, eliminate or minimise any biosecurity risk. The understory generally ranges in height between 3 and 10m and has been previously managed through selective pruning, lopping and removal works. Its significance has been assessed under the Pre-clearance Assessment prepared by Cumberland Ecology dated 14 March 2021.

The additional trees to be removed are not representative of an endangered or threatened species or ecological community.

All appropriate approvals and consents are to be obtained prior to tree and vegetation removal works commencing. All tree removal works are to be undertaken by suitably qualified tree workers and in accordance with Safe Work Australia's Guide to Managing Risks of Tree Trimming and Removal Works.

Please feel free to contact me should you require any further assistance regarding this matter.

Regards.
Owen Tebbutt

Consulting Arborist
Plateau Tree Service

Tree number	Tree name	Tree dimensions				Vigour	Condition	Age class	ULE	Amenity and Visual Value	Native or Exotic	TPZ (m)	SRZ (m)	Comments	Remove or Retain
	Botanical name Common name	Height (m)	Spread (m)	D.B.H. (mm)	D.A.B. (mm)										
1	*Acacia saligna* (Golden Wreath Wattle)	1-5	4x4	-	-	N	G	M	S	M	N	-	-	No access to rail corridor, DBH not obtained. Short lived tree species. Clash with soil nailing and GST.	Remove
2	*Acacia saligna* (Golden Wreath Wattle)	1-5	4x4	-	-	N	G	M	S	M	N	-	-	No access to rail corridor, DBH not obtained. Short lived tree species. Clash with soil nailing and GST.	Remove
3	*Ligustrum lucidim* (Broad-leafed Privet)	5-10	1x1	100	200	N	G	M	S	L	E	2	1.5	Understorey specimen. Listed noxious weed under Biosecurity Act 2015 – general biosecurity duty exists. Clash with MSB.	Remove
4	*Ligustrum lucidim* (Broad-leafed Privet)	5-10	1x1	100	200	N	G	M	S	L	E	2	1.5	Understorey specimen. Listed noxious weed under Biosecurity Act 2015 – general biosecurity duty exists. Clash with MSB.	Remove
5	*Ligustrum lucidim* (Broad-leafed Privet)	1-5	1x1	50	80	N	G	M	S	L	E	2	1.5	Understorey specimen. Listed noxious weed under Biosecurity Act 2015 – general biosecurity duty exists. Clash with MSB.	Remove
6	*Ligustrum lucidim* (Broad-leafed Privet)	1-5	1x1	50	80	N	G	M	S	L	E	2	1.5	Understorey specimen. Listed noxious weed under Biosecurity Act 2015 – general biosecurity duty exists. Clash with MSB.	Remove
7	*Ligustrum lucidim* (Broad-leafed Privet)	1-5	1x1	50	80	N	G	M	S	L	E	2	1.5	Understorey specimen. Listed noxious weed under Biosecurity Act 2015 – general biosecurity duty exists. Clash with MSB.	Remove
8	*Ligustrum lucidim* (Broad-leafed Privet)	5-10	1x1	50	80	N	G	M	S	L	E	2	1.5	Understorey specimen. Listed noxious weed under Biosecurity Act 2015 – general biosecurity duty exists. Clash with MSB.	Remove
9	*Ligustrum lucidim* (Broad-leafed Privet)	5-10	1x1	50	80	N	G	M	S	L	E	2	1.5	Understorey specimen. Listed noxious weed under Biosecurity Act 2015 – general biosecurity duty exists. Clash with MSB.	Remove
10	*Ligustrum lucidim* (Broad-leafed Privet)	5-10	1x1	50	80	N	G	M	S	L	E	2	1.5	Understorey specimen. Listed noxious weed under Biosecurity Act 2015 – general biosecurity duty exists. Clash with MSB.	Remove
11	*Ligustrum lucidim* (Broad-leafed Privet)	5-10	1x1	50	80	N	G	M	S	L	E	2	1.5	Understorey specimen. Listed noxious weed under Biosecurity Act 2015 – general biosecurity duty exists. Clash with MSB.	Remove
12	*Ligustrum lucidim* (Broad-leafed Privet)	5-10	1x1	50	80	N	G	M	S	L	E	2	1.5	Understorey specimen. Listed noxious weed under Biosecurity Act 2015 – general biosecurity duty exists. Clash with MSB.	Remove
13	*Pittosporum undulatum* (Sweet pittosporum)	5-10	2x2	100	200	N	G	M	S	L	N	2	1.5	Clash with soil nailing and GST.	Remove

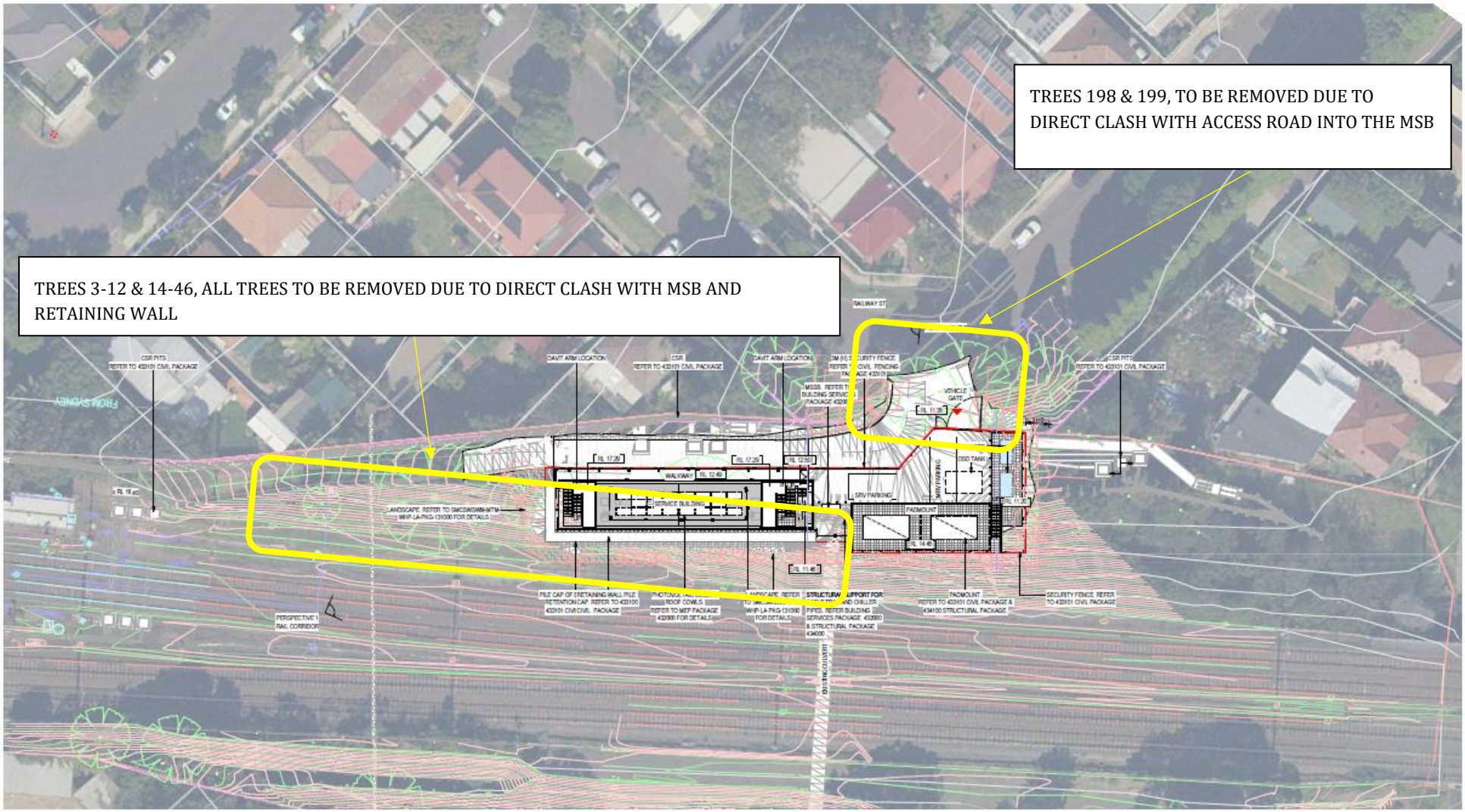
Tree number	Tree name Botanical name Common name	Tree dimensions Height (m)	Spread (m)	D.B.H. (mm)	D.A.B. (mm)	Vigour	Condition	Age class	ULE	Amenity and Visual Value	Native or Exotic	TPZ (m)	SRZ (m)	Comments	Remove or Retain
14	*Phoenix canariensis* (Canary Island Date Palm)	1-2	2x2	100	200	N	G	M	M	L	E	3	1.5	Understorey specimen. Clash with MSB. Not a tree due to height.	Remove
15	*Phoenix canariensis* (Canary Island Date Palm)	1-2	2x2	100	200	N	G	M	M	L	E	3	1.5	Understorey specimen. Clash with MSB. Not a tree due to height.	Remove
16	*Cinnamomum camphora* (Camphor laurel)	5-10	3x3	100	200	N	G	M	M	L	E	2	1.5	Understorey specimen. Listed noxious weed under Biosecurity Act 2015 – general biosecurity duty exists. Clash with MSB.	Remove
17	*Cinnamomum camphora* (Camphor laurel)	5-10	3x3	100	200	N	G	M	M	L	E	2	1.5	Understorey specimen. Listed noxious weed under Biosecurity Act 2015 – general biosecurity duty exists. Clash with MSB.	Remove
18	*Cinnamomum camphora* (Camphor laurel)	5-10	3x3	100	200	N	G	M	M	L	E	2	1.5	Understorey specimen. Listed noxious weed under Biosecurity Act 2015 – general biosecurity duty exists. Clash with MSB.	Remove
19	*Cinnamomum camphora* (Camphor laurel)	5-10	3x3	100	200	N	G	M	M	L	E	2	1.5	Understorey specimen. Listed noxious weed under Biosecurity Act 2015 – general biosecurity duty exists. Clash with MSB.	Remove
20	*Cinnamomum camphora* (Camphor laurel)	10-15	3x3	150	250	N	G	M	M	L	E	2	1.5	Understorey specimen. Listed noxious weed under Biosecurity Act 2015 – general biosecurity duty exists. Clash with MSB.	Remove
21	*Cinnamomum camphora* (Camphor laurel)	10-15	3x3	1000	1200	N	G	M	M	L	E	12	3.6	Understorey specimen. Listed noxious weed under Biosecurity Act 2015 – general biosecurity duty exists. Clash with MSB.	Remove
22	*Cinnamomum camphora* (Camphor laurel)	5-10	3x3	50	80	N	G	M	M	L	E	2	1.5	Understorey specimen. Listed noxious weed under Biosecurity Act 2015 – general biosecurity duty exists. Clash with MSB.	Remove
23	*Cinnamomum camphora* (Camphor laurel)	5-10	3x3	50	80	N	G	M	M	L	E	2	1.5	Understorey specimen. Listed noxious weed under Biosecurity Act 2015 – general biosecurity duty exists. Clash with MSB.	Remove
24	*Alianthus altissima* (Tree of Heaven)	5-10	3x3	100	200	N	G	M	S	L	E	2	1.5	Understorey specimen. Listed noxious weed under Biosecurity Act 2015 – general biosecurity duty exists. Clash with MSB.	Remove
25	*Alianthus altissima* (Tree of Heaven)	5-10	3x3	100	200	N	G	M	S	L	E	2	1.5	Understorey specimen. Listed noxious weed under Biosecurity Act 2015 – general biosecurity duty exists. Clash with MSB.	Remove
26	*Alianthus altissima* (Tree of Heaven)	5-10	3x3	100	200	N	G	M	S	L	E	2	1.5	Understorey specimen. Listed noxious weed under Biosecurity Act 2015 – general biosecurity duty exists. Clash with MSB.	Remove

Tree number	Tree name	Tree dimensions				Vigour	Condition	Age class	ULE	Amenity and Visual Value	Native or Exotic	TPZ (m)	SRZ (m)	Comments	Remove or Retain
	Botanical name Common name	Height (m)	Spread (m)	D.B.H. (mm)	D.A.B. (mm)										
27	*Alianthus altissima* (Tree of Heaven)	5-10	3x3	100	200	N	G	M	S	L	E	2	1.5	Understorey specimen. Listed noxious weed under Biosecurity Act 2015 – general biosecurity duty exists. Clash with MSB.	Remove
28	*Alianthus altissima* (Tree of Heaven)	5-10	3x3	100	200	N	G	M	S	L	E	2	1.5	Understorey specimen. Listed noxious weed under Biosecurity Act 2015 – general biosecurity duty exists. Clash with MSB.	Remove
29	*Alianthus altissima* (Tree of Heaven)	5-10	3x3	100	200	N	G	M	S	L	E	2	1.5	Understorey specimen. Listed noxious weed under Biosecurity Act 2015 – general biosecurity duty exists. Clash with MSB.	Remove
30	*Alianthus altissima* (Tree of Heaven)	5-10	3x3	100	200	N	G	M	S	L	E	2	1.5	Understorey specimen. Listed noxious weed under Biosecurity Act 2015 – general biosecurity duty exists. Clash with MSB.	Remove
31	*Alianthus altissima* (Tree of Heaven)	5-10	3x3	100	200	N	G	M	S	L	E	2	1.5	Understorey specimen. Listed noxious weed under Biosecurity Act 2015 – general biosecurity duty exists. Clash with MSB.	Remove
32	*Alianthus altissima* (Tree of Heaven)	5-10	3x3	100	200	N	G	M	S	L	E	2	1.5	Understorey specimen. Listed noxious weed under Biosecurity Act 2015 – general biosecurity duty exists. Clash with MSB.	Remove
33	*Robinia psuedoacacia* (Black Locust)	5-10	3x3	100	200	N	G	M	S	L	E	2	1.5	Understorey specimen. Listed noxious weed under Biosecurity Act 2015 – general biosecurity duty exists. Clash with MSB.	Remove
34	*Robinia psuedoacacia* (Black Locust)	5-10	3x3	100	200	N	G	M	S	L	E	2	1.5	Understorey specimen. Listed noxious weed under Biosecurity Act 2015 – general biosecurity duty exists. Clash with MSB.	Remove
35	*Robinia psuedoacacia* (Black Locust)	5-10	3x3	100	200	N	G	M	S	L	E	2	1.5	Understorey specimen. Listed noxious weed under Biosecurity Act 2015 – general biosecurity duty exists. Clash with MSB.	Remove
36	*Gleditsia triacanthos* (Honey Locust)	1-2	1x1	50	80	N	G	Y	S	L	E	2	1.5	Understorey specimen. Listed noxious weed under Biosecurity Act 2015. Not a tree due to height. Clash with MSB.	Remove
37	*Morus alba* (Mulberry)	5-10	3x3	200	300	N	G	M	S	L	E	2.4	2	Understorey specimen. Clash with MSB	Remove
38	*Morus alba* (Mulberry)	5-10	3x3	200	300	N	G	M	S	L	E	2.4	2	Understorey specimen. Clash with MSB	Remove
39	*Senna pendula* (Easter Cassia)	1-5	1x1	50	80	N	G	Y	S	L	E	2	1.5	Understorey specimen. Listed noxious weed under Biosecurity Act 2015 – general biosecurity duty exists. Clash with MSB	Remove

Tree number	Tree name	Tree dimensions				Vigour	Condition	Age class	ULE	Amenity and Visual Value	Native or Exotic	TPZ (m)	SRZ (m)	Comments	Remove or Retain
	Botanical name Common name	Height (m)	Spread (m)	D.B.H. (mm)	D.A.B. (mm)										
40	*Senna pendula* (Easter Cassia)	1-5	1x1	50	80	N	G	Y	S	L	E	2	1.5	Understorey specimen. Listed noxious weed under Biosecurity Act 2015 – general biosecurity duty exists. Clash with MSB	Remove
41	*Senna pendula* (Easter Cassia)	1-5	1x1	50	80	N	G	Y	S	L	E	2	1.5	Understorey specimen. Listed noxious weed under Biosecurity Act 2015 – general biosecurity duty exists. Clash with MSB	Remove
42	*Senna pendula* (Easter Cassia)	1-5	1x1	50	80	N	G	Y	S	L	E	2	1.5	Understorey specimen. Listed noxious weed under Biosecurity Act 2015 – general biosecurity duty exists. Clash with MSB	Remove
43	*Senna pendula* (Easter Cassia)	1-5	1x1	50	80	N	G	Y	S	L	E	2	1.5	Understorey specimen. Listed noxious weed under Biosecurity Act 2015 – general biosecurity duty exists. Clash with MSB	Remove
44	*Senna pendula* (Easter Cassia)	1-5	1x1	50	80	N	G	Y	S	L	E	2	1.5	Understorey specimen. Listed noxious weed under Biosecurity Act 2015 – general biosecurity duty exists. Clash with MSB	Remove
45	*Senna pendula* (Easter Cassia)	1-5	1x1	50	80	N	G	Y	S	L	E	2	1.5	Understorey specimen. Listed noxious weed under Biosecurity Act 2015 – general biosecurity duty exists. Clash with MSB	Remove
46	*Senna pendula* (Easter Cassia)	1-5	1x1	50	80	N	G	Y	S	L	E	2	1.5	Understorey specimen. Listed noxious weed under Biosecurity Act 2015 – general biosecurity duty exists. Clash with MSB	Remove
47	*Acacia saligna* (Golden Wreath Wattle)	5-10	3x3	150	250	N	G	M	S	L	N	2	1.5	Clash with soil nailing and GST.	Remove
48	*Acacia saligna* (Golden Wreath Wattle)	5-10	3x3	150	250	N	G	M	S	L	N	2	1.5	Clash with soil nailing and GST.	Remove
49	*Acacia saligna* (Golden Wreath Wattle)	5-10	3x3	150	250	N	G	M	S	L	N	2	1.5	Clash with soil nailing and GST.	Remove
50	*Acacia saligna* (Golden Wreath Wattle)	5-10	3x3	50	80	N	G	M	S	L	N	2	1.5	Clash with soil nailing and GST.	Remove
51	*Acacia saligna* (Golden Wreath Wattle)	5-10	3x3	50	80	N	G	M	S	L	N	2	1.5	Clash with soil nailing and GST.	Remove
52	*Acacia saligna* (Golden Wreath Wattle)	5-10	3x3	100	200	N	G	M	S	L	N	2	1.5	Clash with soil nailing and GST.	Remove

Tree number	Tree name	Tree dimensions				Vigour	Condition	Age class	ULE	Amenity and Visual Value	Native or Exotic	TPZ (m)	SRZ (m)	Comments	Remove or Retain
	Botanical name Common name	Height (m)	Spread (m)	D.B.H. (mm)	D.A.B. (mm)										
53	*Acacia saligna* (Golden Wreath Wattle)	5-10	3x3	100	200	N	G	M	S	L	N	2	1.5	Clash with soil nailing and GST.	Remove
54	*Grevillea* sp (Grevillea)	5-10	2x2	50	80	N	G	M	S	L	N	2	1.5	Clash with soil nailing and GST.	Remove
55	*Yucca* sp (Yucca)	1-5	1x1	-	-	N	G	M	S	L	E	2	1.5	Clash with soil nailing and GST.	Remove
56	*Yucca* sp (Yucca)	1-5	1x1	-	-	N	G	M	S	L	E	2	1.5	Clash with soil nailing and GST.	Remove


TREES 3-12 & 14 -46, ALL TREES TO BE REMOVED DUE TO DIRECT CLASH WITH MSB AND RETAINING WALL
3,4,5,6,7,8,9,10,11,12,14,15,16,17,18,19,20,21,22,23,24,25,26,27,28,29,30,
31,32,33,34,35,36,37,38,39,40,41,42,43,44,45 & 46
Railway St
Railway St
Railway St
Hopetoun St
1
2
3
4
5
6
7
8
10A
12



FOR CONSTRUCTION

REV	BY	DATE	DESCRIPTION	APPD
00	BN	31/03/2021	APPROVED FOR CONSTRUCTION	LP

A1 Original | Co-ordinate System: MGA Zone 56 | Height Datum: A.H.D. | This sheet may be prepared using colour and may be incomplete if copied | NOTE: Do not scale from this drawing. | ALT. DRG No. SMCSWSWM-MTM-WHP-AT-DWG-431120

CLIENT

SERVICE PROVIDERS

METRON T2M

DRAWN E. GUYOT
DESIGNED B. HOWARD
DRG CHECK M. LODGE
DESIGN CHECK G. DAVIES
APPROVED A. PALMER 31/03/2021

SYDNEY METRO

HURLSTONE PARK
ARCHITECTURAL
OVERALL ARRANGEMENT
SITE PLAN – SERVICE BUILDING

STATUS: FOR CONSTRUCTION | SHEET 1 OF 1

DRG No. SMCSWSWM-MTM-WHP-AT-DWG-431120 | REV 00

Appendix 3: Tree Assessment Criteria

Tree number: Identifying number given to individual (or group) trees.
Botanical Name: Latin name for tree showing genus and species.
Common Name: The common name given to the tree.
Tree Dimensions: The physical dimensions of the tree.

- **Height**: Estimated or measured height of tree in meters.
- **Spread**: Estimated or measured radial canopy spread of tree in meters.
- **Diameter at Breast Height (DBH)**: The estimated or measured diameter of trunk given in mm measured at 1.4m from ground.
- **Diameter Above Base (DAB)**: The estimated or measured diameter of trunk given in mm measured above the root flare. Used to calculate the structural root zone of the tree.

Age Class: An estimation of how old the tree is in relation to its life expectancy.

- **Young** – Age less than 20% of life expectancy of tree in situ
- **Mature** – Age 20% - 80% of life expectancy of tree in situ
- **Old** – Age greater than 80% of life expectancy of tree in situ
- **Dead** – Tree is dead

Vigour: Ability of a tree to sustain its life processes. This is independent of the condition of a tree but may impact upon it. Vigour can appear to alter rapidly with change of seasons (seasonality) e.g., dormant, deciduous or semi-deciduous trees. Vigour can be categorised as Dormant, Low, Normal and High.

- **Dormant Vigour** – Determined by the existing turgidity in the lower order branches in the outer extremity of the crow, with good bud set and formation, and where the last extension growth is distinct from those most recently preceding it, evident by bud scale scars. Normal vigour during dormancy is achieved when such growth is evident on a majority of branches throughout the crown.
- **Low Vigour** – Reduced ability of a tree to sustain its life processes. This may be evident by the atypical growth of leaves, reduced crown cover and reduced crown density, branches, roots and trunk, and a deterioration of their functions with reduced resistance to predation. This is independent of the condition of a tree but may impact upon it, and especially the ability of a tree to sustain itself against predation.
- **Normal Vigour** – Ability of a tree to maintain and sustain its life processes. This may be evident by the typical growth of leaves, crown cover and crown density, branches, roots and trunk and resistance to predation. This is independent of the condition of a tree but may impact upon it, and especially the ability of a tree to sustain itself against predation.
- **High Vigour** – Accelerated growth of a tree due to incidental or deliberate artificial changes to its growing environment that are seemingly beneficial, but may result in premature aging or failure if the favourable conditions cease, or promote prolonged senescence if the favourable conditions remain, e.g. water from a leaking pipe, water and nutrients from a leaking or disrupted sewer pipe, nutrients from animal waste, a tree growing next to a chicken coop, or a stock feed lot, or a regularly used stockyard, a tree subject to stringent watering and fertilisation program, or some trees may achieve an extended lifespan from continuous pollarding practices over the life of the tree.

Condition: A tree's crown form and growth habit, as modified by its environment (aspect, suppression by other trees, soils) the stability and viability of the root plate, trunk and structural branches (first (1st) and possibly (2nd) order branches), including structural defects such as wounds, cavities or hollows, crooked trunk or weak trunk/branch junctions and the effects of predation by pests and diseases. These may not be directly connected with vigour and it is possible for a tree to be of normal vigour but in poor condition. Condition can be categorised as Dead, Poor, Fair and Good.

- **Dead Condition** – Tree is no longer capable of performing any of the following processes or is exhibiting any of the following symptoms; Photosynthesis via its foliage crown (as indicated by the presence of moist, green or other coloured leaves), Osmosis (the ability of the roots system to take up water), Turgidity (the ability of the plant to sustain moisture pressure in its cells), Epicormic shoots or epicormic strands in Eucalypts (the production of new shoots as a response to stress, generated from latent or adventitious buds or from a lignotuber), Permanent leaf loss, Permanent leaf wilting (the loss of turgidity which is marked by desiccation of stems leaves and roots), Abscission of the epidermis (bark desiccates and peels off to the beginning of the sap wood).
- **Poor Condition** - Tree is of good habit or misshapen, a form that may be severely restricted for space and light, exhibits symptoms of advanced and irreversible decline such as fungal, or bacterial infestation, major die-back in the branch and foliage crown, structural deterioration from insect damage e.g. termite infestation, or storm damage or lightning strike, ring barking from borer activity in the trunk, root damage or instability of the tree, or damage from physical wounding impacts or abrasion, or from altered local environmental conditions and has been unable to adapt to such changes and may decline further to death regardless of remedial works or other modifications to the local environment that would normally be sufficient to provide for its basic survival if in good to fair condition. Deterioration physically, often characterised by a gradual and continuous reduction in vigour but may be independent of a change in vigour, but characterised by a proportionate increase in susceptibility to, and predation by pests and diseases against which the tree cannot be sustained. Such conditions may also be evident in trees of advanced senescence due to normal phenological processes, without modifications to the growing environment or physical damage having been inflicted upon the tree. This may be independent from, or contributed to by vigour.
- **Fair Condition** - Tree is of good habit or misshapen, a form not severely restricted for space and light, has some physical indication of decline due to the early effects of predation by pests and diseases, fungal, bacterial, or insect infestation, or has suffered physical injury to itself that may be contributing to instability or structural weaknesses, or is faltering due to the modification of the environment essential for its basic survival. Such a tree may recover with remedial works where appropriate, or without intervention may stabilise or improve over time, or in response to the implementation of beneficial changes to its local environment. This may be independent from, or contributed to by vigour.
- **Good Condition** - Tree is of good habit, with crown form not severely restricted for space and light, physically free from the adverse effects of predation by pests and diseases, obvious instability or structural weaknesses, fungal, bacterial or insect infestation and is expected to continue to live in much the same condition as at the time of inspection provided conditions around it for its basic survival do not alter greatly. This may be independent from, or contributed to by vigour.

Safe Useful Life Expectancy (SULE) SULE is the length of time that the arborist assesses an individual tree can be retained with an acceptable level of risk based on the information available at the time of inspection. It is a snapshot in time of the potential an individual tree has for survival in the eyes of the assessor. SULE is not static – it is closely related to tree health and the surrounding conditions. Alterations in these variables may result in changes to the SULE assessment. Consequently, the reliability all SULE assessments have will decrease as time passes from the initial assessment and the potential for changes in variables increases.

- **Remove –** Trees that should be removed within the next 5 years
- **Short –** Trees that appear to be retainable at the time of the assessment for 5-15 years with an acceptable level of risk.
- **Medium –** Trees that appear to be retainable at the time of the assessment for 15-40 years with an acceptable level of risk.
- **Long –** Trees that appear to be retainable at the time of the assessment for 40+ years with an acceptable level of risk.

Amenity and Visual Value – For the purposes of assessing the visual and landscape value of each tree the IACA Significance of a Tree, Assessment Rating System (STARS) © (IACA 2010) © has been adopted. - The landscape significance of a tree is an essential criterion to establish the importance that a particular tree may have on a site. The system uses a scale of High, Medium and Low significance in the landscape.

High significance in landscape

- The tree is in good condition and good vigour
- The tree has a form typical for the species
- The tree is a remnant or is a planted locally indigenous specimen and/or is rare or uncommon in the local area or of botanical interest or of substantial age
- The tree is listed as a heritage item, threatened species or part of an endangered ecological community or listed on council's significant tree register
- The tree is visually prominent and visible from a considerable distance when viewed from most directions within the landscape due to its size and scale and makes a positive contribution to the local amenity
- The tree supports social and cultural sentiments or spiritual associations, reflected by the broader population or community group or has commemorative values
- The tree's growth is unrestricted by above and below ground influences, supporting its ability to reach dimensions typical for the taxa in situ – tree is appropriate to the site conditions

Medium significance in landscape

- The tree is in fair-good condition and good or low vigour
- The tree has form typical or atypical of the species
- The tree is a planted locally indigenous or a common species with its taxa commonly planted in the local area
- The tree is visible from surrounding properties, although not visually prominent as partially obstructed by other vegetation or buildings when viewed from the street
- The tree provides a fair contribution to the visual character and amenity of the local area
- The tree's growth is moderately restricted by above or below ground influences, reducing its ability to reach dimensions typical for the taxa in situ

Low significance in landscape

- The tree is in fair-poor condition and good or low vigour
- The tree has form atypical of the species
- The tree is not visible or is partly visible from the surrounding properties as obstructed by other vegetation or buildings
- The tree provides a minor contribution or has a negative impact on the visual character and amenity of the local area
- The tree is a young specimen which may or may not have reached dimensions to be protected by local Tree Preservation Orders or similar protection mechanisms and can easily be replaced with a suitable specimen
- The tree's growth is severely restricted by above or below ground influences, unlikely to reach dimensions typical for the taxa in situ – tree is inappropriate to the site conditions
- The tree is listed as exempt under the provisions of the local Council Tree Preservation Order or similar protection mechanisms
- The tree has a wound or defect that has the potential to become structurally unsound
- **Environmental Pest / Noxious Weed Species**
- The tree is an environmental pest species due to its invasiveness or poisonous/allergenic properties.
- The tree is a declared noxious weed by legislation
- **Hazardous / Irreversible Decline**
- The tree is structurally unsound and/or unstable and is considered potentially dangerous
- The tree is dead, or is in irreversible decline, or has the potential to fail or collapse in full or in part in the immediate to short term

The tree is to have a minimum of three (3) criteria in a category to be classified in that group.

In the development of this document IACA acknowledges the contribution and original concept of the Footprint Green Tree Significance & Retention Value Matrix, developed by Footprint Green Pty Ltd in June 2010.

The Australian Standard 4970-2009 Protection of Trees on Development Sites defines the requirements for assessing trees with respect to development. It provides the guidance on how to decide which trees are appropriate for retention and on the means of protecting them during construction works. It describes the areas and offsets, referred to as the Tree Protection Zone (TPZ) and Structural Root Zone (SRZ) required to be free from development works to maintain tree vitality and stability. This report has been prepared in accordance with the conditions set out within the standard.

- **Tree Protection Zone** – The tree protection zone is defined as a specified area above and below ground set aside for the protection of the tree's roots and crown. It is expressed as a radial measurement taken from the centre of the trunk at ground level.

Structural Root Zone – The structural root zone is defined as a specified area around the base of a tree required to maintain its stability within the ground. It is expressed as a radial measurement taken from the center of the trunk at ground level. Excavation and development works are not recommended within the structural root zone unless additional investigation as to root size and location is undertaken

PLATEAUTREES
Safety. Quality. Progress.

Pruning Specification

7 COMMONS ST,HURLSTONE PARK 2193

Prepared By: Colin Curtis
AQF 5 Arboriculture Diploma
Arboriculture Australia Member #2332
Member of the International Society of Arboriculture #228182

Prepared For:
Downer Group

11/05/2021

1. INTRODUCTION

1.1 A request from Downer Group was made to Plateau Trees on the 11th May 2021, to produce a pruning specification as to allow for heavy vehicle access within the rail corridor of Hurlstone Park Station. The pruning of one (1) x tree is detailed within this specification.

2. THE SITE

2.1 The subject tree are located in the rear yard of 7 Commons St, Hurlstone Park 2193.The tree can be seen in figure 1 below, numbered and outlined in red.

Figure 1

1 7 Commons St, Hurlstone Park 2193.

Plateau Tree Service Pty Ltd
PO BOX 1522, DEE WHY NSW 2099 Australia
P: 02 9939 5350 | F: 02 9905 7569
E: info@plateautrees.com.au | W: www.plateautrees.com.au
ABN : 17 090 798 002

3. PRUNING SPECIFICATION

3.1 TREE 1 – MORTON BAY FIG (*FICUS MACROPHYLLA*) SEE FIGURE 2

Branch No #	Branch / Stem Height (Mts)	Branch / Stem Diameter (mm)	Branch Order	Pruning Class	Canopy Percentage
1	3	80	2nd	7.2.4, Selective	3%
2	3	250	2nd	7.2.4, Selective	13%
3	3.6	180	2nd	7.2.4, Selective	7%

Figure 2: Cut locations of limbs to be pruned marked in red.

2 7 Commons St, Hurlstone Park 2193.

This area of foliage is minor regrowth from weed species and is requested to be pruned back to the fence line.

3 7 Commons St, Hurlstone Park 2193.

Plateau Tree Service Pty Ltd
PO BOX 1522, DEE WHY NSW 2099 Australia
P: 02 9939 5350 | F: 02 9905 7569
E: info@plateautrees.com.au | W: www.plateautrees.com.au
ABN : 17 090 798 002

4. CONCLUSION & RECOMMENDATIONS

4.1 All works must be undertaken in accordance with the Australian Standard (AS)4373-2007, Pruning of Amenity Trees.

4.2 Any additional limbs that may be required to be pruned that have not been mentioned in this specification, will be undertaken at the discretion of the site arborist.

4.3 Pruning must be undertaken by a qualified Arborist (AQF[1] 3) following the guidelines provided in the Amenity Tree Industry – Work Cover Code of Practice 1998 and Safe work Australia's "Guide to managing risks of tree trimming and removal work" (July 2016).

.

[1] *Australian Qualification Framework*

Plateau Tree Service Pty Ltd
PO BOX 1522, DEE WHY NSW 2099 Australia
P: 02 9939 5350 | F: 02 9905 7569
E: info@plateautrees.com.au | W: www.plateautrees.com.au
ABN : 17 090 798 002

PLATEAUTREES
Safety. Quality. Progress.

Pruning Specification

5 RAILWAY ST,HURLSTONE PARK 2193

Prepared By: Colin Curtis
AQF 5 Arboriculture Diploma
Arboriculture Australia Member #2332
Member of the International Society of Arboriculture #228182

Prepared For:
Downer Group

11/05/2021

1. INTRODUCTION

1.1 A request from Downer Group was made to Plateau Trees on the 11th May 2021, to produce a pruning specification as to allow for heavy vehicle access within the rail corridor of Hurlstone Park Station. The pruning of two (2) x trees is detailed within this specification.

2. THE SITE

2.1 The subject trees are located in the rear yard of 5 Railway St, Hurlstone Park 2193.These trees can be seen in figure 1 below, numbered and outlined in red.

Figure 1

1 5 Railway S, Hurlstone Park 2193.

3. PRUNING SPECIFICATION

3.1 TREE 1 – WILLOW BOTTLE BRUSH (*CALLISTEMON SALIGNUS*) SEE FIGURE 2

Branch No #	Branch / Stem Height (Mts)	Branch / Stem Diameter (mm)	Branch Order	Pruning Class	Canopy Percentage
1	2	150	1st	7.2.4, Selective	4%
2	2.1	120	1st	7.2.4, Selective	4%
3	2.3	100	1st	7.2.4, Selective	4%
4	2.5	80	1st	7.2.4, Selective	3%

Figure 2: Limbs to be pruned marked in red.

2 5 Railway S, Hurlstone Park 2193.

3.2 TREE 2 – GUM TREE (*UNIDENTIFIED EUCALYPTUS SP.*) SEE FIGURE 3

Branch No #	Branch / Stem Height	Branch / Stem Diameter	Branch Order	Pruning Class	Canopy Percentage
1	4.4m	180mm	2nd	7.2.4, Selective	8%
2	4.5m	180mm	2nd	7.2.4, Selective	9%

Figure 3: Limbs to be pruned marked in red.

3 5 Railway S, Hurlstone Park 2193.

4. CONCLUSION & RECOMMENDATIONS

4.1 All works must be undertaken in accordance with the Australian Standard (AS)4373-2007, Pruning of Amenity Trees.

4.2 Any additional limbs that may be required to be pruned that have not been mentioned in this specification, will be undertaken at the discretion of the site arborist.

4.3 Pruning must be undertaken by a qualified Arborist (AQF[1] 3) following the guidelines provided in the Amenity Tree Industry – Work Cover Code of Practice 1998 and Safe work Australia's "Guide to managing risks of tree trimming and removal work" (July 2016).

.

[1] *Australian Qualification Framework*

Plateau Tree Service Pty Ltd
PO BOX 1522, DEE WHY NSW 2099 Australia
P: 02 9939 5350 | F: 02 9905 7569
E: info@plateautrees.com.au | W: www.plateautrees.com.au
ABN : 17 090 798 002

APPENDIX 6.1 HURLSTONE PARK AIA (PLATEAU TREES)

PLATEAUTREES
Safety. Quality. Progress.

Date: 23 August 2021

Re: Additional tree removals at Hurlstone Park Station as part of the Southwest Metro Package.

At the request of Downer Group an onsite inspection was undertake at Hurlstone Park Station. It has been asked to identify and record additional tree removals beyond those recommended within the Arboricultural Impact Assessment (AIA) was prepared by Urban Arbor, dated 11 December 2019, Ref19/12/11/SWMMS. On the 17 August a site walkthrough was undertaken by myself and representatives from Downer Group. Additional tree removals were identified with respects to the proposed Southwest Metro Package works. The data for these additional trees can be found as Appendix 1 of this report.

Additional tree removals were identified at the following locations:

- Tree 1, northern side of the rail corridor adjacent the western side of rail bridge
- Trees 2 and 3 southern side of rail corridor adjacent Floss Street

Image 1 show the approximate locations of the assessed trees.

Tree 1 consists of a self-seeded multi-stemmed *Acer negundo* (Box Elder), refer Appendix 2 photograph 1. It has been assessed as having a short useful life expectancy and low landscape value. The wider Southwest Metro Package works require three 300mm diameter piles to be excavated at the location of the tree to

Plateau Tree Service Pty Ltd
PO BOX 1522, DEE WHY NSW 2099 Australia
P: 02 9939 5350 | F: 02 9905 7569
E: info@plateautrees.com.au | W: www.plateautrees.com.au
ABN : 17 090 798 002

Image 1: Aerial image of Hurlstone Park Station showing the location of additional tree and vegetation removal. *(Source Six Maps accessed 23/08/2021)*.

enable the construction of a materials throw screen. As such, the tree cannot be retained.

Trees 2 and 3 consist of an *Acacia* sp (Wattle) and *Cinnamomum camphora* (Camphor Laurel) respectively. They have been assessed as having a short useful life expectancy and medium landscape significance. A scaffolding pad is to be established over the position of tree 2 to enable equipment access to the rail corridor to undertake soil nailing works. Some selected individual stems of tree 3 may also require removal to accommodate these works. Tree 2 and selected stems of tree 3 shall require removal to enable these works. The removal of selected stems from tree 3 is not expected to have a significant impact upon the clump of stems as a whole. Only those stems found to be directly impacted upon by the proposed works are to be removed from the Camphor Laurel.

The additional trees to be removed are not representative of an endangered or threatened species or ecological community. The removal of tree 1 is not expected to have a significant impact upon local amenity. The removal of tree 2 and selected stems of tree 3 are likely to result in a short-term loss of amenity and greater exposure of the rail corridor and associated infrastructure from Floss Street.

All appropriate approvals and consents are to be obtained prior to tree and vegetation removal works commencing. All tree removal works are to be undertaken by suitably qualified tree workers and in accordance with Safe Work Australia's Guide to Managing Risks of Tree Trimming and Removal Works.

Please feel free to contact me should you require any further assistance regarding this matter.

Regards.
Owen Tebbutt

Consulting Arborist
Plateau Tree Service

Appendix 1: Tree Assessment Schedule

Tree number	Tree name	Tree dimensions				Vigour	Condition	Age class	ULE	Amenity and Visual Value	Native or Exotic	TPZ (m)	SRZ (m)	Comments	Remove or Retain
	Botanical name **Common name**	**Height (m)**	**Spread (m)**	**D.B.H. (mm)**	**D.A.B. (mm)**										
1	*Acer negundo* (Box elder)	5-10	2x2	multi	multi	-	G	Y	S	L	E	2	1.5	Multi-stemmed self-seeded specimen. Minimum TPZ and SRZ apply. Seasonal loss of leaves prevents accurate assessment of vigour.	Remove
2	*Acacia* sp (Wattle)	5-10	1x1	200	300	N	G	M	S	M	N	2.4	2	Likely a self-seeded specimen growing atop rail embankment. Kinked trunk with cavity. Tree has poor form. Tree is required to be removed to provide construction access to Duntroon St Bridge.	Remove
3	*Cinnamomum camphora* (Camphor Laurel)	10-15	4x4	100	-	N	G	M	S	M	E	4	-	Clump of multiple stems. Possibly regrowth off of old stump.	Remove stems as required

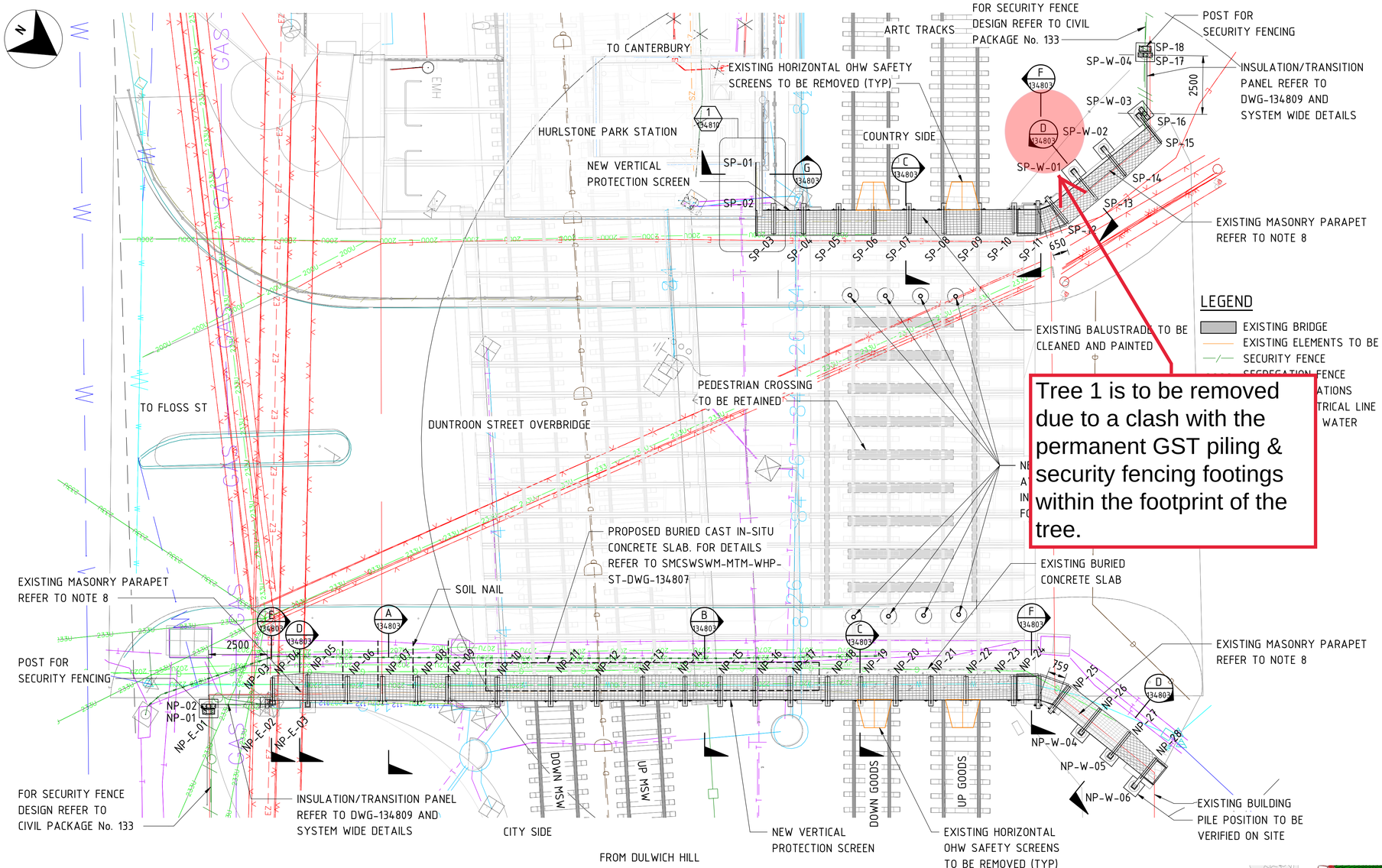
Appendix 2: Site Photographs

Photograph 1: Tree 1 *Acer negundo* (Box Elder) growing adjacent rail bridge wall on the northern side of the rail corridor.

Photograph 2: Tree 2 *Acacia* sp (Wattle) growing on the southern side of the rail corridor atop of the embankment.

Photograph 3: Tree 3 *Cinnamomum camphora* (Camphor Laurel) growing on the southern side of the rail corridor atop of the embankment. Note the kink and cavity within the trunk of tree 2.

Photograph 4: Trees 2 and 3 as seen from the rail bridge.



PLAN
SCALE 1 : 100

Tree 1 is to be removed due to a clash with the permanent GST piling & security fencing footings within the footprint of the tree.

LEGEND

- EXISTING BRIDGE
- EXISTING ELEMENTS TO BE REMOVED
- SECURITY FENCE
- SEGREGATION FENCE
- ATIONS
- TRICAL LINE
- WATER

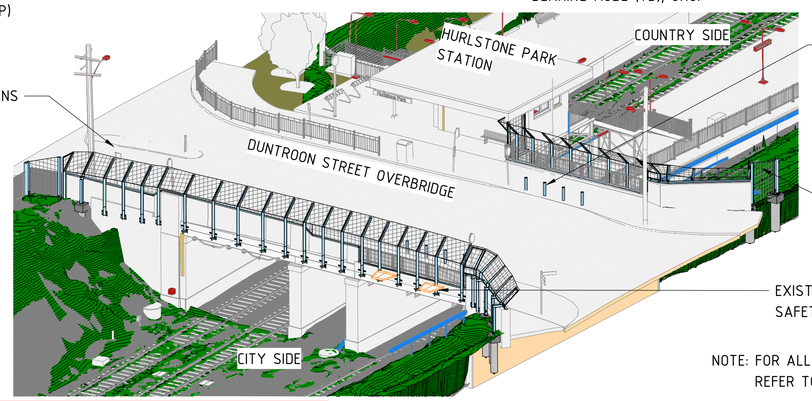
NOTES

1. FOR GENERAL NOTES AND SYSTEM WIDE TYPICAL DETAILS REFER TO DRAWINGS SMCSWSWM-MTM-WEC-ST-DWG-204850 TO 204999.
2. FOR CLASSIFICATION OF ROCK AND BORED PILE GEOTECHNICAL NOTES REFER TO GENERAL NOTES.
3. THE BRIDGE HAS BEEN ASSESSED WITH LOAD RATING FACTOR BELOW 1 FOR GENERAL ACCESS VEHICLE, WHICH SHOULD BE CONSIDERED DURING CONSTRUCTION OPERATIONS. FOR FURTHER DETAILS ON THE LOAD CAPACITY OF THE EXISTING STRUCTURE, PLEASE REFER TO 'LOAD RATING AND MANAGEMENT OF OVERBRIDGES' TECHNICAL NOTE (DOC. REF. NO. SMCSWSWM-MTM-WEC-ST-REP-104001).
4. THE HURLSTONE PARK RAILWAY STATION GROUP (INCLUDING DUNTROON STREET OVERBRIDGE) IS LISTED UNDER THE LOCAL ENVIRONMENTAL PLAN, S170 HERITAGE AND CONSERVATION REGISTER AND NATIONAL TRUST REGISTER. RAILCORP SECTION 170 REGISTER (SHI No. 4802051) AND CANTERBURY LEP 2012 (ITEM No. 1124)
5. DESIGN PARAMETERS ADOPTED FOR THE EXISTING STRUCTURAL ELEMENTS AS PER AS BUILT INFORMATION: CITY RAIL PROJECTS GROUP CIVIL DESIGN-HURLSTONE PARK FLOSS ST O/B-PARAPET WALL REPLACEMENT CONCRETE DETAILS 24/01/1994-No. 785-087
   - ASSUMED CONCRETE COMPRESSIVE STRENGTH = 32 MPa
   - DEFORMED BARS: GRADE 400
   - ROUND BAR: GRADE 230 TO AS1302
   - STRUCTURAL STEEL PLATES: GRADE 250 TO AS3678
6. ASSUMPTION OF TYPICAL 12MPa COMPRESSIVE STRENGTH OF THE EXISTING MASONRY WALL HAS BEEN TAKEN INTO ACCOUNT IN DESIGN OF THE PROTECTION SCREEN POST FIXINGS, BASED ON THE GUIDANCE PROVIDED IN AS 5100.7:2017 AND AS 3700: 2018. THE COMPRESSIVE STRENGTH OF MASONRY AT REPRESENTATIVE LOCATIONS TO BE TESTED BY THE CONTRACTOR PRIOR TO CONSTRUCTION IN ACCORDANCE WITH AS3700: 2018. A TEST REPORT TO BE PROVIDED BY THE CONTRACTOR TO THE PRINCIPALS SUPERINTENDANT TO VERIFY THE DESIGN PARAMETERS.
7. THE MASONRY WALL THICKNESS AND THE SIZE OF THE BURIED CONCRETE SLAB HAVE BEEN BASED ON POINT-CLOUD SURVEY INFORMATION AND HISTORICAL DESIGN / AS-BUILT DRAWINGS OF THE EXISTING BRIDGE STRUCTURE.
8. EXISTING MASONRY PARAPET MAY NEED TO BE TEMPORARILY DEMOLISHED AND REBUILT DURING THE PILING AND ANCHORING WORKS AS REQUIRED BY CONTRACTOR. METHODOLOGY AND EXTENT OF DEMOLITION TO BE IN ACCORDANCE WITH THE HERITAGE STATEMENT AND SHALL BE SUBMITTED TO THE PRINCIPAL'S REPRESENTATIVE FOR APPROVAL. (APPENDIX 12 OF ARCHITECTURAL DESIGN REPORT DOC. REF. No. SMCSWSWM-MTM-WHP-AT-REP-131000).
9. ASSUMPTION OF TYPICAL 20MPa COMPRESSIVE STRENGTH OF THE EXISTING CONCRETE UPSTAND HAS BEEN TAKEN INTO ACCOUNT IN THE DESIGN OF THE PROTECTION SCREEN POST FIXINGS, BASED ON THE GUIDANCE PROVIDED IN AS 5100.7;2017. THE COMPRESSIVE STRENGTH OF CONCRETE AT LOCATIONS OF FIXINGS TO BE TESTED BY THE CONTRACTOR PRIOR CONSTRUCTION, USING NON-DESTRUCTIVE TEST METHODS, SUCH AS ULTRASONIC PULSE VELOCITY AND SURFACE HARDNESS METHODS IN ACCORDANCE WITH AS 5100.8:2017. A TEST REPORT TO BE PROVIDED BY THE CONTRACTOR TO THE PRINCIPAL'S SUPIRENTENDANT TO VERIFY THE DESIGN PARAMETERS.
10. ALL BOLTS AND ANCHOR ROD CONNECTIONS TO BE TENSION CONTROLLED IN BEARING MODE (TB), UNO.

PILE SCHEDULE

PILE ID	DIAMETER (mm)	SOP EASTING	SOP NORTHING	PILE CUT OFF LEVEL (m AHD)	INDICATIVE PILE TOE LEVEL (m AHD)	INDICATIVE PILE LENGTH (m)	SOCKET MATERIAL
NP-E-01	600	327375.175	6246229.828	24.658	22.3	2.4	1m INTO CLASS V SANDSTONE
NP-E-02	600	327373.691	6246231.971	24.918	22.3	2.6	1m INTO CLASS V SANDSTONE
NP-E-03	450	327372.776	6246233.315	25.051	22.3	2.8	1m INTO CLASS V SANDSTONE
NP-W-04	450	327356.020	6246261.803	25.143	22.7	2.4	1m INTO CLASS III SANDSTONE
NP-W-05	450	327356.195	6246263.394	25.024	22.7	2.3	1m INTO CLASS III SANDSTONE
NP-W-06	450	327356.738	6246264.941	24.863	22.7	2.2	1m INTO CLASS III SANDSTONE
SP-W-01	450	327335.982	6246248.667	24.141	22.7	1.4	1m INTO CLASS III SANDSTONE
SP-W-02	450	327334.481	6246249.224	24.384	22.7	1.7	1m INTO CLASS III SANDSTONE
SP-W-03	600	327332.364	6246249.757	24.568	22.7	1.9	1m INTO CLASS III SANDSTONE
SP-W-04	600	327330.044	6246248.502	24.780	22.7	2.1	1m INTO CLASS III SANDSTONE

*PILE TOP LEVELS TO BE CONFIRMED ON SITE



ISOMETRIC VIEW

NOTE: FOR ALL OTHER UTILITY DETAILS, REFER TO CIVIL DESIGN PACKAGE NO. 133

DRAWING COLOUR CODED - PRINT ALL COPIES IN COLOUR

FOR CONSTRUCTION

REV.	BY	DATE	DESCRIPTION	APPD.
00	F.A	31.03.2021	APPROVED FOR CONSTRUCTION	L.P

1:100 FULL SIZE A1

A1 Original | Co-ordinate System: MGA Zone 56 | Height Datum: A.H.D. | This sheet may be prepared using colour and may be incomplete if copied | NOTE: Do not scale from this drawing. | ALT. DRG No. SMCSWSWM-MTM-WHP-ST-DWG-134801.RVT

CLIENT: NSW GOVERNMENT | sydney METRO

SERVICE PROVIDERS: METRON T2M

DRAWN F. ALPAPARA
DESIGNED E.ZHAO
DRG CHECK S. FUENTES
DESIGN CHECK I. HESPE
APPROVED L. PALMER 31.03.2021

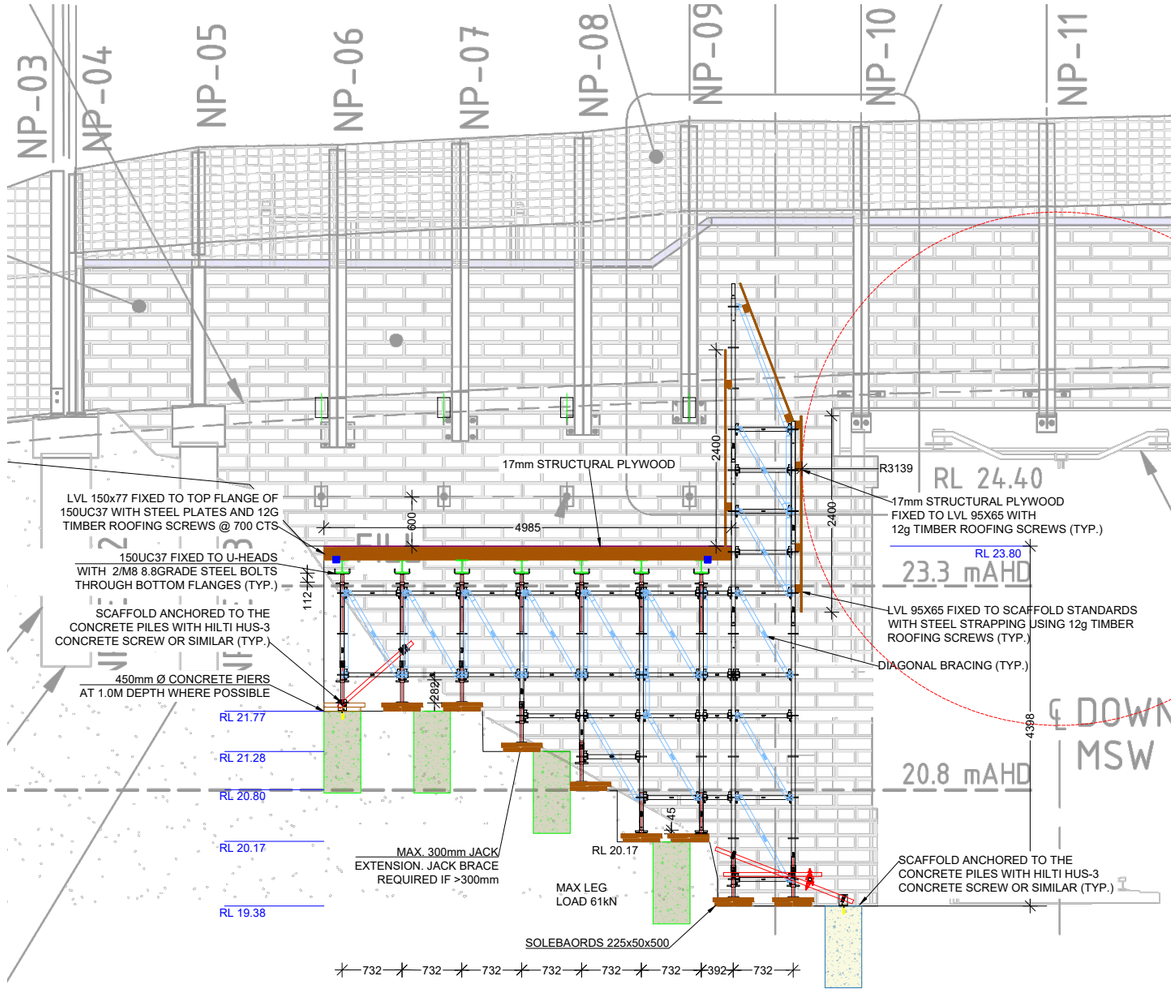
SYDNEY METRO

HURLSTONE PARK STATION
STRUCTURAL - BRIDGES
DUNTROON STREET OVERBRIDGE - HURLSTONE PARK (9.330km)
GENERAL ARRANGEMENT - SHEET 1

STATUS: FOR CONSTRUCTION | SHEET 1 OF 2 | ©

DRG No. SMCSWSWM-MTM-WHP-ST-DWG-134801 | REV. 00

Appendix 1: Tree Assessment Schedule identified tree 2 for removal and 3 for selective pruning. The removal of vegetation will allow for the construction of a loading platform next to Duntroon Street Bridge. The loading platform is required to provide a safe foundation for the soil nailing rig to undertake works on the bridge abutment.



ELEVATION VIEW
NOT TO SCALE

4 OFF SOIL NAIL AT 1500 SPACING, 1200 BENEATH WALKWAY FINISH LEVEL

DRAWING NOTES

1. LANE SCAFFOLD PTY LTD COPYRIGHT
THIS DRAWING IS THE COPYRIGHT OF LANE SCAFFOLD PTY LTD. NO UNAUTHORIZED USE, COPY OR DISCLOSURE IS TO BE MADE AND IT IS TO BE RETURNED UPON REQUEST. THE DRAWING IS SUPPLIED SUBJECT TO THE COMPANY'S STANDARD CONDITIONS AS APPLICABLE. LANE SCAFFOLD PTY LTD RESERVES THE RIGHT TO AMEND DRAWING DETAILS AND MATERIAL COMPONENTS SUBJECT TO STOCK AVAILABILITY.

2. TYING & BRACING
THE CUSTOMER IS RESPONSIBLE FOR ENSURING ALL STRUCTURES REMAIN ADEQUATELY TIED AND/OR BRACED TO CARRY THE LOAD AND ENSURE STABILITY. NO TIES OR BRACES ARE TO BE REMOVED OR ALTERED IN ANY WAY WITHOUT THE EXPRESSED WRITTEN AUTHORITY FROM LANE SCAFFOLD PTY LTD. WHERE LANE SCAFFOLD PTY LTD IS SUPPLYING EQUIPMENT ONLY, THE SUPPLY & FIXING OF ALL NECESSARY TIES IS THE RESPONSIBILITY OF THE CUSTOMER.

UNLESS NOTED OTHERWISE ON DRAWING:
- THE DISTANCE BETWEEN FACE BRACING PANELS IS NOT TO EXCEED 3 BAYS HORIZONTALLY AND EVERY 4.0M VERTICALLY.
- ALL RETURNS OR BREAKS IN THE SCAFFOLD ARE TO BE TUBE TIED, COMPLETE WITH PLANKING AND GUARDRAILS AS REQUIRED ON ADJACENT SCAFFOLD.
- SCAFFOLD TO BE A MAXIMUM OF 225MM FROM WORKING FACE UNLESS DIRECTED OTHERWISE BY LOCAL SAFETY AUTHORITY.
- HOP-UPS ARE NOT TO BE LOADED WITH MATERIAL. THEY ARE TO BE USED FOR ACCESS BY PERSONNEL ONLY.

3. PROTECTION & CLIENT RESPONSIBILITY
IT SHALL REMAIN THE CLIENTS RESPONSIBILITY TO ENSURE THAT ALL REASONABLE PRECAUTIONS ARE TAKEN TO AVOID IMPACT LOADS ON THE SCAFFOLD DURING USE. IRRESPECTIVE OF ANY RECOMMENDATIONS SHOWN ON THE DRAWINGS, THE USER IRRESPONSIBLE FOR THE STRUCTURAL ADEQUACY OF ALL MATERIAL OF HIS OWN SUPPLY AND FOR ENSURING THAT THE APPROVED WORKING LOAD LIMITS ARE NOT EXCEEDED.

4. FOUNDATIONS/SUPPORT
UNLESS OTHERWISE NOTED, NO SOLEPLATES OR OTHER MEANS OF SPREADING THE IMPOSED LOADS ARE SUPPLIED BY LANE SCAFFOLD PTY LTD. WHERE LANE SCAFFOLD PTY LTD EQUIPMENT IS SUPPORTED, SUSPENDED, ANCHORED OR TIED TO AN EXISTING STRUCTURE OR THE GROUND, THE CUSTOMER MUST ENSURE THAT THE STRUCTURE OR GROUND IS ADEQUATE TO SAFELY SUPPORT THE ADDITIONAL IMPOSED LOADS.

5. MODIFICATION
THIS DRAWING HAS BEEN PREPARED USING THE SAFE WORKING LOADS OF THE COMPONENTS SPECIFIED. NO ALTERATION TO COMPONENTS, ASSEMBLY, LOADING OR ANY OTHER ASPECT MUST BE MADE WITHOUT THE EXPRESSED WRITTEN AUTHORITY.

6. GROUND BEARING
CLIENT TO CHECK THAT GROUND IS CAPABLE OF SUSTAINING MAXIMUM LEG LOADS.

***** DO NOT TAKE RISK ! - IF IN DOUBT, ASK *****

7. BASIS OF DESIGN
THIS DRAWING HAS BEEN PREPARED FROM INFORMATION SUPPLIED TO US BY, OR ON BEHALF OF THE CUSTOMER, WHO SHOULD CHECK THAT WE HAVE CORRECTLY INTERPRETED HIS REQUIREMENTS AND THAT ALL LOADINGS, DIMENSIONS, DETAILS, ERECTION, POURING AND STRIKING SEQUENCES ETC. ARE AS REQUIRED AND PRACTICABLE.

THE FOLLOWING DOCUMENTS HAVE BEEN USED TO PREPARE THIS SCHEME:-

CUSTOMER DRAWINGS: .....
CUSTOMER DRAWINGS: .....
DESIGN BRIEF: .....
CUSTOMER METHOD STATEMENT: .....
OTHER INFORMATION: .....

TO ENABLE US TO COMPLETE THIS DRAWING, WE HAVE ALLOWED FOR THE FOLLOWING:

- SCAFFOLD RATED AT SPECIAL DUTY. DUTY LIVE LOAD OF :..... 35kPa
- MAX. SCAFFOLD HEIGHT OF TOP WORKING DECK :..... 4.4m
- NUMBER OF WORKING LEVELS :..... 1
- NUMBER OF WORKING PLATFORM BRACKET LEVELS :..... 1
- MAX. EXTENSION OF ADJUSTABLE BASES :..... 300mm
- MAX. LEG LOAD DESIGN :..... TBA
- MAX. DESIGN TIE LOAD (COMP./TENSION) :..... N/A
- MAX. SCAFFOLD HEIGHT ABOVE TOP TIE WITH NO SHEETING :..... 4.0m
- MAX. SCAFFOLD HEIGHT ABOVE TOP TIE WITH PRESCRIBED SHEETING:..... 2.0m
- WIND LOADS WHERE APPLICABLE, HAVE BEEN CALCULATED IN ACCORDANCE WITH AS1170.2 :..... TBA
- MAX. DESIGN WIND PRESSURE :..... TBA

A SCAFFOLD HANDOVER CHECKLIST TO BE COMPLETED WITH EACH STAGE
A HANDOVER CHECKLIST TO BE COMPLETED AFTER ANY ALTERATIONS, INCLEMENT WEATHER, MONTHLY SAFETY INSPECTIONS AND BEFORE DISMANTLE.

BRACING AND LACING TO BE ADDED AS EACH INDIVIDUAL SECTION OF THE STRUCTURE IS ERECTED.

BRACING FREQUENCY SHOWN IS TYPICAL AND REPEATS ON ALL LEG LINES. BRACING POSITIONS AND DIRECTIONS MAY VARY BUT RATIO OF LEGS PER BRACES MUST REMAIN.

DURING DISMANTLING OPERATIONS REMOVAL OF BRACING MUST BE CAREFULLY CONTROLLED TO ENSURE INDIVIDUAL AREAS ARE NOT DESTABILISED.

PRELIMINARY FOR DISCUSSION ONLY

PERMITTED NUMBER OF LOADED PLATFORMS AND HOP - UP PLATFORMS

MAX HEIGHT (m) TO TOP PLATFORM	MAX NUMBER OF FULLY PLANKED PLATFORMS	MAX NUMBER OF PLANKED HOP - UPS PLATFORMS 1 OR 2 PLANKS WIDE	PERMITTED NUMBER OF LOADED PLATFORMS WITH IN THE SCAFFOLD BAY			PERMITTED NUMBER OF LOADED HIP -UP PLATFORMS 1 OR 2 PLANKS WIDE (LIGHT DUTY ONLY)
			HEAVY DUTY (675 kg)	MEDIUM DUTY (450 kg)	LIGHT DUTY (225 kg)	
4.4	1	0	1	-	-	N/A

AMENDMENTS

REV.	AMENDMENT	BY	CHKD	DATE
A	PRELIMINARY	DL	AE	06/08/2021
B	RAISE DECK, MOVE PILE TIE LOCATIONS	DL	-	11/08/2021
C	-	-	-	-
D	-	-	-	-
E	-	-	-	-
F	-	-	-	-
G	-	-	-	-
H	-	-	-	-

RESIDUAL RISK ASSESSMENT
WHEREVER POSSIBLE, RISK IS DESIGNED-OUT OF THIS PROPOSAL DURING THE DESIGN PROCESS. WHERE THIS IS NOT POSSIBLE, THE RISK WILL BE MINIMISED AND ANY RESIDUAL RISK WILL BE NOTED AND INDICATED BY THE SYMBOL.

DRAWING STATUS
CONSTRUCTION STATUS FULLY VALID WHEN CHECKED AND DATED !

STATUS: **PRELIMINARY**

THIS DRAWING IS FOR DISCUSSION, PRICING AND CHECKING BY THE CUSTOMER. IT FORMS NO PART OF ANY AGREEMENT UNTIL ISSUED AND MARKED AS CHECKED IN ITS CONSTRUCTION STATUS.

Checked by: AE Date: 06/08/2021

Lane Scaffold Pty Ltd
ABN: 24 643 650 131

PO Box 320,
Liverpool NSW 1871

david.lane@lanescaffold.com.au

LANE SCAFFOLD

TITLE	
SITE :	SYDNEY METRO SOUTHWEST
STRUCTURE :	DRILL RIG PLATFORM
AREA :	EMBANKMENT DOWNLINE
EQUIPMENT :	PROSCAF ROSETTE
CUSTOMER :	DOWNER EDI WORKS

DRAWING BY : DL	DATE : 11/08/2021	DRAWING No. : TW-073-SK-002
CHECK BY : -	DATE : -	REVISION : B
CAD FILE : DLS0044	SCALE : NTS	

PLOTTING DATE : Aug 11, 2021 - 1:57pm

D:\Lane Scaffold Dropbox\David Lane\AutoCAD Drawings\Lane Scaffold\ DLS0044 - Downer - Drill Rig Access_14.07.2021.dwg <Layout:SK02>

Appendix 3: Tree Assessment Criteria

Tree number: Identifying number given to individual (or group) trees.
Botanical Name: Latin name for tree showing genus and species.
Common Name: The common name given to the tree.
Tree Dimensions: The physical dimensions of the tree.

- **Height**: Estimated or measured height of tree in meters.
- **Spread**: Estimated or measured radial canopy spread of tree in meters.
- **Diameter at Breast Height (DBH)**: The estimated or measured diameter of trunk given in mm measured at 1.4m from ground.
- **Diameter Above Base (DAB)**: The estimated or measured diameter of trunk given in mm measured above the root flare. Used to calculate the structural root zone of the tree.

Age Class: An estimation of how old the tree is in relation to its life expectancy.

- **Young** – Age less than 20% of life expectancy of tree in situ
- **Mature** – Age 20% - 80% of life expectancy of tree in situ
- **Old** – Age greater than 80% of life expectancy of tree in situ
- **Dead** – Tree is dead

Vigour: Ability of a tree to sustain its life processes. This is independent of the condition of a tree but may impact upon it. Vigour can appear to alter rapidly with change of seasons (seasonality) e.g., dormant, deciduous or semi-deciduous trees. Vigour can be categorised as Dormant, Low, Normal and High.

- **Dormant Vigour** – Determined by the existing turgidity in the lower order branches in the outer extremity of the crow, with good bud set and formation, and where the last extension growth is distinct from those most recently preceding it, evident by bud scale scars. Normal vigour during dormancy is achieved when such growth is evident on a majority of branches throughout the crown.
- **Low Vigour** – Reduced ability of a tree to sustain its life processes. This may be evident by the atypical growth of leaves, reduced crown cover and reduced crown density, branches, roots and trunk, and a deterioration of their functions with reduced resistance to predation. This is independent of the condition of a tree but may impact upon it, and especially the ability of a tree to sustain itself against predation.
- **Normal Vigour** – Ability of a tree to maintain and sustain its life processes. This may be evident by the typical growth of leaves, crown cover and crown density, branches, roots and trunk and resistance to predation. This is independent of the condition of a tree but may impact upon it, and especially the ability of a tree to sustain itself against predation.
- **High Vigour** – Accelerated growth of a tree due to incidental or deliberate artificial changes to its growing environment that are seemingly beneficial, but may result in premature aging or failure if the favourable conditions cease, or promote prolonged senescence if the favourable conditions remain, e.g. water from a leaking pipe, water and nutrients from a leaking or disrupted sewer pipe, nutrients from animal waste, a tree growing next to a chicken coop, or a stock feed lot, or a regularly used stockyard, a tree subject to stringent watering and fertilisation program, or some trees may achieve an extended lifespan from continuous pollarding practices over the life of the tree.

Condition: A tree's crown form and growth habit, as modified by its environment (aspect, suppression by other trees, soils) the stability and viability of the root plate, trunk and structural branches (first (1st) and possibly (2nd) order branches), including structural defects such as wounds, cavities or hollows, crooked trunk or weak trunk/branch junctions and the effects of predation by pests and diseases. These may not be directly connected with vigour and it is possible for a tree to be of normal vigour but in poor condition. Condition can be categorised as Dead, Poor, Fair and Good.

- **Dead Condition** – Tree is no longer capable of performing any of the following processes or is exhibiting any of the following symptoms; Photosynthesis via its foliage crown (as indicated by the presence of moist, green or other coloured leaves), Osmosis (the ability of the roots system to take up water), Turgidity (the ability of the plant to sustain moisture pressure in its cells), Epicormic shoots or epicormic strands in Eucalypts (the production of new shoots as a response to stress, generated from latent or adventitious buds or from a lignotuber), Permanent leaf loss, Permanent leaf wilting (the loss of turgidity which is marked by desiccation of stems leaves and roots), Abscission of the epidermis (bark desiccates and peels off to the beginning of the sap wood).
- **Poor Condition** - Tree is of good habit or misshapen, a form that may be severely restricted for space and light, exhibits symptoms of advanced and irreversible decline such as fungal, or bacterial infestation, major die-back in the branch and foliage crown, structural deterioration from insect damage e.g. termite infestation, or storm damage or lightning strike, ring barking from borer activity in the trunk, root damage or instability of the tree, or damage from physical wounding impacts or abrasion, or from altered local environmental conditions and has been unable to adapt to such changes and may decline further to death regardless of remedial works or other modifications to the local environment that would normally be sufficient to provide for its basic survival if in good to fair condition. Deterioration physically, often characterised by a gradual and continuous reduction in vigour but may be independent of a change in vigour, but characterised by a proportionate increase in susceptibility to, and predation by pests and diseases against which the tree cannot be sustained. Such conditions may also be evident in trees of advanced senescence due to normal phenological processes, without modifications to the growing environment or physical damage having been inflicted upon the tree. This may be independent from, or contributed to by vigour.
- **Fair Condition** - Tree is of good habit or misshapen, a form not severely restricted for space and light, has some physical indication of decline due to the early effects of predation by pests and diseases, fungal, bacterial, or insect infestation, or has suffered physical injury to itself that may be contributing to instability or structural weaknesses, or is faltering due to the modification of the environment essential for its basic survival. Such a tree may recover with remedial works where appropriate, or without intervention may stabilise or improve over time, or in response to the implementation of beneficial changes to its local environment. This may be independent from, or contributed to by vigour.
- **Good Condition** - Tree is of good habit, with crown form not severely restricted for space and light, physically free from the adverse effects of predation by pests and diseases, obvious instability or structural weaknesses, fungal, bacterial or insect infestation and is expected to continue to live in much the same condition as at the time of inspection provided conditions around it for its basic survival do not alter greatly. This may be independent from, or contributed to by vigour.

Safe Useful Life Expectancy (SULE) SULE is the length of time that the arborist assesses an individual tree can be retained with an acceptable level of risk based on the information available at the time of inspection. It is a snapshot in time of the potential an individual tree has for survival in the eyes of the assessor. SULE is not static – it is closely related to tree health and the surrounding conditions. Alterations in these variables may result in changes to the SULE assessment. Consequently, the reliability all SULE assessments have will decrease as time passes from the initial assessment and the potential for changes in variables increases.

- **Remove –** Trees that should be removed within the next 5 years
- **Short –** Trees that appear to be retainable at the time of the assessment for 5-15 years with an acceptable level of risk.
- **Medium –** Trees that appear to be retainable at the time of the assessment for 15-40 years with an acceptable level of risk.
- **Long –** Trees that appear to be retainable at the time of the assessment for 40+ years with an acceptable level of risk.

Amenity and Visual Value – For the purposes of assessing the visual and landscape value of each tree the IACA Significance of a Tree, Assessment Rating System (STARS) © (IACA 2010) © has been adopted. - The landscape significance of a tree is an essential criterion to establish the importance that a particular tree may have on a site. The system uses a scale of High, Medium and Low significance in the landscape.

High significance in landscape

- The tree is in good condition and good vigour
- The tree has a form typical for the species
- The tree is a remnant or is a planted locally indigenous specimen and/or is rare or uncommon in the local area or of botanical interest or of substantial age
- The tree is listed as a heritage item, threatened species or part of an endangered ecological community or listed on council's significant tree register
- The tree is visually prominent and visible from a considerable distance when viewed from most directions within the landscape due to its size and scale and makes a positive contribution to the local amenity
- The tree supports social and cultural sentiments or spiritual associations, reflected by the broader population or community group or has commemorative values
- The tree's growth is unrestricted by above and below ground influences, supporting its ability to reach dimensions typical for the taxa in situ – tree is appropriate to the site conditions

Medium significance in landscape

- The tree is in fair-good condition and good or low vigour
- The tree has form typical or atypical of the species
- The tree is a planted locally indigenous or a common species with its taxa commonly planted in the local area
- The tree is visible from surrounding properties, although not visually prominent as partially obstructed by other vegetation or buildings when viewed from the street
- The tree provides a fair contribution to the visual character and amenity of the local area
- The tree's growth is moderately restricted by above or below ground influences, reducing its ability to reach dimensions typical for the taxa in situ

Low significance in landscape

- The tree is in fair-poor condition and good or low vigour
- The tree has form atypical of the species
- The tree is not visible or is partly visible from the surrounding properties as obstructed by other vegetation or buildings
- The tree provides a minor contribution or has a negative impact on the visual character and amenity of the local area
- The tree is a young specimen which may or may not have reached dimensions to be protected by local Tree Preservation Orders or similar protection mechanisms and can easily be replaced with a suitable specimen
- The tree's growth is severely restricted by above or below ground influences, unlikely to reach dimensions typical for the taxa in situ – tree is inappropriate to the site conditions
- The tree is listed as exempt under the provisions of the local Council Tree Preservation Order or similar protection mechanisms
- The tree has a wound or defect that has the potential to become structurally unsound
- **Environmental Pest / Noxious Weed Species**
- The tree is an environmental pest species due to its invasiveness or poisonous/allergenic properties.
- The tree is a declared noxious weed by legislation
- **Hazardous / Irreversible Decline**
- The tree is structurally unsound and/or unstable and is considered potentially dangerous
- The tree is dead, or is in irreversible decline, or has the potential to fail or collapse in full or in part in the immediate to short term

The tree is to have a minimum of three (3) criteria in a category to be classified in that group.

In the development of this document IACA acknowledges the contribution and original concept of the Footprint Green Tree Significance & Retention Value Matrix, developed by Footprint Green Pty Ltd in June 2010.

The Australian Standard 4970-2009 Protection of Trees on Development Sites defines the requirements for assessing trees with respect to development. It provides the guidance on how to decide which trees are appropriate for retention and on the means of protecting them during construction works. It describes the areas and offsets, referred to as the Tree Protection Zone (TPZ) and Structural Root Zone (SRZ) required to be free from development works to maintain tree vitality and stability. This report has been prepared in accordance with the conditions set out within the standard.

- **Tree Protection Zone** – The tree protection zone is defined as a specified area above and below ground set aside for the protection of the tree's roots and crown. It is expressed as a radial measurement taken from the centre of the trunk at ground level.

Structural Root Zone – The structural root zone is defined as a specified area around the base of a tree required to maintain its stability within the ground. It is expressed as a radial measurement taken from the center of the trunk at ground level. Excavation and development works are not recommended within the structural root zone unless additional investigation as to root size and location is undertaken

APPENDIX 6.2 HURLSTONE PARK AIA (PLATEAU TREES)

PLATEAUTREES
Safety. Quality. Progress.

Date: 14 December 2021

Re: Tree inspection at Hurlstone Park Station as part of the Southwest Metro works package.

At the request of Downer Group an onsite inspection was undertake at Hurlstone Park Station. It has been asked to assess the impacts of works associated with the proposed station entry concourse area upon tree 591 *Eucalyptus ficafolia* (WA Flowering Gum) and a *Murray paniculata* (Sweet Jasmine) hedge. Appendix 2 photograph 1 shows the two trees.

Works associated with the new station entry require the existing concrete slab to be extended to facilitate the concourse entry structure. The new slab extends by 1m off the existing slab, is to be 450mm deep on a strip footing. Appendix 2 photograph 2 shows the approximate alignment of the new slab.

The alignment of the new slab requires the existing Sweet Jasmine hedge to be removed. It consists of approximately eleven individual plants. The hedge was not identified within the existing Arboricultural Impact Assessment (AIA) prepared by Urban Arbor, dated 11 December 2019, Ref19/12/11/SWMMS. As such, an assessment has been undertaken and can be found as Appendix 1 Tree Assessment Schedule. Appendix 3 provides the assessment criteria. The Sweet Jasmine is not representative of an endangered or threatened species or ecological community.

Using AS4970 Protection of Trees on Development Sites as a guiding document the tree protection and structural root zone of tree 591 has been calculated at 3m

Plateau Tree Service Pty Ltd
PO BOX 1522, DEE WHY NSW 2099 Australia
P: 02 9939 5350 | F: 02 9905 7569
E: info@plateautrees.com.au | W: www.plateautrees.com.au
ABN : 17 090 798 002

and 2.13m respectively. The concrete slab is aligned approximately 1.5m off the base of the trunk and is regarded as a major encroachment into the protection zone of the tree.

In order to minimise the impacts of the works an exploratory trench is to be excavated using methods that do not damage roots, along the closest alignment required for the concrete slab through the TPZ and SRZ. Appendix 2 photograph 2 shows the alignment of the exploratory trench (approximately at the limits of the existing Sweet Jasmine hedge's canopy). The trench is to be excavated to the full depth of the strip footing along its entire alignment within the garden bed. Exposed roots are to be pruned in accordance with the following method:

- The tree is to be thoroughly irrigated prior to undertaking the excavation and root pruning works. A sprinkler system is to be installed at the base of the tree and run for a minimum of one hour. This irrigation is to be undertaken within the week preceding the excavation works.
- All soil is to be cleared from around the exposed root to provide access to undertake the pruning cut
- The pruning cut is to be made into intact woody tissue perpendicular to the direction of root growth
- Pruning equipment is to be sterilised between each root cutting using an alcohol dip or a 1:10 solution of household bleach and water
- The face of the cut is to be clear of any woody splinters
- The bark at the face of the pruning cut is to be free of splits, cracks or tears
- A sharp clean pruning saw is to be used on roots ≥20mm in diameter. Roots <20mm diameter may be cut using sharp clean secateurs or pruning loppers
- Post works, additional irrigation is to be undertaken. A sprinkler system is to be installed at the base of the tree and run for a minimum of one hour per week for four weeks.

Once all root issues have been addressed bulk excavation of the slab and associated strip footing can be undertaken without additional impact upon the tree.

The proposed concourse structure's roof is aligned at the edge of the slab extension and is 4m in height. Selective pruning works shall be required to be undertaken to tree 591 to accommodate the structure.

Four branches have been identified for removal to accommodate the proposed concourse roof structure. These branches can be seen in Appendix 2 photograph 3. The selective removal of branches constitutes approximately 35% of the total love canopy volume of the tree and is considered to be a major pruning event. Appendix 2 photograph 3 shows the branches which have been identified for removal. A reduction in tree growth and physiological function can be expected as a result of branch removal. All pruning works are to be undertaken in accordance with AS4373(2007) Pruning of Amenity Trees.

The prescribed works to tree 591 are significant and are likely to result in a shortening of the trees useful life expectancy.

It should be understood that the effects of root pruning are not always predictable and can result in a decline in tree health, condition and stability. Undertaking the works in accordance with the provided method provides the best chance to minimise the impacts of the proposed works upon the tree.

Post works, any discernible change in the characteristics of the trees shall be referred to the project arborist and an inspection undertaken. These changes can include, but are not limited to:

- A change in foliage colour and or density
- Drooping, curling and/or crinkling of the foliage
- Dieback or death of branches or areas of the trees canopy
- An increase in the presence of dead branches
- Occurrence of branch failure
- Infestation by pest species

It is felt that these observations can reasonably be made by ordinary people or site personnel with no arboricultural background.

All appropriate approvals and consents are to be obtained prior to tree and vegetation removal works commencing. All tree removal works are to be undertaken by suitably

qualified tree workers and in accordance with Safe Work Australia's Guide to Managing Risks of Tree Trimming and Removal Works.

Please feel free to contact me should you require any further assistance regarding this matter.

Regards.
Owen Tebbutt

Plateau Trees

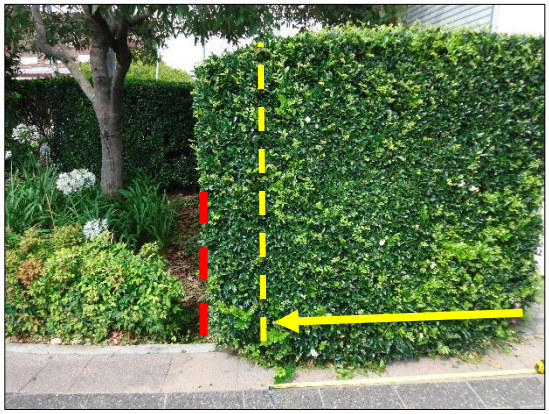
Appendix 1: Tree Assessment Schedule

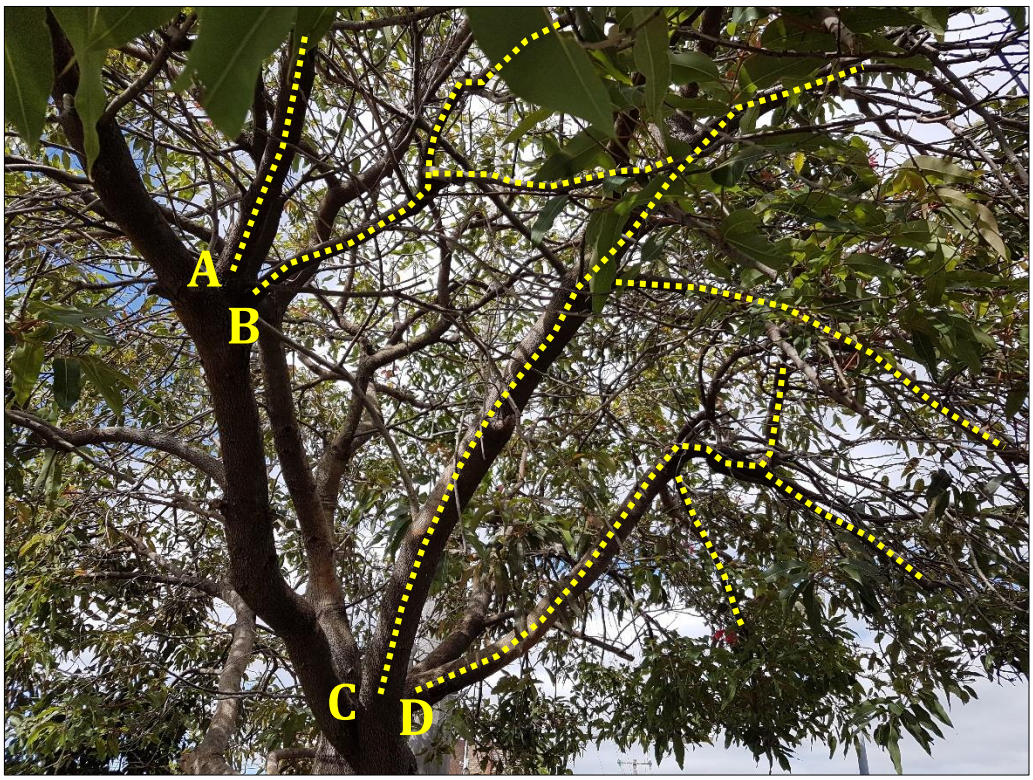
Tree number	Tree name	Tree dimensions				Vigour	Condition	Age class	ULE	Amenity and Visual Value	Native or Exotic	TPZ (m)	SRZ (m)	Comments	Remove or Retain
	Botanical name Common name	Height (m)	Spread (m)	D.B.H. (mm)	D.A.B. (mm)										
1	*Murraya paniculata* (Sweet Jasmine)	2	0.5x0.5	multi	400	N	G	M	M	M	N	2	1.5	Approx. 11 individual multi-stemmed specimens planted as a hedge. Minimum TPZ and SRZ apply. Removal of the hedge is unlikely to have a significant impact upon local visual amenity given the context of the works.	Remove

Appendix 2: Site Photographs

Photograph 1: Image showing tree 591 and the adjacent Sweet Jasmine hedge that are impacted upon by the proposed works.

Photograph 2: The yellow dashed line indicates the edge of the proposed concrete slab. The red line indicates the alignement of exploratory excavation within the garden bed. All excavateion along this line is to be undertaken using non-destructive digging methods that do not damage roots. Root exposed by the works are to be pruned in accordnace with the provided method.





Photograph 3: Branches identified for removal from tree 591 to provide clearance for the proposed concourse roof structure. Branch A is 40mm in diameter at 2.7m height, branch B is 20mm in diameter at 2.7m height, branch C is 120mm in diameter at 2.1m height, branch D is 120mm in diameter at 2.2m height. The removal of identified branches constitutes approximately 35% of the total live canopy volume of the tree.

Appendix 3: Tree Assessment Criteria

Tree number: Identifying number given to individual (or group) trees.
Botanical Name: Latin name for tree showing genus and species.
Common Name: The common name given to the tree.
Tree Dimensions: The physical dimensions of the tree.

- **Height**: Estimated or measured height of tree in meters.
- **Spread**: Estimated or measured radial canopy spread of tree in meters.
- **Diameter at Breast Height (DBH)**: The estimated or measured diameter of trunk given in mm measured at 1.4m from ground.
- **Diameter Above Base (DAB)**: The estimated or measured diameter of trunk given in mm measured above the root flare. Used to calculate the structural root zone of the tree.

Age Class: An estimation of how old the tree is in relation to its life expectancy.

- **Young** – Age less than 20% of life expectancy of tree in situ
- **Mature** – Age 20% - 80% of life expectancy of tree in situ
- **Old** – Age greater than 80% of life expectancy of tree in situ
- **Dead** – Tree is dead

Vigour: Ability of a tree to sustain its life processes. This is independent of the condition of a tree but may impact upon it. Vigour can appear to alter rapidly with change of seasons (seasonality) e.g., dormant, deciduous or semi-deciduous trees. Vigour can be categorised as Dormant, Low, Normal and High.

- **Dormant Vigour** – Determined by the existing turgidity in the lower order branches in the outer extremity of the crow, with good bud set and formation, and where the last extension growth is distinct from those most recently preceding it, evident by bud scale scars. Normal vigour during dormancy is achieved when such growth is evident on a majority of branches throughout the crown.
- **Low Vigour** – Reduced ability of a tree to sustain its life processes. This may be evident by the atypical growth of leaves, reduced crown cover and reduced crown density, branches, roots and trunk, and a deterioration of their functions with reduced resistance to predation. This is independent of the condition of a tree but may impact upon it, and especially the ability of a tree to sustain itself against predation.
- **Normal Vigour** – Ability of a tree to maintain and sustain its life processes. This may be evident by the typical growth of leaves, crown cover and crown density, branches, roots and trunk and resistance to predation. This is independent of the condition of a tree but may impact upon it, and especially the ability of a tree to sustain itself against predation.
- **High Vigour** – Accelerated growth of a tree due to incidental or deliberate artificial changes to its growing environment that are seemingly beneficial, but may result in premature aging or failure if the favourable conditions cease, or promote prolonged senescence if the favourable conditions remain, e.g. water from a leaking pipe, water and nutrients from a leaking or disrupted sewer pipe, nutrients from animal waste, a tree growing next to a chicken coop, or a stock feed lot, or a regularly used stockyard, a tree subject to stringent watering and fertilisation program, or some trees may achieve an extended lifespan from continuous pollarding practices over the life of the tree.

Condition: A tree's crown form and growth habit, as modified by its environment (aspect, suppression by other trees, soils) the stability and viability of the root plate, trunk and structural branches (first (1st) and possibly (2nd) order branches), including structural defects such as wounds, cavities or hollows, crooked trunk or weak trunk/branch junctions and the effects of predation by pests and diseases. These may not be directly connected with vigour and it is possible for a tree to be of normal vigour but in poor condition. Condition can be categorised as Dead, Poor, Fair and Good.

- **Dead Condition** – Tree is no longer capable of performing any of the following processes or is exhibiting any of the following symptoms; Photosynthesis via its foliage crown (as indicated by the presence of moist, green or other coloured leaves), Osmosis (the ability of the roots system to take up water), Turgidity (the ability of the plant to sustain moisture pressure in its cells), Epicormic shoots or epicormic strands in Eucalypts (the production of new shoots as a response to stress, generated from latent or adventitious buds or from a lignotuber), Permanent leaf loss, Permanent leaf wilting (the loss of turgidity which is marked by desiccation of stems leaves and roots), Abscission of the epidermis (bark desiccates and peels off to the beginning of the sap wood).
- **Poor Condition** - Tree is of good habit or misshapen, a form that may be severely restricted for space and light, exhibits symptoms of advanced and irreversible decline such as fungal, or bacterial infestation, major die-back in the branch and foliage crown, structural deterioration from insect damage e.g. termite infestation, or storm damage or lightning strike, ring barking from borer activity in the trunk, root damage or instability of the tree, or damage from physical wounding impacts or abrasion, or from altered local environmental conditions and has been unable to adapt to such changes and may decline further to death regardless of remedial works or other modifications to the local environment that would normally be sufficient to provide for its basic survival if in good to fair condition. Deterioration physically, often characterised by a gradual and continuous reduction in vigour but may be independent of a change in vigour, but characterised by a proportionate increase in susceptibility to, and predation by pests and diseases against which the tree cannot be sustained. Such conditions may also be evident in trees of advanced senescence due to normal phenological processes, without modifications to the growing environment or physical damage having been inflicted upon the tree. This may be independent from, or contributed to by vigour.
- **Fair Condition** - Tree is of good habit or misshapen, a form not severely restricted for space and light, has some physical indication of decline due to the early effects of predation by pests and diseases, fungal, bacterial, or insect infestation, or has suffered physical injury to itself that may be contributing to instability or structural weaknesses, or is faltering due to the modification of the environment essential for its basic survival. Such a tree may recover with remedial works where appropriate, or without intervention may stabilise or improve over time, or in response to the implementation of beneficial changes to its local environment. This may be independent from, or contributed to by vigour.
- **Good Condition** - Tree is of good habit, with crown form not severely restricted for space and light, physically free from the adverse effects of predation by pests and diseases, obvious instability or structural weaknesses, fungal, bacterial or insect infestation and is expected to continue to live in much the same condition as at the time of inspection provided conditions around it for its basic survival do not alter greatly. This may be independent from, or contributed to by vigour.

Safe Useful Life Expectancy (SULE) SULE is the length of time that the arborist assesses an individual tree can be retained with an acceptable level of risk based on the information available at the time of inspection. It is a snapshot in time of the potential an individual tree has for survival in the eyes of the assessor. SULE is not static – it is closely related to tree health and the surrounding conditions. Alterations in these variables may result in changes to the SULE assessment. Consequently, the reliability all SULE assessments have will decrease as time passes from the initial assessment and the potential for changes in variables increases.

- **Remove –** Trees that should be removed within the next 5 years
- **Short –** Trees that appear to be retainable at the time of the assessment for 5-15 years with an acceptable level of risk.
- **Medium –** Trees that appear to be retainable at the time of the assessment for 15-40 years with an acceptable level of risk.
- **Long –** Trees that appear to be retainable at the time of the assessment for 40+ years with an acceptable level of risk.

Amenity and Visual Value – For the purposes of assessing the visual and landscape value of each tree the IACA Significance of a Tree, Assessment Rating System (STARS) © (IACA 2010) © has been adopted. - The landscape significance of a tree is an essential criterion to establish the importance that a particular tree may have on a site. The system uses a scale of High, Medium and Low significance in the landscape.

High significance in landscape

- The tree is in good condition and good vigour
- The tree has a form typical for the species
- The tree is a remnant or is a planted locally indigenous specimen and/or is rare or uncommon in the local area or of botanical interest or of substantial age
- The tree is listed as a heritage item, threatened species or part of an endangered ecological community or listed on council's significant tree register
- The tree is visually prominent and visible from a considerable distance when viewed from most directions within the landscape due to its size and scale and makes a positive contribution to the local amenity
- The tree supports social and cultural sentiments or spiritual associations, reflected by the broader population or community group or has commemorative values
- The tree's growth is unrestricted by above and below ground influences, supporting its ability to reach dimensions typical for the taxa in situ – tree is appropriate to the site conditions

Medium significance in landscape

- The tree is in fair-good condition and good or low vigour
- The tree has form typical or atypical of the species
- The tree is a planted locally indigenous or a common species with its taxa commonly planted in the local area
- The tree is visible from surrounding properties, although not visually prominent as partially obstructed by other vegetation or buildings when viewed from the street
- The tree provides a fair contribution to the visual character and amenity of the local area
- The tree's growth is moderately restricted by above or below ground influences, reducing its ability to reach dimensions typical for the taxa in situ

Low significance in landscape

- The tree is in fair-poor condition and good or low vigour
- The tree has form atypical of the species
- The tree is not visible or is partly visible from the surrounding properties as obstructed by other vegetation or buildings
- The tree provides a minor contribution or has a negative impact on the visual character and amenity of the local area
- The tree is a young specimen which may or may not have reached dimensions to be protected by local Tree Preservation Orders or similar protection mechanisms and can easily be replaced with a suitable specimen
- The tree's growth is severely restricted by above or below ground influences, unlikely to reach dimensions typical for the taxa in situ – tree is inappropriate to the site conditions
- The tree is listed as exempt under the provisions of the local Council Tree Preservation Order or similar protection mechanisms
- The tree has a wound or defect that has the potential to become structurally unsound
- **Environmental Pest / Noxious Weed Species**
- The tree is an environmental pest species due to its invasiveness or poisonous/allergenic properties.
- The tree is a declared noxious weed by legislation
- **Hazardous / Irreversible Decline**
- The tree is structurally unsound and/or unstable and is considered potentially dangerous
- The tree is dead, or is in irreversible decline, or has the potential to fail or collapse in full or in part in the immediate to short term

The tree is to have a minimum of three (3) criteria in a category to be classified in that group.

In the development of this document IACA acknowledges the contribution and original concept of the Footprint Green Tree Significance & Retention Value Matrix, developed by Footprint Green Pty Ltd in June 2010.

The Australian Standard 4970-2009 Protection of Trees on Development Sites defines the requirements for assessing trees with respect to development. It provides the guidance on how to decide which trees are appropriate for retention and on the means of protecting them during construction works. It describes the areas and offsets, referred to as the Tree Protection Zone (TPZ) and Structural Root Zone (SRZ) required to be free from development works to maintain tree vitality and stability. This report has been prepared in accordance with the conditions set out within the standard.

- **Tree Protection Zone** – The tree protection zone is defined as a specified area above and below ground set aside for the protection of the tree's roots and crown. It is expressed as a radial measurement taken from the centre of the trunk at ground level.

Structural Root Zone – The structural root zone is defined as a specified area around the base of a tree required to maintain its stability within the ground. It is expressed as a radial measurement taken from the center of the trunk at ground level. Excavation and development works are not recommended within the structural root zone unless additional investigation as to root size and location is undertaken

APPENDIX 6.3 CCBC APPROAVL FOR TREE REMOVAL AT HURLSTONE PARK

CANTERBURY BANKSTOWN

APPROVAL FOR TREE REMOVAL AND TREE PRUNING

Date: 20May2021
Location: Railway Street, Near Hurlstone Park Precinct
Contractor: Downer

Approval for the pruning and removal of the council trees identified in the attachments to facilitate the works required for the Metro project is approved subject to the following conditions:

Any tress removed will require replacement at councils standard rate of 3:1. The tree/s shall have a container size not less than 75 litres, shall comply with NATSPEC Specifying Trees: a guide to assessment of tree quality (2003) or Australian Standard AS 2303 – 2015 Tree stock for landscape use, and be planted and maintained in accordance with Councils street tree planting specifications Standard Drawing No. S-201.

The tree pruning and removal works are subject to the following conditions:

- All pruning and removal works must be carried out by a qualified arborist (minimum qualifications AQF Level 3 or equivalent);
- All pruning works shall comply with Australian Standard AS4373-2007 Pruning of amenity trees
- The tree pruning work must comply with the Amenity Tree Industry – Code of Practice, 1998 (Workcover, NSW) and the Guide to Managing Risks of Tree Trimming and Removal Work (Safe Work Australia 2016).
- The tree pruning contractor must hold a Public Liability Insurance Certificate of Currency with a minimum indemnity of $20 million, together with a NSW Workers Compensation Insurance Certificate of Currency;
- All tree material shall be removed from site;
- The site must be maintained in a safe condition at all times;
- Appropriate hazard signage to be in place at all times during the tree pruning works.

Tree reference:
T1,T2,T194,T198,T199

Wayne Broomfield
Team Leader Open Space Services

From: James Magsipoc <James.Magsipoc@cbcity.nsw.gov.au>
Sent: Thursday, 20 May 2021 1:15 PM
To: Ismet Ozen <Ismet.Ozen@downergroup.com>
Cc: Julie Henderson <Julie.Henderson@Downergroup.com>; Ben Webb <Ben.Webb@cbcity.nsw.gov.au>; Peter Anderson <Peter.ANDERSON@cbcity.nsw.gov.au>; Ash Jarvis <Ash.Jarvis2@transport.nsw.gov.au>; Peter D'Costa <Peter.D'Costa@Downergroup.com>; Ben Webb <Ben.Webb@cbcity.nsw.gov.au>; Peter Anderson <Peter.ANDERSON@cbcity.nsw.gov.au>; Wayne Bromfield <Wayne.Bromfield@cbcity.nsw.gov.au>
Subject: RE: Approval to Remove Trees: T1,T2,T194,T198,T199

Hi Ismet,

Permission is hereby granted to removed five trees as per attached document based on Arborist report as previously submitted.

Best regards,

CANTERBURY BANKSTOWN

James Magsipoc - Project Officer
T 02 9707 9771
E James.Magsipoc@cbcity.nsw.gov.au
www.cbcity.nsw.gov.au

@ourcbcity
Like & follow us

From: Ismet Ozen <Ismet.Ozen@downergroup.com>
Sent: Thursday, 13 May 2021 4:27 PM
To: James Magsipoc <James.Magsipoc@cbcity.nsw.gov.au>
Cc: Robel Chowdhury <Robel.Chowdhury@downergroup.com>; Gareth O'Brien <Gareth.OBrien@Downergroup.com>
Subject: 2x Tree Removal on Railway Street

Hi James,

As per our prior discussion, please see attached updated arborist & ecologist reports including the 2x trees we need to remove as part of our works on Railway Street, Hurlstone Park.

Please refer to the following pages on:

- Page 4 & 5 on arborist report
- Page 6 & 14 on ecologist report

If you could please review & approve as soon as possible we can start planning dates for these works.

Feel free to call me if you have any questions.

Kind Regards,
Ismet Ozen (Izzy)
Site Engineer

Sydney Metro – Hurlstone Park Station
Infrastructure Projects

Downer
Relationships creating success

T | 0428 106 020
E | Ismet.Ozen@downergroup.com
A | T1, Triniti Business Campus
39 Delhi Road North Ryde NSW 2113
www.downergroup.com

ZERO HARM Think before you print

Downer

disclose, distribute, print, or copy any part of this message if you are not the intended recipient. Downer EDI and any of its subsidiaries each reserve the right to monitor all e-mail communications through its networks. Any views expressed in this message are those of the individual sender, except where the message states otherwise and the sender is authorized to state them to be the views of any such entity.

VOLUME 2 OF 2

APPENDIX 7 CAMPSIE AIA (URBAN ARBOR)

URBAN ARBOR
The Trusted Name in Tree Management

Arboricultural Impact Assessment Report

Site location:
South West Metro
Campsie Station
Campsie NSW

Prepared for:
Metron T2M

Prepared by: Bryce Claassens
Urban Arbor Pty Ltd
Date: 14 June 2022
Ref: 220614-SWMCS-AIA
Rev: D

URBAN ARBOR
The Trusted Name in Tree Management

Table of Contents

COPYRIGHT

URBAN ARBOR
The Trusted Name in Tree Management

1. INTRODUCTION

1.1 Urban Arbor have been instructed by Metron T2M to provide an Arboricultural Impact Assessment Report for trees located within the site and adjoining sites in relation to a proposed development.

1.2 Below is a list of all documents and information provided to Urban Arbor to assist in preparing this report.

A) Campsie Landscape Drawings, Metron T2M, Rev B, Including Sheet No: 8, 7 November 2020.
B) Civil Engineering Package No. 1533, Metron T2M, Rev C, 125 Pages in total, 5 June 2020.
C) Campsie Station Service Building, Metron T2M, Rev C, 11 December 2020.
D) Campsie Station Civil Engineering Combined Service Route Detail Layout Plans, Metron T2M, Rev: 00, Sheet 1, 2 and 3, 14 April 2021.
E) Construction RFI, Metron T2M, CRFI Reference No: SMCSWSW5-SMD-CRFI-000034, 14 May 2021.
F) CRFI, Metron T2M, CRFI Ref: SMCSWSW6-DEW-CRFI-000853, Email received 2 May 2022.
G) Tree Report Overlay (002) Markup, Downer, received 16 May 2022.
H) Arboricultural Impact Assessment Report (AIA), Urban Arbor, Ref: 210521-SWMCS-AIA, Rev C, 21 May 2021.

1.3 The trees were inspected on 5 December 2019 and 17 December 2020. Access was available to the subject site and the adjoining public areas only. All tree data contained in this report was collected during these site inspections.

1.4 The only trees re-assessed within this revision (Rev D) include tree 611, 612 and 613. All other tree recommendations within this report reflect the proposed design received at the time of the AIA Rev C, report dated 21 May 2021.

2. SCOPE OF THE REPORT

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

2.1.1 Conduct a visual assessment of all significant trees located within 10 metres of development works from ground level. For the purpose of this report, a significant tree is a tree with a height equal to or greater than 5 metres.

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

2.1.3 Provide an assessment of the potential impact the proposed development is likely to cause to the condition of the subject trees in accordance with AS4970 Protection of trees on development sites (2009).

2.1.4 Specify tree protection measures for trees to be retained in accordance with AS4970-2009.

URBAN ARBOR
The Trusted Name in Tree Management

3. LIMITATIONS

3.1 The observations and recommendations are based on the site inspections identified in the introduction (section 1) and the access available at the time of inspection. Findings of this report are based on the observations and site conditions at the time inspection.

3.2 All of the observations were carried out from ground level and none of the surrounding surfaces were lifted or removed during the inspection. No tests were carried out to the subject trees or surrounding area during the inspection.

3.3 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.

3.4 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.

3.5 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*.

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

3.7 Urban Arbor neither guarantees, nor is it responsible for, the accuracy of information provided by others that is contained within this report.

3.8 While an assessment of the subject trees estimated useful life expectancy is included in this report, no specific tree risk assessment has been undertaken for any of trees at the site.

3.9 The ultimate safety of any tree cannot be categorically guaranteed. Even trees apparently free of defects can collapse or partially collapse in extreme weather conditions. Trees are dynamic, biological entities subject to changes in their environment, the presence of pathogens and the effects of ageing. These factors reinforce the need for regular inspections. It is generally accepted that hazards can only be identified from distinct defects or from other failure-prone characteristics of a tree or its locality.

3.10 Alteration of this report invalidates the entire report.

URBAN ARBOR
The Trusted Name in Tree Management

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 above ground level) - millimetres.

4.1.5 Estimated height - metres

4.1.6 Estimated crown spread (diameter of crown) - metres

4.1.7 Health

4.1.8 Structural condition

4.1.9 Amenity value

4.1.10 Estimated remaining contribution years (SULE)[1]

4.1.11 Retention value (Tree AZ)[2]

4.1.12 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 information was imported into our computerised geographical information system (GIS) PT-mapper pro. This software was used to measure/calculate all encroachment estimates included in this report.

4.5 All DBH measurements, tree protection zones, and structural root zones were calculated in accordance with methods set out in AS4970 Protection of trees on development sites (2009) [4] and in some cases estimated. See appendices for information.

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

---

[1] Barrell Tree Consultancy, *SULE: Its use and status into the New Millennium*, TreeAZ/03/2001, http://www.treeaz.com/.

[2] Barrell Tree Consultancy, *Tree AZ version 10.04-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 (2015).

[4] Council Of Standards Australia, *AS4970 Protection of trees on development sites* (2009).

URBAN ARBOR
The Trusted Name in Tree Management

5. SITE LOCATION AND BRIEF DESCRIPTION

5.1 The site is located in the suburb of Campsie, New South Wales, which is located in the Canterbury Bankstown Local Government Area (LGA). The trees are subject to protection under the Canterbury Local Environmental Plan (LEP) 2012[5] and Development Control Plan (DCP) 2012.[6] The site is identified as a heritage item (I40) in the LEP heritage maps.[7]

6. GENERAL INFORMATION IN RELATION TO PROTECTING TREES ON DEVELOPMENT SITES

6.1 **Tree protection zone (TPZ):** The TPZ is the principle means of protecting trees on development sites and is an area required to maintain the viability of trees during development. It is commonly observed that tree roots will extend significantly further than the indicative TPZ, however the TPZ is an area identified in AS4970-2009 to be the area where root loss or disturbance will generally 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 TPZ also incorporates the SRZ (see below for more information about the SRZ). The TPZ is calculated by multiplying the DBH by twelve, with the exception of palms, other monocots, cycads and tree ferns, the TPZ of which have been calculated at one metre outside the crown projection. Additional information about the TPZ is included in appendix 3.

6.2 **Structural Root Zone (SRZ):** 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 needs to be maintained to preserve a viable tree. The SRZ is calculated using the following formula; (DAB x 50) $^{0.42}$ x 0.64. There are several factors that can vary 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. Soil level changes should also generally be avoided inside the SRZ of trees to be retained. Palms, other monocots, cycads and tree ferns do not have an SRZ. See the appendices for more information about the SRZ.

---

5 *Canterbury Local Environmental Plan 2012*, https://www.legislation.nsw.gov.au/#/view/EPI/2012/673, accessed 14 June 2022.

6 *Canterbury Development Control Plan 2012*, https://www.cbcity.nsw.gov.au/development/planning-control-policies/canterbury-development-control-plan-2012, accessed 14 June 2022.

7 *Canterbury Local Environmental Plan Heritage Map - Sheet HER_006*, https://eplanningdlprod.blob.core.windows.net/pdfmaps/1550_COM_HER_006_010_20200820.pdf, accessed 14 June 2022.

URBAN ARBOR
The Trusted Name in Tree Management

6.3 **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.

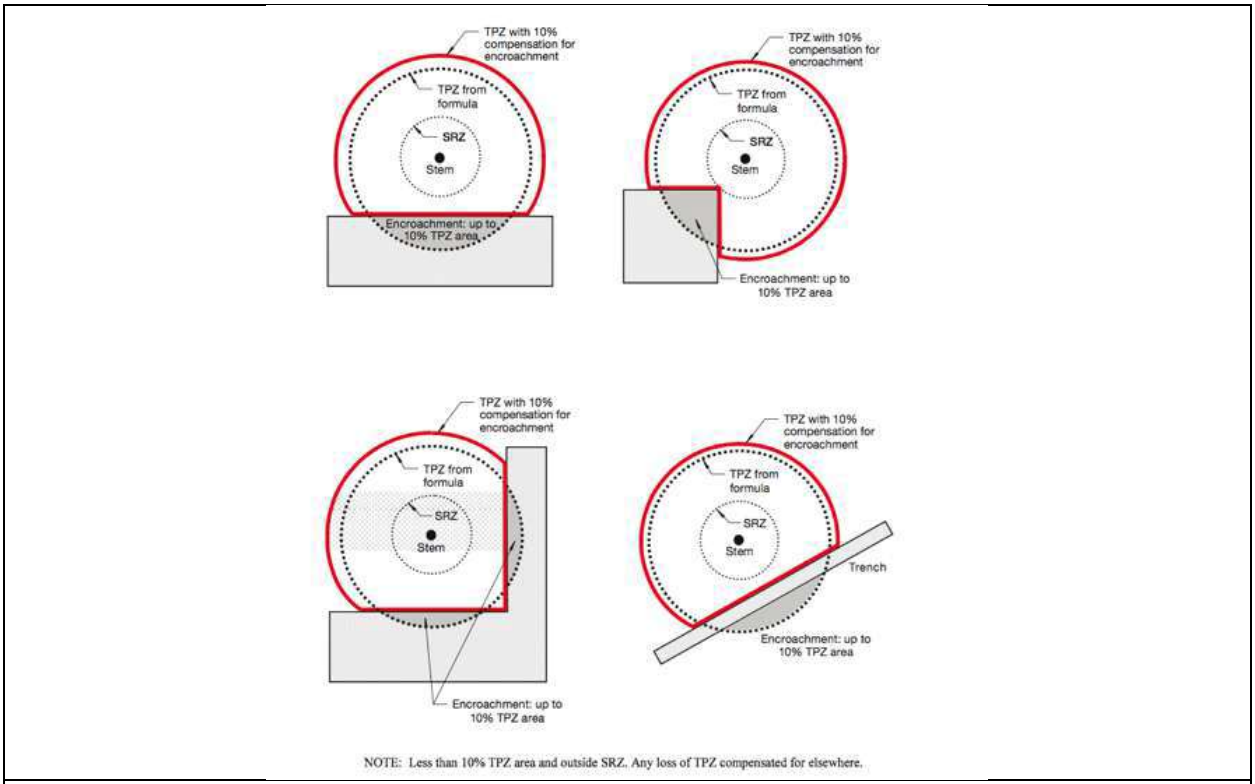


Image 1: Example minor TPZ encroachment from AS4970-2009.

6.4 **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. Root investigations may be required to identify roots that will be impacted during major TPZ encroachment (see appendix 3 for more information in relation to root investigations).

URBAN ARBOR
The Trusted Name in Tree Management

7. OBSERVATIONS

7.1 **Tree information:** Details of each individual tree assessed, including the observations taken during the site inspection can be found in the tree inspection schedule in appendix 2, where the indicative tree protection zone (TPZ) for the subject trees has been calculated. The TPZ and SRZ should be measured in radius from the centre of the trunk. The subject trees have been awarded a retention value based on the observations during the site inspection. The system 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 Tree AZ categories sheet (Barrell Tree Consultancy) has been included in the appendices to assist with understanding the retention values. The retention value that has been allocated to the subject trees in this report is not definitive and should only be used as a guideline. This information has been summarised below.

7.2 **Site Plan:** Site plans have been included in appendix 1, where the indicative TPZ and SRZ of the trees have been overlaid onto the received plans provided by the client. The following plans are included in appendix 1;

- Appendix 1A: Proposed Site Plan Overview
- Appendix 1B: Proposed Service Building
- Appendix 1C: Proposed Service Route Plan
- Appendix 1D: Proposed Piling Plan

8. ASSESSMENT OF CONSTRUCTION IMPACTS

8.1 Table 1: In the table below, the impact of the proposed development has been assessed for all trees included in the report. The assessed TPZ encroachments include proposed structures and hard landscaping only. All soft landscaping should be completed in accordance with section 11.10.

Tree ID	Species	Retention value	TPZ radius (m)	TPZ area (m^2)	SRZ radius (m)	TPZ encroachment	Discussion/ Conclusion	Recommendation
511	*Leptospermum petersonii*	A1	3.2	32.2	2.4	None	No proposed TPZ encroachment.	Retain and protect
515	*Cotoneaster spp*	Z1	2.0	12.6	1.8	None	No proposed TPZ encroachment.	Retain and protect
516	*Leptospermum petersonii*	Z1	2.0	12.6	1.6	None	No proposed TPZ encroachment.	Retain and protect
517	*Pittosporum undulatum*	A1	3.5	38.5	2.0	None	No proposed TPZ encroachment.	Retain and protect
518	*Pittosporum undulatum*	Z1	2.0	12.6	1.7	None	No proposed TPZ encroachment.	Retain and protect
519	*Callistemon viminalis*	A1	4.0	50.3	2.3	None	No proposed TPZ encroachment.	Retain and protect
520	*Callistemon viminalis*	A1	3.2	32.2	2.2	None	No proposed TPZ encroachment.	Retain and protect
521	*Leptospermum petersonii*	A2	4.1	52.8	2.2	None	No proposed TPZ encroachment.	Retain and protect
522	*Grevillea robusta*	A1	5.4	91.6	2.4	None	No proposed TPZ encroachment.	Retain and protect
523	*Eucalyptus microcorys*	Z9	3.8	45.4	2.1	Footprint	The trunk of the tree is located within the footprint of the proposed service building padmount.	Remove

URBAN ARBOR
The Trusted Name in Tree Management

Tree ID	Species	Retention value	TPZ radius (m)	TPZ area (m^2)	SRZ radius (m)	TPZ encroachment	Discussion/ Conclusion	Recommendation
524	*Lophostemon confertus*	A1	2.0	12.6	1.6	Major	The proposed service building construction area will encroach into the TPZ and SRZ, indicating the condition and stability of the tree will be impacted. The tree is recommended for removal due to impacts from the proposed development.	Remove
525	*Eucalyptus microcorys*	A1	3.4	36.3	2.0	None	No proposed TPZ encroachment.	Retain and protect
610	*Platanus x acerifolia*	A1	6.5	132.7	2.7	None	No proposed TPZ encroachment.	Retain and protect
611	*Elaeocarpus reticulatus*	A1	2.7	22.9	1.9	Footprint	The trunk of tree 611 will be located within the footprint of the proposed trunking route and pile footing excavations. The removal of the tree will be required to accommodate the proposed works in this location.	Remove
612	*Elaeocarpus reticulatus*	A1	3.7	43.0	2.0	Minor	The proposed trunking route and pile footing excavations will not encroach into the TPZ of tree 612. The 2m buffer zone required for personnel and machinery access will be within the TPZ. Canopy pruning will be required to accommodate the 2m buffer zone. See section 9.2 for canopy pruning specifications.	Retain and protect
613	*Elaeocarpus reticulatus*	A1	3.6	40.7	2.0	Minor	The proposed trunking route and pile footing excavations will not encroach into the TPZ. The 2m buffer zone required for personnel and machinery access will be within the TPZ, however, no canopy pruning will be required to accommodate the 2m buffer zone. The tree can be retained in a viable condition	Retain and protect
614	*Triadica sebifera*	A1	3.9	47.8	2.3	None	No proposed TPZ encroachment.	Retain and protect
615	*Acacia podalyriifolia*	Z3	2.0	12.6	1.7	None	No proposed TPZ encroachment.	Retain and protect
616	*Pittosporum undulatum*	A1	4.1	52.8	2.6	None	No proposed TPZ encroachment.	Retain and protect
617	*Melaleuca bracteata*	A1	2.2	15.2	1.7	None	No proposed TPZ encroachment.	Retain and protect
618	*Callistemon viminalis*	A1	2.4	18.1	1.7	None	No proposed TPZ encroachment.	Retain and protect

URBAN ARBOR
The Trusted Name in Tree Management

Tree ID	Species	Retention value	TPZ radius (m)	TPZ area (m^2)	SRZ radius (m)	TPZ encroachment	Discussion/ Conclusion	Recommendation
619	*Melaleuca bracteata*	A1	3.1	30.2	2.0	None	No proposed TPZ encroachment.	Retain and protect
620	*Acacia podalyriifolia*	Z3	2.4	18.1	1.7	None	No proposed TPZ encroachment.	Retain and protect
621	*Syncarpia glomulifera*	A1	3.1	30.2	2.0	None	No proposed TPZ encroachment.	Retain and protect
622	*Melaleuca bracteata*	A1	2.2	15.2	1.8	None	No proposed TPZ encroachment.	Retain and protect
623	*Callistemon viminalis*	Z4	2.0	12.6	1.5	None	No proposed TPZ encroachment.	Retain and protect
624	*Melaleuca bracteata*	A1	2.2	15.2	1.7	None	No proposed TPZ encroachment.	Retain and protect
625	*Callistemon viminalis*	A1	2.1	13.9	1.7	None	No proposed TPZ encroachment.	Retain and protect
626	*Melaleuca bracteata*	A1	2.0	12.6	1.6	None	No proposed TPZ encroachment.	Retain and protect
627	*Melaleuca bracteata*	A1	2.3	16.6	1.9	None	No proposed TPZ encroachment.	Retain and protect
628	*Callistemon viminalis*	A1	3.0	28.3	1.8	None	No proposed TPZ encroachment.	Retain and protect
629	*Callistemon viminalis*	A1	3.6	40.7	2.0	None	No proposed TPZ encroachment.	Retain and protect
630	*Callistemon viminalis*	A1	2.4	18.1	1.8	None	No proposed TPZ encroachment.	Retain and protect
631	*Callistemon viminalis*	A1	2.2	15.2	1.7	None	No proposed TPZ encroachment.	Retain and protect

URBAN ARBOR
The Trusted Name in Tree Management

Tree ID	Species	Retention value	TPZ radius (m)	TPZ area (m^2)	SRZ radius (m)	TPZ encroachment	Discussion/ Conclusion	Recommendation
632	*Callistemon viminalis*	A1	3.4	36.3	1.9	None	No proposed TPZ encroachment.	Retain and protect
633	*Callistemon viminalis*	A1	2.9	26.4	1.9	None	No proposed TPZ encroachment.	Retain and protect
634	*Callistemon viminalis*	A1	2.8	24.6	1.8	None	No proposed TPZ encroachment.	Retain and protect
635	*Callistemon viminalis*	A1	2.4	18.1	1.8	None	No proposed TPZ encroachment.	Retain and protect
636	*Melaleuca bracteata*	A1	2.0	12.6	1.6	None	No proposed TPZ encroachment.	Retain and protect
637	*Melaleuca quinquenervia*	A1	4.1	52.8	2.2	Major	The proposed LCR, LV, comms route TL04 and platform reconstruction works will encroach into the TPZ by 54% (28.7m^2) and into the SRZ. This is considered to be a major TPZ encroachment and the proposed works could potentially impact the condition and stability of the tree. The tree is recommended for removal due to development impacts.	Remove
638	*Ficus rubiginosa*	A1	9.1	260.2	3.1	Major	The proposed LCR, LV, comms route TL04 and platform reconstruction works will encroach into the TPZ by 76% (197.7m^2) and into the SRZ. This is considered to be a major TPZ encroachment and the proposed works could potentially impact the condition and stability of the tree. The tree is recommended for removal due to development impacts.	Remove
639	*Melia azedarach*	A1	3.4	36.3	2.1	Major	The proposed LCR, LV, comms route TL04 and platform reconstruction works will encroach into the TPZ by 47% (16.9m^2) and into the SRZ. This is considered to be a major TPZ encroachment and the proposed works could potentially impact the condition and stability of the tree. The tree is recommended for removal due to development impacts.	Remove
640	*Schinus molle*	A1	9.8	301.7	3.4	Footprint	The trunk of the tree is located within the footprint of the proposed CSR route section T02.	Remove

URBAN ARBOR
The Trusted Name in Tree Management

Tree ID	Species	Retention value	TPZ radius (m)	TPZ area (m^2)	SRZ radius (m)	TPZ encroachment	Discussion/ Conclusion	Recommendation
641	*Cinnamomum camphora*	A1	6.6	136.8	2.9	None	No proposed TPZ encroachment.	Retain and protect
642	*Lophostemon confertus*	A1	6.0	113.1	2.6	None	No proposed TPZ encroachment.	Retain and protect
643	*Brachychiton populneus*	A1	4.2	55.4	2.3	None	No proposed TPZ encroachment.	Retain and protect
644	*Ligustrum lucidum*	Z3	3.2	32.2	2.3	None	No proposed TPZ encroachment.	Retain and protect
645	*Cinnamomum camphora*	A1	8.0	201.1	3.4	None	No proposed TPZ encroachment.	Retain and protect

Notes

TPZ Encroachment Percentage: TPZ encroachment percentages are based on new structures and hard surfaces only. New soft landscaping, such as turf or amenity planting areas have not been included in the calculation for TPZ encroachment.

9. CONCLUSIONS

9.1 **Table 2:** Summary of the impact to trees during the development;

Impact	Reason	Category A	Category Z	Total
		A	Z	
Trees to be removed	Building construction, new surfacing and/or proximity, or trees in poor condition.	524, 611, 637, 638, 639, 640 (Six trees)	523 (One tree)	**7 trees**
Retained trees subject to TPZ encroachment greater than 10%	Removal of existing surfacing/structures and/or installation of new surfacing/structures.	None	None	**None**
Retained trees subject to TPZ encroachment of 10% or less	Removal of existing surfacing/structures and/or installation of new surfacing/structures.	511, 517, 519, 520, 521, 522, 525, 610, 612, 613, 614, 616, 617, 618, 619, 621, 622, 624, 625, 626, 627, 628, 629, 630, 631, 632, 633, 634, 635, 636, 641, 642, 643, 645 (Thirty-four trees)	515, 516, 518, 615, 620, 623, 644 (Seven trees)	**41 trees**

URBAN ARBOR
The Trusted Name in Tree Management

9.2 **Canopy Pruning Tree 612:** Canopy pruning will be required to accommodate the new building. The following canopy pruning will be required:

- Brach 1 - 120mm diameter second order branch to the East at 1.2m above ground level (Image 1)
- Branch 2 - 100mm diameter second order branch to the East at 1.5m above ground level (Image 1).

The pruning specified above will result in removing 10-15% of the overall live crown. The pruning will not adversely impact the condition of the tree. The pruning is therefore considered minor and acceptable. All pruning can and must be carried out in accordance with section 7.2.4 of AS4373-2007 for selective pruning.[8] The final pruning cut must be to the branch collar/union.

Image 1: Looking East from within the site towards tree 612, showing branch 1 and 2. The yellow lines indicate the branches to be removed, the red lines indicated the approximate location of the final pruning cuts.

[8] Council Of Standards Australia, *AS 4373 Pruning of amenity trees* (2007) page 14.

URBAN ARBOR
The Trusted Name in Tree Management

10. RECOMMENDATIONS

10.1 This report assesses the impact of a proposed development at the subject site to forty-eight (48) trees located within the site and adjoining sites, in accordance with AS4970 Protection of trees on development sites (2009).

10.2 Site plans have been included in appendix 1, where the indicative TPZ and SRZ of the trees have been overlaid onto the received plans provided by the client. The following plans are included in appendix 1;

- Appendix 1A: Proposed Site Plan Overview
- Appendix 1B: Proposed Service Building
- Appendix 1C: Proposed Service Route Plan
- Appendix 1D: Proposed Piling Plan

10.3 The only trees re-assessed within this revision (Rev D) include tree 611, 612 and 613. All other tree recommendations within this report reflect the proposed design received at the time of the AIA Rev C, report dated 21 May 2021.

10.4 Seven (7) trees have been recommended for removal in this report, including tree 523, 524, 611, 637, 638, 639 and 640. Tree 524, 611, 637, 638, 639 and 640 are higher value category A retention value trees. Tree 523 is a lower value category Z retention value tree that generally should not be a constraint to development works.

10.5 The remaining forty-one trees (41) will be subject to minor and acceptable TPZ encroachments of 10% or less and can be retained in a viable condition, including tree 511, 515, 516, 517, 518, 519, 520, 521, 522, 525, 610, 612, 613, 614, 615, 616, 617, 618, 619, 620, 621, 622, 623, 624, 625, 626, 627, 628, 629, 630, 631, 632, 633, 634, 635, 636, 641, 642, 643, 644 and 645.

10.6 Tree 612 will require canopy pruning to accommodate the proposed construction. See section 9.2 for canopy pruning specifications.

10.7 All trees to be retained must be protected for the duration of development, (including demolition and landscaping, in accordance with AS4970-2009). See section 11 for more information.

10.8 See section 11.10 for general landscape guidance when working within the TPZ of trees to be retained.

10.9 Where possible underground services must be located outside the TPZ of trees to be retained. All underground services located inside the TPZ of any tree to be retained must be installed via tree sensitive techniques. This should include either directional drilling methods or manual excavations to minimise the impact to trees identified for retention.

10.10 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. This report should be submitted as supporting evidence with any tree removal/pruning or development application.

URBAN ARBOR
The Trusted Name in Tree Management

11. TREE PROTECTION REQUIREMENTS

11.1 **Use of this report:** All contractors must be made aware of the tree protection requirements prior to commencing works at the site. This report and a copy of the site plan (Appendix 1) drawings must also be made available to any contractor prior to works commencing and during any on site operations.

11.2 **Project Arborist:** Prior to any works commencing at the site a project Arborist should be appointed. The project Arborist should be qualified to a minimum AQF level 5 and/or equivalent qualifications and experience, and should assist with any development issues relating to trees that may arise. If at any time it is not feasible to carryout works in accordance with this, an alternative must be agreed in writing with the project Arborist.

11.3 **Tree work:** All tree work must be carried out by a qualified and experienced Arborist with a minimum of AQF level 3 in arboriculture, in accordance with NSW Work Cover Code of Practice for the Amenity Tree Industry (1998) and AS4373 Pruning of amenity trees (2007).

11.4 **Initial site meeting/on-going regular inspections:** The project Arborist is to hold a pre-construction site meeting with principle contractor to discuss methods and importance of tree protection measures and resolve any issues in relation to tree protection that may arise. In accordance with AS4970-2009, the project Arborist should carryout regular site inspections to ensure works are carried out in accordance with this document throughout the development process. Site inspections are recommended on a one-month frequency.

11.5 **Site Specific Tree Protection Recommendations:** All trees to be retained must be protected in accordance with general requirements of AS4970-2009 for the duration of the development, details of which are discussed in further details in this section of the report. Trees set back from the proposed works by more than 10m will not require tree protection unless designated construction traffic areas are proposed within the TPZ. If construction traffic areas are proposed adjacent to the trees, tree protection fencing and ground protection will be required. The tree below requires the following tree protection:

Tree 525: Tree protection fencing is to encompass the TPZ perimeter (3.4m radius from centre of tree). TPZ signage is required on the fencing. The fencing can only be moved under the approval of the project arborist.

11.6 **Tree protection Specifications:** It is the responsibility of the principle contractor to install tree protection prior to works commencing at the site (prior to demolition works) and to ensure that the tree protection remains in adequate condition for the duration of the development. The tree protection must not be moved without prior agreement of the project Arborist. The project Arborist must inspect that the tree protection has been installed in accordance with this document and AS4970-2009 prior to works commencing.

URBAN ARBOR
The Trusted Name in Tree Management

11.6.1 Protective fencing: Site specific tree protection requirements are in section 11.5. Where it is not feasible to install fencing at the specified location due to factors such restricting access to areas of the site or for constructing new structures, an alternative location and protection specification must be agreed with the project Arborist. Where the installation of fencing in unfeasible due to restrictions on space, trunk and branch protection will be required (see below). The protective fencing must be constructed of 1.8 metre 'cyclone chainmesh fence'. The fencing must only be removed for the landscaping phase and must be authorised by the project Arborist. Any modifications to the fencing locations must be approved by the project Arborist.

11.6.2 TPZ signage: Tree protection signage is to be attached to the protective fencing, displayed in a prominent position and the sign repeated at 10 metres intervals or closer where the fence changes direction. Each sign shall contain in a clearly legible form, the following information:

- Tree protection zone/No access.
- This fence has been installed to prevent damage to the tree/s and their growing environment both above and below ground. Do not move fencing or enter TPZ without the agreement of the project Arborist.
- The name, address, and telephone number of the developer/builder and project Arborist

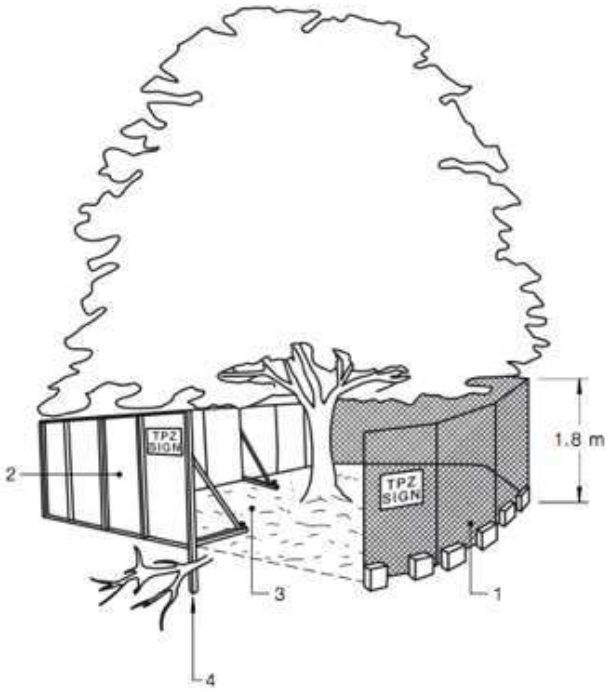
11.6.3 Trunk and Branch Protection: The trunk must be protected by wrapped hessian or similar material to limit damage. Timber planks (50mm x 100mm or similar) should then be placed around tree trunk. The timber planks should be spaced at 100mm intervals, and must be fixed against the trunk with tie wire, or strapping and connections finished or covered to protect pedestrians from injury. The hessian and timber planks must not be fixed to the tree in any instance. The trunk and branch protection shall be installed prior to any work commencing on site and shall be maintained in good condition for the entire development period.

11.6.4 Mulch: Any areas of the TPZ located inside the subject site (only trees to be retained directly adjacent to site works must be mulched to a depth of 75mm with good quality composted wood chip/leaf mulch.

11.6.5 Ground Protection: Ground protection is required to protect the underlying soil structure and root system in areas where it is not practical to restrict access to whole TPZ, while allowing space for construction. Ground protection must consist of good quality composted wood chip/leaf mulch to a depth of between 150-300mm, laid on top of geo textile fabric. If vehicles are to be using the area, additional protection will be required such as rumble boards or track mats to spread the weight of the vehicle and avoid load points. Ground protection is to be specified by the project Arborist as required.

URBAN ARBOR
The Trusted Name in Tree Management

11.6.6 Temporary irrigation: Temporary irrigation should be set up in the TPZ of all trees to be retained, and should distribute water evenly throughout the area of the TPZ. The irrigation should be used for at minimum one hour daily throughout all stages of the development.

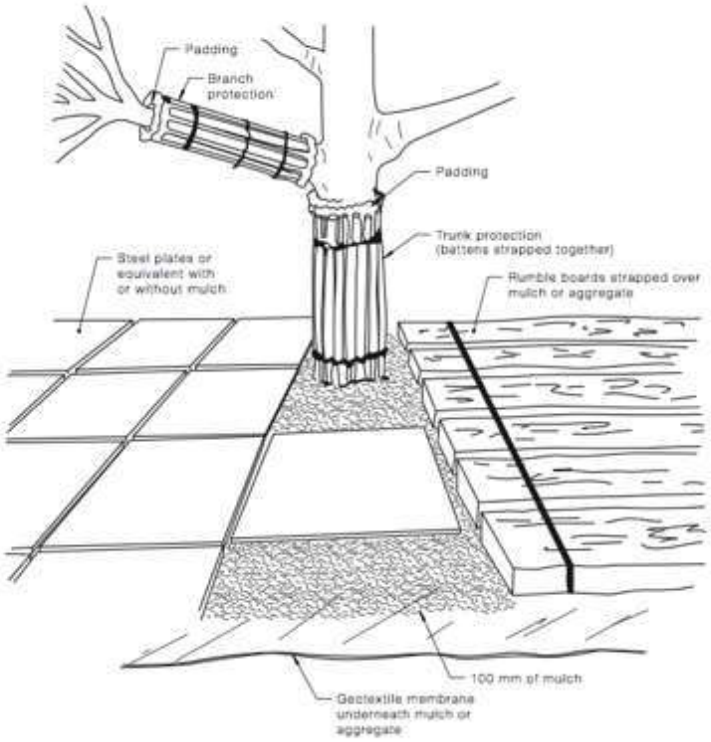


LEGEND:
1 Chain wire mesh panels with shade cloth (if required) attached, held in place with concrete feet.
2 Alternative plywood or wooden paling fence panels. This fencing material also prevents building materials or soil entering the TPZ.
3 Mulch installation across surface of TPZ (at the discretion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

An image from AS4970-2009,[9] with example tree protection.

[9] Council Of Standards Australia, *AS4970 Protection of trees on development sites* (2009), page 16.

URBAN ARBOR
The Trusted Name in Tree Management



NOTES:

1 For trunk and branch protection use boards and padding that will prevent damage to bark. Boards are to be strapped to trees, not nailed or screwed.

2 Rumble boards should be of a suitable thickness to prevent soil compaction and root damage.

An image from AS4970-2009,[10] with example tree protection.

11.7 **Restricted activities inside TPZ:** The following activities must be avoided inside the TPZ of all trees to be retained unless approved by the project Arborist. If at any time these activities cannot be avoided an alternative must be agreed in writing with the project Arborist to minimise the impact to the tree.

A) Machine excavation.
B) Ripping or cultivation of soil.
C) Storage of spoil, soil or any such materials
D) Preparation of chemicals, including preparation of cement products.
E) Refuelling.
F) Dumping of waste.
G) Wash down and cleaning of equipment.
H) Placement of fill.
I) Lighting of fires.
J) Soil level changes.
K) Any physical damage to the crown, trunk, or root system.
L) Parking of vehicles.

[10] Council Of Standards Australia, *AS4970 Protection of trees on development sites* (2009), page 17.

URBAN ARBOR
The Trusted Name in Tree Management

11.8 **Demolition:** The demolition of all existing structures inside or directly adjacent to the TPZ of trees to be retained must be undertaken in consultation with the project Arborist. Any machinery is to work from inside the footprint of the existing structures or outside the TPZ, reaching in to minimise soil disturbance and compaction. If it is not feasible to locate demolition machinery outside the TPZ of trees to be retained, ground protection will be required. The demolition should be undertaken inwards into the footprint of the existing structures, sometimes referred to as the 'top down, pull back' method.

11.9 **Excavations:** The project Arborist must supervise and certify that all excavations and root pruning are in accordance with AS4373-2007 and AS4970-2009. For continuous strip footings, first manual excavation is required along the edge of the structures closest to the subject trees. Manual excavation should be a depth of 1 metre (or to unfavourable root growth conditions such as bed rock or heavy clay, if agreed by project Arborist). Next roots must be pruned back in accordance with AS4373-2007. After all root pruning is completed, machine excavation is permitted within the footprint of the structure. For tree sensitive footings, such as pier and beam, all excavations inside the TPZ must be manual. Manual excavation may include the use of pneumatic and hydraulic tools, high-pressure air or a combination of high-pressure water and a vacuum device. No pruning of roots greater 30mm in diameter is to be carried out without approval of the project arborist. All pruning of roots greater than 30mm in diameter must be carried out by a qualified Arborist/Horticulturalist with a minimum AQF level 3. Root pruning is to be a clean cut with a sharp tool in accordance with AS4373 Pruning of amenity trees (2007).[11] The tree root is to be pruned back to a branch root if possible. Make a clean cut and leave as small a wound as possible.

11.10 **Landscaping:** All landscaping works within the TPZ of trees to be retained are to be undertaken in consultation with a consulting Arborist to minimize the impact to trees. General guidance is provided below to minimise the impact of new landscaping to trees to be retained.

- Level changes should be minimised. The existing ground levels within the landscape areas should not be lowered by more than 100mm or increased by more than 100mm (300mm increase is acceptable if using a coarse free draining material) without assessment by a consulting Arborist.
- New retaining walls should be avoided. Where new retaining walls are proposed inside the TPZ of trees to be retained, they should be constructed from tree sensitive material, such as timber sleepers, that require minimal footings/excavations. If brick retaining walls are proposed inside the TPZ, considerer pier and beam type footings to bridge significant roots that are critical to the trees condition. Retaining walls must be located outside the SRZ and sleepers/beams located above existing soil grades.

[11] Council Of Standards Australia, *AS 4373 Pruning of amenity trees* (2007) page 18

URBAN ARBOR
The Trusted Name in Tree Management

- New footpaths and hard surfaces should be minimised, as they can limit the availability of water, nutrients and air to the trees root system. Where they are proposed, they should be constructed on or above existing soil grades to minimise root disturbance and consider using a permeable surface. Footpaths should be located outside the SRZ where possible.
- Where fill/sub base is used inside the TPZ, fill material should be a coarse granular material that does not restrict the flow of water and air to the root system below. This type of material will also reduce the impact of soil compaction during construction.
- The location of new plantings inside the TPZ of trees to be retained should be flexible to avoid unnecessary damage to tree roots greater than 30mm in diameter.

11.11 **Sediment and Contamination:** All contamination run off from the development such as but not limited to concrete, sediment and toxic wastes must be prevented from entering the TPZ at all times.

11.12 **Tree Wounding/Injury:** Any wounding or injury that occurs to a tree during the construction process will require the project Arborist to be contacted for an assessment of the injury and provide mitigation/remediation advice. It is generally accepted that trees may take many years to decline and eventually die from root damage. All repair work is to be carried out by the project Arborist, at the contractor's expense.

11.13 **Completion of Development Works:** After all construction works are complete the project Arborist should assess that the subject trees have been retained in the same condition and vigour. If changes to condition are identified the project Arborist should provide recommendations for remediation.

URBAN ARBOR
The Trusted Name in Tree Management

12. CONSTRUCTION HOLD POINTS FOR TREE PROTECTION

12.1 **Hold Points:** Below is a sequence of hold points requiring project Arborist certification throughout the development process**.** It provides a list of hold points that must be checked and certified. All certification must be provided in written format upon completion of the development. The final certification must include details of any instructions for remediation undertaken during the development. The principle contractor should be responsible for implementing all tree protection requirements.

Hold Point	Stage	Date Completed and Signature of Project Arborist Responsible
Project Arborist to hold pre construction site meeting with principal contractor to discuss methods and importance of tree protection measures and resolve any issues in relation to feasibility of tree protection requirements that may arise. Project Arborist to mark all trees approved for removal under DA consent.	Prior to development work commencing	
Project Arborist to assess and certify that tree protection has been installed in accordance with AS4970-2009 prior to works commencing at site.	Prior to development work commencing.	
In accordance with AS4970-2009 the project arborist should carryout regular site inspections to ensure works are carried out in accordance with the recommendations. Site inspections are recommended on a monthly frequency.	On-going throughout the development	
The removal of existing structures inside the TPZ of any tree to be retained, such as the existing buildings and hard surfaces must be supervised by the project Arborist.	Demolition	
Project Arborist to supervise all manual excavations and root pruning inside the TPZ of any tree to be retained. Project Arborist to approve all pruning of roots greater than 30mm inside TPZ. All root pruning of roots greater than 30mm in diameter must be carried out by a qualified Arborist/Horticulturalist with a minimum AQF level 3.	Construction	
Project Arborist to certify that all underground services including storm water inside TPZ of any tree to be retained have been installed in accordance with AS4970-2009.	Construction	
All landscaping works within the TPZ of trees to be retained are to be undertaken in consultation with the project Arborist to minimise the impact to trees.	Construction/ Landscape	
After all demolition, construction and landscaping works are complete the project Arborist should assess that the subject trees have been retained in the same condition and vigour. If changes to condition are identified the project Arborist should provide recommendations for remediation.	Upon completion of development	

URBAN ARBOR
The Trusted Name in Tree Management

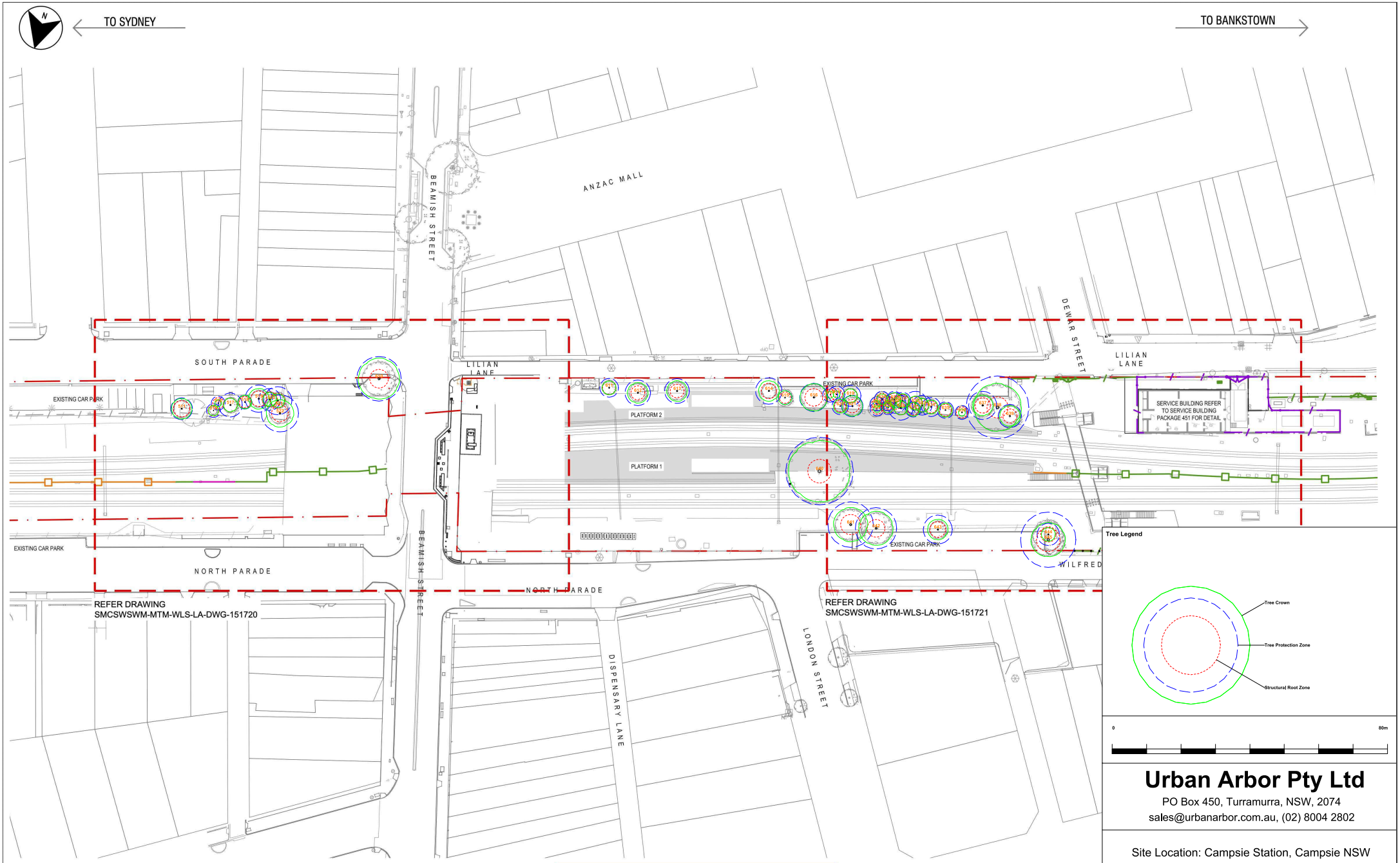
13. BIBLIOGRAPHY/REFERENCES

- Council Of Standards Australia, *AS4970 Protection of trees on development sites* (2009).
- Council Of Standards Australia, *AS4373 Pruning of amenity trees* (2007).
- Mattheck, C. & Breloer, H., *The body language of trees - A handbook for failure analysis*, The Stationary Office, London, England (2015).
- Lonsdale, D., *Principles of tree hazard assessment and management*, The Stationary Office, London, England (1999).
- 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).
- 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 Tree Consultancy, *Tree AZ version 10.10-ANZ*, http://www.treeaz.com/.
- *Canterbury Local Environmental Plan 2012*, https://www.legislation.nsw.gov.au/#/view/EPI/2012/673.
- *Canterbury Development Control Plan 2012*, https://www.cbcity.nsw.gov.au/development/planning-control-policies/canterbury-development-control-plan-2012.

14. LIST OF APPENDICES

The following are included in the appendices:
Appendix 1A: Proposed Site Plan Overview
Appendix 1B: Proposed Service Building
Appendix 1C: Proposed Service Route Plan
Appendix 1D: Proposed Piling Plan
Appendix 2 - Tree Inspection Schedule
Appendix 3 - Further information of methodology

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



DRAWING COLOUR CODED - PRINT ALL COPIES IN COLOUR

Tree Legend

0 80m

Urban Arbor Pty Ltd

PO Box 450, Turramurra, NSW, 2074
sales@urbanarbor.com.au, (02) 8004 2802

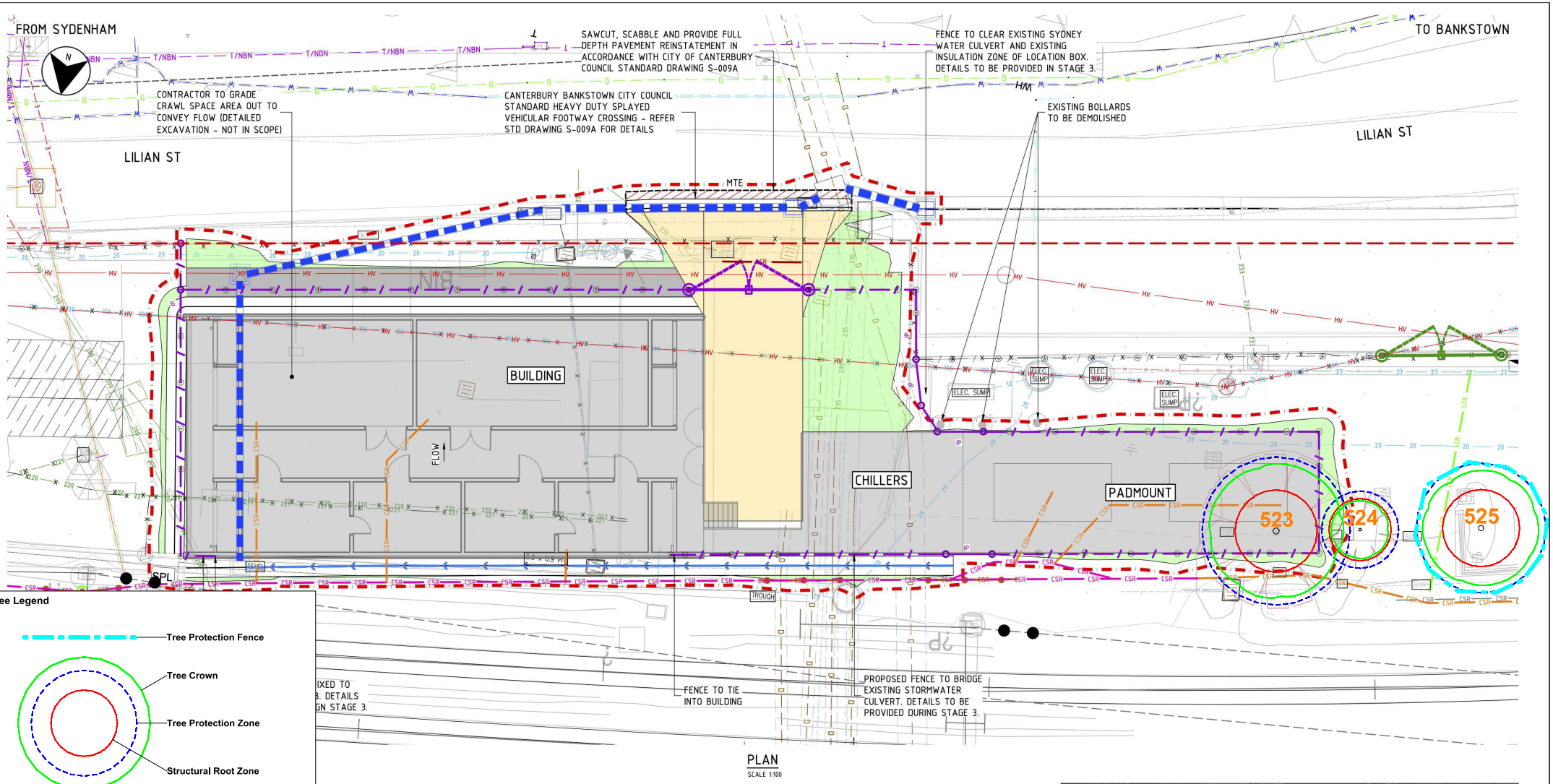
Site Location: Campsie Station, Campsie NSW

SCALE :	DATE :
1 : 500 @ A1	21/12/2020

URBAN ARBOR
The Trusted Name in Tree Management

Appendix 1A: Proposed Site Plan Overview

Prepared by: Bryce Claassens

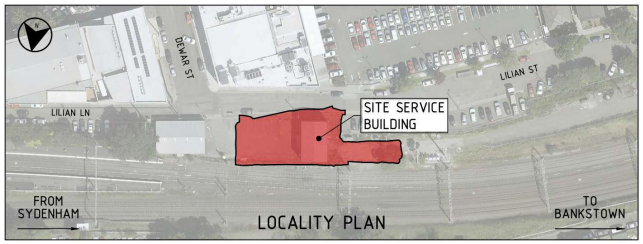


PLAN
SCALE 1:100

Tree Legend

- Tree Protection Fence
- Tree Crown
- Tree Protection Zone
- Structural Root Zone

0 — 15m



DRAWING COLOUR CODED - PRINT ALL COPIES IN COLOUR

NOT FOR CONSTRUCTION

Urban Arbor Pty Ltd
PO Box 450, Turramurra, NSW, 2074
sales@urbanarbor.com.au, (02) 8004 2802

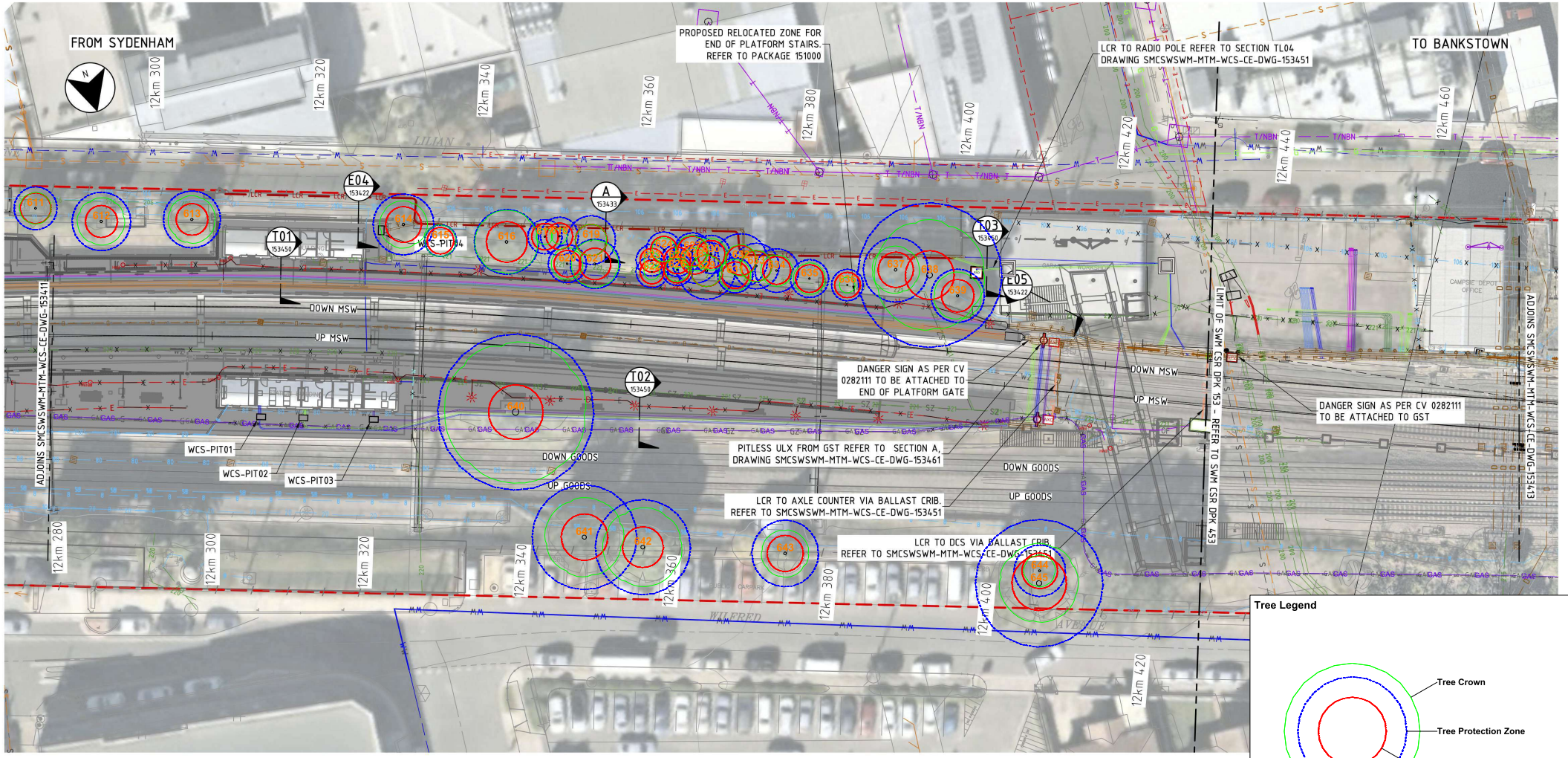
Site Location: Campsie Station, Campsie, NSW

SCALE :	DATE :
1 : 100 @ A1	21/12/2020

URBAN ARBOR
The Trusted Name in Tree Management

Appendix 1B: Proposed Service Building

Prepared by: Bryce Claassens



PLAN VIEW
SCALE 1:250

NOTES

1. FOR GENERAL NOTES REFER TO DRAWINGS SMCSWSWM-MTM-WCS-CE-DWG-153401 TO 153405.
2. FOR LEGEND REFER TO DRAWINGS SMCSWSWM-MTM-WCS-CE-DWG-153408 AND 153409.
3. FOR CORRIDOR CSR WORKS, REFER TO S2B CSR DPK 660.

LEGEND

BACKBONE (CSR) CONDUITS

- CSR - HV (33kV)
- CSR - HV (11kV)
- CSR - LOW VOLTAGE
- CSR - COMMUNICATIONS
- CSR - SIGNALLING

LOCAL (LCR) CONDUITS

- LCR - LOW VOLTAGE
- LCR - COMMUNICATIONS
- LCR - SIGNALLING

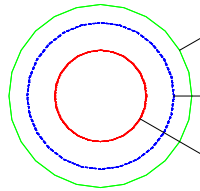
OTHER

- CSR - PROPOSED GST ROUTE
- CSR - PROPOSED CABLE TRAY ROUTE
- CSR - PROPOSED PIT
- LCR - PROPOSED TRENCH ROUTE
- LCR - PROPOSED BALLAST ROUTE
- LCR - PROPOSED GST ROUTE

SYDNEY TRAINS RELOCATED SERVICES

- ST - SYDNEY TRAINS RELOCATION ROUTE

Tree Legend



0 40m

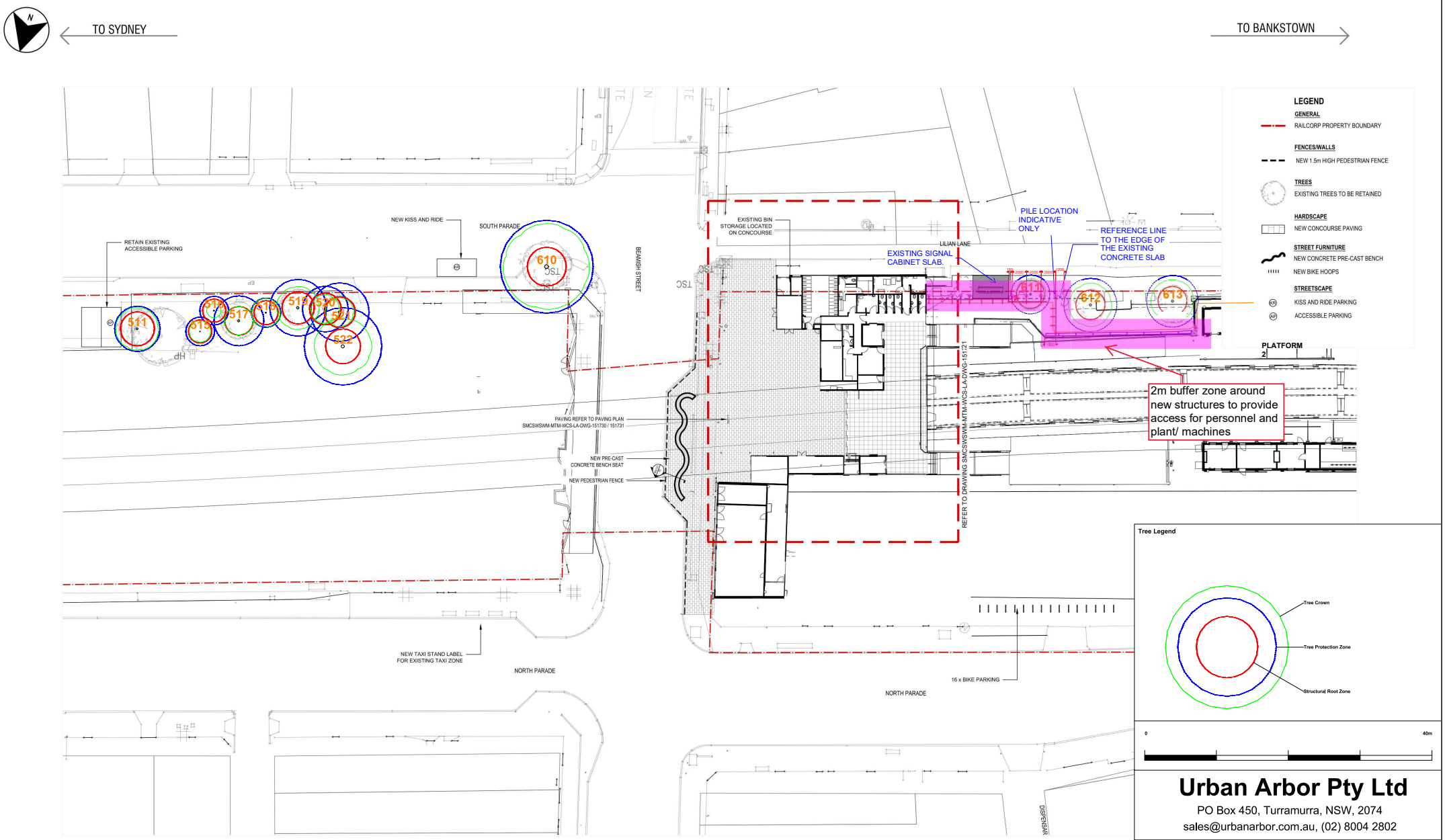
Urban Arbor Pty Ltd
PO Box 450, Turramurra, NSW, 2074
sales@urbanarbor.com.au, (02) 8004 2802

Site Location: Campsie Station, Campsie, NSW

SCALE :	DATE :
1 : 250 @ A1	21/05/2021

Appendix 1C: Proposed Service Route Plan

Prepared by: Bryce Claassens



Urban Arbor Pty Ltd

PO Box 450, Turramurra, NSW, 2074
sales@urbanarbor.com.au, (02) 8004 2802

Site Location: Campsie Station, Campsie NSW

SCALE :	DATE :
1 : 250 @ A1	**14/06/2022**

Appendix 1D: Proposed Piling Plan

URBAN ARBOR
The Trusted Name in Tree Management

Prepared by: Bryce Claassens

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
511	Lemon Scented Teatree	*Leptospermum petersonii*	Mature	6	3	160	120	130	110		263	450	Good	Fair	Medium	2. Medium	A1	3.2	2.4	Located within nature strip. Canopy extends into corridor.
515	Cotoneaster	*Cotoneaster spp*	Semi-mature	4	1.5	80	100				128	250	Good	Fair	Low	5. Small/Young	Z1	2.0	1.8	Located within nature strip.
516	Lemon Scented Tea Tree	*Leptospermum petersonii*	Semi-mature	4.5	1	160					160	180	Fair	Fair	Low	5. Small/Young	Z1	2.0	1.6	Located within nature strip. Health in decline.
517	Sweet Pittosporum	*Pittosporum undulatum*	Mature	6	2	290					290	300	Good	Good	Medium	1. Long	A1	3.5	2.0	Located within nature strip.
518	Sweet Pittosporum	*Pittosporum undulatum*	Semi-mature	5	2	170					170	200	Good	Good	Low	5. Small/Young	Z1	2.0	1.7	Located within nature strip.
519	Weeping Bottlebrush	*Callistemon viminalis*	Mature	5	3	330					330	400	Good	Good	Medium	1. Long	A1	4.0	2.3	Located within nature strip.
520	Weeping Bottlebrush	*Callistemon viminalis*	Mature	5	2	150	150	160			266	380	Good	Fair	Medium	2. Medium	A1	3.2	2.2	Located within nature strip. Pruned for power lines.
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.
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.
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.
524	Queensland Brushbox	*Lophostemon confertus*	Semi-mature	7.5	1.5	150					150	180	Good	Good	Medium	1. Long	A1	2.0	1.6	Located within corridor.
525	Tallowood	*Eucalyptus microcorys*	Mature	12	3	280					280	300	Good	Good	Medium	1. Long	A1	3.4	2.0	Located within corridor.
610	London Plane	*Platanus x acerifolia*	Mature	19	6	540					540	620	Good	Fair	High	2. Medium	A1	6.5	2.7	Asymmetric crown shape due to power line clearance.
611	Blueberry Ash	*Elaeocarpus reticulatus*	Mature	6	2	160	160				226	280	Good	Fair	Medium	2. Medium	A1	2.7	1.9	Located within corridor. Co-dominant stems.
612	Blueberry Ash	*Elaeocarpus reticulatus*	Mature	6	3	250	180				308	310	Good	Good	Medium	1. Long	A1	3.7	2.0	Located within corridor.
613	Blueberry Ash	*Elaeocarpus reticulatus*	Mature	6	3	300					300	300	Good	Good	Medium	1. Long	A1	3.6	2.0	Located within corridor. DBH estimated at base.
614	Chinese Tallo	*Triadica sebifera*	Mature	7	3	180	220	150			321	400	Good	Fair	Medium	2. Medium	A1	3.9	2.3	Located within corridor. Co-dominant stems.
615	Queensland Silver Wattle	*Acacia podalyriifolia*	Mature	5	2	100	120				156	200	Fair	Fair	Low	5. Small/Young	Z3	2.0	1.7	Located within corridor. Exempt species.
616	Sweet Pittosporum	*Pittosporum undulatum*	Mature	6	4	260	220				341	550	Good	Good	Medium	1. Long	A1	4.1	2.6	Located within corridor. Co-dominant stems at base.
617	Black Teatree	*Melaleuca bracteata*	Semi-mature	6	1	180					180	200	Good	Good	Medium	2. Medium	A1	2.2	1.7	Located within corridor.
618	Weeping Bottlebrush	*Callistemon viminalis*	Semi-mature	6	1	200					200	200	Good	Fair	Medium	2. Medium	A1	2.4	1.7	Located within corridor. Multi stem.
619	Black Teatree	*Melaleuca bracteata*	Semi-mature	6	2	150	120	120	120		256	300	Good	Fair	Medium	2. Medium	A1	3.1	2.0	Located within corridor. Co-dominant stems.
620	Queensland Silver Wattle	*Acacia podalyriifolia*	Mature	5	2	200					200	200	Good	Fair	Low	5. Small/Young	Z3	2.4	1.7	Located within corridor. Exempt species.
621	Turpentine	*Syncarpia glomulifera*	Semi-mature	9	3	260					260	300	Good	Good	Medium	1. Long	A1	3.1	2.0	Located within corridor.
622	Black Teatree	*Melaleuca bracteata*	Semi-mature	5	1	120	100	100			185	250	Good	Fair	Medium	2. Medium	A1	2.2	1.8	Located within corridor. Multi stem.
623	Weeping Bottlebrush	*Callistemon viminalis*	Semi-mature	6	1	120					120	150	Poor	Fair	Low	4. Remove	Z4	2.0	1.5	Located within corridor. Advanced stages of decline.
624	Black Teatree	*Melaleuca bracteata*	Semi-mature	6	1.5	150	110				186	200	Good	Fair	Medium	2. Medium	A1	2.2	1.7	Located within corridor. Co-dominant stems.
625	Weeping Bottlebrush	*Callistemon viminalis*	Semi-mature	6	1	100	110	90			174	200	Good	Fair	Medium	1. Long	A1	2.1	1.7	Located within corridor. Multi stem.
626	Black Teatree	*Melaleuca bracteata*	Semi-mature	7	1.5	160					160	190	Good	Good	Medium	1. Long	A1	2.0	1.6	Located within corridor.
627	Black Teatree	*Melaleuca bracteata*	Semi-mature	6	2	160	110				194	260	Good	Fair	Medium	2. Medium	A1	2.3	1.9	Located within corridor. Co-dominant stems with bark inclusion.
628	Weeping Bottlebrush	*Callistemon viminalis*	Semi-mature	5	1.5	250					250	250	Good	Good	Medium	1. Long	A1	3.0	1.8	Located within corridor. Multi stem.
629	Weeping Bottlebrush	*Callistemon viminalis*	Semi-mature	6	2	300					300	300	Good	Fair	Medium	2. Medium	A1	3.6	2.0	Located within corridor. Multi stem.
630	Weeping Bottlebrush	*Callistemon viminalis*	Semi-mature	6	2	140	140				198	220	Good	Good	Medium	1. Long	A1	2.4	1.8	Located within corridor. Multi stem.
631	Weeping Bottlebrush	*Callistemon viminalis*	Semi-mature	6	2	100	100	120			185	200	Good	Fair	Medium	2. Medium	A1	2.2	1.7	Located within corridor. Multi stem.
632	Weeping Bottlebrush	*Callistemon viminalis*	Semi-mature	6	2	180	160	150			284	260	Good	Good	Medium	1. Long	A1	3.4	1.9	Located within corridor. Multi stem.
633	Weeping Bottlebrush	*Callistemon viminalis*	Semi-mature	5	2	240					240	280	Good	Good	Medium	1. Long	A1	2.9	1.9	Located within corridor. Multi stem.
634	Weeping Bottlebrush	*Callistemon viminalis*	Semi-mature	5	2	150	140	110			233	220	Good	Good	Medium	1. Long	A1	2.8	1.8	Located within corridor. Multi stem.
635	Weeping Bottlebrush	*Callistemon viminalis*	Semi-mature	6	2	200					200	220	Good	Good	Medium	1. Long	A1	2.4	1.8	Located within corridor. Multi stem.
636	Black Teatree	*Melaleuca bracteata*	Semi-mature	6	1	160					160	180	Good	Fair	Medium	2. Medium	A1	2.0	1.6	Located within corridor. Suppressed.
637	Broad Leaved Paperbark	*Melaleuca quinquenervia*	Mature	9	3	340					340	390	Good	Fair	Medium	2. Medium	A1	4.1	2.2	Located within corridor. Suppressed by adjacent tree.
638	Port Jackson Fig	*Ficus rubiginosa*	Mature	12	7	760					760	840	Good	Good	High	1. Long	A1	9.1	3.1	Located within corridor.
639	White Cedar	*Melia azedarach*	Mature	7	3	280					280	320	Good	Good	Medium	2. Medium	A1	3.4	2.1	Located within corridor.
640	Peppercorn Tree	*Schinus molle*	Mature	15	9	500	650				820	1100	Good	Good	Medium	1. Long	A1	9.8	3.4	Located within corridor. Adjacent to platform.
641	Camphor Laurel	*Cinnamomum camphora*	Mature	10	5	350	300	300			550	750	Good	Fair	Medium	2. Medium	A1	6.6	2.9	Located within corridor. Vine cover on trunk.
642	Queensland Brushbox	*Lophostemon confertus*	Mature	10	5	500					500	550	Good	Fair	Medium	2. Medium	A1	6.0	2.6	Located within corridor. Vine cover on trunk.
643	Kurrajong	*Brachychiton populneus*	Mature	7	3	350					350	410	Good	Fair	Medium	2. Medium	A1	4.2	2.3	Vine cover on trunk.

Appendix 2 - Tree Inspection Schedule

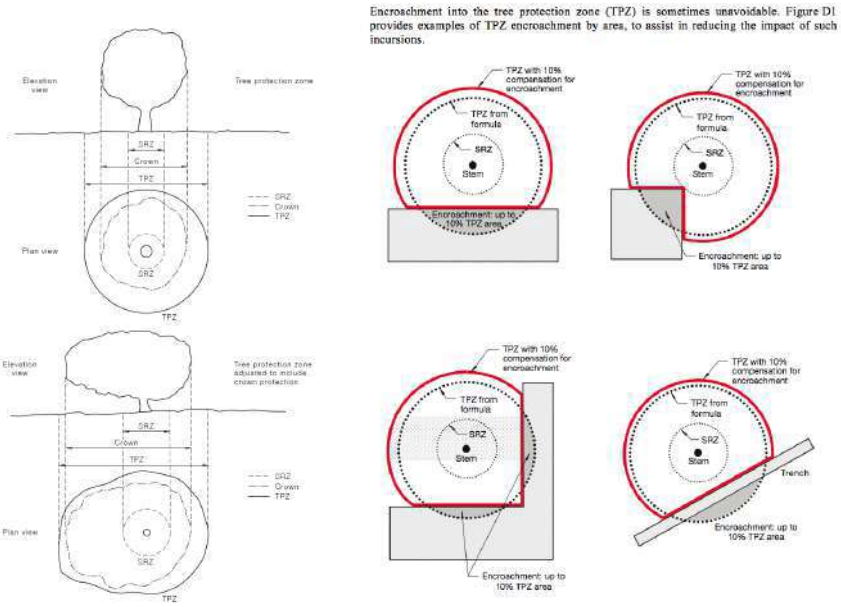
Tree ID	Common Name	Botanical Name	Age Class	Height (m)	Canopy Spread Radius (m)	Stem 1	Stem 2	Stem 3	Stem 4	Stem 5	DBH (mm)	DAB (mm)	Health	Structure	Amenity Value	SULE	Retention Value	TPZ Radius (m)	SRZ Radius (m)	Notes
644	Broad Leaved Privet	*Ligustrum lucidum*	Mature	8	2	200	180				269	400	Fair	Fair	Very Low	3. Short	Z3	3.2	2.3	Located within corridor. Exempt species.
645	Camphor Laurel	*Cinnamomum camphora*	Mature	10	5	300	300	300	300	300	671	1100	Good	Fair	Medium	2. Medium	A1	8.0	3.4	Located within corridor. Multi stem.

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.

URBAN ARBOR
The Trusted Name in Tree Management

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

URBAN ARBOR
The Trusted Name in Tree Management

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 8 CAMPSIE AIA (PLATEAU TREES)

PLATEAUTREES
Safety. Quality. Progress.

Date: 13 March 2021

Re: Additional tree removals at Campsie Station as part of the Southwest Metro Package.

At the request of Downer Group an onsite inspection was undertake at Campsie Station. It has been asked to identify and record additional tree removals beyond those recommended within the Arboricultural Impact Assessment (AIA) prepared by Urban Arbor, dated 17 December 2019, Ref 19/12/17/SWMMS. On the 5 March a site walkthrough was undertaken by myself. Additional tree removals were identified under guidance of a Downer Group representative.

I can confirm that no tree removals were identified within the initial AIA report. Three additional trees located to the rear of the station adjacent the commuter car park off Lillian Street have been identified for removal based on direct design clash and 100% encroachment of TPZ and SRZ. Data for these trees can be found as Appendix 1 of this report. Image 1 shows the location of the additional tree removals.

Trees A, Tallowwood and B Brush Box were found to be in good health and condition. They are considered to have a medium useful life expectancy and landscape significance. Tree C Tallowwood was found to have normal vigour and fair condition. Deadwood and canopy dieback was observed within the tree indicating a possible decline in health and condition. As such the tree is considered to have a short useful life expectancy. Image 2 shows the subject trees. The trees provide some screening and relief from the rail corridor and associated infrastructure along Lillian Street.

Plateau Tree Service Pty Ltd
PO BOX 1522, DEE WHY NSW 2099 Australia
P: 02 9939 5350 | F: 02 9905 7569
E: info@plateautrees.com.au | W: www.plateautrees.com.au
ABN : 17 090 798 002

Image 1: Aerial image showing location of additional tree removals.

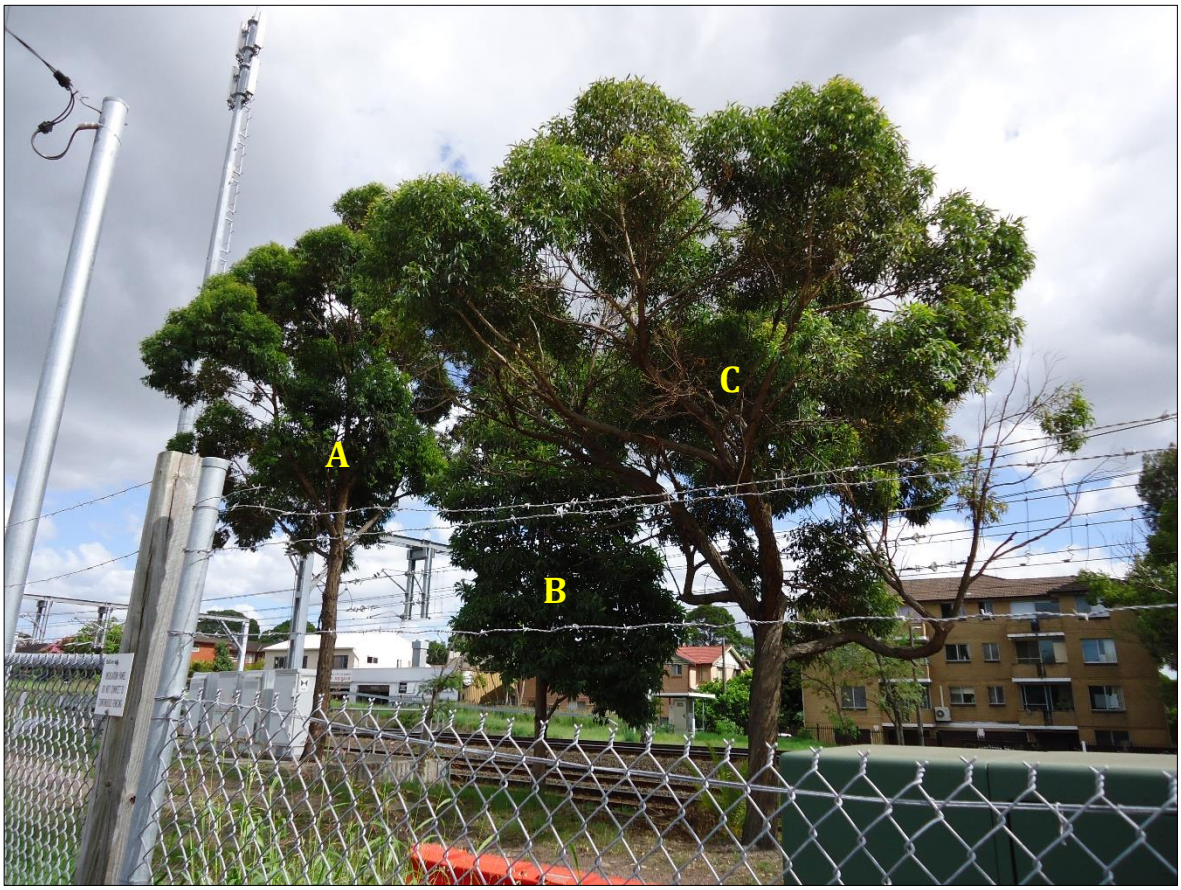
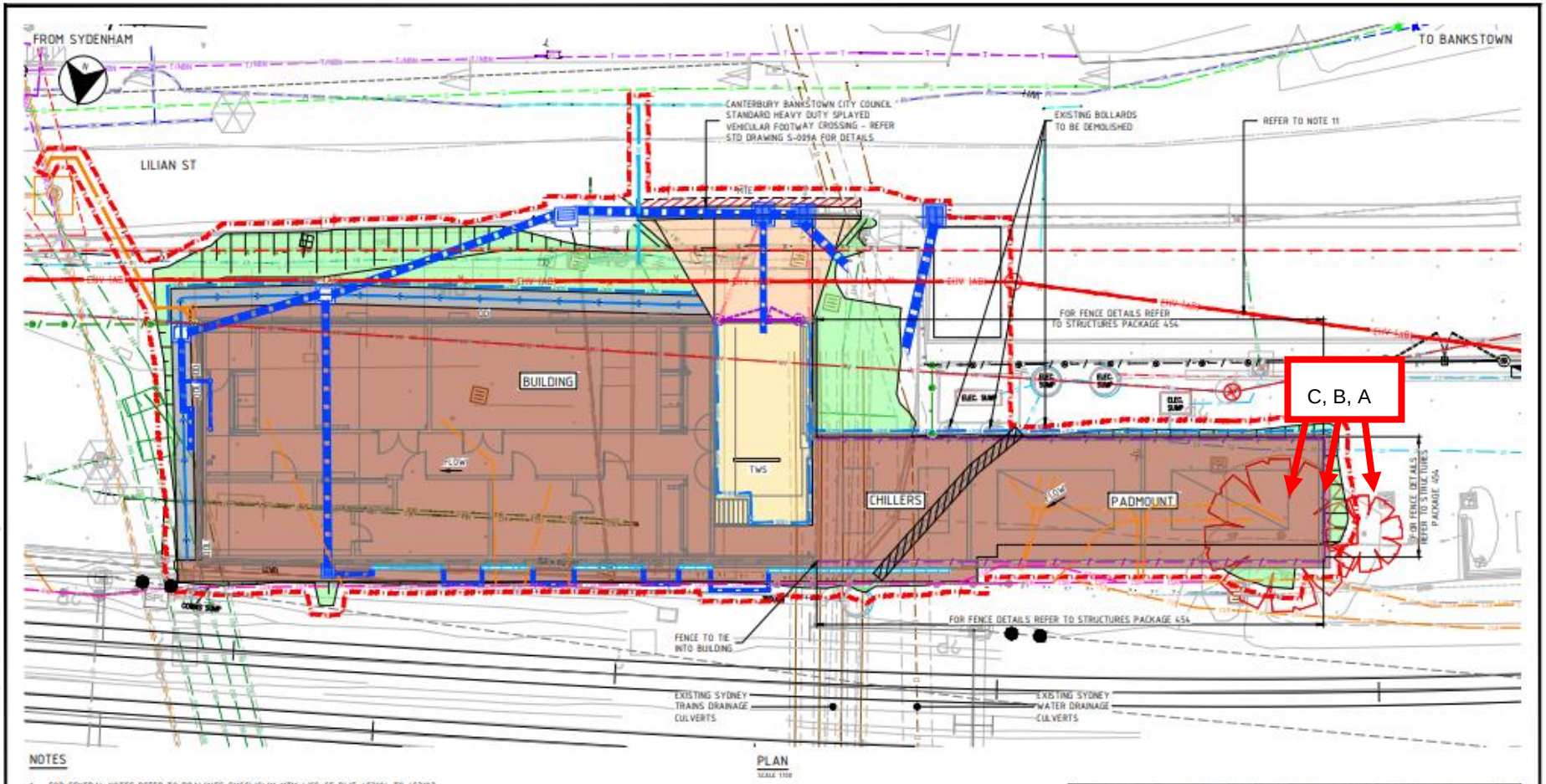


Image 2: The three additional trees identified for removal as part of the Southwest Metro Package works.



NOTES

1. FOR GENERAL NOTES REFER TO DRAWINGS SMCSWSWM-MTM-WCS-CE-DWG-453104 TO 453107.
2. FOR LEGEND REFER TO DRAWING SMCSWSWM-MTM-WCS-CE-DWG-453108 TO 453109.
3. REFER TO STATION DESIGN PACKAGES FOR PLATFORM AND BUILDING WORKS.
4. FOR PAVEMENT PLAN REFER TO DRAWING SMCSWSWM-MTM-WCS-CE-DWG-453161.
5. FOR BULK EARTHWORKS CUT AND FILL PLAN REFER DRAWING SMCSWSWM-MTM-WCS-CE-DWG-453201.
6. FOR BULK EARTHWORKS GRADING PLAN AND LONGITUDINAL SECTION REFER TO DRAWING SMCSWSWM-MTM-WCS-CE-DWG-453206.
7. FOR DRAINAGE LAYOUT REFER TO DRAWING SMCSWSWM-MTM-WCS-CE-DWG-453301.
8. FOR CSR LAYOUT REFER TO DRAWING SMCSWSWM-MTM-WCS-CE-DWG-453418. DO NOT REFER TO ANY OTHER GENERAL ARRANGEMENT PLANS FOR THE DESIGN AND EXTENTS OF CSR WORKS.
9. FOR UTILITIES LAYOUT REFER TO DRAWING SMCSWSWM-MTM-WCS-CE-DWG-453501.
10. FOR AUSGRID LOCATION NOTES REFER TO UTILITIES LAYOUT DRAWING SMCSWSWM-MTM-WCS-CE-DWG-453501.
11. REFER TRACTION SUBSTATION ENABLING WORKS PACKAGE 030 FOR HV RELOCATION DETAILS.
12. THE SERVICE BUILDING IS REQUIRED TO COMPLY WITH EIS REQUIREMENTS. FURTHER FLOOD ASSESSMENT IS PENDING FOR SYDNEY METRO APPROVAL / ACCEPTANCE OF FLOOD IMPACTS BY THE PROPOSED SERVICE BUILDING.

DRAWING COLOUR CODED - PRINT ALL COPIES IN COLOUR

NOT FOR CONSTRUCTION

REV	BY	DATE	DESCRIPTION	APPD
C	TL	18.12.2020	ISSUED FOR STAGE 3	LR
B	TL	06.06.2020	ISSUED FOR STAGE 2	LR
A	RT	08.11.2019	ISSUED FOR STAGE 1	LR

SCALES: 1 : 500 FULL SIZE A1

CLIENT: NSW GOVERNMENT | sydney METRO

SERVICE PROVIDERS: METRON T2M

DRAWN: A. BATMAN
DESIGNED: [illegible]
DRG CHECK: P. ALFORD
DESIGN CHECK: T. LEE
APPROVED: L. PALMER 18.12.2020

SYDNEY METRO
CAMPSIE STATION - SERVICE BUILDING
CIVIL ENGINEERING
SERVICE: BUILDING - CIVIL
GENERAL ARRANGEMENT PLAN

STATUS: STAGE 3 | SHEET 2 OF 2

DRG No: SMCSWSWM-MTM-WCS-CE-DWG-453111 | REV: C

A1 Original | Co-ordinate System: MGA Zone 56 | Height Datum: A.H.D. | This sheet may be prepared using colour and may be incomplete if copied | NOTE: Do not scale from this drawing | ALT DRG No: SMCSWSWM-MTM-WCS-CE-DWG-453111 0

The additional trees to be removed are not representative of an endangered or threatened species or ecological community.

All appropriate approvals and consents are to be obtained prior to tree and vegetation removal works commencing. All tree removal works are to be undertaken by suitably qualified tree workers and in accordance with Safe Work Australia's Guide to Managing Risks of Tree Trimming and Removal Works.

Please feel free to contact me should you require any further assistance regarding this matter.

Regards.
Owen Tebbutt

Consulting Arborist
Plateau Tree Service

Appendix 1: Tree Assessment Schedule

Tree number	Tree name	Tree dimensions				Vigour	Condition	Age class	ULE	Amenity and Visual value	Native or Exotic	TPZ (m)	SRZ (m)	Comments	Remove or Retain
	Botanical name Common name	Height (m)	Spread (m)	D.B.H. (mm)	D.A.B. (mm)										
A	*Eucalyptus microcorys* (Tallowwood)	15-20	5x5	350	400	N	G	M	M	M	N	4.20	2.25	Tree within rail corridor. Tree located within padmount designed access footprint.	Remove
B	*Lophostemon confertus* (Brush Box)	10-15	2x2	200	300	N	G	Y	M	M	N	2.40	2.00	Tree within rail corridor. Tree located within padmount designed footprint.	Remove
C	*Eucalyptus microcorys* (Tallowwood)	10-15	4x4	350	350	N	F	M	S	M	N	4.20	2.13	Tree within rail corridor. Tree is in a state of declining health and located in padmount location.	Remove

Appendix 2: Tree Assessment Criteria

Tree number: Identifying number given to individual (or group) trees.
Botanical Name: Latin name for tree showing genus and species.
Common Name: The common name given to the tree.
Tree Dimensions: The physical dimensions of the tree.

- **Height**: Estimated or measured height of tree in meters.
- **Spread**: Estimated or measured radial canopy spread of tree in meters.
- **Diameter at Breast Height (DBH)**: The estimated or measured diameter of trunk given in mm measured at 1.4m from ground.
- **Diameter Above Base**: The estimated or measured diameter of trunk given in mm measured above the root flare. Used to calculate the structural root zone of the tree.

Age Class: An estimation of how old the tree is in relation to its life expectancy.

- **Young** – Age less than 20% of life expectancy of tree in situ
- **Mature** – Age 20% - 80% of life expectancy of tree in situ
- **Old** – Age greater than 80% of life expectancy of tree in situ
- **Dead** – Tree is dead

Vigour: Ability of a tree to sustain its life processes. This is independent of the condition of a tree but may impact upon it. Vigour can appear to alter rapidly with change of seasons (seasonality) e.g., dormant, deciduous or semi-deciduous trees. Vigour can be categorised as Dormant, Low, Normal and High.

- **Dormant Vigour** – Determined by the existing turgidity in the lower order branches in the outer extremity of the crow, with good bud set and formation, and where the last extension growth is distinct from those most recently preceding it, evident by bud scale scars. Normal vigour during dormancy is achieved when such growth is evident on a majority of branches throughout the crown.
- **Low Vigour** – Reduced ability of a tree to sustain its life processes. This may be evident by the atypical growth of leaves, reduced crown cover and reduced crown density, branches, roots and trunk, and a deterioration of their functions with reduced resistance to predation. This is independent of the condition of a tree but may impact upon it, and especially the ability of a tree to sustain itself against predation.
- **Normal Vigour** – Ability of a tree to maintain and sustain its life processes. This may be evident by the typical growth of leaves, crown cover and crown density, branches, roots and trunk and resistance to predation. This is independent of the condition of a tree but may impact upon it, and especially the ability of a tree to sustain itself against predation.
- **High Vigour** – Accelerated growth of a tree due to incidental or deliberate artificial changes to its growing environment that are seemingly beneficial, but may result in premature aging or failure if the favourable conditions cease, or promote prolonged senescence if the favourable conditions remain, e.g. water from a leaking pipe, water and nutrients from a leaking or disrupted sewer pipe, nutrients from animal waste, a tree growing next to a chicken coop, or a stock feed lot, or a regularly used stockyard, a tree subject to stringent watering and fertilisation program, or some trees may achieve an extended lifespan from continuous pollarding practices over the life of the tree.

Condition: A tree's crown form and growth habit, as modified by its environment (aspect, suppression by other trees, soils) the stability and viability of the root plate, trunk and structural branches (first (1^{st}) and possibly (2^{nd}) order branches), including structural defects such as wounds, cavities or hollows, crooked trunk or weak trunk/branch junctions and the effects of predation by pests and diseases. These may not be directly connected with vigour and it is possible for a tree to be of normal vigour but in poor condition. Condition can be categorised as Dead, Poor, Fair and Good.

- **Dead Condition** – Tree is no longer capable of performing any of the following processes or is exhibiting any of the following symptoms; Photosynthesis via its foliage crown (as indicated by the presence of moist, green or other coloured leaves), Osmosis (the ability of the roots system to take up water), Turgidity (the ability of the plant to sustain moisture pressure in its cells), Epicormic shoots or epicormic strands in Eucalypts (the production of new shoots as a response to stress, generated from latent or adventitious buds or from a lignotuber), Permanent leaf loss, Permanent leaf wilting (the loss of turgidity which is marked by desiccation of stems leaves and roots), Abscission of the epidermis (bark desiccates and peels off to the beginning of the sap wood).
- **Poor Condition** - Tree is of good habit or misshapen, a form that may be severely restricted for space and light, exhibits symptoms of advanced and irreversible decline such as fungal, or bacterial infestation, major die-back in the branch and foliage crown, structural deterioration from insect damage e.g. termite infestation, or storm damage or lightning strike, ring barking from borer activity in the trunk, root damage or instability of the tree, or damage from physical wounding impacts or abrasion, or from altered local environmental conditions and has been unable to adapt to such changes and may decline further to death regardless of remedial works or other modifications to the local environment that would normally be sufficient to provide for its basic survival if in good to fair condition. Deterioration physically, often characterised by a gradual and continuous reduction in vigour but may be independent of a change in vigour, but characterised by a proportionate increase in susceptibility to, and predation by pests and diseases against which the tree cannot be sustained. Such conditions may also be evident in trees of advanced senescence due to normal phenological processes, without modifications to the growing environment or physical damage having been inflicted upon the tree. This may be independent from, or contributed to by vigour.
- **Fair Condition** - Tree is of good habit or misshapen, a form not severely restricted for space and light, has some physical indication of decline due to the early effects of predation by pests and diseases, fungal, bacterial, or insect infestation, or has suffered physical injury to itself that may be contributing to instability or structural weaknesses, or is faltering due to the modification of the environment essential for its basic survival. Such a tree may recover with remedial works where appropriate, or without intervention may stabilise or improve over time, or in response to the implementation of beneficial changes to its local environment. This may be independent from, or contributed to by vigour.
- **Good Condition** - Tree is of good habit, with crown form not severely restricted for space and light, physically free from the adverse effects of predation by pests and diseases, obvious instability or structural weaknesses, fungal, bacterial or insect infestation and is expected to continue to live in much the same condition as at the time of inspection provided conditions around it for its basic survival do not alter greatly. This may be independent from, or contributed to by vigour.

Safe Useful Life Expectancy (SULE) SULE is the length of time that the arborist assesses an individual tree can be retained with an acceptable level of risk based on the information available at the time of inspection. It is a snapshot in time of the potential an individual tree has for survival in the eyes of the assessor. SULE is not static – it is closely related to tree health and the surrounding conditions. Alterations in these variables may result in changes to the SULE assessment. Consequently, the reliability all SULE assessments have will decrease as time passes from the initial assessment and the potential for changes in variables increases.

- **Remove –** Trees that should be removed within the next 5 years
- **Short –** Trees that appear to be retainable at the time of the assessment for 5-15 years with an acceptable level of risk.
- **Medium –** Trees that appear to be retainable at the time of the assessment for 15-40 years with an acceptable level of risk.
- **Long –** Trees that appear to be retainable at the time of the assessment for 40+ years with an acceptable level of risk.

Amenity and Visual Value – For the purposes of assessing the visual and landscape value of each tree the IACA Significance of a Tree, Assessment Rating System (STARS) © (IACA 2010) © has been adopted. - The landscape significance of a tree is an essential criterion to establish the importance that a particular tree may have on a site. The system uses a scale of High, Medium and Low significance in the landscape.

High significance in landscape

- The tree is in good condition and good vigour
- The tree has a form typical for the species
- The tree is a remnant or is a planted locally indigenous specimen and/or is rare or uncommon in the local area or of botanical interest or of substantial age
- The tree is listed as a heritage item, threatened species or part of an endangered ecological community or listed on council's significant tree register
- The tree is visually prominent and visible from a considerable distance when viewed from most directions within the landscape due to its size and scale and makes a positive contribution to the local amenity
- The tree supports social and cultural sentiments or spiritual associations, reflected by the broader population or community group or has commemorative values
- The tree's growth is unrestricted by above and below ground influences, supporting its ability to reach dimensions typical for the taxa in situ – tree is appropriate to the site conditions

Medium significance in landscape

- The tree is in fair-good condition and good or low vigour
- The tree has form typical or atypical of the species
- The tree is a planted locally indigenous or a common species with its taxa commonly planted in the local area
- The tree is visible from surrounding properties, although not visually prominent as partially obstructed by other vegetation or buildings when viewed from the street
- The tree provides a fair contribution to the visual character and amenity of the local area
- The tree's growth is moderately restricted by above or below ground influences, reducing its ability to reach dimensions typical for the taxa in situ

Low significance in landscape

- The tree is in fair-poor condition and good or low vigour
- The tree has form atypical of the species
- The tree is not visible or is partly visible from the surrounding properties as obstructed by other vegetation or buildings
- The tree provides a minor contribution or has a negative impact on the visual character and amenity of the local area
- The tree is a young specimen which may or may not have reached dimensions to be protected by local Tree Preservation Orders or similar protection mechanisms and can easily be replaced with a suitable specimen
- The tree's growth is severely restricted by above or below ground influences, unlikely to reach dimensions typical for the taxa in situ – tree is inappropriate to the site conditions
- The tree is listed as exempt under the provisions of the local Council Tree Preservation Order or similar protection mechanisms
- The tree has a wound or defect that has the potential to become structurally unsound
- **Environmental Pest / Noxious Weed Species**
- The tree is an environmental pest species due to its invasiveness or poisonous/allergenic properties.
- The tree is a declared noxious weed by legislation
- **Hazardous / Irreversible Decline**
- The tree is structurally unsound and/or unstable and is considered potentially dangerous
- The tree is dead, or is in irreversible decline, or has the potential to fail or collapse in full or in part in the immediate to short term

The tree is to have a minimum of three (3) criteria in a category to be classified in that group.

In the development of this document IACA acknowledges the contribution and original concept of the Footprint Green Tree Significance & Retention Value Matrix, developed by Footprint Green Pty Ltd in June 2010.

The Australian Standard 4970-2009 Protection of Trees on Development Sites defines the requirements for assessing trees with respect to development. It provides the guidance on how to decide which trees are appropriate for retention and on the means of protecting them during construction works. It describes the areas and offsets, referred to as the Tree Protection Zone (TPZ) and Structural Root Zone (SRZ) required to be free from development works to maintain tree vitality and stability. This report has been prepared in accordance with the conditions set out within the standard.

- **Tree Protection Zone** – The tree protection zone is defined as a specified area above and below ground set aside for the protection of the tree's roots and crown. It is expressed as a radial measurement taken from the centre of the trunk at ground level.

Structural Root Zone – The structural root zone is defined as a specified area around the base of a tree required to maintain its stability within the ground. It is expressed as a radial measurement taken from the center of the trunk at ground level. Excavation and development works are not recommended within the structural root zone unless additional investigation as to root size and location is undertaken

APPENDIX 8.1 CAMPSIE AIA (PLATEAU TREES)

PLATEAUTREES
Safety. Quality. Progress.

Date: 28 September 2021

Re: Additional tree removal and pruning works at Campsie Station as part of the Southwest Metro Package.

At the request of Downer Group an onsite inspection was undertake at Campsie Station. It has been asked to identify and record additional tree removal and pruning works beyond those recommended within the Arboricultural Impact Assessment (AIA) prepared by Urban Arbor, dated 17 December 2019, Ref 19/12/17/SWMMS. On the 21 June a site walkthrough was undertaken by myself. Additional tree removals were identified under guidance of a Downer Group representative.

Six trees were assessed with respects to the proposed works. Three of these, being trees 614 *Triadica sebifera* (Chinese Tallow), 627 *Melaleuca bracteata* (Black Tea Tree) and 632 *Callistemon viminalis* (Weeping Bottlebrush) were assessed under the initial AIA prepared by Urban Arbor. The remaining three trees identified as tree 1 *Cinnamomum camphora* (Camphor Laurel), 2 and 3 *Celtis sinensis* (Hackberry) were not identified within the AIA. Data relating to these trees can be found as **Appendix 1** of this report. In addition, a dead tree and a clump of *Lantana camara* (Lantana) were identified for removal. Image 1 shows the approximate location of the assessed trees.

The proposed works involve the alignment of a new GST adjacent the southern side of the rail corridor. The western end of the GST transfers to an underground services alignment requiring a pit to be excavated. Tree 1 has been identified for

Plateau Tree Service Pty Ltd
PO BOX 1522, DEE WHY NSW 2099 Australia
P: 02 9939 5350 | F: 02 9905 7569
E: info@plateautrees.com.au | W: www.plateautrees.com.au
ABN : 17 090 798 002

removal to accommodate the pit. The proposed GST is to be aligned within and follow the existing rail corridor fence. Trees 614 and 632 were identified for removal to accommodate the GST's alignment at and around the corners of the existing fence line. Selective pruning works to tree 627 were identified as being required to provide a workable area to install the GST. Three first order branches up to 25mm in diameter were identified for removal and constitute approximately 10-15% of the total canopy volume of the tree. The pruning is considered to be minor and is not expected to have a significant impact upon the health, condition or useful life expectancy of the tree. A reduction in shorth term growth and physiological function can be expected as a result of the pruning works. **Appendix 2** photographs 1 to 4 shows these trees.

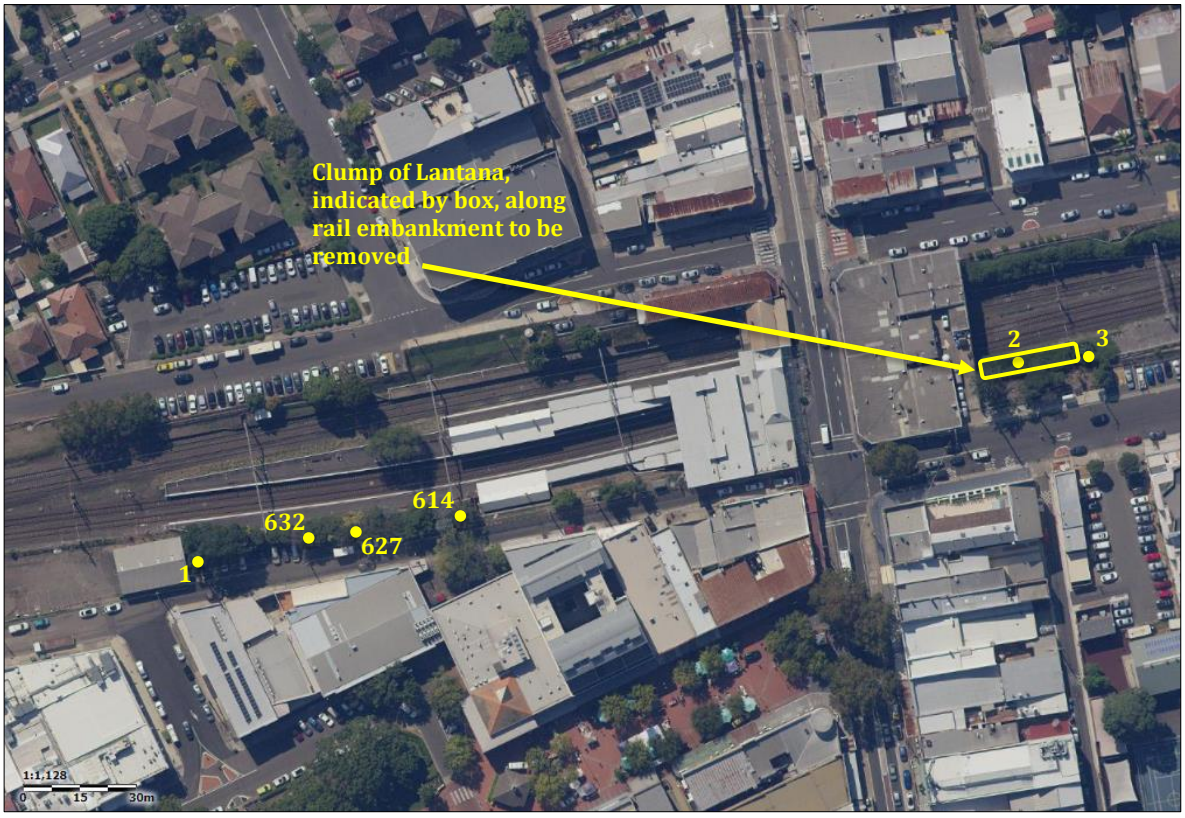


Image 1: Aerial image of Campsie station showing the approximate locations of assessed trees. (*Source: Six Maps accessed 21/06/2021*).

The eastern end of the new GST crosses the rail embankment on the eastern side of the rail bridge and requires the removal of the clump of Lantana and trees 2 and 3. **Appendix 2** photographs 5 and 6 shows these trees.

In order to minimise the impacts of installing the GST adjacent retained trees (611 to 637) all excavation for the GST support posts is to be undertaken using methods that do

not damage tree roots. The excavation must be carried out carefully using spades, forks, and trowels, taking care not to damage the bark and wood of any roots. Specialist tools for removing soil around roots using high-pressure air or water and a vac-truck may be an appropriate alternative to hand digging. If using high-pressure water, the operator is to be appropriately counselled about its use around roots prior to works commencing. Significant damage to tree roots can be caused if high-pressure water is directed upon them. All soil removal must be undertaken with care to minimise disturbance of roots beyond the immediate area of the excavation. Where possible, flexible clumps of smaller roots, including fibrous roots, should be retained if they can be displaced temporarily or permanently beyond the excavation without damage. If digging by hand, a fork should be used to loosen the soil and help located any substantial roots. Once roots have been located, the trowel should be used to clear the soil away from them without damaging the bark.

Roots <100mm in diameter exposed within the support post excavations are to be appropriately pruned. All root pruning cuts are to be made using sharp clean tools such as secateurs, pruners or handsaws, into clean woody tissue perpendicular to the direction of root growth. Where possible the pruning cut is to be made to an appropriate growth point along the root. It should be understood that the effects of root pruning are not always predictable and can result in a decline in tree health and/or condition. A recommendation to remove a tree may be given by the project arborist where it is found that root pruning works are believed to result in a significant impact upon the health, condition, viability or stability of the tree (roots >100mm in diameter) and the relocation of the GST support post is not deemed possible.

The additional trees to be removed are not representative of an endangered or threatened species or ecological community. The Camphor Laurel, Hackberry and Lantana are identified weed species under the Biosecurity Act 2015. A general biosecurity duty exists to prevent, eliminate or minimise any biosecurity risk the plant may pose. Any person who deals with any plant, who knows (or ought to know) of any biosecurity risk, has a duty to ensure the risk is prevented, eliminated or minimised, so far as is reasonably practicable.

All appropriate approvals and consents are to be obtained prior to tree and vegetation removal works commencing. All tree pruning and removal works are to be undertaken by suitably qualified tree workers and in accordance with *AS4373-2007 Pruning of Amenity Trees* and the Safe Work Australia's Guide to Managing Risks of Tree Trimming and Removal Works.

Please feel free to contact me should you require any further assistance regarding this matter.

Regards.

Owen Tebbutt

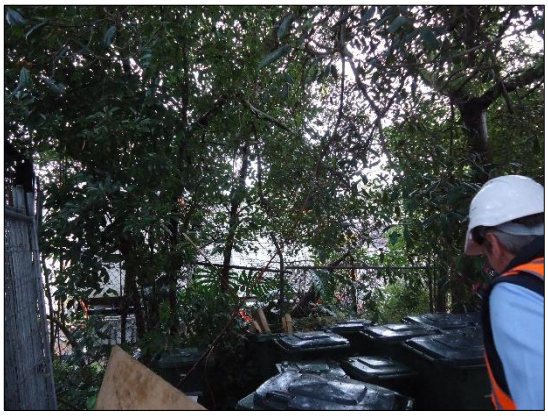
Consulting Arborist
Plateau Tree Service

Appendix 1: Tree assessment Schedule

Tree number	Tree name	Tree dimensions				Vigour	Condition	Age class	ULE	Amenity and Visual Value	Native or Exotic	TPZ (m)	SRZ (m)	Comments	Remove or Retain
	Botanical name Common name	Height (m)	Spread (m)	D.B.H. (mm)	D.A.B. (mm)										
1	*Cinnamomum camphora* (Camphor Laurel)	5-10	1x1	50-90	-	N	G	SM	S	L	E	2	1.5	Fourteen individual stems. Likely to be self-seeded or originating off old stumps. Listed weed species under the Biosecurity act 2015. Clash with permanent GST, underground services and platform 2 retaining wall.	Remove
2	*Celtis* sinensis (Hackberry)	5-10	3x3	-	-	N	G	M	S	L	E	2	1.5	Trunk of tree obscured from view – minimum TPZ and SRZ apply. Growing on embankment within rail corridor. Likely to be self-seeded. Listed weed species under the Biosecurity act 2015. Clash with permanent GST.	Remove
3	*Celtis* sinensis (Hackberry)	1-5	2x2	6x50-100	400	N	G	M	S	L	E	2.88	2.25	Multi-stemmed specimen. Growing on embankment within rail corridor. Likely to be self-seeded. Listed weed species under the Biosecurity act 2015. Clash with permanent GST.	Remove
614	*Triadica sebifera* (Chinese Tallow)	5-10	3x3	321	400	N	F	M	M	M	E	3.9	2.3	Multi-stemmed specimen within rail corridor. Clash with permanent GST, underground services and platform 2 retaining wall.	Remove
627	*Melaleuca bracteata* (Black Tea Tree)	5-10	2x2	194	260	N	F	SM	M	M	N	2.3	1.9	Twin-stemmed specimen within rail corridor. Clash with permanent GST, underground services and platform 2 retaining wall.	Remove
632	*Callistemon viminalis* (Weeping Bottlebrush)	5-10	2x2	284	284	N	G	M	M	M	N	3.4	1.9	Multi-stemmed specimen within rail corridor Clash with permanent GST, underground services and platform 2 retaining wall.	Remove

Appendix 2: Site Photographs

Photograph 1: Clump of vegetation consisting of approximately 14 individual stems of *Cinnamomum camphora* (Camphor Laurel) and a dead tree identified for removal.



Photograph 2: Tree 632 *Callistemon viminalis* (Bottlebrush) identified for removal to accommodate the new GST alignment.

Photograph 3: Tree 627 *Leptospermum petersonii* (Lemon-scented Teatree) identified for selective pruning works create clearances to allow for the new GST alignment.

Photograph 4: Tree 614 *Sapium sebiferum* (Chinese Tallowwood) identified for removal to accommodate the new GST alignment.

Photograph 5: Tree 6 *Celtis sinensis* (Hackberry) located within rail corridor. Tree to be removed to accommodate the new GST alignment. The surrounding Lantana along the rail embankment is also to be removed.

Photograph 6: Tree 7 *Celtis* sinensis (Hackberry) located within rail corridor. Tree to be removed to accommodate the new GST alignment.

FROM SYDENHAM

TO BANKSTOWN

PROPOSED RELOCATED ZONE FOR END OF PLATFORM STAIRS. REFER TO PACKAGE 151000

GST ALIGNMENT. GST AS PER DRAWING SMCSWSWM-MTM-WBS-CE-DWG-213435, CONTAINING A CENTRALLY POSITIONED SEPARATOR

SETOUT (324586.552, 6246126.707)

BURIED CONDUIT ROUTE TO GST TRANSITION, AS PER SPG 0705 DRAWING 112000 / 8 / 2. SETOUT (324535.275, 6246118.430)

BURIED CONDUIT ROUTE TO CONTINUE BETWEEN EXISTING FENCE & GLT

LCR TO RADIO POLE REFER TO SECTION TL04 DRAWING SMCSWSWM-MTM-WCS-CE-DWG-153451

E04 153422

A

T01 153450

T02 153450

T03 153450

E05 153422

WCS-PIT04

SETOUT (324559.717, 6246121.112)

SETOUT (324543.221, 6246120.128)

SETOUT (324514.687, 6246114.032)

DOWN MSW

UP MSW

DOWN GOODS

UP GOODS

Trees 1, 614, 627 & 632 to be removed due to direct clash with underground services, GST pathway and Platform 2 retaining wall.

DANGER SIGN AS PER CV 0282111 TO BE ATTACHED TO END OF PLATFORM GATE

DANGER SIGN AS PER CV 0282111 TO BE ATTACHED TO GST

PITLESS ULX FROM GST REFER TO SECTION A, DRAWING SMCSWSWM-MTM-WCS-CE-DWG-153461

LCR TO GAK REFER TO TL02 153451

LCR TO DCS VIA BALLAST CRIB. REFER TO SMCSWSWM-MTM-WCS-CE-DWG-153451

LIMIT OF SWM CSR DPK 453 REFER TO SWM CSR DPK 453

ADJOINS SMCSWSWM-MTM-WCS-CE-DWG-153411

ADJOINS SMCSWSWM-MTM-WCS-CE-DWG-153413

CAMPSIE DEPOT OFFICE

PUBLIC CARPARK

LILIAN

WILFRED AVENUE

12km 280 12km 300 12km 320 12km 340 12km 360 12km 380 12km 400 12km 420 12km 440 12km 460

PLAN VIEW
SCALE 1:250

NOTES
1. FOR GENERAL NOTES REFER TO DRAWINGS SMCSWSWM-MTM-WCS-CE-DWG-153401 TO 153405.
2. FOR LEGEND REFER TO DRAWINGS SMCSWSWM-MTM-WCS-CE-DWG-153408 AND 153409.
3. FOR CORRIDOR CSR WORKS, REFER TO S2B CSR DPK 660.

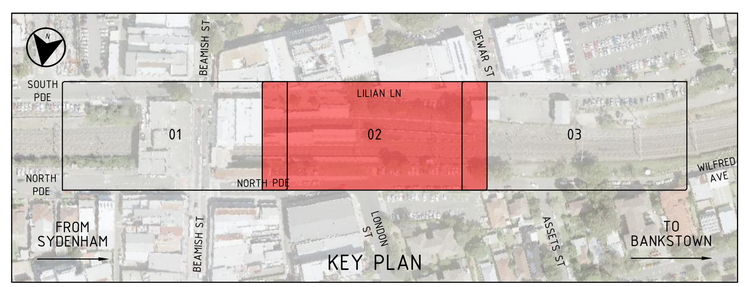
LEGEND

BACKBONE (CSR) CONDUITS
- CSR - HV (33kV)
- CSR - HV (11kV)
- CSR - LOW VOLTAGE
- CSR - COMMUNICATIONS
- CSR - SIGNALLING

LOCAL (LCR) CONDUITS
- LCR - LOW VOLTAGE
- LCR - COMMUNICATIONS
- LCR - SIGNALLING

OTHER
- CSR - PROPOSED GST ROUTE
- CSR - PROPOSED CABLE TRAY ROUTE
- CSR - PROPOSED PIT
- LCR - PROPOSED TRENCH ROUTE
- LCR - PROPOSED BALLAST ROUTE
- LCR - PROPOSED GST ROUTE

SYDNEY TRAINS RELOCATED SERVICES
- ST - SYDNEY TRAINS RELOCATION ROUTE
- ST - SYDNEY TRAINS RELOCATION ROUTE BY OTHERS



DRAWING COLOUR CODED - PRINT ALL COPIES IN COLOUR

FOR CONSTRUCTION

REV.	BY	DATE	DESCRIPTION	APPD.
01.02			CRFI-000492	
01	NJ	20/08/2021	CRFI-000299	LP
00	NJ	14/04/2021	APPROVED FOR CONSTRUCTION	LP

SCALES: 2.5 0 2.5 5 7.5m — 1 : 250 FULL SIZE A1

CLIENT: NSW GOVERNMENT | sydney METRO

SERVICE PROVIDERS: METRON T2M

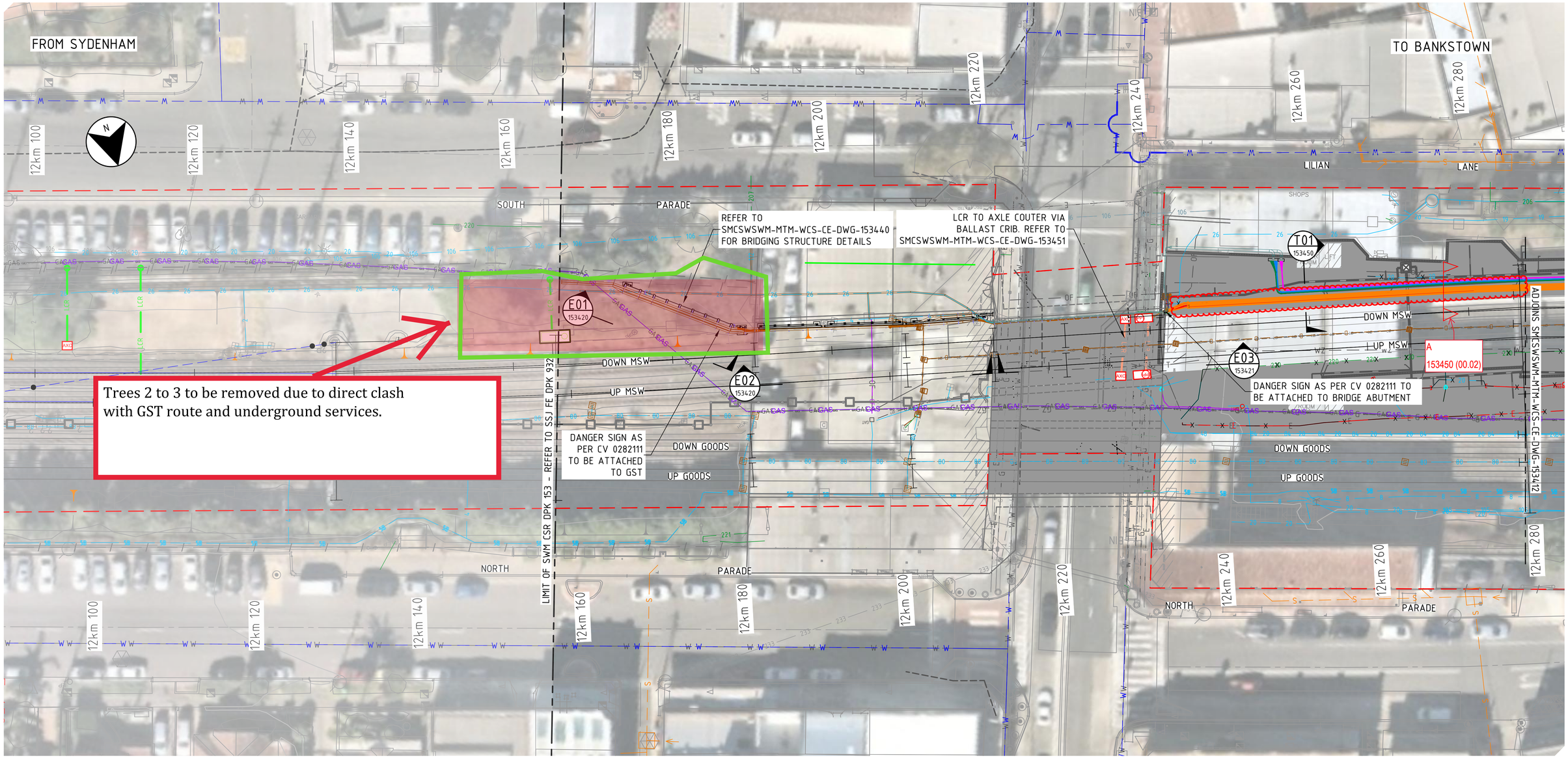
DRAWN H.HU & A.DILLON
DESIGNED N.JALILIAN
DRG CHECK P.ALFORD
DESIGN CHECK O.COLE & A.SHANTIA
APPROVED L.PALMER 20/08/2021

SYDNEY METRO
CAMPSIE STATION (12.165KM TO 12.505KM)
CIVIL ENGINEERING
COMBINED SERVICES ROUTE (CSR)
DETAIL LAYOUT PLAN

STATUS: FOR CONSTRUCTION | SHEET 2 OF 3 | ©

DRG No. SMCSWSWM-MTM-WCS-CE-DWG-153412 | REV. 01

A1 Original | Co-ordinate System: MGA Zone 56 | Height Datum: A.H.D. | This sheet may be prepared using colour and may be incomplete if copied | NOTE: Do not scale from this drawing. | ALT. DRG No. SMCSWSWM-MTM-WCS-CE-DWG-153412



PLAN VIEW
SCALE 1:250

NOTES

1. FOR GENERAL NOTES REFER TO DRAWINGS SMCSWSWM-MTM-WCS-CE-DWG-153401 TO 153405.
2. FOR LEGEND REFER TO DRAWINGS SMCSWSWM-MTM-WCS-CE-DWG-153408 AND 153409.

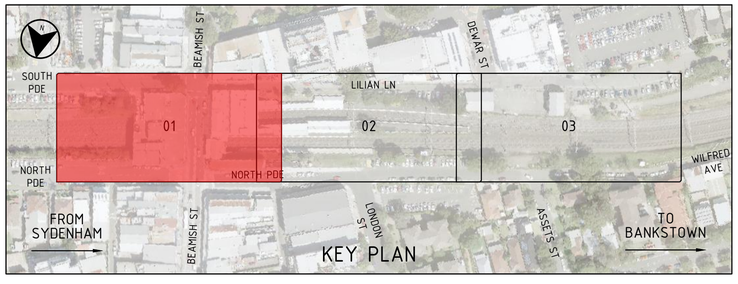
LEGEND

BACKBONE (CSR) CONDUITS
- CSR - HV (33kV)
- CSR - HV (11kV)
- CSR - LOW VOLTAGE
- CSR - COMMUNICATIONS
- CSR - SIGNALLING

LOCAL (LCR) CONDUITS
- LCR - LOW VOLTAGE
- LCR - COMMUNICATIONS
- LCR - SIGNALLING

OTHER
- CSR - PROPOSED GST ROUTE
- CSR - PROPOSED CABLE TRAY ROUTE
- CSR - PROPOSED PIT
- LCR - PROPOSED TRENCH ROUTE
- LCR - PROPOSED BALLAST ROUTE
- LCR - PROPOSED GST ROUTE

SYDNEY TRAINS RELOCATED SERVICES
- ST - SYDNEY TRAINS RELOCATION ROUTE
- ST - SYDNEY TRAINS RELOCATION ROUTE BY OTHERS



DRAWING COLOUR CODED - PRINT ALL COPIES IN COLOUR

FOR CONSTRUCTION

REV.	BY	DATE	DESCRIPTION	APPD.
00.02	OC	24/05/21	HV CONDUIT REDLINE MARKUP	LP
00	NJ	14/04/2021	APPROVED FOR CONSTRUCTION	LP

SCALES
2.5 0 2.5 5 7.5m
1 : 250 FULL SIZE A1

CLIENT: NSW GOVERNMENT | sydney METRO

SERVICE PROVIDERS: METRON T2M

DRAWN H.HU & A.DILLON
DESIGNED N.JALILIAN
DRG CHECK P.ALFORD
DESIGN CHECK O.COLE & A.SHANTIA
APPROVED L.PALMER 14/04/2021

SYDNEY METRO
CAMPSIE STATION (12.165KM TO 12.505KM)
CIVIL ENGINEERING
COMBINED SERVICES ROUTE (CSR)
DETAIL LAYOUT PLAN

STATUS: FOR CONSTRUCTION | SHEET 1 OF 3 | ©

DRG No. SMCSWSWM-MTM-WCS-CE-DWG-153411 | REV. 00

A1 Original | Co-ordinate System: MGA Zone 56 | Height Datum: A.H.D. | This sheet may be prepared using colour and may be incomplete if copied | NOTE: Do not scale from this drawing. | ALT. DRG No. SMCSWSWM-MTM-WCS-CE-DWG-153411

Appendix 3: Tree Assessment Criteria

Tree number: Identifying number given to individual (or group) trees.
Botanical Name: Latin name for tree showing genus and species.
Common Name: The common name given to the tree.
Tree Dimensions: The physical dimensions of the tree.

- **Height**: Estimated or measured height of tree in meters.
- **Spread**: Estimated or measured radial canopy spread of tree in meters.
- **Diameter at Breast Height (DBH)**: The estimated or measured diameter of trunk given in mm measured at 1.4m from ground.
- **Diameter Above Base (DAB)**: The estimated or measured diameter of trunk given in mm measured above the root flare. Used to calculate the structural root zone of the tree.

Age Class: An estimation of how old the tree is in relation to its life expectancy.

- **Young** – New tree planting
- **Semi-Mature** – Established tree with an age less than 20% of life expectancy of tree in situ
- **Mature** – Established tree with an age 20% - 80% of life expectancy of tree in situ
- **Old** – Established tree with an age greater than 80% of life expectancy of tree in situ
- **Dead** – Tree is dead

Vigour: Ability of a tree to sustain its life processes. This is independent of the condition of a tree but may impact upon it. Vigour can appear to alter rapidly with change of seasons (seasonality) e.g., dormant, deciduous or semi-deciduous trees. Vigour can be categorised as Dormant, Low, Normal and High.

- **Dormant Vigour** – Determined by the existing turgidity in the lower order branches in the outer extremity of the crow, with good bud set and formation, and where the last extension growth is distinct from those most recently preceding it, evident by bud scale scars. Normal vigour during dormancy is achieved when such growth is evident on a majority of branches throughout the crown.
- **Low Vigour** – Reduced ability of a tree to sustain its life processes. This may be evident by the atypical growth of leaves, reduced crown cover and reduced crown density, branches, roots and trunk, and a deterioration of their functions with reduced resistance to predation. This is independent of the condition of a tree but may impact upon it, and especially the ability of a tree to sustain itself against predation.
- **Normal Vigour** – Ability of a tree to maintain and sustain its life processes. This may be evident by the typical growth of leaves, crown cover and crown density, branches, roots and trunk and resistance to predation. This is independent of the condition of a tree but may impact upon it, and especially the ability of a tree to sustain itself against predation.
- **High Vigour** – Accelerated growth of a tree due to incidental or deliberate artificial changes to its growing environment that are seemingly beneficial, but may result in premature aging or failure if the favourable conditions cease, or promote prolonged senescence if the favourable conditions remain, e.g. water from a leaking pipe, water and nutrients from a leaking or disrupted sewer pipe, nutrients from animal waste, a tree growing next to a chicken coop, or a stock feed lot, or a regularly used stockyard, a tree subject to stringent watering and fertilisation program, or some trees may achieve an extended lifespan from continuous pollarding practices over the life of the tree.

Condition: A tree's crown form and growth habit, as modified by its environment (aspect, suppression by other trees, soils) the stability and viability of the root plate, trunk and structural branches (first (1st) and possibly (2nd) order branches), including structural defects such as wounds, cavities or hollows, crooked trunk or weak trunk/branch junctions and the effects of predation by pests and diseases. These may not be directly connected with vigour and it is possible for a tree to be of normal vigour but in poor condition. Condition can be categorised as Dead, Poor, Fair and Good.

- **Dead Condition** – Tree is no longer capable of performing any of the following processes or is exhibiting any of the following symptoms; Photosynthesis via its foliage crown (as indicated by the presence of moist, green or other coloured leaves), Osmosis (the ability of the roots system to take up water), Turgidity (the ability of the plant to sustain moisture pressure in its cells), Epicormic shoots or epicormic strands in Eucalypts (the production of new shoots as a response to stress, generated from latent or adventitious buds or from a lignotuber), Permanent leaf loss, Permanent leaf wilting (the loss of turgidity which is marked by desiccation of stems leaves and roots), Abscission of the epidermis (bark desiccates and peels off to the beginning of the sap wood).
- **Poor Condition** - Tree is of good habit or misshapen, a form that may be severely restricted for space and light, exhibits symptoms of advanced and irreversible decline such as fungal, or bacterial infestation, major die-back in the branch and foliage crown, structural deterioration from insect damage e.g. termite infestation, or storm damage or lightning strike, ring barking from borer activity in the trunk, root damage or instability of the tree, or damage from physical wounding impacts or abrasion, or from altered local environmental conditions and has been unable to adapt to such changes and may decline further to death regardless of remedial works or other modifications to the local environment that would normally be sufficient to provide for its basic survival if in good to fair condition. Deterioration physically, often characterised by a gradual and continuous reduction in vigour but may be independent of a change in vigour, but characterised by a proportionate increase in susceptibility to, and predation by pests and diseases against which the tree cannot be sustained. Such conditions may also be evident in trees of advanced senescence due to normal phenological processes, without modifications to the growing environment or physical damage having been inflicted upon the tree. This may be independent from, or contributed to by vigour.
- **Fair Condition** - Tree is of good habit or misshapen, a form not severely restricted for space and light, has some physical indication of decline due to the early effects of predation by pests and diseases, fungal, bacterial, or insect infestation, or has suffered physical injury to itself that may be contributing to instability or structural weaknesses, or is faltering due to the modification of the environment essential for its basic survival. Such a tree may recover with remedial works where appropriate, or without intervention may stabilise or improve over time, or in response to the implementation of beneficial changes to its local environment. This may be independent from, or contributed to by vigour.
- **Good Condition** - Tree is of good habit, with crown form not severely restricted for space and light, physically free from the adverse effects of predation by pests and diseases, obvious instability or structural weaknesses, fungal, bacterial or insect infestation and is expected to continue to live in much the same condition as at the time of inspection provided conditions around it for its basic survival do not alter greatly. This may be independent from, or contributed to by vigour.

Useful Life Expectancy (ULE) ULE is the length of time that the arborist assesses an individual tree can be retained with an acceptable level of risk based on the information available at the time of inspection. It is a snapshot in time of the potential an individual tree has for survival in the eyes of the assessor. ULE is not static – it is closely related to tree health and the surrounding conditions. Alterations in these variables may result in changes to the ULE assessment. Consequently, the reliability all ULE assessments have will decrease as time passes from the initial assessment and the potential for changes in variables increases.

- **Remove –** Trees that should be removed within the next 5 years
- **Short –** Trees that appear to be retainable at the time of the assessment for 5-15 years with an acceptable level of risk.
- **Medium –** Trees that appear to be retainable at the time of the assessment for 15-40 years with an acceptable level of risk.
- **Long –** Trees that appear to be retainable at the time of the assessment for 40+ years with an acceptable level of risk.

Amenity and Visual Value – For the purposes of assessing the visual and landscape value of each tree the IACA Significance of a Tree, Assessment Rating System (STARS) © (IACA 2010) © has been adopted. - The landscape significance of a tree is an essential criterion to establish the importance that a particular tree may have on a site. The system uses a scale of High, Medium and Low significance in the landscape.

High significance in landscape

- The tree is in good condition and good vigour
- The tree has a form typical for the species
- The tree is a remnant or is a planted locally indigenous specimen and/or is rare or uncommon in the local area or of botanical interest or of substantial age
- The tree is listed as a heritage item, threatened species or part of an endangered ecological community or listed on council's significant tree register
- The tree is visually prominent and visible from a considerable distance when viewed from most directions within the landscape due to its size and scale and makes a positive contribution to the local amenity
- The tree supports social and cultural sentiments or spiritual associations, reflected by the broader population or community group or has commemorative values
- The tree's growth is unrestricted by above and below ground influences, supporting its ability to reach dimensions typical for the taxa in situ – tree is appropriate to the site conditions

Medium significance in landscape

- The tree is in fair-good condition and good or low vigour
- The tree has form typical or atypical of the species
- The tree is a planted locally indigenous or a common species with its taxa commonly planted in the local area
- The tree is visible from surrounding properties, although not visually prominent as partially obstructed by other vegetation or buildings when viewed from the street
- The tree provides a fair contribution to the visual character and amenity of the local area
- The tree's growth is moderately restricted by above or below ground influences, reducing its ability to reach dimensions typical for the taxa in situ

Low significance in landscape

- The tree is in fair-poor condition and good or low vigour
- The tree has form atypical of the species
- The tree is not visible or is partly visible from the surrounding properties as obstructed by other vegetation or buildings
- The tree provides a minor contribution or has a negative impact on the visual character and amenity of the local area
- The tree is a young specimen which may or may not have reached dimensions to be protected by local Tree Preservation Orders or similar protection mechanisms and can easily be replaced with a suitable specimen
- The tree's growth is severely restricted by above or below ground influences, unlikely to reach dimensions typical for the taxa in situ – tree is inappropriate to the site conditions
- The tree is listed as exempt under the provisions of the local Council Tree Preservation Order or similar protection mechanisms
- The tree has a wound or defect that has the potential to become structurally unsound
- **Environmental Pest / Noxious Weed Species**
- The tree is an environmental pest species due to its invasiveness or poisonous/allergenic properties.
- The tree is a declared noxious weed by legislation
- **Hazardous / Irreversible Decline**
- The tree is structurally unsound and/or unstable and is considered potentially dangerous
- The tree is dead, or is in irreversible decline, or has the potential to fail or collapse in full or in part in the immediate to short term

The tree is to have a minimum of three (3) criteria in a category to be classified in that group.

In the development of this document IACA acknowledges the contribution and original concept of the Footprint Green Tree Significance & Retention Value Matrix, developed by Footprint Green Pty Ltd in June 2010.

The Australian Standard 4970-2009 Protection of Trees on Development Sites defines the requirements for assessing trees with respect to development. It provides the guidance on how to decide which trees are appropriate for retention and on the means of protecting them during construction works. It describes the areas and offsets, referred to as the Tree Protection Zone (TPZ) and Structural Root Zone (SRZ) required to be free from development works to maintain tree vitality and stability. This report has been prepared in accordance with the conditions set out within the standard.

- **Tree Protection Zone** – The tree protection zone is defined as a specified area above and below ground set aside for the protection of the tree's roots and crown. It is expressed as a radial measurement taken from the centre of the trunk at ground level.
- **Structural Root Zone** – The structural root zone is defined as a specified area around the base of a tree required to maintain its stability within the ground. It is expressed as a radial measurement taken from the center of the trunk at ground level. Excavation and development works are not recommended within the structural root zone unless additional investigation as to root size and location is undertaken

APPENDIX 8.2 CAMPSIE AIA (PLATEAU TREES)

PLATEAUTREES
Safety. Quality. Progress.

Date: 28 September 2021

Re: Additional tree removal and pruning works at Campsie Station as part of the Southwest Metro Package.

At the request of Downer Group an onsite inspection was undertake at Campsie Station. It has been asked to identify and record additional tree removal and pruning works beyond those recommended within the Arboricultural Impact Assessment (AIA) prepared by Urban Arbor, dated 17 December 2019, Ref 19/12/17/SWMMS. On the 20 August a site walkthrough was undertaken by myself. Additional tree removals were identified under guidance of a Downer Group representative.

It is proposed to construct a new fence along the southern side of Platform 2 and access the rail corridor adjacent South Parade to undertake pilling works (Image 1 shows the proposed works locations). These works impact upon twenty-one individual trees all of which are identified within the existing AIA report.

The new fencing, including access requirements, adjacent the southern side of Platform 2 shall require the removal of trees 615, 616, 620, 621, 622, 623, 624, 625, 626, 628, 629, 630, 631, 633, 634, 635 and 636. Access requirements adjacent South Parade require trees 515, 516, 517 and 519 to be removed as well as an existing dead palm tree stump. Data relating to the trees can be found as Appendix 1 Tree Assessment Schedule for data relating to the aforementioned trees. The AIA report prepared by Urban Arbor states the health of tree 516 as fair and 517 as good. I can confirm that at the time of the inspection these trees were found to be

Plateau Tree Service Pty Ltd
PO BOX 1522, DEE WHY NSW 2099 Australia
P: 02 9939 5350 | F: 02 9905 7569
E: info@plateautrees.com.au | W: www.plateautrees.com.au
ABN : 17 090 798 002

dead. Tree 615 was also found to be in a state of declining health and beyond reasonable attempts to remediate. The AIA report also identifies trees 615 and 620 as being exempt from local tree preservation controls. The additional trees to be removed are not representative of an endangered or threatened species or ecological community. Photographs of the assessed trees have been attached to the rear of this report as Appendix 2 Site Photographs.

Image 1: Aerial image of Campsie station showing the approximate locations of assessed trees. (*Source: Six Maps accessed 23/08/2021*).

Tree removals are only to be undertaken where a direct conflict between the proposed works and the position of the tree exists. Where appropriate selective pruning and implementation of tree protection measures is to be considered as a preferred option to whole tree removal. Tree protection measures are to be implemented in accordance with section 11 of the AIA report and the project arborists recommendations.

All appropriate approvals and consents are to be obtained prior to tree and vegetation removal works commencing. All tree pruning and removal works are to be undertaken by suitably qualified tree workers and in accordance with *AS4373-2007 Pruning of Amenity Trees* and the Safe Work Australia's Guide to Managing Risks of Tree Trimming and Removal Works.

Please feel free to contact me should you require any further assistance regarding this matter.

Regards.

Owen Tebbutt

Consulting Arborist
Plateau Tree Service

Appendix 1: Tree Assessment Schedule

Tree number	Tree name Botanical name Common name	Tree dimensions Height (m)	Spread (m)	D.B.H. (mm)	D.A.B. (mm)	Vigour	Condition	Age class	ULE	Amenity and Visual Value	Native or Exotic	TPZ (m)	SRZ (m)	Comments	Remove or Retain
515	*Cotoneaster* sp (Cotoneaster)	1-5	2x2	-	-	N	G	M	R	L	N	2	1.5	Listed weed species. All plants are regulated with a general biosecurity duty to prevent, eliminate or minimise any biosecurity risk they may pose. Any person who deals with any plant, who knows (or ought to know) of any biosecurity risk, has a duty to ensure the risk is prevented, eliminated or minimised, so far as is reasonably practicable.	Remove
516	*Leptospourum petersonii* (Lemon-scented Tea Tree)	1-5	1x1	160	180	-	D	D	R	L	N	2	1.6	Dead tree. Tree located within rail corridor adjacent Platform 2.	Remove
517	*Pittosporum undulatum* (Sweet Pittosporum)	5-10	2x2	290	300	-	D	D	R	L	N	3.5	2	Dead tree. Tree located within rail corridor adjacent Platform 2.	Remove
519	*Callistemon viminalis* (Weeping Bottlebrush)	5-10	2x2	330	400	N	G	M	L	M	N	4	2.3	Tree located within rail corridor adjacent Platform 2.	Remove
615	*Acacia podalyrifolia* (Queensland Wattle)	5-10	2x2	156	200	L	F	M	Y	L	N	2	1.7	Tree located within rail corridor adjacent Platform 2. Exempt tree species.	Remove
616	*Pittosporum undulatum* (Sweet Pittosporum)	5-10	4x4	341	550	N	G	M	S	M	N	4.1	2.6	Tree located within rail corridor adjacent Platform 2.	Remove
620	*Acacia podalyrifolia* (Queensland Wattle)	5-10	2x2	200	200	N	G	M	Y	L	N	2.4	1.7	Tree located within rail corridor adjacent Platform 2. Exempt tree species.	Remove
621	*Syncarpia glomulifera* (Turpentine)	5-10	3x3	260	300	N	G	SM	L	M	N	3.1	2	Tree located within rail corridor adjacent Platform 2.	Remove
622	*Melaleuca bracteata* (Black Tea Tree)	5-10	1x1	185	250	N	G	SM	M	M	N	2.2	1.8	Tree located within rail corridor adjacent Platform 2.	Remove
623	*Callistemon viminalis* (Weeping Bottlebrush)	5-10	1x1	120	150	N	G	SM	R	L	N	2	1.5	Tree located within rail corridor adjacent Platform 2.	Remove

Tree number	Tree name	Tree dimensions				Vigour	Condition	Age class	ULE	Amenity and Visual Value	Native or	TPZ (m)	SRZ (m)	Comments	Remove or Retain
624	*Melaleuca bracteata* (Black Tea Tree)	5-10	2x2	186	200	N	G	SM	M	M	N	2.2	1.7	Tree located within rail corridor adjacent Platform 2.	Remove
625	*Callistemon viminalis* (Weeping Bottlebrush)	5-10	1x1	174	200	N	G	SM	L	M	N	2.1	1.7	Tree located within rail corridor adjacent Platform 2.	Remove
626	*Melaleuca bracteata* (Black Tea Tree)	5-10	2x2	160	190	N	G	SM	L	M	N	2	1.6	Tree located within rail corridor adjacent Platform 2.	Remove
628	*Callistemon viminalis* (Weeping Bottlebrush)	5-10	2x2	250	250	N	G	SM	L	M	N	3	1.8	Tree located within rail corridor adjacent Platform 2.	Remove
629	*Callistemon viminalis* (Weeping Bottlebrush)	5-10	2x2	300	300	N	G	SM	M	M	N	3.6	2	Tree located within rail corridor adjacent Platform 2.	Remove
630	*Callistemon viminalis* (Weeping Bottlebrush)	5-10	2x2	198	220	N	G	SM	L	M	N	2.4	1.8	Tree located within rail corridor adjacent Platform 2.	Remove
631	*Callistemon viminalis* (Weeping Bottlebrush)	5-10	2x2	185	200	N	G	SM	M	M	N	2.2	1.7	Tree located within rail corridor adjacent Platform 2.	Remove
633	*Callistemon viminalis* (Weeping Bottlebrush)	5-10	2x2	240	280	N	G	SM	L	M	N	2.9	1.9	Tree located within rail corridor adjacent Platform 2.	Remove
634	*Callistemon viminalis* (Weeping Bottlebrush)	5-10	2x2	233	220	N	G	SM	L	M	N	2.8	1.8	Tree located within rail corridor adjacent Platform 2.	Remove
635	*Callistemon viminalis* (Weeping Bottlebrush)	5-10	2x2	200	220	N	G	SM	L	M	N	2.4	1.8	Tree located within rail corridor adjacent Platform 2.	Remove
636	*Callistemon viminalis* (Weeping Bottlebrush)	5-10	2x2	160	180	N	G	SM	M	M	N	2	1.6	Tree located within rail corridor adjacent Platform 2.	Remove

Appendix 2: Site Photographs

Photograph 1: Tree 515 *Cotoneaster* sp (Cotoneaster) located adjacent the northern side of South Parade.

Photograph 2: Tree 516 Leptospurum petersonii (Lemon-scented Teatree) was found to be dead.

Photograph 3: Tree 517 Pittosporum undulatum (Sweet Pittosporum) was found to be dead.

Photograph 4: Tree 519 *Callistemon viminalis* (Weeping Bottlebrush) located adjacent the northern side of South Parade.

Photograph 5: Tree 615 *Acacia podalyrifolia* (Queensland Silver Wattle) located adjacent Platform 2. The adjacent Queensland Silver Wattle's are near dead.

Photograph 6: Tree 5 *Melaleuca bracteata* (Black Teatree) located adjacent Platform 2.

Photograph 7: Showing trees adjacent Platform 2. Tree 621 *Syncarpia glomulifera* (Turpentine) is shown for reference.

Photograph 8: Showing trees adjacent Platform 2. Tree 621 *Callistemon viminalis* (Weeping Bottlebrush) is shown for reference.

FROM SYDENHAM

TO BANKSTOWN

PROPOSED RELOCATED ZONE FOR END OF PLATFORM STAIRS. REFER TO PACKAGE 151000

GST ALIGNMENT. GST AS PER DRAWING SMCSWSWM-MTM-WBS-CE-DWG-213435, CONTAINING A CENTRALLY POSITIONED SEPARATOR

SETOUT (324586.552, 6246126.707)

BURIED CONDUIT ROUTE TO GST TRANSITION, AS PER SPG 0705 DRAWING 112000 / 8 / 2. SETOUT (324535.275, 6246118.430)

BURIED CONDUIT ROUTE TO CONTINUE BETWEEN EXISTING FENCE & GLT

LCR TO RADIO POLE REFER TO SECTION TL04 DRAWING SMCSWSWM-MTM-WCS-CE-DWG-153451

E04 153422

A

T01 153450

T02 153450

T03 153450

E05 153422

WCS-PIT04

SETOUT (324559.717, 6246121.112)

SETOUT (324543.221, 6246120.128)

SETOUT (324514.687, 6246114.032)

DOWN MSW

UP MSW

DOWN GOODS

UP GOODS

ADJOINS SMCSWSWM-MTM-WCS-CE-DWG-153411

ADJOINS SMCSWSWM-MTM-WCS-CE-DWG-153413

LIMIT OF SWM CSR DPK 453 REFER TO SWM CSR DPK 453

DANGER SIGN AS PER CV 0282111 TO BE ATTACHED TO END OF PLATFORM GATE

DANGER SIGN AS PER CV 0282111 TO BE ATTACHED TO GST

PITLESS ULX FROM GST REFER TO SECTION A, DRAWING SMCSWSWM-MTM-WCS-CE-DWG-153461

LCR TO GAK REFER TO TL02 153451

LCR TO DCS VIA BALLAST CRIB. REFER TO SMCSWSWM-MTM-WCS-CE-DWG-153451

CAMPSIE DEPOT OFFICE

PUBLIC CARPARK

LILIAN

WILFRED AVENUE

12km 280 12km 300 12km 320 12km 340 12km 360 12km 380 12km 400 12km 420 12km 440 12km 460

Trees 615, 616, 620, 621, 622, 623, 624, 625, 626, 628, 629 630, 631, 633, 635 & 636 to be removed due to direct clash with underground services, GST pathway and Platform 2 retaining wall.

PLAN VIEW
SCALE 1:250

NOTES
1. FOR GENERAL NOTES REFER TO DRAWINGS SMCSWSWM-MTM-WCS-CE-DWG-153401 TO 153405.
2. FOR LEGEND REFER TO DRAWINGS SMCSWSWM-MTM-WCS-CE-DWG-153408 AND 153409.
3. FOR CORRIDOR CSR WORKS, REFER TO S2B CSR DPK 660.

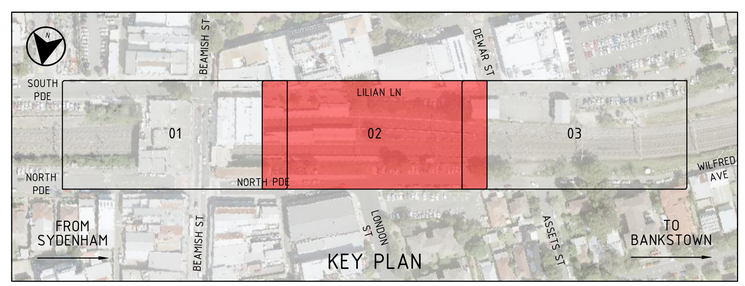
LEGEND

BACKBONE (CSR) CONDUITS
- CSR - HV (33kV)
- CSR - HV (11kV)
- CSR - LOW VOLTAGE
- CSR - COMMUNICATIONS
- CSR - SIGNALLING

LOCAL (LCR) CONDUITS
- LCR - LOW VOLTAGE
- LCR - COMMUNICATIONS
- LCR - SIGNALLING

OTHER
- CSR - PROPOSED GST ROUTE
- CSR - PROPOSED CABLE TRAY ROUTE
- CSR - PROPOSED PIT
- LCR - PROPOSED TRENCH ROUTE
- LCR - PROPOSED BALLAST ROUTE
- LCR - PROPOSED GST ROUTE

SYDNEY TRAINS RELOCATED SERVICES
- ST - SYDNEY TRAINS RELOCATION ROUTE
- ST - SYDNEY TRAINS RELOCATION ROUTE BY OTHERS



DRAWING COLOUR CODED - PRINT ALL COPIES IN COLOUR

FOR CONSTRUCTION

REV.	BY	DATE	DESCRIPTION	APPD.
01.02			CRFI-000492	
01	NJ	20/08/2021	CRFI-000299	LP
00	NJ	14/04/2021	APPROVED FOR CONSTRUCTION	LP

SCALES: 2.5 0 2.5 5 7.5m — 1 : 250 FULL SIZE A1

A1 Original | Co-ordinate System: MGA Zone 56 | Height Datum: A.H.D. | This sheet may be prepared using colour and may be incomplete if copied | NOTE: Do not scale from this drawing. | ALT. DRG No. SMCSWSWM-MTM-WCS-CE-DWG-153412

CLIENT: NSW GOVERNMENT | sydney METRO

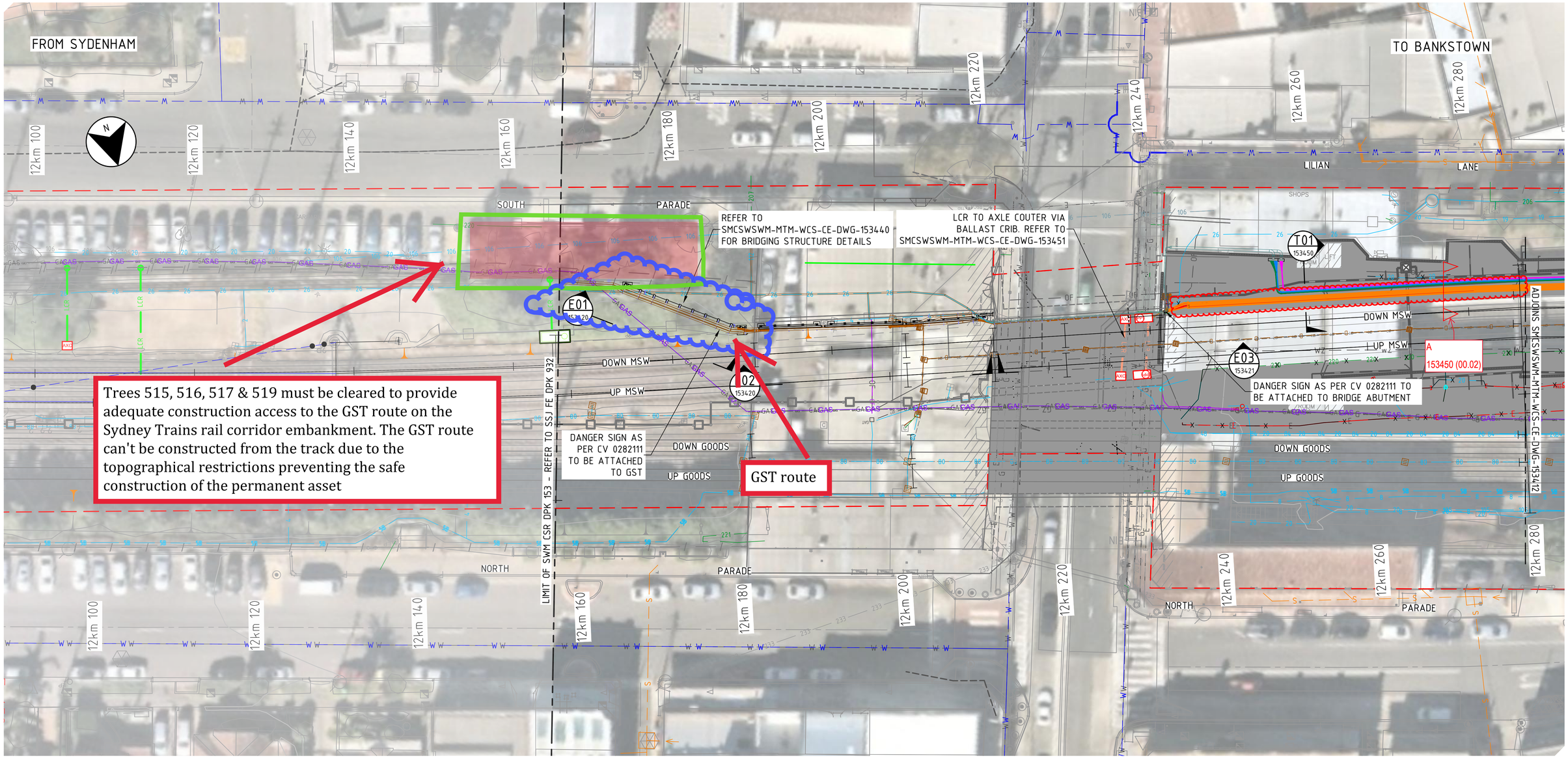
SERVICE PROVIDERS: METRON T2M

DRAWN H.HU & A.DILLON
DESIGNED N.JALILIAN
DRG CHECK P.ALFORD
DESIGN CHECK O.COLE & A.SHANTIA
APPROVED L.PALMER 20/08/2021

SYDNEY METRO
CAMPSIE STATION (12.165KM TO 12.505KM)
CIVIL ENGINEERING
COMBINED SERVICES ROUTE (CSR)
DETAIL LAYOUT PLAN

STATUS: FOR CONSTRUCTION | SHEET 2 OF 3 | ©

DRG No. SMCSWSWM-MTM-WCS-CE-DWG-153412 | REV. 01



PLAN VIEW
SCALE 1:250

NOTES

1. FOR GENERAL NOTES REFER TO DRAWINGS SMCSWSWM-MTM-WCS-CE-DWG-153401 TO 153405.
2. FOR LEGEND REFER TO DRAWINGS SMCSWSWM-MTM-WCS-CE-DWG-153408 AND 153409.

LEGEND

BACKBONE (CSR) CONDUITS

- CSR - HV (33kV)
- CSR - HV (11kV)
- CSR - LOW VOLTAGE
- CSR - COMMUNICATIONS
- CSR - SIGNALLING

LOCAL (LCR) CONDUITS

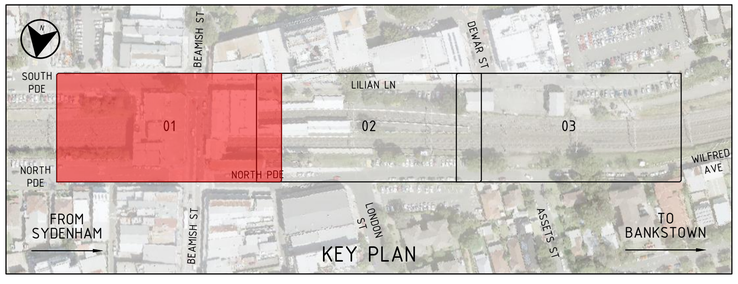
- LCR - LOW VOLTAGE
- LCR - COMMUNICATIONS
- LCR - SIGNALLING

OTHER

- CSR - PROPOSED GST ROUTE
- CSR - PROPOSED CABLE TRAY ROUTE
- CSR - PROPOSED PIT
- LCR - PROPOSED TRENCH ROUTE
- LCR - PROPOSED BALLAST ROUTE
- LCR - PROPOSED GST ROUTE

SYDNEY TRAINS RELOCATED SERVICES

- ST - SYDNEY TRAINS RELOCATION ROUTE
- ST - SYDNEY TRAINS RELOCATION ROUTE BY OTHERS



DRAWING COLOUR CODED - PRINT ALL COPIES IN COLOUR

FOR CONSTRUCTION

REV.	BY	DATE	DESCRIPTION	APPD.
00.02	OC	24/05/21	HV CONDUIT REDLINE MARKUP	LP
00	NJ	14/04/2021	APPROVED FOR CONSTRUCTION	LP

SCALES
2.5 0 2.5 5 7.5m
1 : 250 FULL SIZE A1

CLIENT: NSW GOVERNMENT | sydney METRO

SERVICE PROVIDERS: METRON T2M

DRAWN H.HU & A.DILLON
DESIGNED N.JALILIAN
DRG CHECK P.ALFORD
DESIGN CHECK O.COLE & A.SHANTIA
APPROVED L.PALMER 14/04/2021

SYDNEY METRO

CAMPSIE STATION (12.165KM TO 12.505KM)
CIVIL ENGINEERING
COMBINED SERVICES ROUTE (CSR)
DETAIL LAYOUT PLAN

STATUS: FOR CONSTRUCTION | SHEET 1 OF 3 | ©

DRG No. SMCSWSWM-MTM-WCS-CE-DWG-153411 | REV. 00

A1 Original | Co-ordinate System: MGA Zone 56 | Height Datum: A.H.D. | This sheet may be prepared using colour and may be incomplete if copied | NOTE: Do not scale from this drawing. | ALT. DRG No. SMCSWSWM-MTM-WCS-CE-DWG-153411

Appendix 3: Tree Assessment Criteria

Tree number: Identifying number given to individual (or group) trees.
Botanical Name: Latin name for tree showing genus and species.
Common Name: The common name given to the tree.
Tree Dimensions: The physical dimensions of the tree.

- **Height**: Estimated or measured height of tree in meters.
- **Spread**: Estimated or measured radial canopy spread of tree in meters.
- **Diameter at Breast Height (DBH)**: The estimated or measured diameter of trunk given in mm measured at 1.4m from ground.
- **Diameter Above Base (DAB)**: The estimated or measured diameter of trunk given in mm measured above the root flare. Used to calculate the structural root zone of the tree.

Age Class: An estimation of how old the tree is in relation to its life expectancy.

- **Young** – New tree planting
- **Semi-Mature** – Established tree with an age less than 20% of life expectancy of tree in situ
- **Mature** – Established tree with an age 20% - 80% of life expectancy of tree in situ
- **Old** – Established tree with an age greater than 80% of life expectancy of tree in situ
- **Dead** – Tree is dead

Vigour: Ability of a tree to sustain its life processes. This is independent of the condition of a tree but may impact upon it. Vigour can appear to alter rapidly with change of seasons (seasonality) e.g., dormant, deciduous or semi-deciduous trees. Vigour can be categorised as Dormant, Low, Normal and High.

- **Dormant Vigour** – Determined by the existing turgidity in the lower order branches in the outer extremity of the crow, with good bud set and formation, and where the last extension growth is distinct from those most recently preceding it, evident by bud scale scars. Normal vigour during dormancy is achieved when such growth is evident on a majority of branches throughout the crown.
- **Low Vigour** – Reduced ability of a tree to sustain its life processes. This may be evident by the atypical growth of leaves, reduced crown cover and reduced crown density, branches, roots and trunk, and a deterioration of their functions with reduced resistance to predation. This is independent of the condition of a tree but may impact upon it, and especially the ability of a tree to sustain itself against predation.
- **Normal Vigour** – Ability of a tree to maintain and sustain its life processes. This may be evident by the typical growth of leaves, crown cover and crown density, branches, roots and trunk and resistance to predation. This is independent of the condition of a tree but may impact upon it, and especially the ability of a tree to sustain itself against predation.
- **High Vigour** – Accelerated growth of a tree due to incidental or deliberate artificial changes to its growing environment that are seemingly beneficial, but may result in premature aging or failure if the favourable conditions cease, or promote prolonged senescence if the favourable conditions remain, e.g. water from a leaking pipe, water and nutrients from a leaking or disrupted sewer pipe, nutrients from animal waste, a tree growing next to a chicken coop, or a stock feed lot, or a regularly used stockyard, a tree subject to stringent watering and fertilisation program, or some trees may achieve an extended lifespan from continuous pollarding practices over the life of the tree.

Condition: A tree's crown form and growth habit, as modified by its environment (aspect, suppression by other trees, soils) the stability and viability of the root plate, trunk and structural branches (first (1st) and possibly (2nd) order branches), including structural defects such as wounds, cavities or hollows, crooked trunk or weak trunk/branch junctions and the effects of predation by pests and diseases. These may not be directly connected with vigour and it is possible for a tree to be of normal vigour but in poor condition. Condition can be categorised as Dead, Poor, Fair and Good.

- **Dead Condition** – Tree is no longer capable of performing any of the following processes or is exhibiting any of the following symptoms; Photosynthesis via its foliage crown (as indicated by the presence of moist, green or other coloured leaves), Osmosis (the ability of the roots system to take up water), Turgidity (the ability of the plant to sustain moisture pressure in its cells), Epicormic shoots or epicormic strands in Eucalypts (the production of new shoots as a response to stress, generated from latent or adventitious buds or from a lignotuber), Permanent leaf loss, Permanent leaf wilting (the loss of turgidity which is marked by desiccation of stems leaves and roots), Abscission of the epidermis (bark desiccates and peels off to the beginning of the sap wood).
- **Poor Condition** - Tree is of good habit or misshapen, a form that may be severely restricted for space and light, exhibits symptoms of advanced and irreversible decline such as fungal, or bacterial infestation, major die-back in the branch and foliage crown, structural deterioration from insect damage e.g. termite infestation, or storm damage or lightning strike, ring barking from borer activity in the trunk, root damage or instability of the tree, or damage from physical wounding impacts or abrasion, or from altered local environmental conditions and has been unable to adapt to such changes and may decline further to death regardless of remedial works or other modifications to the local environment that would normally be sufficient to provide for its basic survival if in good to fair condition. Deterioration physically, often characterised by a gradual and continuous reduction in vigour but may be independent of a change in vigour, but characterised by a proportionate increase in susceptibility to, and predation by pests and diseases against which the tree cannot be sustained. Such conditions may also be evident in trees of advanced senescence due to normal phenological processes, without modifications to the growing environment or physical damage having been inflicted upon the tree. This may be independent from, or contributed to by vigour.
- **Fair Condition** - Tree is of good habit or misshapen, a form not severely restricted for space and light, has some physical indication of decline due to the early effects of predation by pests and diseases, fungal, bacterial, or insect infestation, or has suffered physical injury to itself that may be contributing to instability or structural weaknesses, or is faltering due to the modification of the environment essential for its basic survival. Such a tree may recover with remedial works where appropriate, or without intervention may stabilise or improve over time, or in response to the implementation of beneficial changes to its local environment. This may be independent from, or contributed to by vigour.
- **Good Condition** - Tree is of good habit, with crown form not severely restricted for space and light, physically free from the adverse effects of predation by pests and diseases, obvious instability or structural weaknesses, fungal, bacterial or insect infestation and is expected to continue to live in much the same condition as at the time of inspection provided conditions around it for its basic survival do not alter greatly. This may be independent from, or contributed to by vigour.

Useful Life Expectancy (ULE) ULE is the length of time that the arborist assesses an individual tree can be retained with an acceptable level of risk based on the information available at the time of inspection. It is a snapshot in time of the potential an individual tree has for survival in the eyes of the assessor. ULE is not static – it is closely related to tree health and the surrounding conditions. Alterations in these variables may result in changes to the ULE assessment. Consequently, the reliability all ULE assessments have will decrease as time passes from the initial assessment and the potential for changes in variables increases.

- **Young** – Young/small or newly planted trees that can easily be replaced.
- **Remove –** Trees that should be removed within the next 5 years
- **Short –** Trees that appear to be retainable at the time of the assessment for 5-15 years with an acceptable level of risk.
- **Medium –** Trees that appear to be retainable at the time of the assessment for 15-40 years with an acceptable level of risk.

- **Long –** Trees that appear to be retainable at the time of the assessment for 40+ years with an acceptable level of risk.

Amenity and Visual Value – For the purposes of assessing the visual and landscape value of each tree the IACA Significance of a Tree, Assessment Rating System (STARS) © (IACA 2010) © has been adopted. - The landscape significance of a tree is an essential criterion to establish the importance that a particular tree may have on a site. The system uses a scale of High, Medium and Low significance in the landscape.

High significance in landscape

- The tree is in good condition and good vigour
- The tree has a form typical for the species
- The tree is a remnant or is a planted locally indigenous specimen and/or is rare or uncommon in the local area or of botanical interest or of substantial age
- The tree is listed as a heritage item, threatened species or part of an endangered ecological community or listed on council's significant tree register
- The tree is visually prominent and visible from a considerable distance when viewed from most directions within the landscape due to its size and scale and makes a positive contribution to the local amenity
- The tree supports social and cultural sentiments or spiritual associations, reflected by the broader population or community group or has commemorative values
- The tree's growth is unrestricted by above and below ground influences, supporting its ability to reach dimensions typical for the taxa in situ – tree is appropriate to the site conditions

Medium significance in landscape

- The tree is in fair-good condition and good or low vigour
- The tree has form typical or atypical of the species
- The tree is a planted locally indigenous or a common species with its taxa commonly planted in the local area
- The tree is visible from surrounding properties, although not visually prominent as partially obstructed by other vegetation or buildings when viewed from the street
- The tree provides a fair contribution to the visual character and amenity of the local area
- The tree's growth is moderately restricted by above or below ground influences, reducing its ability to reach dimensions typical for the taxa in situ

Low significance in landscape

- The tree is in fair-poor condition and good or low vigour
- The tree has form atypical of the species
- The tree is not visible or is partly visible from the surrounding properties as obstructed by other vegetation or buildings
- The tree provides a minor contribution or has a negative impact on the visual character and amenity of the local area
- The tree is a young specimen which may or may not have reached dimensions to be protected by local Tree Preservation Orders or similar protection mechanisms and can easily be replaced with a suitable specimen
- The tree's growth is severely restricted by above or below ground influences, unlikely to reach dimensions typical for the taxa in situ – tree is inappropriate to the site conditions
- The tree is listed as exempt under the provisions of the local Council Tree Preservation Order or similar protection mechanisms
- The tree has a wound or defect that has the potential to become structurally unsound
- **Environmental Pest / Noxious Weed Species**
- The tree is an environmental pest species due to its invasiveness or poisonous/allergenic properties.
- The tree is a declared noxious weed by legislation
- **Hazardous / Irreversible Decline**
- The tree is structurally unsound and/or unstable and is considered potentially dangerous
- The tree is dead, or is in irreversible decline, or has the potential to fail or collapse in full or in part in the immediate to short term

The tree is to have a minimum of three (3) criteria in a category to be classified in that group.

In the development of this document IACA acknowledges the contribution and original concept of the Footprint Green Tree Significance & Retention Value Matrix, developed by Footprint Green Pty Ltd in June 2010.

The Australian Standard 4970-2009 Protection of Trees on Development Sites defines the requirements for assessing trees with respect to development. It provides the guidance on how to decide which trees are appropriate for retention and on the means of protecting them during construction works. It describes the areas and offsets, referred to as the Tree Protection Zone (TPZ) and Structural Root Zone (SRZ) required to be free from development works to maintain tree vitality and stability. This report has been prepared in accordance with the conditions set out within the standard.

- **Tree Protection Zone** – The tree protection zone is defined as a specified area above and below ground set aside for the protection of the tree's roots and crown. It is expressed as a radial measurement taken from the centre of the trunk at ground level.
- **Structural Root Zone** – The structural root zone is defined as a specified area around the base of a tree required to maintain its stability within the ground. It is expressed as a radial measurement taken from the center of the trunk at ground level. Excavation and development works are not recommended within the structural root zone unless additional investigation as to root size and location is undertaken

APPENDIX 8.3 CAMPSIE AIA (PLATEAU TREES)

PLATEAUTREES
Safety. Quality. Progress.

Tree Pruning Report

Prepared for: Downer Group

Site Address: Campsie Station
Beamish Street
Campsie
NSW
2194

Date: 10 June 2022

Prepared by: Owen Tebbutt
Plateau Trees
Diploma in Horticulture (Arboriculture) Ryde TAFE 2006

Table of Contents

1.0 Introduction

1.1 Background

1.1.1 This tree pruning report has been prepared for Downer Group. It has been asked to identify and assess the pruning requirements needed to provide vegetation clearances to allow for the alignment and construction of a Galvanised Steel Trough (GST) at Campsie Station as part of the Southwest Metro Project.

1.1.2 The station upgrade works involve the alignment and construction of the GST along the southern side of the rail track adjacent Lilian Lane. The alignment of the GST is in direct conflict with selected stems from one *Callistemon viminalis* (Weeping Bottlebrush) identified as tree 618 within the existing Arboricultural Impact Assessment (AIA) prepared by Urban Arbor, dated 17 December 2019, Ref 19/12/17/SWMMS.

1.1.3 The following documentation was reviewed and assists in the preparation of this report:

- Canterbury Development Control Plan (CDCP) 2012 Part B3, Tree Management Order

1.1.4 This report is to be used in its entirety only. Any written or verbal submission, report or presentation that includes statements taken from the findings, discussions, conclusions or recommendations made in this report may only be used where the whole original report (or a copy) is referenced to and directly attached to that submission, report or presentation. Information contained in the report covers only the trees that were inspected and reflects the trees condition at the time of the inspection. There is no guarantee, expressed or implied, that problems or deficiencies of the subject trees may not arise in the future.

2.0 Inspection Methodology

2.1 On the 9 June 2022 an inspection of the tree was undertaken.

2.2 Three stems of the tree were found to be in direct conflict with the GST preventing installation on its alignment. These branches have been identified for

removal to allow for its completion. The diameter of the branch, at the branch collar or growth point, has been recorded along with the approximate percentage of the total canopy volume they represent.

2.3 Data collected during the on-site inspection of the tree can be found as **Appendix 1** Tree Assessment and Pruning Schedule. The tree(s) were assessed using the principles of a ground based Visual Tree Assessment (VTA)[1] and methods consistent with modern arboriculture. No aerial (climbing) inspection, tissue sampling or diagnostic testing was undertaken as part of the inspection process unless otherwise stated.

2.4 Photographs of the tree can be found as **Appendix 2**. Where possible individual branches required for removal have been identified and are highlighted within the photographs.

2.5 Tree assessment criteria can be found as **Appendix 3**.

2.6 Pruning recommendations take into consideration the requirements of AS4373-2007 Pruning of Amenity Trees.

3.0 The Tree

3.1 General

3.1.1 The assessed tree has been identified as *Callistemon viminalis* (Weeping Bottlebrush). At the time of the inspection, it was found to be in fair to poor health and condition. The tree is considered to be in a state of declining health and condition. The useful life expectancy of the tree has been assessed as short (5 to 15 years), a reduction to the value assigned by Urban Arbor. **Appendix 2** photograph 1 shows the tree, photographs 2 and 3 show the branches in direct conflict with the GST alignment.

[1] Mattheck, C. and Breloer, H (2006), *The Body Language of Trees – A Handbook for Failure Analysis*, The Stationary Office. Pages 118-122.

3.2 Wildlife and Habitat

3.2.1 No hollows or cavities that may contain, or are considered suitable for, wildlife nesting or habitation were observed within the tree. No arboreal mammals or birds were observed within the tree during the inspection.

3.3 Threatened Species and/or Ecological Communities

3.3.1 The tree is not listed as a threatened species or form part of an endangered ecological community under the Threatened Species Conservation Act 1995 or the Environment Protection and Biodiversity Conservation Act 1999.

3.4 Trees Located on Private Property

3.4.1 The tree is not located within private property.

3.5 Heritage

3.5.1 The subject tree and the site (Lot 2 DP800219) are not identified under Schedule 5 Environmental Heritage of the Canterbury Environment Plan 2012 nor are they located within a heritage conservation area.

4.0 Assessed Pruning Works

4.1 All stems and branches identified for removal were assessed with respect to AS4373-2007 pruning of Amenity Trees. Under the provisions of AS4373 the assessed pruning works fall within the selective pruning class. This class of pruning is applicable to all tree species. Pruning method has been provided as part 5 of this report.

4.2 Tree 618 has been assessed as requiring the removal and reduction of three stems identified as A, B and C. Stem A is 160mm in diameter originating from the base of the tree. This stem is to be cut to a stub just below the GST (approx. 0.7m height). Whilst this type of pruning cut is not recommended under AS4373 based upon the species type it is expected that the stub will reshoot with new foliage. This is seen as a preferred option to making the final cut close to the base of the tree risking potential infection from decay causing fungi. Stem B is 90mm diameter located at 0.5m height. This stem is to be removed at the nearest appropriate growth point. Stem C is 130mm diameter located at 0.5m height. The

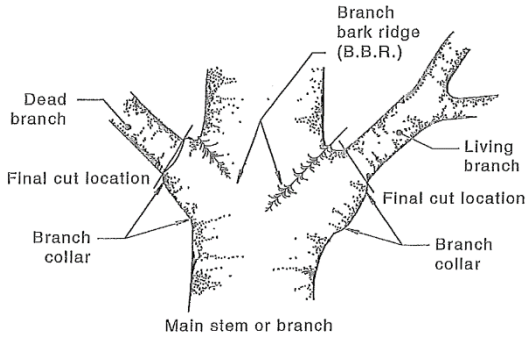
stem is to be removed at the nearest appropriate growth point. Stems B and C both originate from the same parent stem. The total pruning works constitute approximately 50% of the total canopy volume of the tree and are considered to be major pruning works. A reduction in growth, physiological function and a shortening of the trees useful life expectancy can be expected as a result of the works. Pruning wounds for branches A, B and C shall expose internal woody tissues which may become points of infection for decay causing fungi. **Appendix 2** photograph 4 shows branches identified for pruning.

4.5 The visual amenity of the tree is expected to be moderately altered as a result of the prescribed pruning. Sightlines to the trees are thought to be limited to station users, vehicles and pedestrians using Lillian Lane.

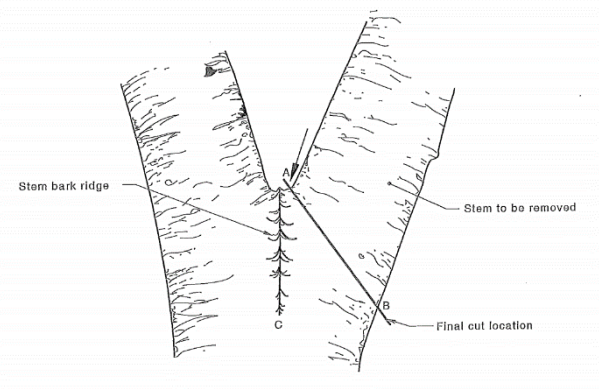
5.0 Pruning Method

5.1 All tree pruning works are to be undertaken by suitably qualified tree workers (minimum AQF level 3 or equivalent) and in accordance with AS4373-2007 Pruning of Amenity Trees and Safe Work Australia's Guide to Managing Risks of Tree Trimming and Removal Works. All appropriate approvals and consents are to be obtained prior to tree removal works commencing.

5.2 Natural target pruning is the removal of branches, stems, and stubs such that final cuts are achieved as close as possible to the branch collar without cutting into it, or leaving a protruding stub. The branch collar is an area of overlapping trunk and branch tissue forming a swelling around the base of many branches. It contains defensive chemicals that prevent infection from bacterial and/or fungal pathogens. The associated diagram shows final cut locations when undertaking pruning works.



5.3 On co-dominant stems line A-B represents the angle and location of the final cut, point C the bottom of the stem bark ridge. Point B is opposite Point C and represents the bottom of the final cut. Stems B and C are to be cut in accordance with this method.



5.4 The cutting of branches which results in a stub, referred to as lopping, is regarded as an unacceptable practice, except in certain circumstances. Lopping may result in:

- An increased rate of shoot production and elongation, which is weakly attached to the parent tree
- Decay of the stubs
- Poor form and visual amenity
- Reduced life expectancy of the tree
- Pre-disposing the tree to pathogenic infection and insect attack

Stem A is to be cut using this method.

6.0 Conclusions

6.1 Upon inspection it was found that the GST had partially been constructed, with only the section directly adjacent the tree to be installed. The removal of the three stems as stated shall allow for completion of the GST's installation.

6.2 The prescribed pruning works are considered to be major and are likely to significantly impact upon the health, condition and vitality of the tree in the short-term. The visual impacts of the pruning works are not considered to be significant given the size and position of the tree.

6.3 Pruning works are to be undertaken as prescribed within this report.

6.4 In the interests of maintaining tree health and to minimise its visual impact all pruning works are to be kept to the minimal amount required to achieve the GST clearances. Where possible the final cuts are to be made so that the smallest wound area is left on the tree.

6.5 The tree is to be inspected by a suitably qualified arborist (minimum AQF 5 or equivalent) upon completion of the project. At a minimum the inspection is to include:

- An assessment of the vigour, vitality and condition of the tree
- An assessment for the presence of decay at the pruning sites
- An assessment of the development of wound wood around the pruning site
- An assessment of the development of epicormic shoots at or near to the pruning site

Appendix 1: Tree Assessment and Pruning Schedule

Tree number	Tree name Botanical name Common name	Tree dimensions Height (m)	 Spread (m)	 D.B.H. (mm)	Vigour	Condition	Age class	ULE	Landscape Significance	Pruning Requirements	Estimated % of Live Canopy Loss	Impacts/Comments
618	*Callistemon viminalis* (Weeping Bottlebrush)	5-10	2x2	Multi-stemmed	N-L	F	M	S	M	Stem A- 160mm diameter first order branch originating from base of tree, reduce branch to stub below GST (approx. 0.7m) Stem B- 900mm diameter first order branch at 0.5m height, remove branch to nearest growth point Stem C- 130mm diameter first order branch at 0.5m height, remove branch to nearest growth point	≈50%	Long-term reduction in tree growth and physiological function. Pruning wounds large enough to expose internal woody tissues. Potential exists for wound area to be infected with decay causing fungi. Likely epicormic response throughout canopy and around pruning wounds.

Appendix 2: Photographs

Photograph 1: Tree 618 *Callistemon viminalis* (Weeping Bottlebrush) as seen from the northern side of the rail corridor.

Photograph 2: Looking east along the alignment of the GST. Selective stem removal is required to allow for the GST alignment.

Photograph 3: Looking west along the alignment of the GST. Selective stem removal is required to allow for the GST alignment.

Photograph 4: Stems A, B and C to be removed. Stem A is 160mm in diameter and is to be reduced to below the GST (approx. 0.7m height). Stem s B and C are 90mm and 130mm in diameter and are to be removed to the nearest appreciate growth point. The two branches originate off the same stem.

Appendix 3: Tree Assessment Criteria

Tree number: Identifying number given to individual (or group) trees.
Botanical Name: Latin name for tree showing genus and species.
Common Name: The common name given to the tree.
Tree Dimensions: The physical dimensions of the tree.

- **Height**: Estimated or measured height of tree in meters.
- **Spread**: Estimated or measured radial canopy spread of tree in meters.
- **Diameter at Breast Height (DBH)**: The estimated or measured diameter of trunk given in mm measured at 1.4m from ground.

Age Class: An estimation of how old the tree is in relation to its life expectancy.

- **Young** – Age less than 20% of life expectancy of tree in situ
- **Mature** – Age 20% - 80% of life expectancy of tree in situ
- **Old** – Age greater than 80% of life expectancy of tree in situ
- **Dead** – Tree is dead

Vigour: Ability of a tree to sustain its life processes. This is independent of the condition of a tree but may impact upon it. Vigour can appear to alter rapidly with change of seasons (seasonality) e.g., dormant, deciduous or semi-deciduous trees. Vigour can be categorised as Dormant, Low, Normal and High.

- **Dormant Vigour** – Determined by the existing turgidity in the lower order branches in the outer extremity of the crow, with good bud set and formation, and where the last extension growth is distinct from those most recently preceding it, evident by bud scale scars. Normal vigour during dormancy is achieved when such growth is evident on a majority of branches throughout the crown.
- **Low Vigour** – Reduced ability of a tree to sustain its life processes. This may be evident by the atypical growth of leaves, reduced crown cover and reduced crown density, branches, roots and trunk, and a deterioration of their functions with reduced resistance to predation. This is independent of the condition of a tree but may impact upon it, and especially the ability of a tree to sustain itself against predation.
- **Normal Vigour** – Ability of a tree to maintain and sustain its life processes. This may be evident by the typical growth of leaves, crown cover and crown density, branches, roots and trunk and resistance to predation. This is independent of the condition of a tree but may impact upon it, and especially the ability of a tree to sustain itself against predation.
- **High Vigour** – Accelerated growth of a tree due to incidental or deliberate artificial changes to its growing environment that are seemingly beneficial, but may result in premature aging or failure if the favourable conditions cease, or promote prolonged senescence if the favourable conditions remain, e.g. water from a leaking pipe, water and nutrients from a leaking or disrupted sewer pipe, nutrients from animal waste, a tree growing next to a chicken coop, or a stock feed lot, or a regularly used stockyard, a tree subject to stringent watering and fertilisation program, or some trees may achieve an extended lifespan from continuous pollarding practices over the life of the tree.

Condition: A tree's crown form and growth habit, as modified by its environment (aspect, suppression by other trees, soils) the stability and viability of the root plate, trunk and structural branches (first (1st) and possibly (2nd) order branches), including structural defects such as wounds, cavities or hollows, crooked trunk or weak trunk/branch junctions and the effects of predation by pests and diseases. These may not be directly connected with vigour and it is possible for a tree to be of normal vigour but in poor condition. Condition can be categorised as Dead, Poor, Fair and Good.

- **Dead Condition** – Tree is no longer capable of performing any of the following processes or is exhibiting any of the following symptoms; Photosynthesis via its foliage crown (as indicated by the presence of moist, green or other coloured leaves), Osmosis (the ability of the roots system to take up water), Turgidity (the ability of the plant to sustain moisture pressure in its cells), Epicormic shoots or epicormic strands in Eucalypts (the production of new shoots as a response to stress, generated from latent or adventitious buds or from a lignotuber), Permanent leaf loss, Permanent leaf wilting (the loss of turgidity which is marked by desiccation of stems leaves and roots), Abscission of the epidermis (bark desiccates and peels off to the beginning of the sap wood).
- **Poor Condition** - Tree is of good habit or misshapen, a form that may be severely restricted for space and light, exhibits symptoms of advanced and irreversible decline such as fungal, or bacterial infestation, major die-back in the branch and foliage crown, structural deterioration from insect damage e.g. termite infestation, or storm damage or lightning strike, ring barking from borer activity in the trunk, root damage or instability of the tree, or damage from physical wounding impacts or abrasion, or from altered local environmental conditions and has been unable to adapt to such changes and may decline further to death regardless of remedial works or other modifications to the local environment that would normally be sufficient to provide for its basic survival if in good to fair condition. Deterioration physically, often characterised by a gradual and continuous reduction in vigour but may be independent of a change in vigour, but characterised by a proportionate increase in susceptibility to, and predation by pests and diseases against which the tree cannot be sustained. Such conditions may also be evident in trees of advanced senescence due to normal phenological processes, without modifications to the growing environment or physical damage having been inflicted upon the tree. This may be independent from, or contributed to by vigour.
- **Fair Condition** - Tree is of good habit or misshapen, a form not severely restricted for space and light, has some physical indication of decline due to the early effects of predation by pests and diseases, fungal, bacterial, or insect infestation, or has suffered physical injury to itself that may be contributing to instability or structural weaknesses, or is faltering due to the modification of the environment essential for its basic survival. Such a tree may recover with remedial works where appropriate, or without intervention may stabilise or improve over time, or in response to the implementation of beneficial changes to its local environment. This may be independent from, or contributed to by vigour.
- **Good Condition** - Tree is of good habit, with crown form not severely restricted for space and light, physically free from the adverse effects of predation by pests and diseases, obvious instability or structural weaknesses, fungal, bacterial or insect infestation and is expected to continue to live in much the same condition as at the time of inspection provided conditions around it for its basic survival do not alter greatly. This may be independent from, or contributed to by vigour.

Useful Life Expectancy (ULE) ULE is the length of time that the arborist assesses an individual tree can be retained with an acceptable level of risk based on the information available at the time of inspection. It is a snapshot in time of the potential an individual tree has for survival in the eyes of the assessor. ULE is not static – it is closely related to tree health and the surrounding conditions. Alterations in these variables may result in changes to the ULE assessment. Consequently, the reliability all ULE assessments have will decrease as time passes from the initial assessment and the potential for changes in variables increases.

- **Remove –** Trees that should be removed within the next 5 years
- **Short –** Trees that appear to be retainable at the time of the assessment for 5-15 years with an acceptable level of risk.
- **Medium –** Trees that appear to be retainable at the time of the assessment for 15-40 years with an acceptable level of risk.
- **Long –** Trees that appear to be retainable at the time of the assessment for 40+ years with an acceptable level of risk.

Visual Amenity – For the purposes of assessing the visual and landscape value of each tree the IACA Significance of a Tree, Assessment Rating System (STARS) © (IACA 2010) © has been adopted. **-** The landscape significance of a tree is an essential criterion to establish the importance that a particular tree may have on a site. The system uses a scale of High, Medium and Low significance in the landscape.

High visual amenity

- The tree is in good condition and good vigour
- The tree has a form typical for the species
- The tree is a remnant or is a planted locally indigenous specimen and/or is rare or uncommon in the local area or of botanical interest or of substantial age
- The tree is listed as a heritage item, threatened species or part of an endangered ecological community or listed on council's significant tree register
- The tree is visually prominent and visible from a considerable distance when viewed from most directions within the landscape due to its size and scale and makes a positive contribution to the local amenity
- The tree supports social and cultural sentiments or spiritual associations, reflected by the broader population or community group or has commemorative values
- The tree's growth is unrestricted by above and below ground influences, supporting its ability to reach dimensions typical for the taxa in situ – tree is appropriate to the site conditions

Medium visual amenity

- The tree is in fair-good condition and good or low vigour
- The tree has form typical or atypical of the species
- The tree is a planted locally indigenous or a common species with its taxa commonly planted in the local area
- The tree is visible from surrounding properties, although not visually prominent as partially obstructed by other vegetation or buildings when viewed from the street
- The tree provides a fair contribution to the visual character and amenity of the local area
- The tree's growth is moderately restricted by above or below ground influences, reducing its ability to reach dimensions typical for the taxa in situ

Low visual amenity

- The tree is in fair-poor condition and good or low vigour
- The tree has form atypical of the species
- The tree is not visible or is partly visible from the surrounding properties as obstructed by other vegetation or buildings
- The tree provides a minor contribution or has a negative impact on the visual character and amenity of the local area
- The tree is a young specimen which may or may not have reached dimensions to be protected by local Tree Preservation Orders or similar protection mechanisms and can easily be replaced with a suitable specimen
- The tree's growth is severely restricted by above or below ground influences, unlikely to reach dimensions typical for the taxa in situ – tree is inappropriate to the site conditions
- The tree is listed as exempt under the provisions of the local Council Tree Preservation Order or similar protection mechanisms
- The tree has a wound or defect that has the potential to become structurally unsound
- **Environmental Pest / Noxious Weed Species**
- The tree is an environmental pest species due to its invasiveness or poisonous/allergenic properties.
- The tree is a declared noxious weed by legislation
- **Hazardous / Irreversible Decline**
- The tree is structurally unsound and/or unstable and is considered potentially dangerous
- The tree is dead, or is in irreversible decline, or has the potential to fail or collapse in full or in part in the immediate to short term

The tree is to have a minimum of three (3) criteria in a category to be classified in that group.

In the development of this document IACA acknowledges the contribution and original concept of the Footprint Green Tree Significance & Retention Value Matrix, developed by Footprint Green Pty Ltd in June 2010.

APPENDIX 9 DULWICH HILL AIA (URBAN ARBOR)

URBAN ARBOR
The Trusted Name in Tree Management

URBAN ARBOR
The Trusted Name in Tree Management

Arboricultural Impact Assessment Report

Site location:
South West Metro
Dulwich Hill Station
Dulwich Hill NSW

Prepared for:
Metron T2M

Prepared by: Jack Williams and Bryce Claassens
Urban Arbor Pty Ltd
Date: 22 December 2020
Ref: 201222-SWMDH-AIA
Rev: B

URBAN ARBOR
The Trusted Name in Tree Management

Table of Contents

Document Number: **SMCSWSWM-MTM-WDH-LA-REP-121000**

Revision: B **Status: For Approval**

COPYRIGHT

URBAN ARBOR
The Trusted Name in Tree Management

1. INTRODUCTION

1.1 Urban Arbor have been instructed by Metron T2M to provide an Arboricultural Impact Assessment Report for trees located within the site and adjoining sites in relation to a proposed development.

1.2 Below is a list of all documents and information provided to Urban Arbor to assist in preparing this report.

A) Dulwich Hill Landscape Drawings, Metron T2M, Rev E, Including Sheet No: 8 and 10, 30 October 2020.
B) Civil Engineering Package No. 123, Metron T2M, Rev C, 170 Pages in total, 17 June 2020.
C) Dulwich Hill Station Service Building, Metron T2M, Rev C, 3 December 2020.

1.3 The trees were inspected on 4 December 2019. Access was available to the subject site and the adjoining public areas only. All tree data contained in this report was collected during this site inspection.

2. SCOPE OF THE REPORT

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

2.1.1 Conduct a visual assessment of all significant trees located within 10 metres of development works from ground level. For the purpose of this report, a significant tree is a tree with a height equal to or greater than 5 metres.

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

2.1.3 Provide an assessment of the potential impact the proposed development is likely to cause to the condition of the subject trees in accordance with AS4970 Protection of trees on development sites (2009).

2.1.4 Specify tree protection measures for trees to be retained in accordance with AS4970-2009.

URBAN ARBOR
The Trusted Name in Tree Management

3. LIMITATIONS

3.1 The observations and recommendations are based on the site inspections identified in the introduction (section 1) and the access available at the time of inspection. Findings of this report are based on the observations and site conditions at the time inspection.

3.2 All of the observations were carried out from ground level and none of the surrounding surfaces were lifted or removed during the inspection. No tests were carried out to the subject trees or surrounding area during the inspection.

3.3 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.

3.4 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.

3.5 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*.

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

3.7 Urban Arbor neither guarantees, nor is it responsible for, the accuracy of information provided by others that is contained within this report.

3.8 While an assessment of the subject trees estimated useful life expectancy is included in this report, no specific tree risk assessment has been undertaken for any of trees at the site.

3.9 The ultimate safety of any tree cannot be categorically guaranteed. Even trees apparently free of defects can collapse or partially collapse in extreme weather conditions. Trees are dynamic, biological entities subject to changes in their environment, the presence of pathogens and the effects of ageing. These factors reinforce the need for regular inspections. It is generally accepted that hazards can only be identified from distinct defects or from other failure-prone characteristics of a tree or its locality.

3.10 Alteration of this report invalidates the entire report.

URBAN ARBOR
The Trusted Name in Tree Management

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 above ground level) - millimetres.

4.1.5 Estimated height - metres

4.1.6 Estimated crown spread (diameter of crown) - metres

4.1.7 Health

4.1.8 Structural condition

4.1.9 Amenity value

4.1.10 Estimated remaining contribution years (SULE)[1]

4.1.11 Retention value (Tree AZ)[2]

4.1.12 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 information was imported into our computerised geographical information system (GIS) PT-mapper pro. This software was used to measure/calculate all encroachment estimates included in this report.

4.5 All DBH measurements, tree protection zones, and structural root zones were calculated in accordance with methods set out in AS4970 Protection of trees on development sites (2009) [4] and in some cases estimated. See appendices for information.

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

---

[1] Barrell Tree Consultancy, *SULE: Its use and status into the New Millennium*, TreeAZ/03/2001, http://www.treeaz.com/.

[2] Barrell Tree Consultancy, *Tree AZ version 10.04-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 (2015).

[4] Council Of Standards Australia, *AS4970 Protection of trees on development sites* (2009).

URBAN ARBOR
The Trusted Name in Tree Management

5. SITE LOCATION AND BRIEF DESCRIPTION

5.1 The site is located in the suburb of Dulwich Hill, New South Wales, which is located in the Inner West Local Government Area (LGA). Therefore, all trees at the site are subject to protection under the Marrickville Local Environmental Plan (LEP) 2011[5], Marrickville Development Control Plan (DCP) 2011[6] and the Inner West Council Tree Management DCP 2020.[7] The site has been identified as a heritage item (item number I316) in the LEP heritage maps.[8] The site has been identified as containing biodiversity in the LEP Natural Resource Biodiversity maps.[9]

6. GENERAL INFORMATION IN RELATION TO PROTECTING TREES ON DEVELOPMENT SITES

6.1 **Tree protection zone (TPZ):** The TPZ is the principle means of protecting trees on development sites and is an area required to maintain the viability of trees during development. It is commonly observed that tree roots will extend significantly further than the indicative TPZ, however the TPZ is an area identified in AS4970-2009 to be the area where root loss or disturbance will generally 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 TPZ also incorporates the SRZ (see below for more information about the SRZ). The TPZ is calculated by multiplying the DBH by twelve, with the exception of palms, other monocots, cycads and tree ferns, the TPZ of which have been calculated at one metre outside the crown projection. Additional information about the TPZ is included in appendix 3.

---

5 *Marrickville Local Environmental Plan 2011*, https://www.legislation.nsw.gov.au/#/view/EPI/2011/645/full, accessed 22 December 2020.

6 *Marrickville Development Control Plan 2011*, https://www.innerwest.nsw.gov.au/develop/planning-controls/current-development-control-plans-dcp/marrickville-dcp, accessed 22 December 2020.

7 *Inner West Tree Management Development Control Plan 2020*, https://www.innerwest.nsw.gov.au/live/information-for-residents/trees/trees-on-your-property-pruning-or-removing, accessed 22 December 2020.

8 *Marrickville LEP Heritage map - Sheet HER_002*, https://www.legislation.nsw.gov.au/view/pdf/map/14391361-91d4-4b7f-86d5-b2f4d6a79fd6, accessed 22 December 2020.

9 *Marrickville LEP Natural Resource Biodiversity map - Sheet NRB_002*, https://www.legislation.nsw.gov.au/view/pdf/map/df0a5a54-fe19-696a-ac57-a2dcc4b418b1, accessed 22 December 2020.

URBAN ARBOR
The Trusted Name in Tree Management

6.2 **Structural Root Zone (SRZ):** 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 needs to be maintained to preserve a viable tree. The SRZ is calculated using the following formula; (DAB x 50) $^{0.42}$ x 0.64. There are several factors that can vary 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. Soil level changes should also generally be avoided inside the SRZ of trees to be retained. Palms, other monocots, cycads and tree ferns do not have an SRZ. See the appendices for more information about the SRZ.

6.3 **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.

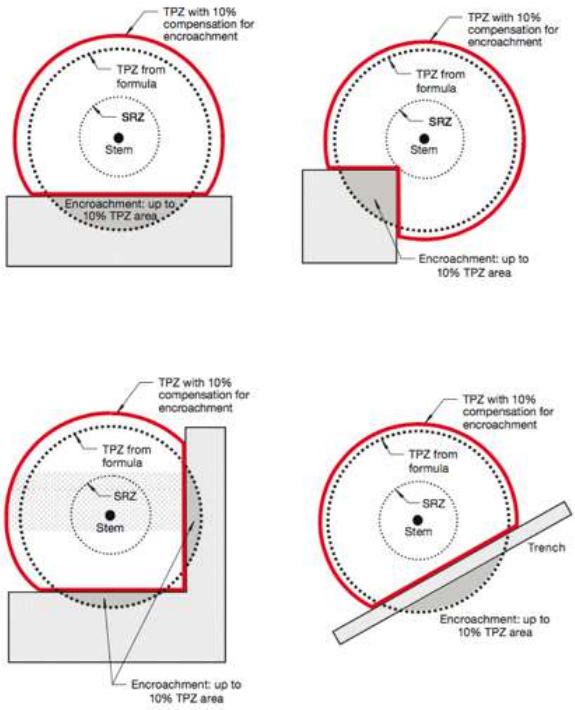


Image 1: Example minor TPZ encroachment from AS4970-2009.

6.4 **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. Root investigations may be required to identify roots that will be impacted during major TPZ encroachment (see appendix 3 for more information in relation to root investigations).

7. OBSERVATIONS

7.1 **Tree information:** Details of each individual tree assessed, including the observations taken during the site inspection can be found in the tree inspection schedule in appendix 2, where the indicative tree protection zone (TPZ) for the subject trees has been calculated. The TPZ and SRZ should be measured in radius from the centre of the trunk. The subject trees have been awarded a retention value based on the observations during the site inspection. The system 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 Tree AZ categories sheet (Barrell Tree Consultancy) has been included in the appendices to assist with understanding the retention values. The retention value that has been allocated to the subject trees in this report is not definitive and should only be used as a guideline. This information has been summarised below.

7.2 **Site Plan:** Three site plans have been included in appendix 1, where the indicative TPZ and SRZ of the trees have been overlaid onto the received plans provided by the client. The following plans are included in appendix 1;

- Appendix 1A: Proposed Landscape South
- Appendix 1B: Proposed Landscape North
- Appendix 1C: Proposed Service Building

8. ASSESSMENT OF CONSTRUCTION IMPACTS

8.1 Table 1: In the table below, the impact of the proposed development has been assessed for all trees included in the report. The assessed TPZ encroachments include proposed structures and hard landscaping only. All soft landscaping should be completed in accordance with section 11.10.

Tree ID	Species	Retention value	TPZ radius (m)	TPZ area (m^2)	SRZ radius (m)	TPZ encroachment	Discussion/ Conclusion	Recommendation
93	*Platanus x hispanica*	A1	13.2	547.4	3.6	Footprint	The trunk of the tree is located within the footprint of the proposed service building construction.	Remove
94	*Platanus x hispanica*	A1	14.4	651.4	3.7	Major	The proposed service building structures and service installation will encroach into the TPZ by 23% (152m^2) but not into the SRZ. A palisade fence and combined service route (CSR) will also encroach into the TPZ and SRZ. This is considered to be a major TPZ encroachment and the proposed works could potentially impact the condition and stability of the tree. To reduce the impact to the tree, the proposed services, palisade fence and CSR must be installed in accordance with section 9.2 of this report.	Retain and protect*
95	*Platanus x hispanica*	A1	14.4	651.4	3.6	Major	A palisade and combined service route (CSR) will encroach into the TPZ and SRZ. This is considered to be a major TPZ encroachment and the proposed works could potentially impact the condition and stability of the tree. To reduce the impact to the tree, the proposed palisade fence and CSR must be installed in accordance with section 9.2 of this report.	Retain and protect*
563	*Cupaniopsis anacardioides*	Z1	2.0	12.6	1.5	Major	A security fence will encroach into the TPZ and SRZ. This is considered to be a major TPZ encroachment and the proposed works could potentially impact the condition and stability of the tree. To reduce the impact to the tree, the proposed security fence must be installed in accordance with section 9.2 of this report.	Retain and protect*
564	*Cupaniopsis anacardioides*	A1	4.8	72.4	2.5	Footprint	The trunk of the tree is located within the footprint of the proposed security fence. The proposed kiss and ride shelter structure and footings will also encroach into the TPZ and SRZ by 17% (12.1m^2) and into the SRZ. The tree is recommended for removal due to impacts from the proposed development.	Remove

URBAN ARBOR
The Trusted Name in Tree Management

Tree ID	Species	Retention value	TPZ radius (m)	TPZ area (m^2)	SRZ radius (m)	TPZ encroachment	Discussion/ Conclusion	Recommendation
565	*Cupaniopsis anacardioides*	A1	4.3	58.1	2.3	Footprint	The trunk of the tree is located within the footprint of the proposed kiss and ride shelter.	Remove
566	*Cupaniopsis anacardioides*	Z1	2.0	12.6	1.6	Major	A security fence will encroach into the TPZ and SRZ. This is considered to be a major TPZ encroachment and the proposed works could potentially impact the condition and stability of the tree. To reduce the impact to the tree, the proposed security fence must be installed in accordance with section 9.2 of this report.	Retain and protect*
567	*Cupaniopsis anacardioides*	Z1	2.0	12.6	1.8	Major	A security fence will encroach into the TPZ and SRZ. This is considered to be a major TPZ encroachment and the proposed works could potentially impact the condition and stability of the tree. To reduce the impact to the tree, the proposed security fence must be installed in accordance with section 9.2 of this report.	Retain and protect*
568	*Cupaniopsis anacardioides*	Z1	2.0	12.6	1.6	Major	A security fence will encroach into the TPZ and SRZ. This is considered to be a major TPZ encroachment and the proposed works could potentially impact the condition and stability of the tree. To reduce the impact to the tree, the proposed security fence must be installed in accordance with section 9.2 of this report.	Retain and protect*
569	*Cupaniopsis anacardioides*	Z1	2.0	12.6	1.5	Major	A security fence will encroach into the TPZ and SRZ. This is considered to be a major TPZ encroachment and the proposed works could potentially impact the condition and stability of the tree. To reduce the impact to the tree, the proposed security fence must be installed in accordance with section 9.2 of this report.	Retain and protect*
570	*Cupaniopsis anacardioides*	Z1	2.0	12.6	1.5	Major	A security fence will encroach into the TPZ and SRZ. This is considered to be a major TPZ encroachment and the proposed works could potentially impact the condition and stability of the tree. To reduce the impact to the tree, the proposed security fence must be installed in accordance with section 9.2 of this report.	Retain and protect*
571	*Cupaniopsis anacardioides*	Z1	2.0	12.6	1.5	Major	A security fence will encroach into the TPZ and SRZ. This is considered to be a major TPZ encroachment and the proposed works could potentially impact the condition and stability of the tree. To reduce the impact to the tree, the proposed security fence must be installed in accordance with section 9.2 of this report.	Retain and protect*

URBAN ARBOR
The Trusted Name in Tree Management

Tree ID	Species	Retention value	TPZ radius (m)	TPZ area (m^2)	SRZ radius (m)	TPZ encroachment	Discussion/ Conclusion	Recommendation
572	*Cupaniopsis anacardioides*	Z1	2.0	12.6	1.5	Major	A security fence will encroach into the TPZ and SRZ. This is considered to be a major TPZ encroachment and the proposed works could potentially impact the condition and stability of the tree. To reduce the impact to the tree, the proposed security fence must be installed in accordance with section 9.2 of this report.	Retain and protect*
573	*Cupaniopsis anacardioides*	Z1	2.0	12.6	1.5	Major	A security fence will encroach into the TPZ and SRZ. This is considered to be a major TPZ encroachment and the proposed works could potentially impact the condition and stability of the tree. To reduce the impact to the tree, the proposed security fence must be installed in accordance with section 9.2 of this report.	Retain and protect*
574	*Backhousia citriodora*	Z1	2.0	12.6	1.5	None	No proposed TPZ encroachment.	Retain and protect
575	*Backhousia citriodora*	Z1	2.0	12.6	1.5	Major	The proposed hard surface paving will encroach into the TPZ and SRZ. This is considered to be a major TPZ encroachment and the proposed works could potentially impact the condition and stability of the tree. To reduce the impact to the tree, the proposed hard surfacing must be installed in accordance with section 9.2 of this report.	Retain and protect*
576	*Backhousia citriodora*	Z1	2.0	12.6	1.5	Major	The proposed hard surface paving will encroach into the TPZ and SRZ. This is considered to be a major TPZ encroachment and the proposed works could potentially impact the condition and stability of the tree. To reduce the impact to the tree, the proposed hard surfacing must be installed in accordance with section 9.2 of this report.	Retain and protect*
577	*Cinnamomum camphora*	Z9	3.8	45.4	2.1	None	No proposed TPZ encroachment.	Retain and protect
578	*Cinnamomum camphora*	Z9	3.0	28.3	2.3	None	No proposed TPZ encroachment.	Retain and protect
G12	*Mixed spp*	Z3	2.0	12.6	1.6	None	Group of mixed species trees located within the rail corridor. All species within the group are weed/exempt species. No proposed TPZ encroachment.	Retain and protect
579	*Triadica sebifera*	A1	2.0	12.6	1.7	None	No proposed TPZ encroachment.	Retain and protect

URBAN ARBOR
The Trusted Name in Tree Management

Tree ID	Species	Retention value	TPZ radius (m)	TPZ area (m^2)	SRZ radius (m)	TPZ encroachment	Discussion/ Conclusion	Recommendation
580	*Liquidambar styraciflua*	A1	2.2	15.2	1.7	None	No proposed TPZ encroachment.	Retain and protect
581	*Ficus rubiginosa*	A1	3.8	45.4	2.4	None	No proposed TPZ encroachment.	Retain and protect
582	*Casuarina glauca*	Z1	2.0	12.6	1.7	Major	The proposed hard surfacing will encroach into the TPZ by 40% (5.1m^2) and into the SRZ. The proposed hard surfacing levels will be lower than the existing hard surfacing and excavations will be required. This is considered to be a major TPZ encroachment and the proposed works could potentially impact the condition and stability of the tree. The tree is recommended for removal due to impacts from the proposed development.	Remove
583	*Casuarina glauca*	Z1	2.0	12.6	1.8	Major	The proposed hard surfacing will encroach into the TPZ by 35% (4.4m^2) and into the SRZ. The proposed hard surfacing levels will be lower than the existing hard surfacing and excavations will be required. This is considered to be a major TPZ encroachment and the proposed works could potentially impact the condition and stability of the tree. The tree is recommended for removal due to impacts from the proposed development.	Remove
584	*Casuarina glauca*	Z1	2.0	12.6	1.5	Major	The proposed hard surfacing will encroach into the TPZ by 33% (4.1m^2) and into the SRZ. The proposed hard surfacing levels will be lower than the existing hard surfacing and excavations will be required. This is considered to be a major TPZ encroachment and the proposed works could potentially impact the condition and stability of the tree. The tree is recommended for removal due to impacts from the proposed development.	Remove
585	*Casuarina glauca*	Z1	2.0	12.6	1.5	Major	The proposed hard surfacing will encroach into the TPZ by 35% (4.1m^2) and into the SRZ. The proposed hard surfacing levels will be lower than the existing hard surfacing and excavations will be required. This is considered to be a major TPZ encroachment and the proposed works could potentially impact the condition and stability of the tree. The tree is recommended for removal due to impacts from the proposed development.	Remove

URBAN ARBOR
The Trusted Name in Tree Management

Tree ID	Species	Retention value	TPZ radius (m)	TPZ area (m^2)	SRZ radius (m)	TPZ encroachment	Discussion/ Conclusion	Recommendation
586	*Casuarina glauca*	Z1	2.0	12.6	1.5	Major	The proposed hard surfacing will encroach into the TPZ by 24% (3.0m^2) and into the SRZ. The proposed hard surfacing levels will be lower than the existing hard surfacing and excavations will be required. This is considered to be a major TPZ encroachment and the proposed works could potentially impact the condition and stability of the tree. The tree is recommended for removal due to impacts from the proposed development.	Remove
587	*Casuarina glauca*	Z1	2.0	12.6	1.5	Major	The proposed hard surfacing will encroach into the TPZ by 26% (3.3m^2) and into the SRZ. The proposed hard surfacing levels will be lower than the existing hard surfacing and excavations will be required. This is considered to be a major TPZ encroachment and the proposed works could potentially impact the condition and stability of the tree. The tree is recommended for removal due to impacts from the proposed development.	Remove
588	*Casuarina glauca*	Z1	2.0	12.6	1.5	Major	The proposed hard surfacing will encroach into the TPZ by 35% (4.4m^2) and into the SRZ. The proposed hard surfacing levels will be lower than the existing hard surfacing and excavations will be required. This is considered to be a major TPZ encroachment and the proposed works could potentially impact the condition and stability of the tree. The tree is recommended for removal due to impacts from the proposed development.	Remove
589	*Casuarina glauca*	Z1	2.0	12.6	1.5	Major	The proposed hard surfacing will encroach into the TPZ by 31% (3.9m^2) and into the SRZ. The proposed hard surfacing levels will be lower than the existing hard surfacing and excavations will be required. This is considered to be a major TPZ encroachment and the proposed works could potentially impact the condition and stability of the tree. The tree is recommended for removal due to impacts from the proposed development.	Remove

URBAN ARBOR
The Trusted Name in Tree Management

Tree ID	Species	Retention value	TPZ radius (m)	TPZ area (m^2)	SRZ radius (m)	TPZ encroachment	Discussion/ Conclusion	Recommendation
590	*Casuarina glauca*	Z1	2.0	12.6	1.5	Major	The proposed hard surfacing will encroach into the TPZ by 35% (4.4m^2) and into the SRZ. The proposed hard surfacing levels will be lower than the existing hard surfacing and excavations will be required. This is considered to be a major TPZ encroachment and the proposed works could potentially impact the condition and stability of the tree. The tree is recommended for removal due to impacts from the proposed development.	Remove

Notes

TPZ Encroachment Percentage: TPZ encroachment percentages are based on new structures and hard surfaces only. New soft landscaping, such as turf or amenity planting areas have not been included in the calculation for TPZ encroachment.

Retain and protect*: The proposed construction must be completed in accordance with section 9.2 to reduce the impact to the tree.

9. CONCLUSIONS

9.1 **Table 2:** Summary of the impact to trees during the development;

Impact	Reason	Category A	Category Z	Total
		A	Z	
Trees to be removed	Building construction, new surfacing and/or proximity, or trees in poor condition.	93, 564, 565 (Three trees)	582, 583, 584, 585, 586, 587, 588, 589, 590 (Nine trees)	**12 trees**
Trees subject to TPZ encroachment greater than 10% requiring tree sensitive design and construction to be retained	Removal of existing surfacing/structures and/or installation of new surfacing/structures.	94, 95 (Two trees)	563, 566, 567, 568, 569, 570, 571, 572, 573, 575, 576 (Eleven trees)	**13 trees**
Retained trees subject to TPZ encroachment of 10% or less	Removal of existing surfacing/structures and/or installation of new surfacing/structures.	579, 580, 581 (Three trees)	574, 577, 578, G12 (Three trees and one group of trees)	**6 trees and one group**

URBAN ARBOR
The Trusted Name in Tree Management

9.2 **Construction Design/Specification Requirements:** The proposed construction will encroach into the TPZ of trees 94, 95, 563, 566, 567, 568, 569, 570, 571, 572, 573, 575 and 576 by more than 10%. To ensure the trees are not adversely impacted by the construction, it must be demonstrated the following design and construction specifications can be implemented within the TPZ of the trees. If the construction cannot be completed in accordance with these specifications, the trees may not be viable for retention.

9.2.1 **Underground Services – tree 94:** AS4970 Protection of trees on development sites (2009) recommends that all underground services located inside the TPZ of any tree to be retained should be installed via tree sensitive techniques. This should include either directional drilling methods or manual excavations to minimise the impact to trees identified for retention.

If directional drilling is proposed, section 4.5.5 of AS4970-2009 says that 'The directional drilling bore should be at least 600 mm deep. The project Arborist should assess the likely impacts of boring and bore pits on retained trees'.[10] The feasibility of sub-surface boring/directional drilling will need to be investigated by a sub-surface boring/directional drilling specialist. The project Arborist should provide advice and supervise excavations for bore pits, which must be carried out manually if located within the TPZ. The top of the pipe must be at least 600mm below the existing soil grade. The location of bore pits should be flexible in the TPZ to avoid significant roots, the project Arborist should assess and advise in writing the impact of any significant root severance to the condition of the tree.
If manual excavations are proposed, all excavations for the services should be carried out manually under the supervision of the project Arborist (minimum qualification AQF 5). Manual excavation may include the use of pneumatic and hydraulic tools, high-pressure air or a combination of high-pressure water and a vacuum device. All roots greater than 40mm in diameter should be retained in the service trench. The service pipe should then be threaded below the retained roots where practical. Roots greater than 40mm within the alignment of the service pipe should only be severed/pruned under the approval of the project Arborist. All root pruning should be in accordance with AS4373 Pruning of amenity trees (2007).

9.2.2 **Palisade/Security Fence – tree 94, 95, 563, 566, 567, 568, 569, 570, 571, 572 and 573:** The proposed fencing will be installed using the tree sensitive method of post and rail type construction. To ensure the trees are not significantly impacted by the works, all post holes must be excavated manually. The post location must be flexible to avoid the severance of significant roots 40mm and greater in diameter. No posts are to be located within the SRZ or root investigations will be required to determine the post location. See appendix 3 for more information in regards to root investigations. All rails/horizontal materials are to be located on or above existing soil grades. This will allow for the majority of the root system to be retained between the posts, minimising root loss.

[10] Council Of Standards Australia, *AS 4970 Protection of trees on development sites* (2009) page 18.

9.2.3 **CSR – tree 94 and 95:** The proposed CSR will be installed using the tree sensitive method of post and rail type construction. To ensure the trees are not significantly impacted by the works, all post holes within the TPZ must be excavated manually. The post location must be flexible to avoid the severance of significant roots 40mm and greater in diameter. No posts are to be located within the SRZ or root investigations will be required to determine the post location. See Appendix 3 for more information in regards to root investigations. All rails/horizontal materials are to be located on or above existing soil grades. This will allow for the majority of the root system to be retained between the posts, minimising root loss.

9.2.4 **Tree Sensitive Hard Surfacing Construction – tree 575 and 576:** To retain the trees in a viable condition, the hard surfacing must be constructed in a tree sensitive method. The hard surfacing should be constructed above existing grades in the TPZ of the trees. The diagram below (Image A) gives an example of a no-excavation method for constructing hard surfacing close to trees. The location of retaining pegs should be flexible, avoiding damage to structural roots.

If excavations are essential, they must not exceed 100mm below the existing grades. The excavations should be supervised by a project Arborist with a minimum AQF level 5 qualification. All excavations for the hard surfacing should be carried out manually to avoid impacting retained tree roots. All tree roots greater than 40mm in diameter should be retained, unless the project arborist has assessed and advised that the pruning/severing of the root will not impact the condition or stability of the tree. Manual excavation may include the use of pneumatic and hydraulic tools, high-pressure air or a combination of high-pressure water and a vacuum device.

Where tree roots greater than 40mm are encountered that must be retained, the hard surfacing should be elevated over the individual tree root to allow for its retention. Examples of methods that can be used to bridge individual tree roots have been included below (Image B and C). Using pier and beam bridges as per image C is the recommended/preferred method, as it will allow for future growth of the tree roots, reducing future damage to the surfacing from the roots.

URBAN ARBOR
The Trusted Name in Tree Management

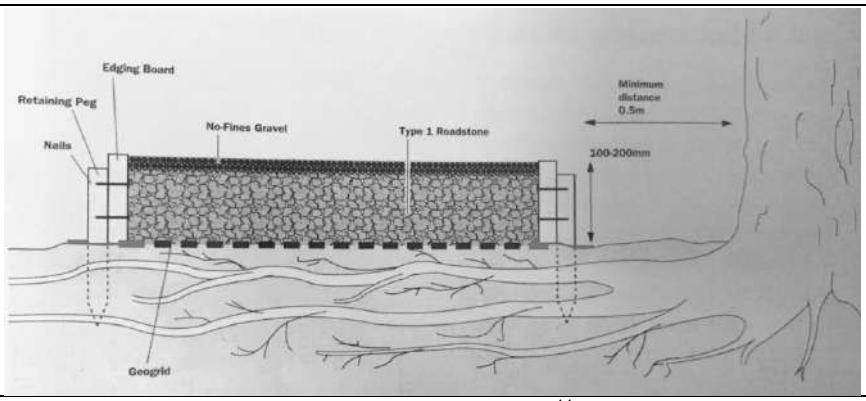


Image A: An image from 'Tree Roots in the Built Environment'[11], showing how to construct hard surfacing above a trees root system without excavation. Type 1 Roadstones are an example of blue metal or crushed sandstone.

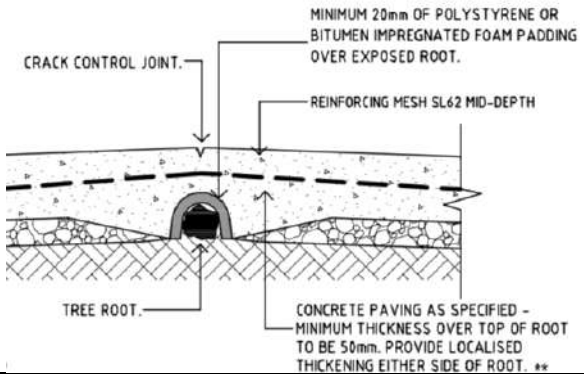


Image B: Example method for bridging concrete surfacing over tree roots provided in the Canterbury Bankstown Council standard drawings.[12]

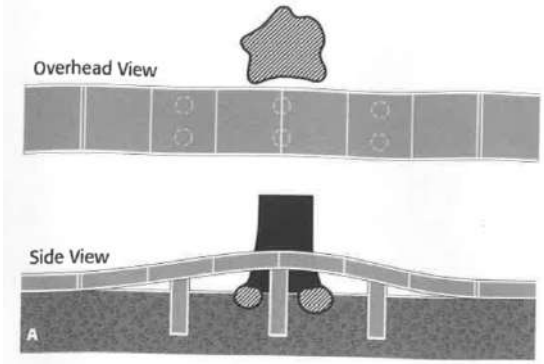


Image C: Example method from Reducing infrastructure damage by tree roots: A compendium of strategies.[13]

[11] Roberts, J., Jackson, N., & Smith, M., *Tree Roots in the Built Environment*, The Stationary Office, London, England (2006). Page 305 & 306.

[12] *Canterbury Bankstown Council standard drawing S-209 Existing street tree treatments*, https://www.cbcity.nsw.gov.au/development/planning-control-policies/council-standard-drawings, accessed 3 October 2019.

[13] Costello, L. R., & Jones, K. S, *Reducing infrastructure damage by tree roots: A compendium of strategies*, Western Chapter of the International Society of Arboriculture, 31883 Success Valley Drive, Porterville, CA (2003), page 27.

URBAN ARBOR
The Trusted Name in Tree Management

9.3 **Photographs**

Image 1: Looking North towards trees 586, 587, 588, 589 and 590. The trees have been recommended for removal due to impacts from the proposed hard surfacing excavations.

URBAN ARBOR
The Trusted Name in Tree Management

10. RECOMMENDATIONS

10.1 This report assesses the impact of a proposed development at the subject site to thirty-one (31) trees and one (1) group of trees located within the site and adjoining sites, in accordance with AS4970 Protection of trees on development sites (2009).

10.2 Site plans have been included in appendix 1, where the indicative TPZ and SRZ of the trees have been overlaid onto the received plans provided by the client. The following plans are included in appendix 1;

- Appendix 1A: Proposed Landscape South
- Appendix 1B: Proposed Landscape North
- Appendix 1C: Proposed Service Building

10.3 Twelve (12) trees have been recommended for removal within this report, including tree 93, 564, 565, 582, 583, 584, 585, 586, 587, 588, 589 and 590. Tree 93, 564 and 565 are higher value category A retention value trees. The remaining trees recommended for removal are lower value category Z retention value trees that generally should not be a constraint to development works.

10.4 Thirteen (13) trees have been recommended to be retained that will be subject to TPZ encroachments greater than 10%, including tree 94, 95, 563, 566, 567, 568, 569, 570, 571, 572, 573, 575 and 576. To reduce the impact to the trees, the proposed construction within the TPZ of the trees must be completed in accordance with section 9.2 of this report.

10.5 The remaining six (6) trees and one (1) group of trees will be subject to minor and acceptable TPZ encroachments of 10% or less and can be retained in a viable condition, including tree 574, 577, 578, 579, 580, 581 and G12.

10.6 All trees to be retained must be protected for the duration of development, (including demolition and landscaping, in accordance with AS4970-2009). See section 11 for more information.

10.7 See section 11.10 for general landscape guidance when working within the TPZ of trees to be retained.

10.8 Where possible underground services must be located outside the TPZ of trees to be retained. All underground services located inside the TPZ of any tree to be retained must be installed via tree sensitive techniques. See section 9.2.1 for more information.

10.9 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. This report should be submitted as supporting evidence with any tree removal/pruning or development application.

URBAN ARBOR
The Trusted Name in Tree Management

11. TREE PROTECTION REQUIREMENTS

11.1 **Use of this report:** All contractors must be made aware of the tree protection requirements prior to commencing works at the site. This report and a copy of the site plan (Appendix 1) drawings must also be made available to any contractor prior to works commencing and during any on site operations.

11.2 **Project Arborist:** Prior to any works commencing at the site a project Arborist should be appointed. The project Arborist should be qualified to a minimum AQF level 5 and/or equivalent qualifications and experience, and should assist with any development issues relating to trees that may arise. If at any time it is not feasible to carryout works in accordance with this, an alternative must be agreed in writing with the project Arborist.

11.3 **Tree work:** All tree work must be carried out by a qualified and experienced Arborist with a minimum of AQF level 2 in arboriculture, in accordance with NSW Work Cover Code of Practice for the Amenity Tree Industry (1998) and AS4373 Pruning of amenity trees (2007).

11.4 **Initial site meeting/on-going regular inspections:** The project Arborist is to hold a pre-construction site meeting with principle contractor to discuss methods and importance of tree protection measures and resolve any issues in relation to tree protection that may arise. In accordance with AS4970-2009, the project Arborist should carryout regular site inspections to ensure works are carried out in accordance with this document throughout the development process. Site inspections are recommended on a one-month frequency.

11.5 **Site Specific Tree Protection Recommendations:** The table below provides recommendations for each tree, including site specific tree protection requirements. All trees to be retained must be protected in accordance with general requirements of AS4970-2009 for the duration of the development, details of which are discussed in further details in this section of the report.

Tree ID	Tree Species	TPZ Radius (m)	SRZ Radius (m)	Recommendations
93	*Platanus x hispanica*	13.2	3.6	Remove.
94	*Platanus x hispanica*	14.4	3.7	Retain and protect. Tree protection fencing is to create a combined exclusion zone for tree 93 and 94. The fencing is to encompass as much of the TPZ area as practical while allowing space for construction activities. TPZ signage is required on the fencing.
95	*Platanus x hispanica*	14.4	3.6	Retain and protect. See tree protection recommendations for tree 94.
563	*Cupaniopsis anacardioides*	2.0	1.5	Retain and protect. Tree protection fencing is to run along the edge of the existing hard surfacing, encompassing the garden bed area adjacent to the tree. TPZ signage is required on the fencing.

URBAN ARBOR
The Trusted Name in Tree Management

564	*Cupaniopsis anacardioides*	4.8	2.5	Remove.
565	*Cupaniopsis anacardioides*	4.3	2.3	Remove.
566	*Cupaniopsis anacardioides*	2.0	1.6	Retain and protect. Tree protection fencing is to create a combined exclusion zone for tree 566 – 573. Fencing is to run along the edge of the existing hard surfacing, encompassing the garden bed area adjacent to the trees. TPZ signage is required on the fencing.
567	*Cupaniopsis anacardioides*	2.0	1.8	Retain and protect. See tree protection recommendations for tree 566.
568	*Cupaniopsis anacardioides*	2.0	1.6	Retain and protect. See tree protection recommendations for tree 566.
569	*Cupaniopsis anacardioides*	2.0	1.5	Retain and protect. See tree protection recommendations for tree 566.
570	*Cupaniopsis anacardioides*	2.0	1.5	Retain and protect. See tree protection recommendations for tree 566.
571	*Cupaniopsis anacardioides*	2.0	1.5	Retain and protect. See tree protection recommendations for tree 566.
572	*Cupaniopsis anacardioides*	2.0	1.5	Retain and protect. See tree protection recommendations for tree 566.
573	*Cupaniopsis anacardioides*	2.0	1.5	Retain and protect. See tree protection recommendations for tree 566.
574	*Backhousia citriodora*	2.0	1.5	Retain and protect. Tree protection fencing is to run along the edge of the existing hard surfacing, encompassing the garden bed area adjacent to the tree. TPZ signage is required on the fencing.
575	*Backhousia citriodora*	2.0	1.5	Retain and protect. Tree protection fencing is to run along the edge of the existing hard surfacing, encompassing the garden bed area adjacent to the tree. TPZ signage is required on the fencing.
576	*Backhousia citriodora*	2.0	1.5	Retain and protect. Tree protection fencing is to run along the edge of the existing hard surfacing, encompassing the garden bed area adjacent to the tree. TPZ signage is required on the fencing.
577	*Cinnamomum camphora*	3.8	2.1	Retain. Set back from works. No tree protection required.
578	*Cinnamomum camphora*	3.0	2.3	Retain. Set back from works. No tree protection required.
G12	*Mixed spp*	2.0	1.6	Retain. Set back from works. No tree protection required.
579	*Triadica sebifera*	2.0	1.7	Retain. Set back from works. No tree protection required.
580	*Liquidambar styraciflua*	2.2	1.7	Retain. Set back from works. No tree protection required.
581	*Ficus rubiginosa*	3.8	2.4	Retain. Set back from works. No tree protection required.
582	*Casuarina glauca*	2.0	1.7	Remove.
583	*Casuarina glauca*	2.0	1.8	Remove.
584	*Casuarina glauca*	2.0	1.5	Remove.

585	*Casuarina glauca*	2.0	1.5	Remove.
586	*Casuarina glauca*	2.0	1.5	Remove.
587	*Casuarina glauca*	2.0	1.5	Remove.
588	*Casuarina glauca*	2.0	1.5	Remove.
589	*Casuarina glauca*	2.0	1.5	Remove.
590	*Casuarina glauca*	2.0	1.5	Remove.

11.6 **Tree protection Specifications:** It is the responsibility of the principle contractor to install tree protection prior to works commencing at the site (prior to demolition works) and to ensure that the tree protection remains in adequate condition for the duration of the development. The tree protection must not be moved without prior agreement of the project Arborist. The project Arborist must inspect that the tree protection has been installed in accordance with this document and AS4970-2009 prior to works commencing.

11.6.1 Protective fencing: Site specific tree protection requirements are in section 11.5. Where it is not feasible to install fencing at the specified location due to factors such restricting access to areas of the site or for constructing new structures, an alternative location and protection specification must be agreed with the project Arborist. Where the installation of fencing in unfeasible due to restrictions on space, trunk and branch protection will be required (see below). The protective fencing must be constructed of 1.8 metre 'cyclone chainmesh fence'. The fencing must only be removed for the landscaping phase and must be authorised by the project Arborist. Any modifications to the fencing locations must be approved by the project Arborist.

11.6.2 TPZ signage: Tree protection signage is to be attached to the protective fencing, displayed in a prominent position and the sign repeated at 10 metres intervals or closer where the fence changes direction. Each sign shall contain in a clearly legible form, the following information:

- Tree protection zone/No access.
- This fence has been installed to prevent damage to the tree/s and their growing environment both above and below ground. Do not move fencing or enter TPZ without the agreement of the project Arborist.
- The name, address, and telephone number of the developer/builder and project Arborist

11.6.3 Trunk and Branch Protection: The trunk must be protected by wrapped hessian or similar material to limit damage. Timber planks (50mm x 100mm or similar) should then be placed around tree trunk. The timber planks should be spaced at 100mm intervals, and must be fixed against the trunk with tie wire, or strapping and

URBAN ARBOR
The Trusted Name in Tree Management

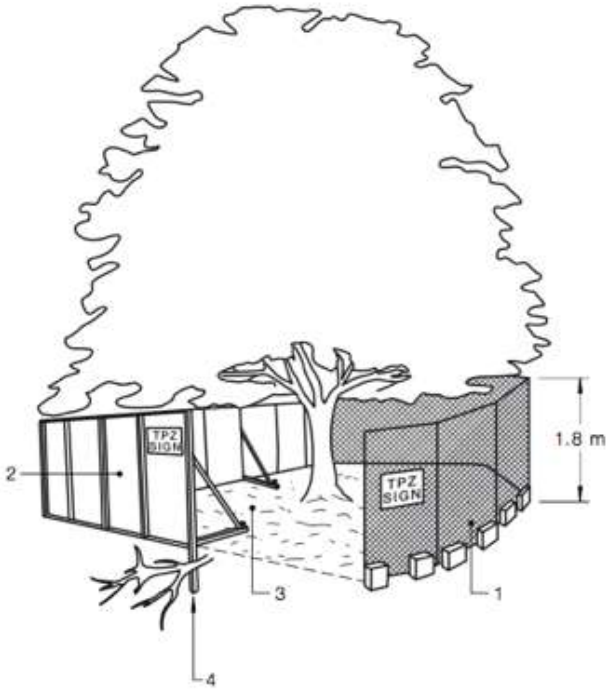
connections finished or covered to protect pedestrians from injury. The hessian and timber planks must not be fixed to the tree in any instance. The trunk and branch protection shall be installed prior to any work commencing on site and shall be maintained in good condition for the entire development period.

11.6.4 Mulch: Any areas of the TPZ located inside the subject site (only trees to be retained directly adjacent to site works must be mulched to a depth of 75mm with good quality composted wood chip/leaf mulch.

11.6.5 Ground Protection: Ground protection is required to protect the underlying soil structure and root system in areas where it is not practical to restrict access to whole TPZ, while allowing space for construction. Ground protection must consist of good quality composted wood chip/leaf mulch to a depth of between 150-300mm, laid on top of geo textile fabric. If vehicles are to be using the area, additional protection will be required such as rumble boards or track mats to spread the weight of the vehicle and avoid load points. Ground protection is to be specified by the project Arborist as required.

11.6.6 Temporary irrigation: Temporary irrigation should be set up in the TPZ of all trees to be retained, and should distribute water evenly throughout the area of the TPZ. The irrigation should be used for at minimum one hour daily throughout all stages of the development.

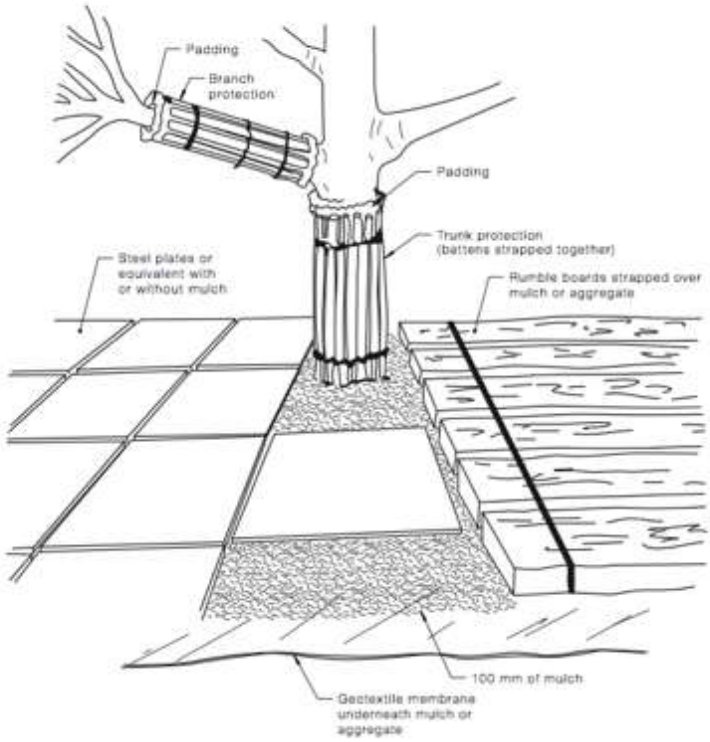
URBAN ARBOR
The Trusted Name in Tree Management



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

An image from AS4970-2009,[14] with example tree protection.

[14] Council Of Standards Australia, *AS4970 Protection of trees on development sites* (2009), page 16.



NOTES:

1 For trunk and branch protection use boards and padding that will prevent damage to bark. Boards are to be strapped to trees, not nailed or screwed.

2 Rumble boards should be of a suitable thickness to prevent soil compaction and root damage.

An image from AS4970-2009,[15] with example tree protection.

11.7 **Restricted activities inside TPZ:** The following activities must be avoided inside the TPZ of all trees to be retained unless approved by the project Arborist. If at any time these activities cannot be avoided an alternative must be agreed in writing with the project Arborist to minimise the impact to the tree.

A) Machine excavation.
B) Ripping or cultivation of soil.
C) Storage of spoil, soil or any such materials
D) Preparation of chemicals, including preparation of cement products.
E) Refueling.
F) Dumping of waste.
G) Wash down and cleaning of equipment.
H) Placement of fill.
I) Lighting of fires.
J) Soil level changes.
K) Any physical damage to the crown, trunk, or root system.
L) Parking of vehicles.

[15] Council Of Standards Australia, *AS4970 Protection of trees on development sites* (2009), page 17.

URBAN ARBOR
The Trusted Name in Tree Management

11.8 **Demolition:** The demolition of all existing structures inside or directly adjacent to the TPZ of trees to be retained must be undertaken in consultation with the project Arborist. Any machinery is to work from inside the footprint of the existing structures or outside the TPZ, reaching in to minimise soil disturbance and compaction. If it is not feasible to locate demolition machinery outside the TPZ of trees to be retained, ground protection will be required. The demolition should be undertaken inwards into the footprint of the existing structures, sometimes referred to as the 'top down, pull back' method.

11.9 **Excavations:** The project Arborist must supervise and certify that all excavations and root pruning are in accordance with AS4373-2007 and AS4970-2009. For continuous strip footings, first manual excavation is required along the edge of the structures closest to the subject trees. Manual excavation should be a depth of 1 metre (or to unfavourable root growth conditions such as bed rock or heavy clay, if agreed by project Arborist). Next roots must be pruned back in accordance with AS4373-2007. After all root pruning is completed, machine excavation is permitted within the footprint of the structure. For tree sensitive footings, such as pier and beam, all excavations inside the TPZ must be manual. Manual excavation may include the use of pneumatic and hydraulic tools, high-pressure air or a combination of high-pressure water and a vacuum device. No pruning of roots greater 30mm in diameter is to be carried out without approval of the project arborist. All pruning of roots greater than 30mm in diameter must be carried out by a qualified Arborist/Horticulturalist with a minimum AQF level 3. Root pruning is to be a clean cut with a sharp tool in accordance with AS4373 Pruning of amenity trees (2007).[16] The tree root is to be pruned back to a branch root if possible. Make a clean cut and leave as small a wound as possible.

11.10 **Landscaping:** All landscaping works within the TPZ of trees to be retained are to be undertaken in consultation with a consulting Arborist to minimize the impact to trees. General guidance is provided below to minimise the impact of new landscaping to trees to be retained.

- Level changes should be minimised. The existing ground levels within the landscape areas should not be lowered by more than 100mm or increased by more than 100mm (300mm increase is acceptable if using a coarse free draining material) without assessment by a consulting Arborist.
- New retaining walls should be avoided. Where new retaining walls are proposed inside the TPZ of trees to be retained, they should be constructed from tree sensitive material, such as timber sleepers, that require minimal footings/excavations. If brick retaining walls are proposed inside the TPZ, considerer pier and beam type footings to bridge significant roots that are critical to the trees condition. Retaining walls must be located outside the SRZ and sleepers/beams located above existing soil grades.

[16] Council Of Standards Australia, *AS 4373 Pruning of amenity trees* (2007) page 18

- New footpaths and hard surfaces should be minimised, as they can limit the availability of water, nutrients and air to the trees root system. Where they are proposed, they should be constructed on or above existing soil grades to minimise root disturbance and consider using a permeable surface. Footpaths should be located outside the SRZ where possible.
- Where fill/sub base is used inside the TPZ, fill material should be a coarse granular material that does not restrict the flow of water and air to the root system below. This type of material will also reduce the impact of soil compaction during construction.
- The location of new plantings inside the TPZ of trees to be retained should be flexible to avoid unnecessary damage to tree roots greater than 30mm in diameter.

11.11 **Underground Services:** Where possible underground services should be located outside the TPZ of trees to be retained. All underground services located inside the TPZ of any tree to be retained must be installed via tree sensitive techniques. This should include either directional drilling methods or manual excavations to minimise the impact to trees identified for retention. No roots greater than 40mm in diameter should be severed during the installation of service pipes unless approved in writing by the project Arborist.

11.12 **Sediment and Contamination:** All contamination run off from the development such as but not limited to concrete, sediment and toxic wastes must be prevented from entering the TPZ at all times.

11.13 **Tree Wounding/Injury:** Any wounding or injury that occurs to a tree during the construction process will require the project Arborist to be contacted for an assessment of the injury and provide mitigation/remediation advice. It is generally accepted that trees may take many years to decline and eventually die from root damage. All repair work is to be carried out by the project Arborist, at the contractor's expense.

11.14 **Completion of Development Works:** After all construction works are complete the project Arborist should assess that the subject trees have been retained in the same condition and vigour. If changes to condition are identified the project Arborist should provide recommendations for remediation.

URBAN ARBOR
The Trusted Name in Tree Management

12. CONSTRUCTION HOLD POINTS FOR TREE PROTECTION

12.1 **Hold Points:** Below is a sequence of hold points requiring project Arborist certification throughout the development process**.** It provides a list of hold points that must be checked and certified. All certification must be provided in written format upon completion of the development. The final certification must include details of any instructions for remediation undertaken during the development. The principle contractor should be responsible for implementing all tree protection requirements.

Hold Point	Stage	Date Completed and Signature of Project Arborist Responsible
Project Arborist to hold pre construction site meeting with principal contractor to discuss methods and importance of tree protection measures and resolve any issues in relation to feasibility of tree protection requirements that may arise. Project Arborist to mark all trees approved for removal under DA consent.	Prior to development work commencing	
Project Arborist to assess and certify that tree protection has been installed in accordance with AS4970-2009 prior to works commencing at site.	Prior to development work commencing.	
In accordance with AS4970-2009 the project arborist should carryout regular site inspections to ensure works are carried out in accordance with the recommendations. Site inspections are recommended on a monthly frequency.	On-going throughout the development	
The removal of existing structures inside the TPZ of any tree to be retained, such as the existing buildings and hard surfaces must be supervised by the project Arborist.	Demolition	
Project Arborist to supervise all manual excavations and root pruning inside the TPZ of any tree to be retained. Project Arborist to approve all pruning of roots greater than 30mm inside TPZ. All root pruning of roots greater than 30mm in diameter must be carried out by a qualified Arborist/Horticulturalist with a minimum AQF level 3.	Construction	
Project Arborist to certify that all underground services including storm water inside TPZ of any tree to be retained have been installed in accordance with AS4970-2009.	Construction	
All landscaping works within the TPZ of trees to be retained are to be undertaken in consultation with the project Arborist to minimise the impact to trees.	Construction/ Landscape	
After all demolition, construction and landscaping works are complete the project Arborist should assess that the subject trees have been retained in the same condition and vigour. If changes to condition are identified the project Arborist should provide recommendations for remediation.	Upon completion of development	

URBAN ARBOR
The Trusted Name in Tree Management

13. BIBLIOGRAPHY/REFERENCES

- Council Of Standards Australia, *AS4970 Protection of trees on development sites* (2009).
- Council Of Standards Australia, *AS4373 Pruning of amenity trees* (2007).
- Mattheck, C. & Breloer, H., *The body language of trees - A handbook for failure analysis*, The Stationary Office, London, England (2015).
- Lonsdale, D., *Principles of tree hazard assessment and management*, The Stationary Office, London, England (1999).
- 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).
- 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 Tree Consultancy, *Tree AZ version 10.10-ANZ*, http://www.treeaz.com/.
- *Marrickville Local Environmental Plan 2011*, https://www.legislation.nsw.gov.au/#/view/EPI/2011/645/full.
- *Marrickville Development Control Plan 2011*, https://www.innerwest.nsw.gov.au/develop/planning-controls/current-development-control-plans-dcp/marrickville-dcp.
- *Inner West Tree Management Development Control Plan 2020*, https://www.innerwest.nsw.gov.au/live/information-for-residents/trees/trees-on-your-property-pruning-or-removing.

14. LIST OF APPENDICES

The following are included in the appendices:
Appendix 1A: Proposed Landscape South
Appendix 1B: Proposed Landscape North
Appendix 1C: Proposed Service Building
Appendix 2 - Tree Inspection Schedule
Appendix 3 - Further information of methodology

Jack Williams
Diploma of Arboriculture (AQF5)
FdSc Arboriculture
Registered Consulting Arborist No. 2556
ISA Member No. 228863
Quantified Tree Risk Assessment (QTRA)
ISA Tree Risk Assessment Qualification (TRAQ)

Bryce Claassens
Diploma of Arboriculture (AQF5)
Cert III Landscape Construction
Member Arboriculture Australia
QTRA
TRAQ

TO SYDNEY

TO BANKSTOWN

WARDELL ROAD

EWART LANE

DUDLEY STREET

BEDFORD CRESCENT

BEDFORD C

247-249 WARDELL ROAD MIXED-USE BUILDING BY OTHERS

DULWICH HILL STATION PRECINCT PUBLIC DOMAIN WORKS - STAGE A BY OTHERS

NEW KERB ALIGNMENT ALONG WARDELL ROAD BY OTHERS

DETAIL AREA A - REFER DRAWING SMCSWSWM-MTM-WDH-LA-DWG-121753

DETAIL AREA B - REFER DRAWING SMCSWSWM-MTM-WDH-LA-DWG-121753

DETAIL AREA C - REFER DRAWING SMCSWSWM-MTM-WDH-LA-DWG-121754

DETAIL AREA D - REFER DRAWING SMCSWSWM-MTM-WDH-LA-DWG-121762

STAIRS 1 REFER TO DRAWING SMCSWSWM-MTM-WDH-LA-DWG-121758

STAIRS 2 REFER TO DRAWING SMCSWSWM-MTM-WDH-LA-DWG-121759

EXISTING ROCK OUTCROP TO BE INVESTIGATED BY CONTRACTOR

EXISTING UNDERLYING ROCK EXPOSED AND CUT TO LEVELS SHOWN

CARPARK DESIGN TBC - TO BE UPDATED IN LINE WITH SERVICE BUILDING PACKAGES

BIKE STORAGE AREA

EXISTING SUBSTATION

STAIRS 1

STAIRS 2

RAMP 1

BEN-1

BEN-2 X 3

BEN-2 X 4

BIN-1

DF-1

BOL-1 X 5

BOL-2 X 4

BR-1 X 5

EXISTING HV POLE TO BE RETAINED

EXISTING BOOKING OFFICE

ELSHOLZ KERB TO TIE INTO EXISTING ADJACENT KERB REFER TO CIVIL DESIGN PACKAGE 123

RAIL CORRIDOR BOUNDARY FENCE REFER TO DRAWING SMCSWSWM-MTM-WDH-LA-DWG-121763 AND FENCING PACKAGE 123

REFER TO ARCHITECTURAL PACKAGE 121 FOR FITOUT BELOW STAIRS

LIFT FAN ROOM UNDERNEATH

ADJOINS DRAWING SMCSWSWM-MTM-WDH-LA-DWG-121721

NEW RMS TYPE 1 FENCE REFER TO BRIDGE PACKAGE FOR INSTALLATION DETAILS AND CIVIL PACKAGE FOR SETOUT

ELSHOLZ KERB AND RAISED FOOTPATH - REFER TO BRIDGES PACKAGE No. 124 AND CIVIL PACKAGE No. 123

PLATFORM BUILDING REFER ARCHITECT'S PACKAGE

PLATFORM

NEW FOOTBRIDGE REFER TO ARCHITECTURAL PACKAGE

PROTECTION SCREEN REFER TO URBAN DESIGN PACKAGE No. 121

ELSHOLZ KERB REFER TO BRIDGES PACKAGE No. 124 AND CIVIL PACKAGE No. 123

EXISTING BIKE PARKING

SECURITY FENCE REFER TO FENCING PACKAGE 123

PROPOSED KISS & RIDE AND TAXI STAND REFER TO CIVIL PACKAGE 123 FOR LINEMARKING, SIGNAGE, SETOUT AND LEVEL INFORMATION

DRAWING COLOUR CODED - PRINT ALL COPIES IN COLOUR

LEGEND

- RAILCORP PROPERTY BOUNDARY
- EXTENT OF LANDSCAPE WORKS

EXISTING

- EXISTING TREES TO BE RETAINED
- EXISTING ELECTRICITY POLE TO BE RETAINED
- EXISTING OVERHEAD POWER LINE

PLANTING

- PROPOSED TREES REFER PLANTING PLAN
- MASS PLANTING REFER PLANTING PLAN AND SCHEDULE FOR DETAILS

FENCE/WALLS

- PLAZA FENCING REFER TO FENCING PLAN SMCSWSWM-MTM-WDH-LA-DWG-121723
- PROTECTION SCREEN REFER TO URBAN DESIGN PACKAGE No. 121
- RMS TYPE 1 FENCE REFER TO CIVIL PACKAGE 123
- SECURITY FENCE REFER TO FENCING PACKAGE 123
- SANDSTONE LOGS REFER TO DRAWING SMCSWSWM-MTM-WDH-LA-DWG-121753 TO 121754 AND MATERIAL SCHEDULE

PAVING

- NATURAL STONE PAVING. REFER TO MATERIALS SCHEDULE, PAVING PLAN AND DETAILS
- TREE GRATES. REFER TO MATERIALS SCHEDULE
- TACTILE INDICATORS - WARNING INDICATORS TO COMPLY WITH AS1428.4. REFER TO MATERIALS SCHEDULE
- TRENCH DRAIN REFER TO CIVIL PACKAGE 123

FURNITURE

- SEAT 1 REFER TO DETAIL 03 /

Tree Legend

- Tree Protection Fencing
- Tree Crown
- Tree Protection Zone
- Structural Root Zone

0 — 30m

Urban Arbor Pty Ltd

PO Box 450, Turramurra, NSW, 2074

sales@urbanarbor.com.au, (02) 8004 2802

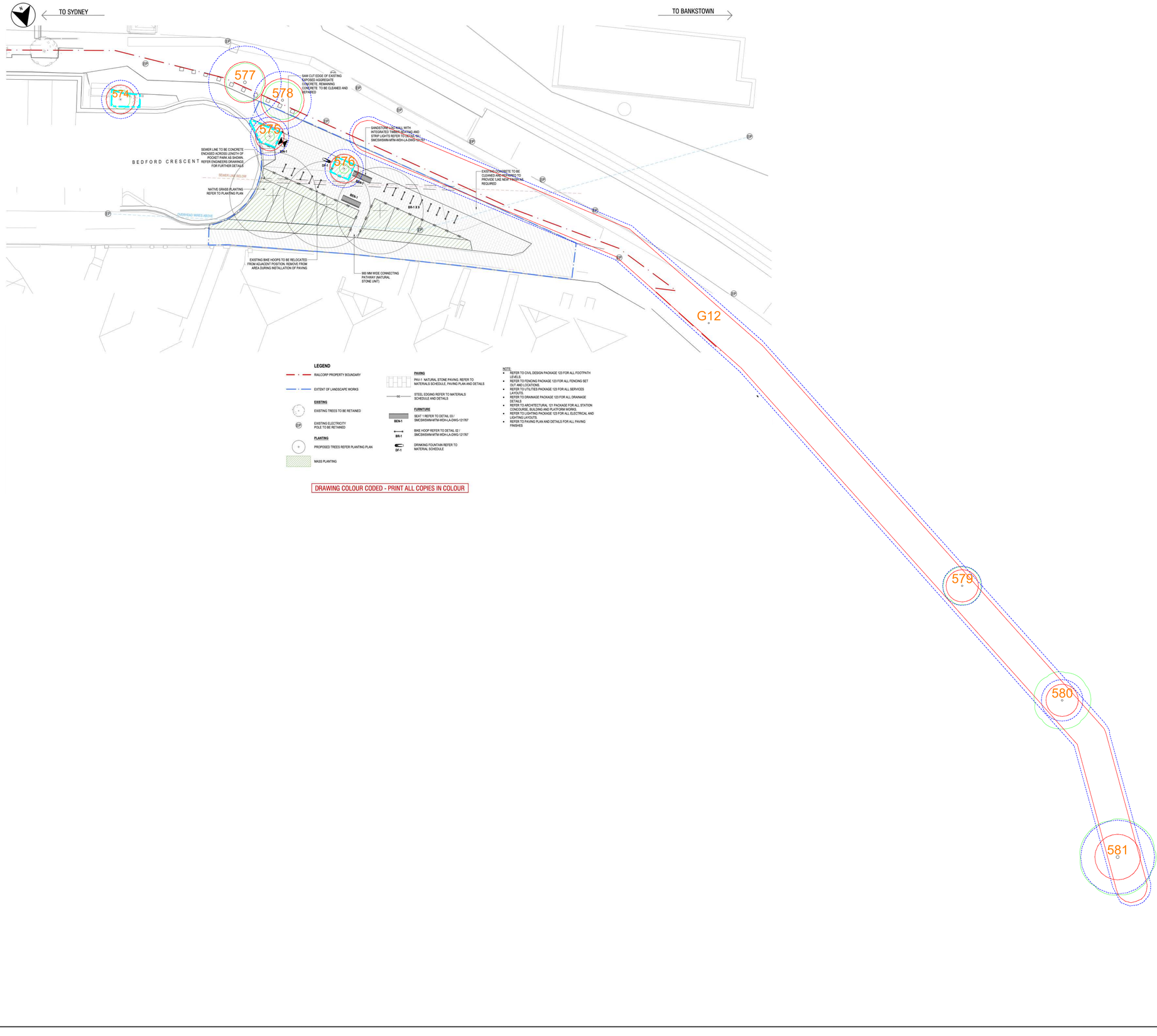
Site Location: Dulwich Hill Station, Dullwich Hill NSW

SCALE :	DATE :
1 : 200 @ A1	22/12/2020

Appendix 1A: Proposed Landscape South

Prepared by: Bryce Claassens

URBAN ARBOR
The Trusted Name in Tree Management



LEGEND

- RAILCORP PROPERTY BOUNDARY
- EXTENT OF LANDSCAPE WORKS

EXISTING

- EXISTING TREES TO BE RETAINED
- EP — EXISTING ELECTRICITY POLE TO BE RETAINED

PLANTING

- PROPOSED TREES REFER PLANTING PLAN
- MASS PLANTING

PAVING

- PAV-1 NATURAL STONE PAVING. REFER TO MATERIALS SCHEDULE, PAVING PLAN AND DETAILS
- SE — STEEL EDGING REFER TO MATERIALS SCHEDULE AND DETAILS

FURNITURE

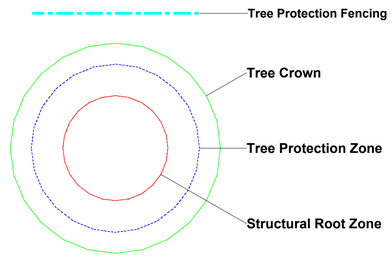
- SEN-1 — SEAT 1 REFER TO DETAIL 03 / SMCSWSWM-MTM-WOH-LA-DWG-121767
- BR-1 — BIKE HOOP REFER TO DETAIL 02 / SMCSWSWM-MTM-WOH-LA-DWG-121767
- DF-1 — DRINKING FOUNTAIN REFER TO MATERIAL SCHEDULE

NOTE:

- REFER TO CIVIL DESIGN PACKAGE 123 FOR ALL FOOTPATH LEVELS
- REFER TO FENCING PACKAGE 123 FOR ALL FENCING SET OUT AND LOCATIONS.
- REFER TO UTILITIES PACKAGE 123 FOR ALL SERVICES LAYOUTS.
- REFER TO DRAINAGE PACKAGE 123 FOR ALL DRAINAGE DETAILS.
- REFER TO ARCHITECTURAL 121 PACKAGE FOR ALL STATION CONCOURSE, BUILDING AND PLATFORM WORKS.
- REFER TO LIGHTING PACKAGE 123 FOR ALL ELECTRICAL AND LIGHTING LAYOUTS.
- REFER TO PAVING PLAN AND DETAILS FOR ALL PAVING FINISHES

DRAWING COLOUR CODED - PRINT ALL COPIES IN COLOUR

Tree Legend



0 — 30m

Urban Arbor Pty Ltd

PO Box 450, Turramurra, NSW, 2074
sales@urbanarbor.com.au, (02) 8004 2802

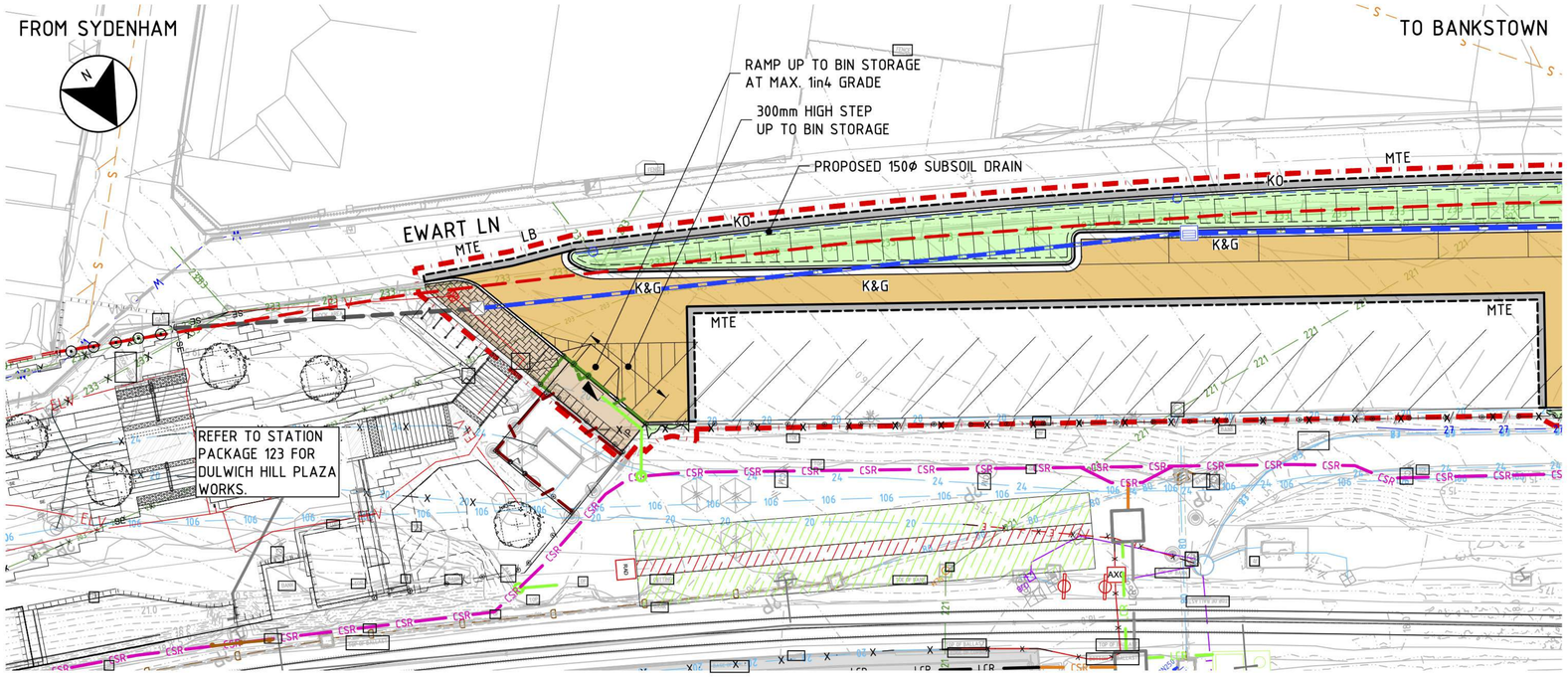
Site Location: Dulwich Hill Station, Dullwich Hill NSW

SCALE :	DATE :
1 : 200 @ A1	22/12/2020

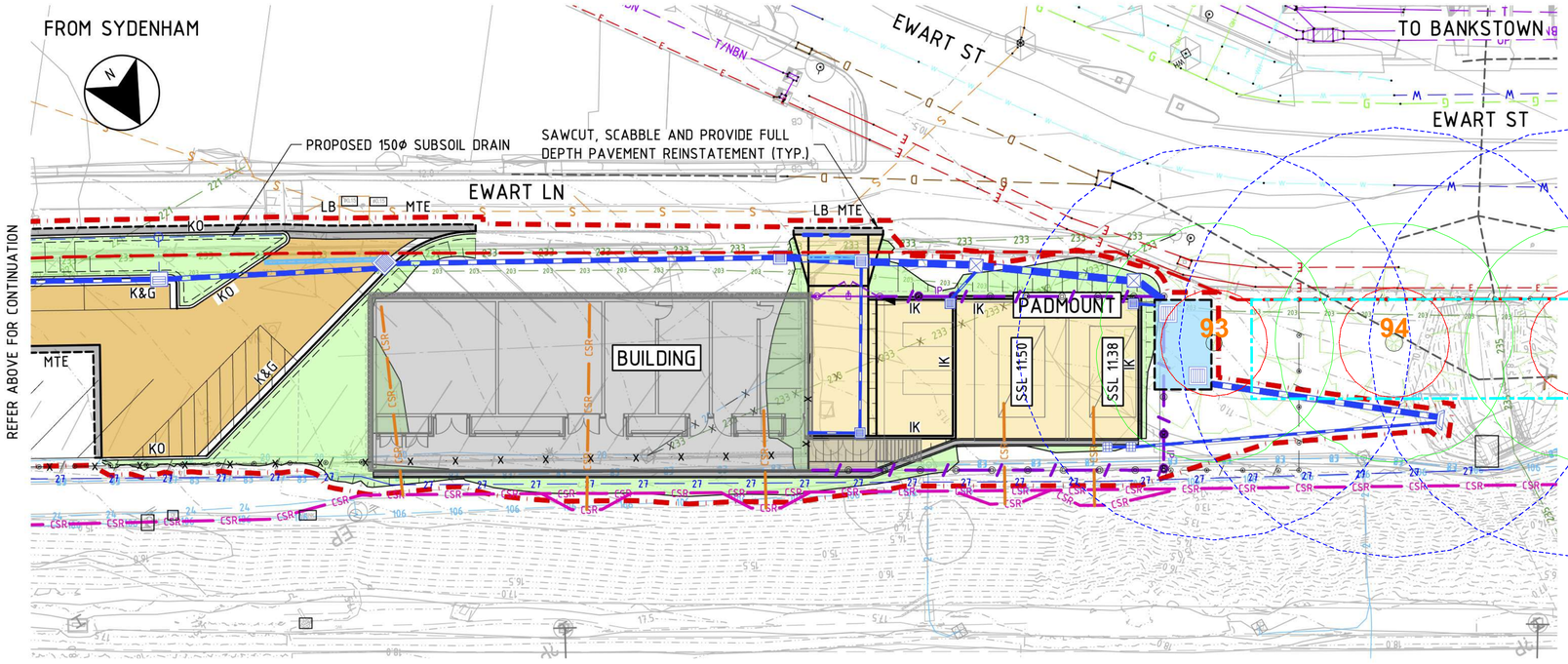
URBAN ARBOR
The Trusted Name in Tree Management

Appendix 1B: Proposed Landscape North

Prepared by: Bryce Claassens

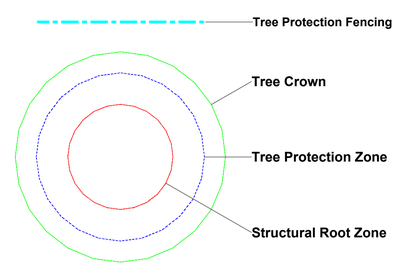


PLAN
SCALE 1:200



PLAN
SCALE 1:200

Tree Legend



0 30m

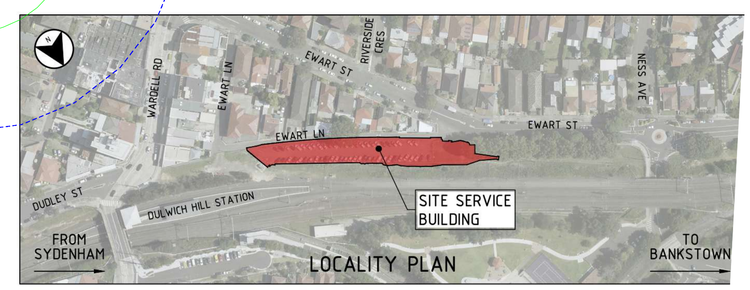
Urban Arbor Pty Ltd

PO Box 450, Turramurra, NSW, 2074
sales@urbanarbor.com.au, (02) 8004 2802

Site Location: Dulwich Hill Station, Dullwich Hill NSW

SCALE : 1 : 200 @ A1	DATE : 22/12/2020	URBAN ARBOR The Trusted Name in Tree Management
Appendix 1C: Proposed Service Building		

Prepared by: Bryce Claassens



LOCALITY PLAN

DRAWING COLOUR CODED - PRINT ALL COPIES IN COLOUR

NOT FOR CONSTRUCTION

Appendix 2 - Tree Inspection Schedule

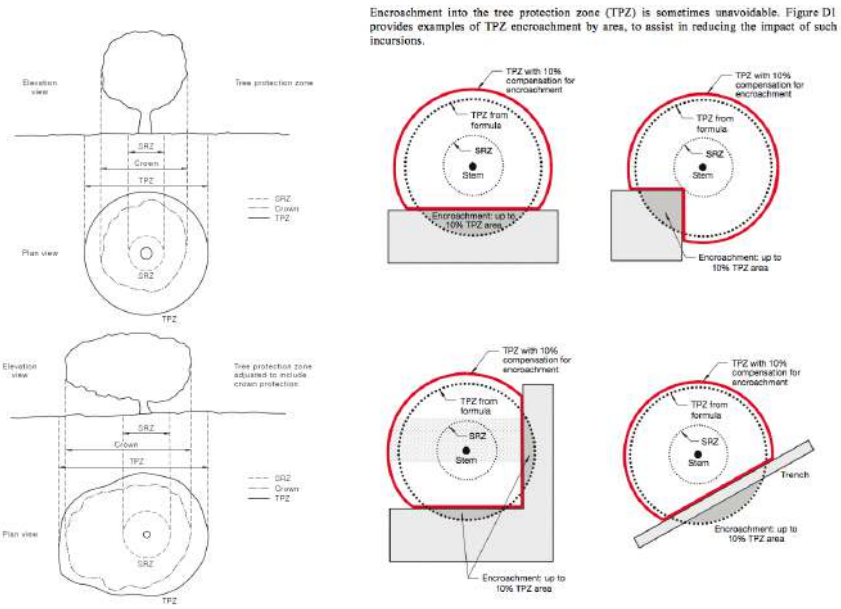
Tree ID	Common Name	Botanical Name	Age Class	Height (m)	Canopy Spread Radius (m	Stem 1	Stem 2	Stem 3	Stem 4	Stem 5	DBH (mm)	DAB (mm)	Health	Structure	Amenity Value	SULE	Retention Value	TPZ Radius (m)	SRZ Radius (m)	Notes
93	London Plane	*Platanus x hispanica*	Mature	21	8	1100					1100	1200	Good	Fair	High	2. Medium	A1	13.2	3.6	Located within corridor. Asymmetric crown shape due to power line clearance. Suckers at base.
94	London Plane	*Platanus x hispanica*	Mature	22	8	1200					1200	1300	Good	Fair	High	2. Medium	A1	14.4	3.7	Located within corridor. Asymmetric crown shape due to power line clearance.
95	London Plane	*Platanus x hispanica*	Mature	21	8	1200					1200	1250	Good	Fair	High	2. Medium	A1	14.4	3.6	Located within corridor. Asymmetric crown shape due to power line clearance.
563	Tuckeroo	*Cupaniopsis anacardioides*	Young	3	1	90					90	120	Good	Good	Low	5. Small/Young	Z1	2.0	1.5	None.
564	Tuckeroo	*Cupaniopsis anacardioides*	Mature	6	4	280	260	110			398	490	Good	Good	Medium	1. Long	A1	4.8	2.5	Multiple pruning wounds.
565	Tuckeroo	*Cupaniopsis anacardioides*	Mature	6	4	360					360	420	Good	Good	Medium	1. Long	A1	4.3	2.3	None.
566	Tuckeroo	*Cupaniopsis anacardioides*	Young	3	1	130					130	170	Good	Good	Low	5. Small/Young	Z1	2.0	1.6	None.
567	Tuckeroo	*Cupaniopsis anacardioides*	Semi-mature	4	1.5	160					160	230	Good	Good	Low	5. Small/Young	Z1	2.0	1.8	None.
568	Tuckeroo	*Cupaniopsis anacardioides*	Semi-mature	4	1	150					150	180	Good	Good	Low	5. Small/Young	Z1	2.0	1.6	None.
569	Tuckeroo	*Cupaniopsis anacardioides*	Semi-mature	4	1.5	120					120	150	Good	Good	Low	5. Small/Young	Z1	2.0	1.5	None.
570	Tuckeroo	*Cupaniopsis anacardioides*	Young	3	1	100					100	150	Good	Fair	Low	5. Small/Young	Z1	2.0	1.5	Multi stem tree.
571	Tuckeroo	*Cupaniopsis anacardioides*	Young	3	1	120					120	150	Good	Good	Low	5. Small/Young	Z1	2.0	1.5	None.
572	Tuckeroo	*Cupaniopsis anacardioides*	Young	3	1	90					90	100	Good	Good	Low	5. Small/Young	Z1	2.0	1.5	None.
573	Tuckeroo	*Cupaniopsis anacardioides*	Young	3	1	70					70	90	Good	Fair	Low	5. Small/Young	Z1	2.0	1.5	Trunk wound to N at 1m.
574	Tuckeroo	*Backhousia citriodora*	Young	2	1	50					50	80	Good	Good	Low	5. Small/Young	Z1	2.0	1.5	None.
575	Lemon Myrtle	*Backhousia citriodora*	Young	2	0.5	50					50	60	Good	Good	Low	5. Small/Young	Z1	2.0	1.5	None.
576	Lemon Myrtle	*Backhousia citriodora*	Young	2	0.5	50					50	60	Good	Good	Low	5. Small/Young	Z1	2.0	1.5	None.
577	Lemon Myrtle	*Cinnamomum camphora*	Semi-mature	4	2	150	180	150	150		316	350	Good	Fair	Low	3. Short	Z9	3.8	2.1	Topped for power lines. Within corridor. Exempt species.
578	Camphor Laurel	*Cinnamomum camphora*	Semi-mature	4	2	120	120	150	100		248	400	Good	Fair	Low	3. Short	Z9	3.0	2.3	Topped for power lines. Within corridor. Exempt species.
G12	Mixed Weed Species	*Mixed spp*	Semi-mature	6	2	150					150	180	Good	Fair	Very Low	2. Medium	Z3	2.0	1.6	Group of weed species located within corridor. Privet, lantana, Celtis, African olive, camphor, mulberry, loquat.
579	Chinese Tallo	*Triadica sebifera*	Semi-mature	7	2	170					170	200	Good	Fair	Medium	2. Medium	A1	2.0	1.7	Located within corridor.
580	Sweetgum	*Liquidambar styraciflua*	Semi-mature	9	3	180					180	200	Good	Good	Medium	1. Long	A1	2.2	1.7	Located within corridor.
581	Port Jackson Fig	*Ficus rubiginosa*	Semi-mature	9	4	150	200	200			320	450	Good	Fair	Medium	1. Long	A1	3.8	2.4	Located within corridor. Growing through existing fence.
582	Swamp Oak	*Casuarina glauca*	Young	5	1	140	80				161	200	Good	Fair	Low	5. Small/Young	Z1	2.0	1.7	None.
583	Swamp Oak	*Casuarina glauca*	Semi-mature	5	1	150	70				166	220	Good	Fair	Low	5. Small/Young	Z1	2.0	1.8	None.
584	Swamp Oak	*Casuarina glauca*	Semi-mature	5	1	100					100	150	Good	Fair	Low	5. Small/Young	Z1	2.0	1.5	None.
585	Swamp Oak	*Casuarina glauca*	Semi-mature	4.5	1	120					120	150	Good	Fair	Low	5. Small/Young	Z1	2.0	1.5	None.
586	Swamp Oak	*Casuarina glauca*	Young	2	0.5	50					50	80	Good	Fair	Low	5. Small/Young	Z1	2.0	1.5	None.
587	Swamp Oak	*Casuarina glauca*	Young	2	0.5	50					50	80	Good	Fair	Low	5. Small/Young	Z1	2.0	1.5	None.
588	Swamp Oak	*Casuarina glauca*	Young	2	0.5	50					50	80	Good	Fair	Low	5. Small/Young	Z1	2.0	1.5	None.
589	Swamp Oak	*Casuarina glauca*	Young	2	0.5	50					50	100	Good	Fair	Low	5. Small/Young	Z1	2.0	1.5	None.
590	Swamp Oak	*Casuarina glauca*	Young	2	0.5	50					50	90	Good	Fair	Low	5. Small/Young	Z1	2.0	1.5	None.

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 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.

URBAN ARBOR
The Trusted Name in Tree Management

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 10 DULWICH HILL AIA (PLATEAU TREES)

PLATEAUTREES
Safety. Quality. Progress.

Date: 13 March 2021

Re: Additional tree removals at Punchbowl Station as part of the Southwest Metro Package.

At the request of Downer Group an onsite inspection was undertake at Punchbowl Station. It has been asked to identify and record additional tree removals beyond those recommended within the Arboricultural Impact Assessment (AIA) prepared by Urban Arbor, dated 15 January 2020, Ref 20/01/15/SWMPB. On the 5 March a site walkthrough was undertaken by myself and a representative from Downer Group. Additional tree removals were identified with respects to the proposed Southwest Metro Package works.

Based upon the information, rational and justification provided within the AIA Report I can confirm that trees 733, 734, 735 and 736 shall require removal to accommodate the proposed works.

Additional tree removals where there is direct design clash and 100% impact to the TPZ and SRZ have been identified as trees 729 and 730 *Callistemon viminalis* (BottleBrush). These trees were initially identified for retention within the AIA report. However, it has since been confirmed that they shall require removal to accommodate the construction of a lift to the railway line overpass. Reference should be made to the AIA report for their respective tree data. Image 1 shows the location of the two trees. Image 2 shows the two trees. Drawing 1 shows their design clash.

The trees are considered to be in good health and condition and provide minor screening of the rail corridor from the area adjacent the station entry. They are

Plateau Tree Service Pty Ltd
PO BOX 1522, DEE WHY NSW 2099 Australia
P: 02 9939 5350 | F: 02 9905 7569
E: info@plateautrees.com.au | W: www.plateautrees.com.au
ABN : 17 090 798 002

not representative of an endangered or threatened species or ecological community.

Image 1: Aerial image of Punchbowl Station showing the location of trees 729 and 730.

Image 2: Trees 729 and 730 are to be removed to accommodate the lift shaft works.

TO SYDNEY

TO BANKSTOWN

ADJOINS DRAWINGS SMCSWSWM-MTM-WPS-LA-DG-241720

PLATFORM

PLATFORM BUILDING

EXISTING TREE (*Callistemon viminalis*) TO BE REMOVED TREE 729 AND 730 IN URBAN ARBOR REPORT

BIN (BIN-1)

DRINKING FOUNTAIN (DF-1)

EXISTING SYDNEY TRAINS COMMUNICATION CABINET TO BE RETAINED ENSURE 1.5m CLEAR ZONE MAINTAINED SURROUNDING UNIT

FUTURE RETAIL LOCATION

EXISTING TREE (*Elaeocarpus reticulatus*) TO BE REMOVED

BIN STORAGE AREA

10 x BIKE HOOPS (BH-1)

EXISTING HEDGE (Elaeocarpus reticulatus) TO BE RETAINED

FUTURE POP UP RETAIL

2 NOS. ELEAOCARPUS RETICULATUS TRANSPLANTED FROM SITE. REFER TO SMCSWSWM-MTM-WPS-LA-DWG-241702 FOR EXISTING LOCATION.

ELEVATED WALKWAY REFER TO DETAIL PLAN SMCSWSWM-MTM-WPS-LA-DWG-241764

REST PARK

REINSTATE EXISTING PARK SIGNAGE

EXISTING BUS STOP

LIMIT OF WORKS

KERB DETAIL - REFER TO CIVIL PACKAGE 243
STAIR HANDRAIL DETAIL - REFER TO ARCHITECTURAL DRAWING NO. SMCSWSWM-MTM-WPS-AT-DWG-241501

GARDEN BED PLANTING WITH COIR MESH (MS-1) - REFER TO DETAIL ON SMCSWSWM-MTM-WPS-LA-DWG-241753

EXISTING TREE (*Lophostemon confertus*) TO BE REMOVED

EXISTING LIGHT POLE TO BE RETAINED

PROPOSED SEATING (ST-2)

IN-SITU CONCRETE WALL (W-2)

CONCRETE STAIR

METRO TOTEM TO WAYFINDING PACAKGE

PLANTING REFER TO PLANTING PLAN SMCSWSWM-MTM-WPS-LA-DWG-241741

IN-SITU CONCRETE WALL (W-1)

EXISTING CONCRETE FOOTPATH TO BE RETAINED

PROPOSED PEDESTRIAN CROSSING SUBJECT TO FURTHER INVESTIGATION

THROW SCREEN - REFER TO URBAN DESIGN PACKAGE 241810

NEW 2.4m SECURITY FENCING - REFER TO FENCING PACKAGE

PUNCHBOWL ROAD UNDERPASS PATHWAY WIDENING - REFER TO CIVIL PACKAGE 243 FOR DETAILS AND SET OUT

PUNCHBOWL ROAD OVERBRIDGE

EXISTING UNDERPASS

RE-PAINT BRIDGE ABUTMENT AND SOFFIT REFER TO MATERIAL SCHEDULE

PUNCHBOWL ROAD

BREUST PLACE

HIGHCLERE AVENUE

LEGEND

EXISTING
- EXISTING TREES TO BE RETAINED
- EXISTING TREES TO BE REMOVED
- EXISTING ELECTRICAL POLE
- EXISTING LIGHT

GENERAL
- RAILCORP PROPERTY BOUNDARY
- EXTENT OF LANDSCAPE WORKS

FENCES/WALLS
- 2.4m HIGH CLOSE SPACED WELDED MESH FENCE AND GATE REFER TO FENCING PACKAGE
- CHAIN MESH FENCE TO BIN STORAGE
- THROW SCREEN REFER TO URBAN DESIGN PACKAGE 241810

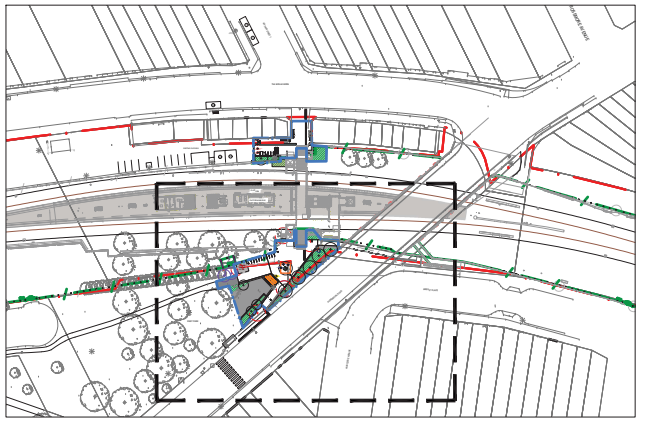
LANDSCAPE
- NEW PLANTING
- PROPOSED TREE
- RELOCATED TREE
- SV-1 STRATAVAULT CELL
- LAWN

HARDSCAPE
- PAV-1 PLAZA PAVING
- TGS-1 WARNING TACTILE INDICATORS
- TGS-1A DIRECTIONAL TACTILE INDICATORS
- W-1 IN-SITU CONCRETE WALL (500mm WIDE)
- W-2 IN-SITU CONCRETE WALL (300mm WIDE)
- EP-1 ELEVATED WALKWAY

STREET FURNITURE
- ST-2 PROPOSED SEATING
- BH-1 BIKE PARKING (HOOPS)
- BIN-1 BIN
- DF-1 NEW DRINKING FOUNTAIN
- NEW METRO TOTEM

LIGHTING
- LP-1 LIGHTING POLE
- L-2 PEDESTRIAN LIGHTING FOR UNDERPASS
- L-4 IN-GROUND LIGHTING

NOTES:
- THE DESIGN IS BASED ON SYDNEY METRO CHAINAGE. PLEASE REFER TO CIVIL DRAWINGS FOR SYDNEY METRO CHAINAGE ALIGNMENT (PACKAGE NO. 103).
- REFER TO CIVIL DESIGN PACKAGE 243 FOR ALL FOOTPATH LEVELS.
- REFER TO FENCING PACKAGE 243 FOR ALL FENCING SET OUT AND LOCATIONS.
- REFER TO UTILITIES PACKAGE 243 FOR ALL SERVICES LAYOUTS.
- REFER TO ARCHITECTURAL PACKAGE 241 FOR ALL STATION CONCOURSE, BUILDING AND PLATFORM WORKS.
- REFER TO LIGHTING PACKAGE 243 FOR ALL ELECTRICAL AND LIGHTING LAYOUTS.
-REFER TO ARBORIST'S ARBORICULTURAL IMPACT ASSESSMENT REPORT FOR TREE PROTECTION WORKS
-REFER TO MITIGATION MEASURES DETAILED IN THE HERITAGE REPORT FOR WORKS AROUND PUNCHBOWL STATION WITHIN PAD02.



KEY PLAN
1:1000

DRAWING COLOUR CODED - PRINT ALL COPIES IN COLOUR

NOT FOR CONSTRUCTION

REV.	BY	DATE	DESCRIPTION	APPD.
E	ME	06/11/2020	UPDATED STAGE 3 ISSUE	LP
D	ME	17/06/2020	ISSUED FOR STAGE 3	LP
C	ME	08/05/2020	ISSUED FOR STAGE 3	LP
B	ME	25/10/2019	ISSUED FOR STAGE 2	LP
A	ME	05/07/2019	ISSUED FOR STAGE 1	LP

SCALES
2 0 2 4 6 8m
1 : 200 FULL SIZE A1

CLIENT: NSW GOVERNMENT | sydney METRO

SERVICE PROVIDERS: METRON T2M

DRAWN	D. LEE	06/11/2020
DESIGNED	M. ENOCH	06/11/2020
DRG CHECK	M. ENOCH	06/11/2020
DESIGN CHECK	G. DAVIES	06/11/2020
APPROVED	L. PALMER	06/11/2020

SYDNEY METRO
PUNCHBOWL (16.886km to 17.217km)
LANDSCAPE DESIGN
DETAIL PLAN
PUNCHBOWL ROAD

STATUS: STAGE 3 | SHEET 6 of 37 | ©

DRG No. SMCSWSWM-MTM-WPS-LA-DWG-241721 | REV. E

A1 Original | Co-ordinate System: MGA Zone 56 | Height Datum: A.H.D. | This sheet may be prepared using colour and may be incomplete if copied | NOTE: Do not scale from this drawing. | ALT. DRG No. SMCSWSWM-MTM-WPS-LA-DWG-241721 P01

Cad File: X:\2 Projects\2019P181671 Southwest\Metro Design Services\02 CAD\80_WPS_Punchbowl\Plots\SMCSWSWM-MTM-WPS-LA-DWG-241721.dwg
Plot Date: 12/11/20 - 17:25
100mm AT FULL SIZE

All appropriate approvals and consents are to be obtained prior to tree and vegetation removal works commencing. All tree removal works are to be undertaken by suitably qualified tree workers and in accordance with Safe Work Australia's Guide to Managing Risks of Tree Trimming and Removal Works.

Please feel free to contact me should you require any further assistance regarding this matter.

Regards.

Owen Tebbutt

Consulting Arborist
Plateau Tree Service

APPENDIX 10.1 DULWICH HILL AIA (PLATEAU TREES)

PLATEAUTREES
Safety. Quality. Progress.

Date: 25 May 2021

Re: Additional tree removals at Dulwich Hill Station as part of the Southwest Metro Package.

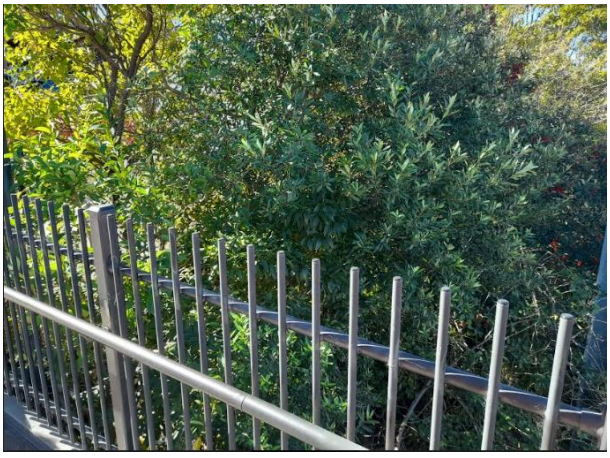
At the request of Downer Group an onsite arboricultural inspection at Dulwich Hill Station was conducted on the 18th May 2021.Weather conditions were fine.
The reason for this inspection was to assess and identify additional trees within the area proposed for the construction of New Bridge Footing Abutment.
A walkthrough the site was conducted in the presence of a Downer Group representative.
Upon inspection it was concluded that the that all trees shown within the attached images (and Appendix 1) will require removal to facilitate the proposed construction to take place.
All vegetation has been assessed as being insignificant.

Best Regards
Colin Curtis

Level 5 Consulting Arborist
Tree Risk Assessment Qualification (TRAQ)
Member of Arboriculture Australia #2332
Member of the International Society of Arboriculture (ISA) # 228182

Image 1:Metro map (2021).

Image 2:Tree A circled in red.



Images 3 & 4: Trees B-F displayed.

Appendix 1: Tree Assessment Schedule

PLATEAUTREES
Safety. Quality. Progress.

Tree number	Tree name	Tree dimensions				Vigour	Condition	Age class	ULE	Amenity and Visual	Native or	TPZ (m)	SRZ (m)	Comments	Remove or Retain
	Botanical name **Common name**	**Height (m)**	**Spread (m)**	**D.B.H. (mm)**	**D.A.B. (mm)**										
A	*Cupaniopsis anacardioides* (Tuckeroo)	3	2	8	10	N	F	Y	M	L	N	2	1.5	Clash with permanent fencing at Bedford Crescent.	Remove
B	*Cinnamomum camphora* (Camphor Laurel)	3	2	<10	<10	N	F	Y	S	L	E	2	1.5	Clash with permanent footbridge.	Remove
C	*Olea europaea* (African Olive)	<2	2	<10	<10	N	F	Y	S	L	E	2	1.5	Clash with permanent footbridge. Accounted for only within vegetation clearance total.	Remove
D	(*Ligustrum sp.*) (Privet)	<2	2	<10	<10	N	F	Y	S	L	E	2	1.5	Clash with permanent footbridge. Accounted for only within vegetation clearance total.	Remove
E	(*Cotoneaster sp.*) Cotoneaster	<2	2	<10	<10	N	F	Y	S	L	E	2	1.5	Clash with permanent footbridge. Accounted for only within vegetation clearance total.	Remove
F	(*Pittosporum undulatum*) Sweet Daphne	<2	2	<10	<10	N	F	Y	S	L	N	2	1.5	Clash with permanent footbridge. Accounted for only within vegetation clearance total.	Remove

Appendix 3: Tree Assessment Criteria

Tree number: Identifying number given to individual (or group) trees.
Botanical Name: Latin name for tree showing genus and species.
Common Name: The common name given to the tree.
Tree Dimensions: The physical dimensions of the tree.

- **Height**: Estimated or measured height of tree in meters.
- **Spread**: Estimated or measured radial canopy spread of tree in meters.
- **Diameter at Breast Height (DBH)**: The estimated or measured diameter of trunk given in mm measured at 1.4m from ground.
- **Diameter Above Base (DAB)**: The estimated or measured diameter of trunk given in mm measured above the root flare. Used to calculate the structural root zone of the tree.

Age Class: An estimation of how old the tree is in relation to its life expectancy.

- **Young** – Age less than 20% of life expectancy of tree in situ
- **Mature** – Age 20% - 80% of life expectancy of tree in situ
- **Old** – Age greater than 80% of life expectancy of tree in situ
- **Dead** – Tree is dead

Vigour: Ability of a tree to sustain its life processes. This is independent of the condition of a tree but may impact upon it. Vigour can appear to alter rapidly with change of seasons (seasonality) e.g., dormant, deciduous or semi-deciduous trees. Vigour can be categorised as Dormant, Low, Normal and High.

- **Dormant Vigour** – Determined by the existing turgidity in the lower order branches in the outer extremity of the crow, with good bud set and formation, and where the last extension growth is distinct from those most recently preceding it, evident by bud scale scars. Normal vigour during dormancy is achieved when such growth is evident on a majority of branches throughout the crown.
- **Low Vigour** – Reduced ability of a tree to sustain its life processes. This may be evident by the atypical growth of leaves, reduced crown cover and reduced crown density, branches, roots and trunk, and a deterioration of their functions with reduced resistance to predation. This is independent of the condition of a tree but may impact upon it, and especially the ability of a tree to sustain itself against predation.
- **Normal Vigour** – Ability of a tree to maintain and sustain its life processes. This may be evident by the typical growth of leaves, crown cover and crown density, branches, roots and trunk and resistance to predation. This is independent of the condition of a tree but may impact upon it, and especially the ability of a tree to sustain itself against predation.
- **High Vigour** – Accelerated growth of a tree due to incidental or deliberate artificial changes to its growing environment that are seemingly beneficial, but may result in premature aging or failure if the favourable conditions cease, or promote prolonged senescence if the favourable conditions remain, e.g. water from a leaking pipe, water and nutrients from a leaking or disrupted sewer pipe, nutrients from animal waste, a tree growing next to a chicken coop, or a stock feed lot, or a regularly used stockyard, a tree subject to stringent watering and fertilisation program, or some trees may achieve an extended lifespan from continuous pollarding practices over the life of the tree.

Condition: A tree's crown form and growth habit, as modified by its environment (aspect, suppression by other trees, soils) the stability and viability of the root plate, trunk and structural branches (first (1st) and possibly (2nd) order branches), including structural defects such as wounds, cavities or hollows, crooked trunk or weak trunk/branch junctions and the effects of predation by pests and diseases. These may not be directly connected with vigour and it is possible for a tree to be of normal vigour but in poor condition. Condition can be categorised as Dead, Poor, Fair and Good.

- **Dead Condition** – Tree is no longer capable of performing any of the following processes or is exhibiting any of the following symptoms; Photosynthesis via its foliage crown (as indicated by the presence of moist, green or other coloured leaves), Osmosis (the ability of the roots system to take up water), Turgidity (the ability of the plant to sustain moisture pressure in its cells), Epicormic shoots or epicormic strands in Eucalypts (the production of new shoots as a response to stress, generated from latent or adventitious buds or from a lignotuber), Permanent leaf loss, Permanent leaf wilting (the loss of turgidity which is marked by desiccation of stems leaves and roots), Abscission of the epidermis (bark desiccates and peels off to the beginning of the sap wood).
- **Poor Condition** - Tree is of good habit or misshapen, a form that may be severely restricted for space and light, exhibits symptoms of advanced and irreversible decline such as fungal, or bacterial infestation, major die-back in the branch and foliage crown, structural deterioration from insect damage e.g. termite infestation, or storm damage or lightning strike, ring barking from borer activity in the trunk, root damage or instability of the tree, or damage from physical wounding impacts or abrasion, or from altered local environmental conditions and has been unable to adapt to such changes and may decline further to death regardless of remedial works or other modifications to the local environment that would normally be sufficient to provide for its basic survival if in good to fair condition. Deterioration physically, often characterised by a gradual and continuous reduction in vigour but may be independent of a change in vigour, but characterised by a proportionate increase in susceptibility to, and predation by pests and diseases against which the tree cannot be sustained. Such conditions may also be evident in trees of advanced senescence due to normal phenological processes, without modifications to the growing environment or physical damage having been inflicted upon the tree. This may be independent from, or contributed to by vigour.
- **Fair Condition** - Tree is of good habit or misshapen, a form not severely restricted for space and light, has some physical indication of decline due to the early effects of predation by pests and diseases, fungal, bacterial, or insect infestation, or has suffered physical injury to itself that may be contributing to instability or structural weaknesses, or is faltering due to the modification of the environment essential for its basic survival. Such a tree may recover with remedial works where appropriate, or without intervention may stabilise or improve over time, or in response to the implementation of beneficial changes to its local environment. This may be independent from, or contributed to by vigour.
- **Good Condition** - Tree is of good habit, with crown form not severely restricted for space and light, physically free from the adverse effects of predation by pests and diseases, obvious instability or structural weaknesses, fungal, bacterial or insect infestation and is expected to continue to live in much the same condition as at the time of inspection provided conditions around it for its basic survival do not alter greatly. This may be independent from, or contributed to by vigour.

Useful Life Expectancy (ULE) ULE is the length of time that the arborist assesses an individual tree can be retained with an acceptable level of risk based on the information available at the time of inspection. It is a snapshot in time of the potential an individual tree has for survival in the eyes of the assessor. ULE is not static – it is closely related to tree health and the surrounding conditions. Alterations in these variables may result in changes to the ULE assessment. Consequently, the reliability all ULE assessments have will decrease as time passes from the initial assessment and the potential for changes in variables increases.

- **Remove –** Trees that should be removed within the next 5 years
- **Short –** Trees that appear to be retainable at the time of the assessment for 5-15 years with an acceptable level of risk.
- **Medium –** Trees that appear to be retainable at the time of the assessment for 15-40 years with an acceptable level of risk.
- **Long –** Trees that appear to be retainable at the time of the assessment for 40+ years with an acceptable level of risk.

Amenity and Visual Value – For the purposes of assessing the visual and landscape value of each tree the IACA Significance of a Tree, Assessment Rating System (STARS) © (IACA 2010) © has been adopted. - The landscape significance of a tree is an essential criterion to establish the importance that a particular tree may have on a site. The system uses a scale of High, Medium and Low significance in the landscape.

High significance in landscape

- The tree is in good condition and good vigour
- The tree has a form typical for the species
- The tree is a remnant or is a planted locally indigenous specimen and/or is rare or uncommon in the local area or of botanical interest or of substantial age
- The tree is listed as a heritage item, threatened species or part of an endangered ecological community or listed on council's significant tree register
- The tree is visually prominent and visible from a considerable distance when viewed from most directions within the landscape due to its size and scale and makes a positive contribution to the local amenity
- The tree supports social and cultural sentiments or spiritual associations, reflected by the broader population or community group or has commemorative values
- The tree's growth is unrestricted by above and below ground influences, supporting its ability to reach dimensions typical for the taxa in situ – tree is appropriate to the site conditions

Medium significance in landscape

- The tree is in fair-good condition and good or low vigour
- The tree has form typical or atypical of the species
- The tree is a planted locally indigenous or a common species with its taxa commonly planted in the local area
- The tree is visible from surrounding properties, although not visually prominent as partially obstructed by other vegetation or buildings when viewed from the street
- The tree provides a fair contribution to the visual character and amenity of the local area
- The tree's growth is moderately restricted by above or below ground influences, reducing its ability to reach dimensions typical for the taxa in situ

Low significance in landscape

- The tree is in fair-poor condition and good or low vigour
- The tree has form atypical of the species
- The tree is not visible or is partly visible from the surrounding properties as obstructed by other vegetation or buildings
- The tree provides a minor contribution or has a negative impact on the visual character and amenity of the local area
- The tree is a young specimen which may or may not have reached dimensions to be protected by local Tree Preservation Orders or similar protection mechanisms and can easily be replaced with a suitable specimen
- The tree's growth is severely restricted by above or below ground influences, unlikely to reach dimensions typical for the taxa in situ – tree is inappropriate to the site conditions
- The tree is listed as exempt under the provisions of the local Council Tree Preservation Order or similar protection mechanisms
- The tree has a wound or defect that has the potential to become structurally unsound
- **Environmental Pest / Noxious Weed Species**
- The tree is an environmental pest species due to its invasiveness or poisonous/allergenic properties.
- The tree is a declared noxious weed by legislation
- **Hazardous / Irreversible Decline**
- The tree is structurally unsound and/or unstable and is considered potentially dangerous
- The tree is dead, or is in irreversible decline, or has the potential to fail or collapse in full or in part in the immediate to short term

The tree is to have a minimum of three (3) criteria in a category to be classified in that group.

In the development of this document IACA acknowledges the contribution and original concept of the Footprint Green Tree Significance & Retention Value Matrix, developed by Footprint Green Pty Ltd in June 2010.

The Australian Standard 4970-2009 Protection of Trees on Development Sites defines the requirements for assessing trees with respect to development. It provides the guidance on how to decide which trees are appropriate for retention and on the means of protecting them during construction works. It describes the areas and offsets, referred to as the Tree Protection Zone (TPZ) and Structural Root Zone (SRZ) required to be free from development works to maintain tree vitality and stability. This report has been prepared in accordance with the conditions set out within the standard.

- **Tree Protection Zone** – The tree protection zone is defined as a specified area above and below ground set aside for the protection of the tree's roots and crown. It is expressed as a radial measurement taken from the centre of the trunk at ground level.
- **Structural Root Zone** – The structural root zone is defined as a specified area around the base of a tree required to maintain its stability within the ground. It is expressed as a radial measurement taken from the center of the trunk at ground level. Excavation and development works are not recommended within the structural root zone unless additional investigation as to root size and location is undertaken

APPENDIX 10.2 DULWICH HILL AIA (PLATEAU TREES)

Date: 2nd July 2021

Arborist Assessment Dulwich Hill Station

At the request of Downer Group an onsite Visual Tree Assessment (VTA) inspection at Dulwich Hill Station (within the rail corridor) was conducted on the 15th June 2021.Weather conditions were fine.

The reason for this inspection was to provide an arboricultural opinion regarding possible impact that may be resultant from the installation of drainage services that will be placed within the Tree Protection Zone (TPZ), bordering the Structural Root Zone (SRZ), of one (1) x London Plane (*Platanus x Hybrida*).

At the time of inspection, it was observed that multiple roots ranging between 100-400mm in diametre will require to be cut/pruned to allow for the proposed drainage infrastructure to be installed. No options for re direction of this service was apparent without huge design changes.

It was concluded that pruning of such root sizes (within the TPZ, bordering the SRZ) in all likelihood has the potential to result in decline/and or whole tree failure.

If whole tree failure occurred, it could be deemed to be foreseeable that excavation for drainage could/may be responsible.

This is not read as/or intended to be a risk assement.

Best Regards
Colin Curtis

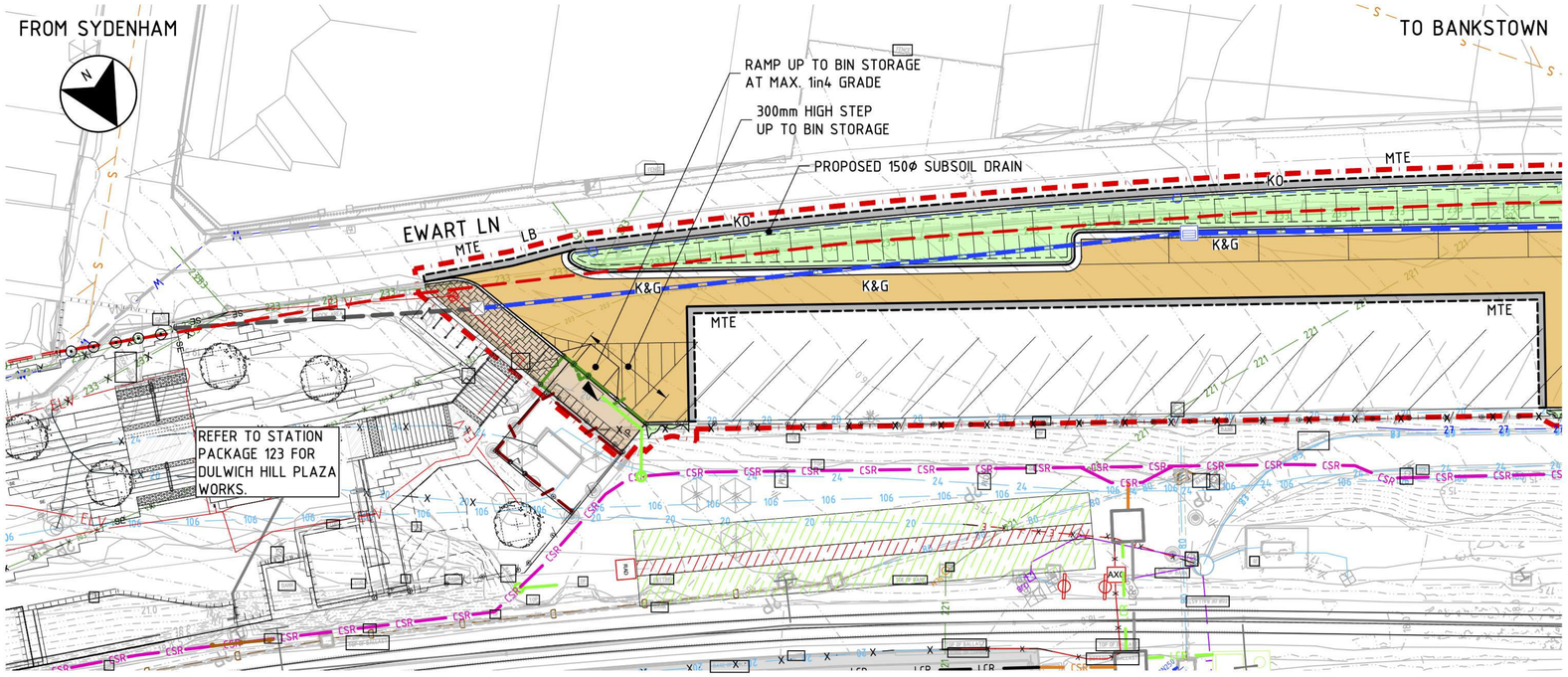
Level 5 Consulting Arborist
Tree Risk Assessment Qualification (TRAQ)
Member of Arboriculture Australia #2332
Member of the International Society of Arboriculture (ISA) # 228182

Image of the subject tree (Tree 94) taken on the 15th June 2021 (red line shows approximate location of required excavations).

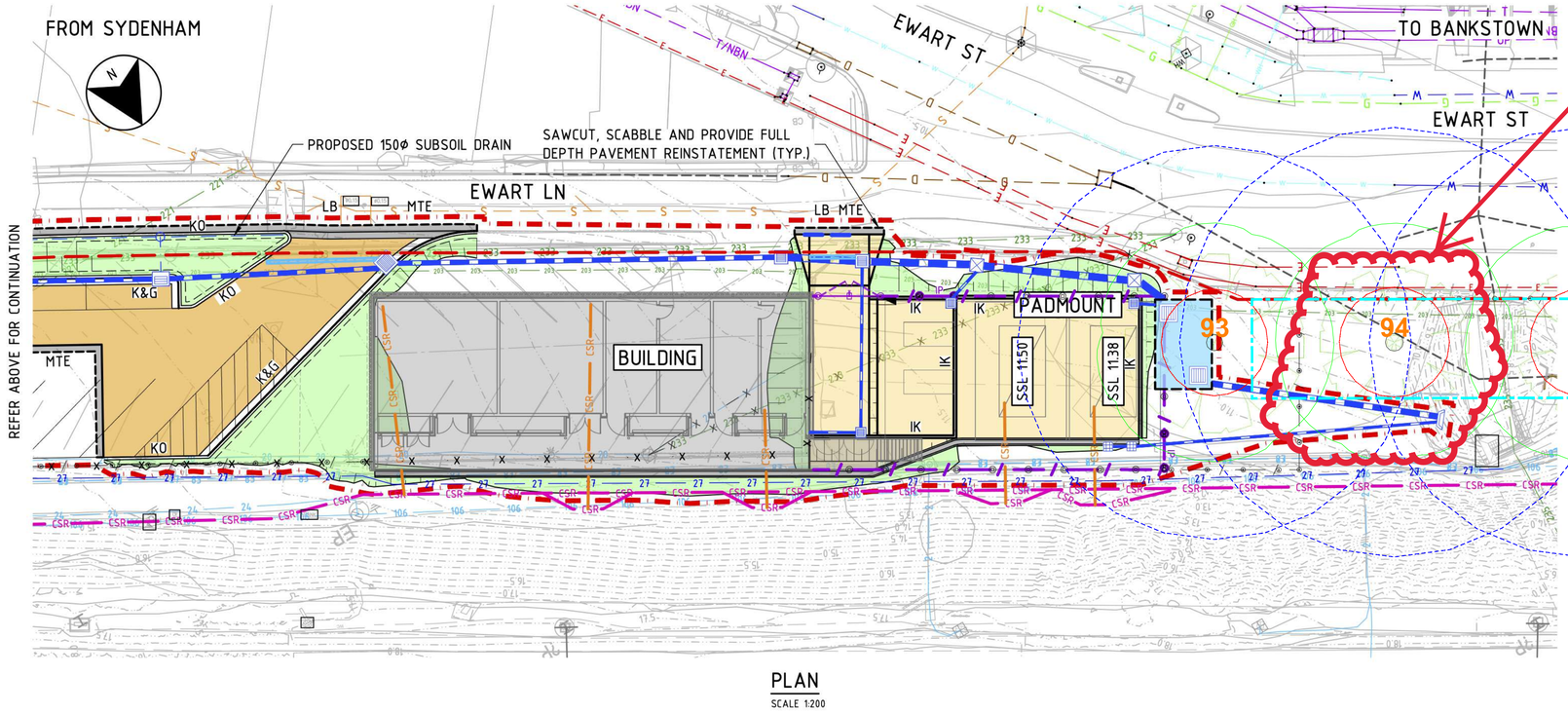
Location of the subject tree (tree 94) circled in red (*Metromap 2021*).

Appendix 1: Tree Assessment Schedule

Tree number	Tree name	Tree dimensions				Vigour	Condition	Age class	ULE	Amenity and Visual Value	Native or Exotic	TPZ (m)	SRZ (m)	Comments	Remove or Retain
	Botanical name **Common name**	**Height (m)**	**Spread (m)**	**DBH (cm)**	**DAB (cm)**										
94	*Platanus x Hybrida* London Plane	20	12	100	120	NV	F	M	M	M	E	15	3.57	To be removed due to a clash with the permanent drainage design.	Remove

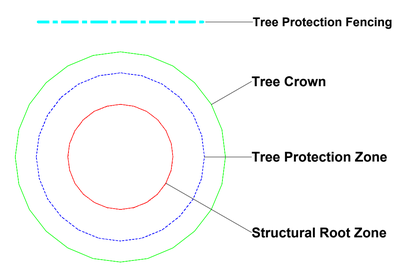


PLAN
SCALE 1:200



PLAN
SCALE 1:200

Tree Legend



0 30m

Urban Arbor Pty Ltd

PO Box 450, Turramurra, NSW, 2074
sales@urbanarbor.com.au, (02) 8004 2802

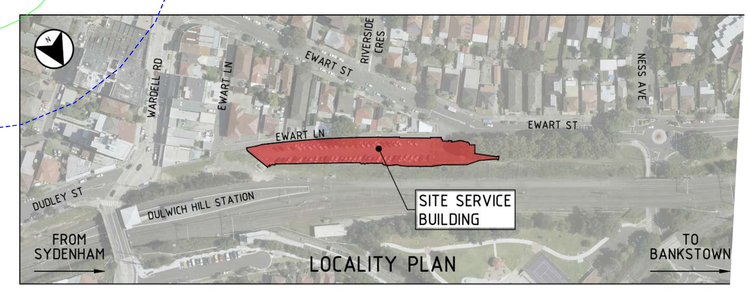
Site Location: Dulwich Hill Station, Dullwich Hill NSW

To be cleared due to clash with permanent drainage design. Drainage design indicted by blue and white dotted line.

2/2020

uilding

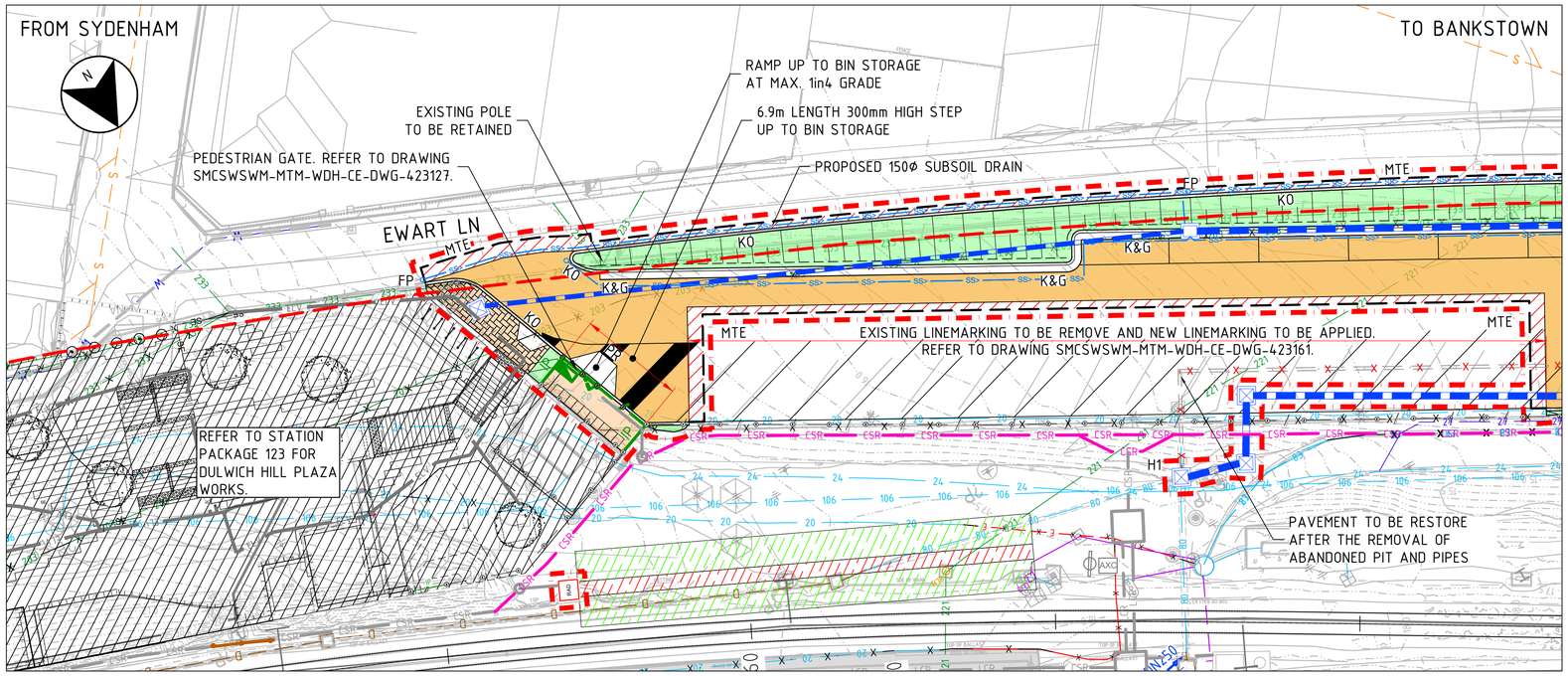
ryce Claassens



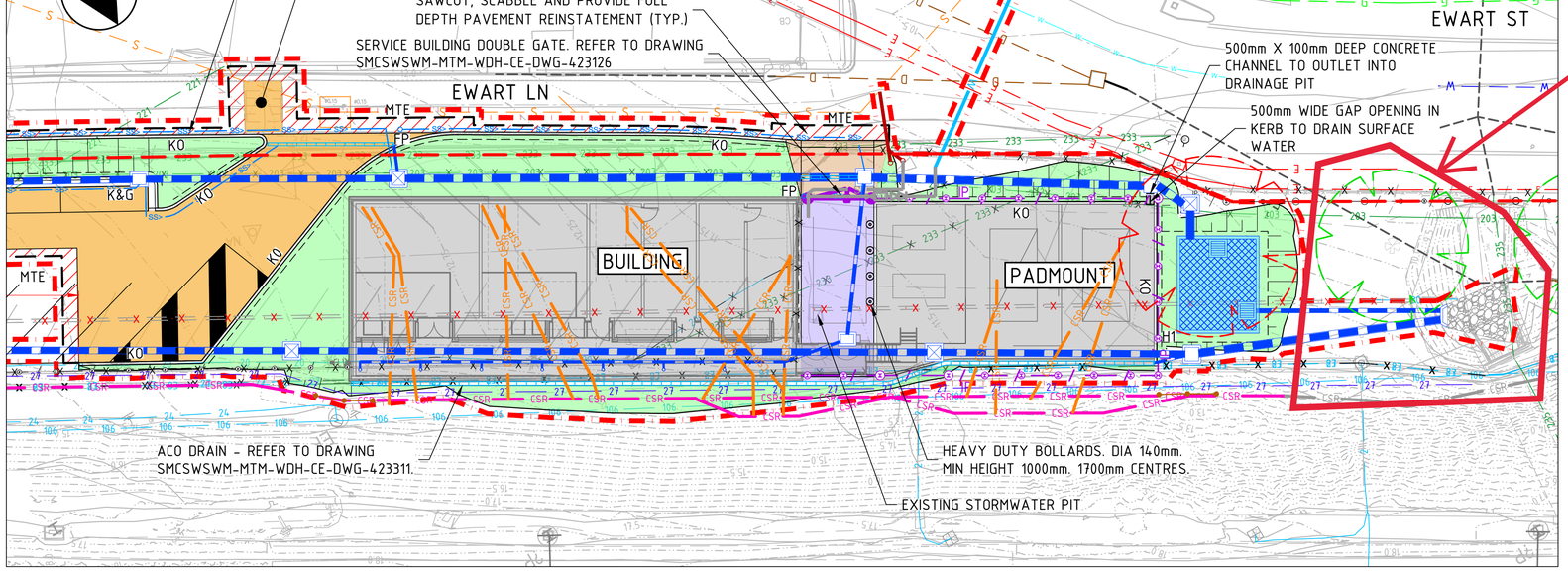
LOCALITY PLAN

DRAWING COLOUR CODED - PRINT ALL COPIES IN COLOUR

NOT FOR CONSTRUCTION



PLAN
SCALE 1:200

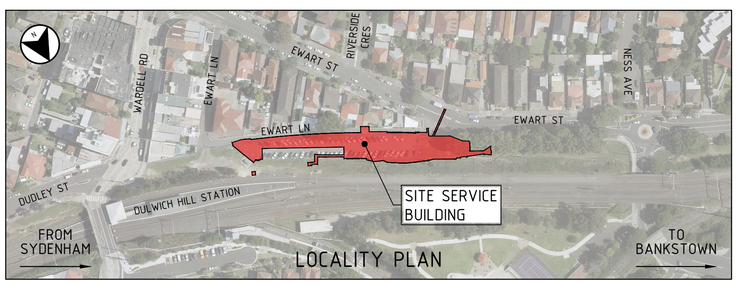


PLAN
SCALE 1:200

NOTES

1. FOR GENERAL NOTES REFER TO DRAWINGS SMCSWSWM-MTM-WDH-CE-DWG-423104 TO 423107.
2. FOR LEGEND REFER TO DRAWINGS SMCSWSWM-MTM-WDH-CE-DWG-423108 TO 423109.
3. REFER TO STATION DESIGN PACKAGES FOR PLATFORM AND BUILDING WORKS.
4. FOR PAVEMENT PLAN REFER TO DRAWINGS SMCSWSWM-MTM-WDH-CE-DWG-423161 TO 423162.
5. FOR BULK EARTHWORKS CUT AND FILL PLAN REFER TO DRAWING SMCSWSWM-MTM-WDH-CE-DWG-423201.
6. FOR BULK EARTHWORKS PLAN AND LONGITUDINAL SECTION REFER TO DRAWING SMCSWSWM-MTM-WDH-CE-DWG-423206.
7. FOR DRAINAGE GENERAL ARRANGEMENT PLAN REFER TO DRAWING SMCSWSWM-MTM-WDH-CE-DWG-423301.
8. FOR CSR GENERAL ARRANGEMENT PLAN REFER TO DRAWING SMCSWSWM-MTM-WDH-CE-DWG-423411. DO NOT REFER TO ANY OTHER GENERAL ARRANGEMENT PLANS FOR THE DESIGN AND EXTENTS OF CSR WORKS.
9. FOR UTILITIES GENERAL ARRANGEMENT PLAN REFER TO DRAWING SMCSWSWM-MTM-WDH-CE-DWG-423501.
10. FOR GATE AND FENCE SETOUT, REFER TO DRAWINGS SMCSWSWM-MTM-WDH-CE-DWG-423138 TO 423139.
11. FOR LANDSCAPE TREATMENT REFER TO LANDSCAPE DESIGN PACKAGE 121.

To be cleared due to clash with permanent drainage design. Drainage design indicted by blue and white dotted line.



DRAWING COLOUR CODED - PRINT ALL COPIES IN COLOUR

FOR CONSTRUCTION

REV.	BY	DATE	DESCRIPTION	APPD.
00	MC	21.04.2021	APPROVED FOR CONSTRUCTION	LP

SCALES: 1 : 200 (2 0 2 4 6 8m) FULL SIZE A1

CLIENT: NSW GOVERNMENT | sydney METRO

SERVICE PROVIDERS: METRON T2M

DRAWN M. FORTU
DESIGNED G. LUO
DRG CHECK P. ALFORD
DESIGN CHECK T. LEE
APPROVED L. PALMER 21.04.2021

SYDNEY METRO
DULWICH HILL STATION - SERVICE BUILDING
CIVIL ENGINEERING
SERVICE BUILDING - CIVIL
GENERAL ARRANGEMENT PLAN

STATUS: FOR CONSTRUCTION | SHEET 1 OF 1 | ©

DRG No. SMCSWSWM-MTM-WDH-CE-DWG-423111 | REV. 00

A1 Original | Co-ordinate System: MGA Zone 56 | Height Datum: A.H.D. | This sheet may be prepared using colour and may be incomplete if copied | NOTE: Do not scale from this drawing. | ALT. DRG No. SMCSWSWM-MTM-WDH-CE-DWG-423111 0

Appendix 2: Tree Assessment Criteria

Tree number: Identifying number given to individual (or group) trees.
Botanical Name: Latin name for tree showing genus and species.
Common Name: The common name given to the tree.
Tree Dimensions: The physical dimensions of the tree.

- **Height**: Estimated or measured height of tree in meters.
- **Spread**: Estimated or measured radial canopy spread of tree in meters.
- **Diameter at Breast Height (DBH)**: The estimated or measured diameter of trunk given in mm measured at 1.4m from ground.
- **Diameter Above Base (DAB)**: The estimated or measured diameter of trunk given in mm measured above the root flare. Used to calculate the structural root zone of the tree.

Age Class: An estimation of how old the tree is in relation to its life expectancy.

- **Young** – Age less than 20% of life expectancy of tree in situ
- **Mature** – Age 20% - 80% of life expectancy of tree in situ
- **Old** – Age greater than 80% of life expectancy of tree in situ
- **Dead** – Tree is dead

Vigour: Ability of a tree to sustain its life processes. This is independent of the condition of a tree but may impact upon it. Vigour can appear to alter rapidly with change of seasons (seasonality) e.g., dormant, deciduous or semi-deciduous trees. Vigour can be categorized as Dormant, Low, Normal and High.

- **Dormant Vigour** – Determined by the existing turgidity in the lower order branches in the outer extremity of the crow, with good bud set and formation, and where the last extension growth is distinct from those most recently preceding it, evident by bud scale scars. Normal vigour during dormancy is achieved when such growth is evident on a majority of branches throughout the crown.
- **Low Vigour** – Reduced ability of a tree to sustain its life processes. This may be evident by the atypical growth of leaves, reduced crown cover and reduced crown density, branches, roots and trunk, and a deterioration of their functions with reduced resistance to predation. This is independent of the condition of a tree but may impact upon it, and especially the ability of a tree to sustain itself against predation.
- **Normal Vigour** – Ability of a tree to maintain and sustain its life processes. This may be evident by the typical growth of leaves, crown cover and crown density, branches, roots and trunk and resistance to predation. This is independent of the condition of a tree but may impact upon it, and especially the ability of a tree to sustain itself against predation.
- **High Vigour** – Accelerated growth of a tree due to incidental or deliberate artificial changes to its growing environment that are seemingly beneficial, but may result in premature aging or failure if the favourable conditions cease, or promote prolonged senescence if the favourable conditions remain, e.g. water from a leaking pipe, water and nutrients from a leaking or disrupted sewer pipe, nutrients from animal waste, a tree growing next to a chicken coop, or a stock feed lot, or a regularly used stockyard, a tree subject to stringent watering and fertilisation program, or some trees may achieve an extended lifespan from continuous pollarding practices over the life of the tree.

Condition: A tree's crown form and growth habit, as modified by its environment (aspect, suppression by other trees, soils) the stability and viability of the root plate, trunk and structural branches (first (1^{st}) and possibly (2^{nd}) order branches), including structural defects such as wounds, cavities or hollows, crooked trunk or weak trunk/branch junctions and the effects of predation by pests and diseases. These may not be directly connected with vigour, and it is possible for a tree to be of normal vigour but in poor condition. Condition can be categorized as Dead, Poor, Fair and Good.

- **Dead Condition** – Tree is no longer capable of performing any of the following processes or is exhibiting any of the following symptoms; Photosynthesis via its foliage crown (as indicated by the presence of moist, green or other coloured leaves), Osmosis (the ability of the roots system to take up water), Turgidity (the ability of the plant to sustain moisture pressure in its cells), Epicormic shoots or epicormic strands in Eucalypts (the production of new shoots as a response to stress, generated from latent or adventitious buds or from a lignotuber), Permanent leaf loss, Permanent leaf wilting (the loss of turgidity which is marked by desiccation of stems leaves and roots), Abscission of the epidermis (bark desiccates and peels off to the beginning of the sap wood).
- **Poor Condition** - Tree is of good habit or misshapen, a form that may be severely restricted for space and light, exhibits symptoms of advanced and irreversible decline such as fungal, or bacterial infestation, major die-back in the branch and foliage crown, structural deterioration from insect damage e.g. termite infestation, or storm damage or lightning strike, ring barking from borer activity in the trunk, root damage or instability of the tree, or damage from physical wounding impacts or abrasion, or from altered local environmental conditions and has been unable to adapt to such changes and may decline further to death regardless of remedial works or other modifications to the local environment that would normally be sufficient to provide for its basic survival if in good to fair condition. Deterioration physically, often characterised by a gradual and continuous reduction in vigour but may be independent of a change in vigour, but characterised by a proportionate increase in susceptibility to, and predation by pests and diseases against which the tree cannot be sustained. Such conditions may also be evident in trees of advanced senescence due to normal phenological processes, without modifications to the growing environment or physical damage having been inflicted upon the tree. This may be independent from or contributed to by vigour.

- **Fair Condition** - Tree is of good habit or misshapen, a form not severely restricted for space and light, has some physical indication of decline due to the early effects of predation by pests and diseases, fungal, bacterial, or insect infestation, or has suffered physical injury to itself that may be contributing to instability or structural weaknesses, or is faltering due to the modification of the environment essential for its basic survival. Such a tree may recover with remedial works where appropriate, or without intervention may stabilise or improve over time, or in response to the implementation of beneficial changes to its local environment. This may be independent from or contributed to by vigour.
- **Good Condition** - Tree is of good habit, with crown form not severely restricted for space and light, physically free from the adverse effects of predation by pests and diseases, obvious instability or structural weaknesses, fungal, bacterial or insect infestation and is expected to continue to live in much the same condition as at the time of inspection provided conditions around it for its basic survival do not alter greatly. This may be independent from or contributed to by vigour.

Useful Life Expectancy (ULE) ULE is the length of time that the arborist assesses an individual tree can be retained with an acceptable level of risk based on the information available at the time of inspection. It is a snapshot in time of the potential an individual tree has for survival in the eyes of the assessor. ULE is not static – it is closely related to tree health and the surrounding conditions. Alterations in these variables may result in changes to the ULE assessment. Consequently, the reliability all ULE assessments have will decrease as time passes from the initial assessment and the potential for changes in variables increases.

- **Remove –** Trees that should be removed within the next 5 years
- **Short –** Trees that appear to be retainable at the time of the assessment for 5-15 years with an acceptable level of risk.
- **Medium –** Trees that appear to be retainable at the time of the assessment for 15-40 years with an acceptable level of risk.
- **Long –** Trees that appear to be retainable at the time of the assessment for 40+ years with an acceptable level of risk.

Amenity and Visual Value – For the purposes of assessing the visual and landscape value of each tree the IACA Significance of a Tree, Assessment Rating System (STARS) © (IACA 2010) © has been adopted. - The landscape significance of a tree is an essential criterion to establish the importance that a particular tree may have on a site. The system uses a scale of High, Medium and Low significance in the landscape.

High significance in landscape

- The tree is in good condition and good vigour
- The tree has a form typical for the species
- The tree is a remnant or is a planted locally indigenous specimen and/or is rare or uncommon in the local area or of botanical interest or of substantial age
- The tree is listed as a heritage item, threatened species or part of an endangered ecological community or listed on council's significant tree register
- The tree is visually prominent and visible from a considerable distance when viewed from most directions within the landscape due to its size and scale and makes a positive contribution to the local amenity
- The tree supports social and cultural sentiments or spiritual associations, reflected by the broader population or community group or has commemorative values
- The tree's growth is unrestricted by above and below ground influences, supporting its ability to reach dimensions typical for the taxa in situ – tree is appropriate to the site conditions

Medium significance in landscape

- The tree is in fair-good condition and good or low vigour
- The tree has form typical or atypical of the species
- The tree is a planted locally indigenous or a common species with its taxa commonly planted in the local area
- The tree is visible from surrounding properties, although not visually prominent as partially obstructed by other vegetation or buildings when viewed from the street
- The tree provides a fair contribution to the visual character and amenity of the local area
- The tree's growth is moderately restricted by above or below ground influences, reducing its ability to reach dimensions typical for the taxa in situ

Low significance in landscape

- The tree is in fair-poor condition and good or low vigour
- The tree has form atypical of the species
- The tree is not visible or is partly visible from the surrounding properties as obstructed by other vegetation or buildings
- The tree provides a minor contribution or has a negative impact on the visual character and amenity of the local area
- The tree is a young specimen which may or may not have reached dimensions to be protected by local Tree Preservation Orders or similar protection mechanisms and can easily be replaced with a suitable specimen
- The tree's growth is severely restricted by above or below ground influences, unlikely to reach dimensions typical for the taxa in situ – tree is inappropriate to the site conditions
- The tree is listed as exempt under the provisions of the local Council Tree Preservation Order or similar protection mechanisms
- The tree has a wound or defect that has the potential to become structurally unsound
- **Environmental Pest / Noxious Weed Species**
- The tree is an environmental pest species due to its invasiveness or poisonous/allergenic properties.
- The tree is a declared noxious weed by legislation
- **Hazardous / Irreversible Decline**

- The tree is structurally unsound and/or unstable and is considered potentially dangerous
- The tree is dead, or is in irreversible decline, or has the potential to fail or collapse in full or in part in the immediate to short term

The tree is to have a minimum of three (3) criteria in a category to be classified in that group.

In the development of this document IACA acknowledges the contribution and original concept of the Footprint Green Tree Significance & Retention Value Matrix, developed by Footprint Green Pty Ltd in June 2010.

The Australian Standard 4970-2009 Protection of Trees on Development Sites defines the requirements for assessing trees with respect to development. It provides the guidance on how to decide which trees are appropriate for retention and on the means of protecting them during construction works. It describes the areas and offsets, referred to as the Tree Protection Zone (TPZ) and Structural Root Zone (SRZ) required to be free from development works to maintain tree vitality and stability. This report has been prepared in accordance with the conditions set out within the standard.

- **Tree Protection Zone** – The tree protection zone is defined as a specified area above and below ground set aside for the protection of the tree's roots and crown. It is expressed as a radial measurement taken from the centre of the trunk at ground level.
- **Structural Root Zone** – The structural root zone is defined as a specified area around the base of a tree required to maintain its stability within the ground. It is expressed as a radial measurement taken from the centre of the trunk at ground level. Excavation and development works are not recommended within the structural root zone unless additional investigation as to root size and location is undertaken

APPENDIX 10.3 INNER WEST COUNCIL APPROAVL FOR TREE REMOVAL AT DULWICH HILL

Mark Trethewy

From: Luke Fraser
Sent: Friday, 28 May 2021 12:01 PM
To: David Crosby
Cc: Mark Trethewy; Gareth O'Brien
Subject: RE: Tree removal - Dulwich Hill Station
Attachments: Pages from # SMCSWSWM-MTM-WDH-LA-DWG-121_STN Landscaping AFC-2.pdf; Pages from # SMCSWSWM-MTM-WDH-LA-DWG-121_STN Landscaping AFC.pdf

David,

Unfortunately the removal of the tree is required to facilitate construction of the new Bedford Crescent precinct (hard/ soft landscaping and street furniture installation). As mentioned, there will be a significant beautification/ urban design works undertaken on both sides of Dulwich Station including where the current construction compound is located. Community consultation has been undertaken during the T2M design development process and the Conditions for the project have been completed. I have attached plan view drawings of both precents for your future reference.

For completeness, Downer will remove and dispose the tree nominated to be transplanted in Bedford Crescent after consultation with Inner West Council and confirms that it will be included into the tree offset planting requirements for the project.

Regards,

Luke Fraser
Interface Manager
Infrastructure Projects

Downer
Relationships creating success

M | 0437495678
E | Luke.Fraser@Downergroup.com
Unit 2, 6-16 Galleghan Street
Hexham NSW 2322

From: David Crosby <david.crosby@innerwest.nsw.gov.au>
Sent: Friday, 28 May 2021 10:32 AM
To: Luke Fraser <Luke.Fraser@Downergroup.com>
Subject: RE: Tree removal - Dulwich Hill Station

Hi Luke

Our preference is to keep this established tree, however, if this can't be avoided, we'll let you proceed if you offset that tree under your replacement tree planting requirements. There should also be consultation with the residents on removing this tree.

What's the urban design and landscaping doing through this area? Are more trees being planted anyway?

Regards

David Crosby
Road Access Project Engineer

p +61 2 9392 5650 e david.crosby@innerwest.nsw.gov.au

Council acknowledges the Traditional Custodians of these lands, the Gadigal-Wangal people of the Eora Nation.

Reconciliation Week
27 May - 3 June

From: Luke Fraser <Luke.Fraser@Downergroup.com>
Sent: Friday, 28 May 2021 8:22 AM
To: David Crosby <david.crosby@innerwest.nsw.gov.au>
Subject: RE: Tree removal - Dulwich Hill Station

David,

Just a follow up as we a yet to receive formal advise on the below.

During the phone call with your colleague, it was noticed that the original photo was actually the wrong tree nominated to be relocated (refer to below correct image). Irrespective, the below correspondence is still relevant and we are seeking advise from Inner West Council whether they wish to retain the tree and transplant locally or shall the project add it to the tree offset planting requirements.

Regards,

Luke Fraser
Interface Manager
Infrastructure Projects

Downer
Relationships creating success

M | 0437495678
E | Luke.Fraser@Downergroup.com
Unit 2, 6-16 Galleghan Street
Hexham NSW 2322

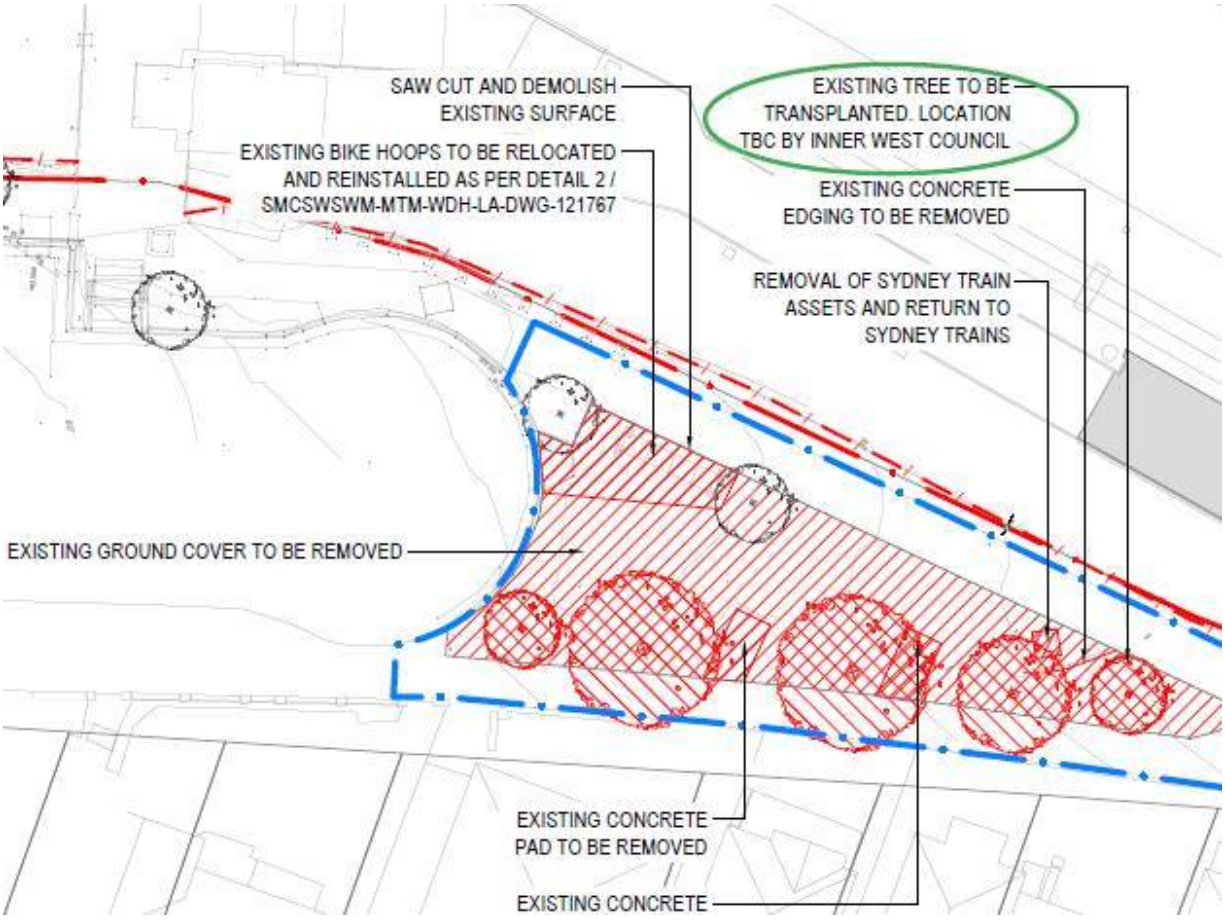
From: Luke Fraser
Sent: Tuesday, 25 May 2021 2:50 PM
To: david.crosby@innerwest.nsw.gov.au
Cc: Julie Henderson <Julie.Henderson@Downergroup.com>; Mark Trethewy <Mark.Trethewy@Downergroup.com>; Gareth O'Brien <Gareth.OBrien@Downergroup.com>
Subject: Tree removal - Dulwich Hill Station

David,

I'm fresh to the Metro project and have been provided your contact details to discuss a required tree relocation at Dulwich Hill Station. (Please point me in another direction if there is a more suitable recipient from IW Council to liaise with.)

In short, the design has nominated a singular tree at Dulwich Hill Station to be relocated (see below design excerpt and street view image of tree circled in red). The tree is quite young and doesn't offer any significant value which leads me to ask whether IWC actually wish to retain the tree. Relocating the tree will pose a few logistical issues given that we (Downer) will need to remove the tree being in our PC and the transplant/ relocation works would need to be undertaken by IW Council given that the new location is likely to be outside of the project boundary.

The alternative to transplanting is for the project to remove the tree along with the remaining vegetation (separate tree clearance request) and add to the project tree offset planting. I believe this would be the most favourable option for both parties, however am seeking initial input from Inner West Council.



Feel free to give me a call to discuss if it makes things easier.

Regards,

Luke Fraser
Interface Manager
Infrastructure Projects

Downer
Relationships creating success

M | 0437495678
E | Luke.Fraser@Downergroup.com
Unit 2, 6-16 Galleghan Street
Hexham NSW 2322

Downer

Mark Trethewy

From: David Crosby <david.crosby@innerwest.nsw.gov.au>
Sent: Tuesday, 15 June 2021 4:24 PM
To: Mark Trethewy
Cc: Luke Fraser; Julie Henderson; Rachel Leet
Subject: RE: Tree removal - Dulwich Hill Station

Hi Mark

Thanks for sending that through. We're happy with that excerpt of the tree removal and replacement policy.

With regards to the trees being removed, we are happy for trees A, 4, 5, 6 & 7 to be removed as part of this project, but we contest the removal of tree 2. It looks as though this tree would be removed to make way for a shelter, and our Trees co-ordinator has said that in the coming years, this tree will provide a natural umbrella with the adjacent trees from the elements anyway.

Is there another location this shelter could be located, or is there a need for a shelter at all?

Regards

David Crosby
Road Access Project Engineer
p +61 2 9392 5650 e david.crosby@innerwest.nsw.gov.au

INNER WEST

Council acknowledges the Traditional Custodians of these lands, the Gadigal-Wangal people of the Eora Nation.

From: Mark Trethewy <Mark.Trethewy@downergroup.com>
Sent: Tuesday, 15 June 2021 11:22 AM
To: David Crosby <david.crosby@innerwest.nsw.gov.au>
Cc: Luke Fraser <Luke.Fraser@Downergroup.com>; Julie Henderson <Julie.Henderson@Downergroup.com>; Rachel Leet <Rachel.Leet@Downergroup.com>
Subject: [Marketing Mail] RE: Tree removal - Dulwich Hill Station

Hi David,

Do you require anything further on this matter?

Regards,

Mark Trethewy
Environment and Sustainability Advisor
Infrastructure Projects

Downer
Relationships creating success

T | +61 427 299 517
E | Mark.Trethewy@downergroup.com
T3, Triniti Business Campus, 39 Delhi Road
North Ryde NSW 2113

From: Mark Trethewy
Sent: Thursday, 10 June 2021 4:30 PM
To: David Crosby <david.crosby@innerwest.nsw.gov.au>
Cc: Luke Fraser <Luke.Fraser@Downergroup.com>; Julie Henderson <Julie.Henderson@Downergroup.com>; Rachel Leet <Rachel.Leet@Downergroup.com>
Subject: RE: Tree removal - Dulwich Hill Station

Hi David,

Please find attached the Project conditions of approval, the specific section of relevance is E4 (depicted below):

BIODIVERSITY

Biodiversity offsetting

E3 Where impacts to threatened ecological communities or endangered species cannot be avoided, they must be offset in accordance with the requirements of the *NSW Biodiversity Offsets Policy for Major Projects* (OEH, 2014) in agreement with OEH.

Note: the SPIR proposal does not require offsetting under the Framework for Biodiversity Assessment as it does not have any impacts to threatened ecological communities or threatened species.

TREE REMOVAL AND REPLACEMENT

E4 The CSSI must be designed to retain as many trees as possible. Where trees are to be removed, the Proponent must provide a 2:1 ratio replacement of trees. Replacement trees must be planted within the project boundary or on public land up to 500 metres from the project boundary. Replacement tree plantings can be undertaken beyond 500 metres on public land within the local government areas to which the CSSI approval applies if requested by the relevant council(s) or where no more practicable land for planting can be found within and up to 500 metres from the CSSI boundary. The location of replacement tress must be determined in consultation with the relevant council(s).

E5 The Proponent must commission an independent experienced and suitably qualified arborist, to prepare a comprehensive Tree Report(s) before removing any tress 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) assess compliance with the requirements of this approval;
(b) a description of the conditions of the tree(s) and its amenity and visual value;
(c) 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
(d) 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

NSW Government 24

Department of Planning and Environment
Conditions of Approval for Sydney Metro Sydenham to Bankstown Upgrade CSSI 8256
CSSI 8256 MOD 1 determined 22 October 2020

Regards,

Mark Trethewy
Environment and Sustainability Advisor
Infrastructure Projects

Mark Trethewy

From: David Crosby <david.crosby@innerwest.nsw.gov.au>
Sent: Tuesday, 15 June 2021 4:24 PM
To: Mark Trethewy
Cc: Luke Fraser; Julie Henderson; Rachel Leet
Subject: RE: Tree removal - Dulwich Hill Station

Hi Mark

Thanks for sending that through. We're happy with that excerpt of the tree removal and replacement policy.

With regards to the trees being removed, we are happy for trees A, 4, 5, 6 & 7 to be removed as part of this project, but we contest the removal of tree 2. It looks as though this tree would be removed to make way for a shelter, and our Trees co-ordinator has said that in the coming years, this tree will provide a natural umbrella with the adjacent trees from the elements anyway.

Is there another location this shelter could be located, or is there a need for a shelter at all?

Regards

David Crosby
Road Access Project Engineer
p +61 2 9392 5650 e david.crosby@innerwest.nsw.gov.au

INNER WEST

Council acknowledges the Traditional Custodians of these lands, the Gadigal-Wangal people of the Eora Nation.

From: Mark Trethewy <Mark.Trethewy@downergroup.com>
Sent: Tuesday, 15 June 2021 11:22 AM
To: David Crosby <david.crosby@innerwest.nsw.gov.au>
Cc: Luke Fraser <Luke.Fraser@Downergroup.com>; Julie Henderson <Julie.Henderson@Downergroup.com>; Rachel Leet <Rachel.Leet@Downergroup.com>
Subject: [Marketing Mail] RE: Tree removal - Dulwich Hill Station

Hi David,

Do you require anything further on this matter?

Regards,

Mark Trethewy
Environment and Sustainability Advisor
Infrastructure Projects

Downer
Relationships creating success

T | +61 427 299 517
E | Mark.Trethewy@downergroup.com
T3, Triniti Business Campus, 39 Delhi Road
North Ryde NSW 2113

From: Mark Trethewy
Sent: Thursday, 10 June 2021 4:30 PM
To: David Crosby <david.crosby@innerwest.nsw.gov.au>
Cc: Luke Fraser <Luke.Fraser@Downergroup.com>; Julie Henderson <Julie.Henderson@Downergroup.com>; Rachel Leet <Rachel.Leet@Downergroup.com>
Subject: RE: Tree removal - Dulwich Hill Station

Hi David,

Please find attached the Project conditions of approval, the specific section of relevance is E4 (depicted below):

BIODIVERSITY

Biodiversity offsetting

E3 Where impacts to threatened ecological communities or endangered species cannot be avoided, they must be offset in accordance with the requirements of the *NSW Biodiversity Offsets Policy for Major Projects* (OEH, 2014) in agreement with OEH.

Note: the SPIR proposal does not require offsetting under the Framework for Biodiversity Assessment as it does not have any impacts to threatened ecological communities or threatened species.

TREE REMOVAL AND REPLACEMENT

E4 The CSSI must be designed to retain as many trees as possible. Where trees are to be removed, the Proponent must provide a 2:1 ratio replacement of trees. Replacement trees must be planted within the project boundary or on public land up to 500 metres from the project boundary. Replacement tree plantings can be undertaken beyond 500 metres on public land within the local government areas to which the CSSI approval applies if requested by the relevant council(s) or where no more practicable land for planting can be found within and up to 500 metres from the CSSI boundary. The location of replacement tress must be determined in consultation with the relevant council(s).

E5 The Proponent must commission an independent experienced and suitably qualified arborist, to prepare a comprehensive Tree Report(s) before removing any tress 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) assess compliance with the requirements of this approval;
(b) a description of the conditions of the tree(s) and its amenity and visual value;
(c) 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
(d) 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

NSW Government 24

Department of Planning and Environment
Conditions of Approval for Sydney Metro Sydenham to Bankstown Upgrade CSSI 8256
CSSI 8256 MOD 1 determined 22 October 2020

Regards,

Mark Trethewy
Environment and Sustainability Advisor
Infrastructure Projects

T | +61 427 299 517
E | Mark.Trethewy@downergroup.com
T3, Triniti Business Campus, 39 Delhi Road
North Ryde NSW 2113

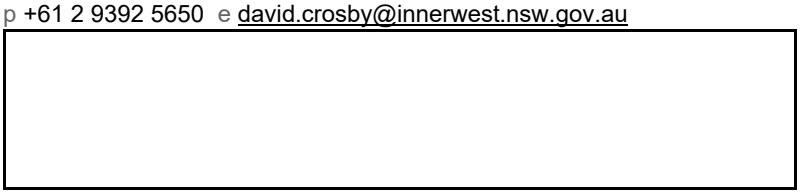
From: David Crosby <david.crosby@innerwest.nsw.gov.au>
Sent: Thursday, 10 June 2021 11:19 AM
To: Mark Trethewy <Mark.Trethewy@downergroup.com>
Cc: Luke Fraser <Luke.Fraser@Downergroup.com>; Julie Henderson <Julie.Henderson@Downergroup.com>; Rachel Leet <Rachel.Leet@Downergroup.com>
Subject: RE: Tree removal - Dulwich Hill Station

Hi Mark

Is there a document for the conditions on replanting trees that you could send me?

Regards

David Crosby
Road Access Project Engineer
p +61 2 9392 5650 e david.crosby@innerwest.nsw.gov.au



Council acknowledges the Traditional Custodians of these lands, the Gadigal-Wangal people of the Eora Nation.

From: Mark Trethewy <Mark.Trethewy@downergroup.com>
Sent: Wednesday, 9 June 2021 12:26 PM
To: David Crosby <david.crosby@innerwest.nsw.gov.au>
Cc: Luke Fraser <Luke.Fraser@Downergroup.com>; Julie Henderson <Julie.Henderson@Downergroup.com>; Rachel Leet <Rachel.Leet@Downergroup.com>
Subject: [Marketing Mail] Tree removal - Dulwich Hill Station

Hi David,

I'm currently working as the Environment & Sustainability Advisor for the Package 5 & 6 Metro Project. Previously Luke Fraser has been in contact with you regarding clearing on council land at this station.

Would you be able to please provide confirmation that we can proceed in removing Tree A and Trees 2, 4, 5, 6 & 7 (Tree 3 previously confirmed for removal with yourself) depicted beneath, as the identified trees are within the final design scope for the station?

In the trees place will be the final landscaping design previously provided by Luke. Downer will offset all relevant trees under the Project conditions of approval for replanting.

Please find attached the completed arborist reports for these trees attached.

Tree A:

Image 2:Tree A circled in red.

Tree 2, & 4-7 (Tree 3 was previously confirmed for clearing by yourself):

Image 1: Aerial image showing the approximate locations of additional trees. *(Source six maps accessed 19/03/2021).*

Regards,

Mark Trethewy
Environment and Sustainability Advisor
Infrastructure Projects

Downer
Relationships creating success

T | +61 427 299 517
E | Mark.Trethewy@downergroup.com

T3, Triniti Business Campus, 39 Delhi Road
North Ryde NSW 2113

_____

Downer

_____

APPENDIX 10.4 DULWICH HILL AIA (ACTIVE GREEN SERVICES)

ARBORICULTURAL MEMORANDUM

Prepared for

Downer Group

Site Address

Dulwich Hill Train Station, Dulwich Hill NSW

October 2022

Prepared by

Iain Dunsmuir
Diploma of Arboriculture (AQF Level 5)

Location	Dulwich Hill, NSW 2203
Project	Dulwich Hill Station Sydney Metro Upgrade
Contact	Tommy Matevossian (Downer Group)
Prepared by	Iain Dunsmuir (AQF 5 Diploma of Arboriculture)
Date of Visit	21.10.2022
Time of Visit	7am
Site Attendees	Iain Dunsmuir, Tommy Matevossian
Version	V2

1 Introduction

i. Active Green Services has been engaged by Downer Group with regards to providing an AQF Level 5 Arborist to provide advice regarding vegetation within the above-mentioned Dulwich Hill Station Upgrade. The purpose of this document is to record the attending Arborists observations, comments and conclusions with regards to a site visit conducted on the 21st of October 2022.

2 Scope

i. A group of trees within the design footprint requires a visual assessment regarding determination of tree retention values as per '*The Significance of a Tree, Assessment Rating System (STARS)*'.

3 Documents Reviewed

i. Arboricultural Impact Assessment Report, Southwest Metro Dulwich Hill Station, prepared by Urban Arbor dated December 2020 (SMCSWSWM-MTM-WDH-LA-REP-121000).

ii. *Marrickville DCP 2011 – 2 20 Tree Management, website version* (Accessed 24/10/2022).

iii. Transport Sydney Trains. Guide To Vegetation Management in The Rail Corridor. 2019

4 Arboricultural Findings

i. Four (4) trees were identified as being in the design footprint and were assessed on the 21st of October 2022.

ii. In the Inner West LGA area of Dulwich Hill, The Marrickville Development Control Plan (DCP) describes a prescribed tree as any tree with a height equal to or greater than six (6) metres above ground level (existing); or any tree that is under six (6) metres in height that has a trunk diameter of more than

300mm at ground level (existing) or any tree with a canopy spread equal to or greater than three (3) metres. The trees assessed on site do not meet the definition of a tree.

iii. Online research using historical images shows at the time of Urban Arbor authoring the original report in 2020, no trees were observed in the area. This supports an assumption that the trees are 'suckers' that have regenerated from stumps likely cleared as part of Sydney Trains maintenance program of clearing 3 metres from live exposed 1500 V dc equipment.

iv. As per 'The Significance of a Tree, Assessment Rating System (STARS). Significance of a Tree, Assessment Rating System (STARS) provides the Retention Value of a tree and/or group of trees by balancing a combination of environmental, cultural, physical, amenity and social values. The landscape significance of a tree is an essential criterion to establish the importance that a particular tree may have on a site. However, rating the significance of a tree becomes subjective and difficult to ascertain in a consistent and repetitive fashion due to assessor bias. It is therefore necessary to have a rating system utilising structured qualitative criteria to assist in determining the Retention Value for a tree. The system uses a scale of High, Medium, and Low significance in the landscape. Once the landscape significance of a tree has been defined, the Retention Value can be determined congruent with the trees' abovementioned Estimated Life Expectancy (ELE). Further details and the assessment criteria are in the Appendix. For this report trees identified as being within the design footprint were assessed.

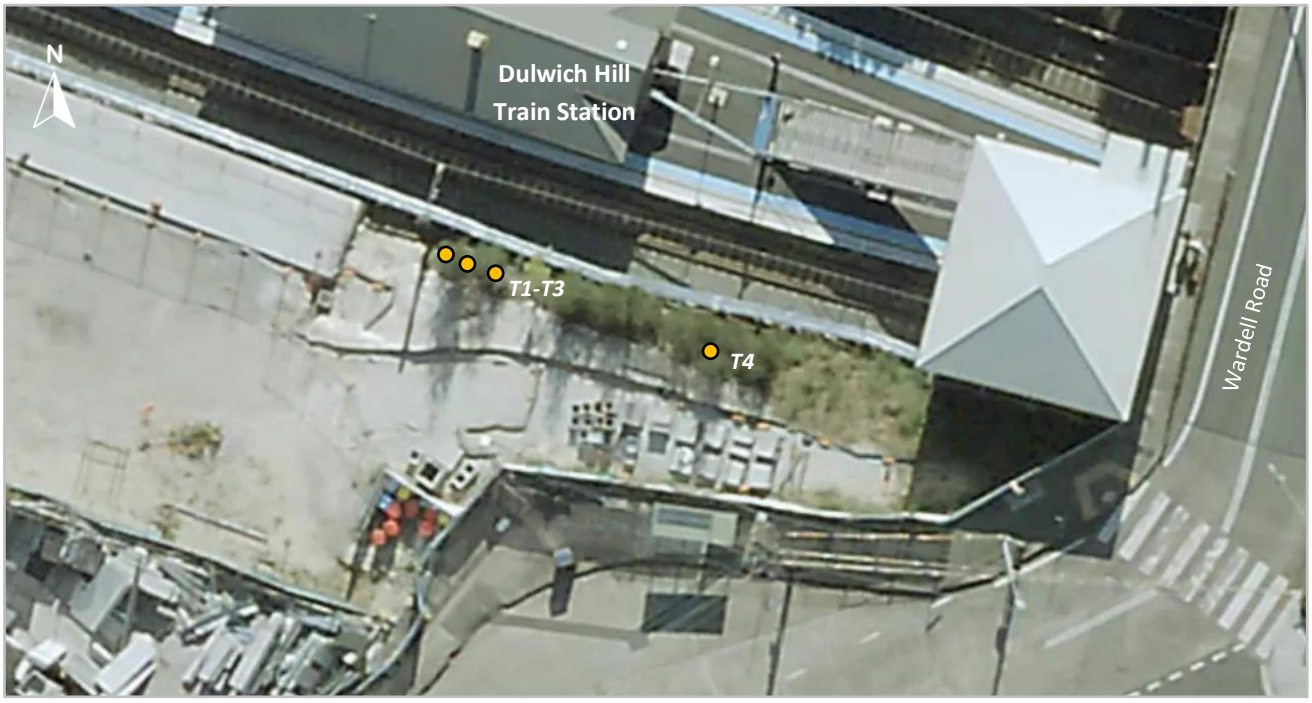
Tree Tag	Botanical Name Common Name	Age Class	Height	Canopy Spread	DBH (m)	Structure Form	Vitality Vigour	Landscape Significance	ELE	Retention Value
T1	*Casuarina glauca* (She Oak)	Immature	3m	N/S: 1m E/W: 1m	0.9m	Poor Poor	Good Good	Low	Medium	Low **Remove**
T2	*Casuarina glauca* (She Oak)	Immature	3m	N/S: 1m E/W: 1m	0.08m	Poor Poor	Good Good	Low	Medium	Low **Remove**
T3	*Casuarina glauca* (She Oak)	Immature	3m	N/S: 1m E/W: 1m	0.06m	Poor Poor	Dead Dead	Low	Dead	Low **Remove**
T4	*Casuarina glauca* (She Oak)	Immature	3m	N/S: 1m E/W: 1m	0.09m	Poor Poor	Good Good	Low	Medium	Low **Remove**

5 Conclusion

i. The group of assessed trees were deemed to have a Low retention value with no significant impact on the landscape, furthermore the trees appear to be regenerated suckers, only a couple of years old grown from stumps arising from clearing activities with a likelihood they will be cleared again in future maintenance cycles.

ii. Under current legislation the group of vegetation does not meet the criteria to be classified as trees, therefore removal does not warrant approval.

6 Tree locations



Indicative location of vegetation not viable to design

7 Photo Sets

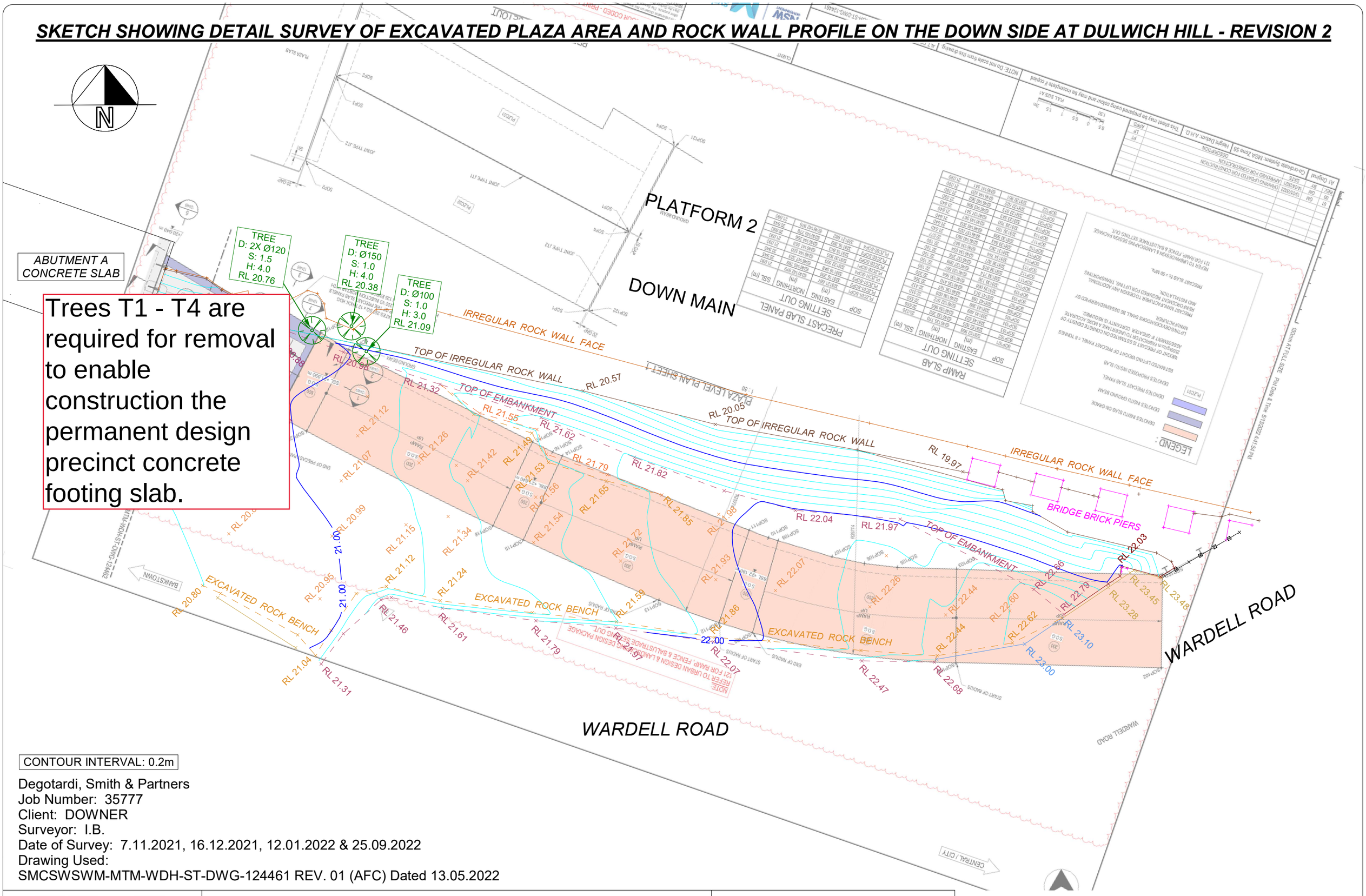
The subject vegetation

Group of trees needed to clear for trench

Vegetation within close proximity to infrastructure

Google street view image (2021) showing no trees

SKETCH SHOWING DETAIL SURVEY OF EXCAVATED PLAZA AREA AND ROCK WALL PROFILE ON THE DOWN SIDE AT DULWICH HILL - REVISION 2



Trees T1 - T4 are required for removal to enable construction the permanent design precinct concrete footing slab.

CONTOUR INTERVAL: 0.2m

Degotardi, Smith & Partners
Job Number: 35777
Client: DOWNER
Surveyor: I.B.
Date of Survey: 7.11.2021, 16.12.2021, 12.01.2022 & 25.09.2022
Drawing Used:
SMCSWSWM-MTM-WDH-ST-DWG-124461 REV. 01 (AFC) Dated 13.05.2022

D S & P
Degotardi Smith & Partners
CONSULTING SURVEYORS ESTABLISHED 1957

DEGOTARDI SMITH & PARTNERS

1/9-11 Bridge Street | Pymble NSW 2073 | Australia
t. (+61) 2 9440 1100
e. surveys@degotardi.com.au
w. www.degotardi.com.au

8 Appendix

IACA Significance of Tree, Assessment Rating System (STARS)

Significance Criteria: *Institute of Australian Consulting Arboriculturists (IACA) Significance of a Tree, Assessment Rating System (STARS)*

The tree is to have a minimum of 3 criteria in a category to be classified in that group

Low	Medium	High
The tree is in fair-poor condition and good or low vigour. The tree has form atypical of the species. The tree is not visible or is partly visible from the surrounding properties or obstructed by other vegetation or buildings. The tree provides a minor contribution or has a negative impact on the visual character and amenity of the local area. The tree is a young specimen which may or may not have reached dimensions to be protected by local Tree Preservation Orders or similar protection mechanisms and can easily be replaced with a suitable specimen. The tree's growth is severely restricted by above or below ground influences, unlikely to reach dimensions typical for the taxa in situ – tree is inappropriate to the site conditions. The tree is listed as exempt under the provisions of the local Council Tree Preservation Order or similar protection mechanisms. The tree has a wound or defect that has the potential to become structurally unsound. **ENVIRONMENTAL PEST/NOXIOUS WEED** The tree is an environmental pest species due to its invasiveness or poisonous/allergenic properties/ declared noxious weed. **HAZRADOUS / IRREVERSIBLE DECLINE** The tree is structurally unsound unstable	The tree is in fair to good condition. The tree has form typical or atypical of the species. The tree is a planted locally indigenous or a common species with its taxa commonly planted in the local area. The tree is visible from surrounding properties, although not visually prominent as partially obstructed by other vegetation or buildings when viewed from the street. The tree provides a fair contribution to the visual character and amenity of the local area. The tree's growth is Mediumly restricted by above or below ground influences, reducing its ability to reach dimensions typical for the taxa in situ.	The tree is in good condition and good vigour. The tree has a form typical for the species. The tree is a remnant or is a planted locally indigenous specimen and/or is rare or uncommon in the local area or of botanical interest or of substantial age. The tree is listed as a heritage item, threatened species or part of an endangered ecological community or listed on councils' significant/notable tree register. The tree is visually prominent and visible from a considerable distance when viewed from most directions within the landscape due to its size and scale and makes a positive contribution to the local amenity. The tree supports social and cultural sentiments or spiritual associations, reflected by the broader population or community group or has commemorative values. The tree's growth is unrestricted by above and below ground influences, supporting its ability to reach dimensions typical for the taxa in situ – tree is appropriate to the site conditions.

and considered potentially dangerous. The tree is dead or in irreversible decline with the potential to fail/collapse.		

(STARS) Tree Retention Value - Priority Matrix

Significance of a Tree, Assessment Rating System (STARS), Institute of Australian Consulting Arboriculturists, Australia, 2010.

		Significance				
		1.High	**2.Medium**	**3.Low**		
		Significance in Landscape	Significance in Landscape	Significance in Landscape	Environmental Pest/Noxious Weed Species	Hazardous / Irreversible Decline
Estimated Life Expectancy	1.Long **>40 Years**					
	2.Medium **15-40 Years**					
	3.Short **<1-15 Years**					
	Dead					

	Priority for Retention (High) - These trees are considered important for retention and should be retained and protected. Design modification or re-location of building/s should be considered to accommodate the setbacks as prescribed by the Australian Standard AS4970 Protection of trees on development sites. Tree sensitive construction measures must be implemented e.g. pier and beam etc if works are to proceed within the Tree Protection Zone.
	Consider for Retention (Medium) - These trees may be retained and protected. These are considered less critical; however, their retention should remain priority with removal considered only if adversely affecting the proposed building/works and all other alternatives have been considered and exhausted.

	Consider for Removal (Low) - These trees are not considered important for retention, nor require special works or design modification to be implemented for their retention.
	Priority for Removal - These trees are considered hazardous, or in irreversible decline, or weeds and should be removed irrespective of development.

Assumptions & Limiting Conditions

1) Active Green Services Pty Ltd (herein after referred to as AGS) contracts with you on the basis that you promise that all legal information which you provide, including land title and ownership of other property, are correct. Active Green Services is not responsible for verifying or ascertaining any of these issues.
2) AGS contracts with you on the basis that your promise that all affected property complies with all applicable statutes and subordinate legislation.
3) AGS will take all reasonable care to obtain necessary information from reliable sources and to verify data. However, AGS neither guarantees nor is responsible for the accuracy of information provided by others.
4) If, after delivery of this report, you later require a representative of AGS to attend court to give evidence or to assist in the preparation for a hearing because of this report, you must pay an additional hourly fee at our then current rate for expert evidence.
5) Alteration of this report invalidates the entire report.
6) AGS retains the copyright in this report. Possession of the original or a copy of this report does not give you or anyone else any right of reproduction, publication or use without the written permission of AGS.
7) The contents of this report represent the professional opinion of the consultant. AGS consultancy fee for the preparation of this report is in no way contingent upon the consultant reporting a particular conclusion of fact, nor upon the occurrence of a subsequent event.
8) Sketches, diagrams, graphs and photographs in this report are intended as visual aids, are not to scale unless stated to be so, and must not be construed as engineering or architectural reports or as surveys.
9) Unless expressly stated otherwise:
    a. The information in this report covers only those items which were examined and reflects the condition of those items at the time of the inspection.
    b. Our inspection is limited to visual examination of accessible components without dissection, excavation or probing. There is no warranty or guarantee, express or implied, that even if they were not present during our inspection, problems or defects in plants or property examined may not arise in the future.
10) This Report supersedes all prior discussions and representations between AGS and the client on the subject.

APPENDIX 11 PUNCHBOWL AIA (URBAN ARBOR)

URBAN ARBOR
The Trusted Name in Tree Management

Arboricultural Impact Assessment Report

Site location:
South West Metro
Punchbowl Station
Punchbowl NSW

Prepared for:
Metron T2M

Prepared by: Jack Williams and
Bryce Claassens
Urban Arbor Pty Ltd
Date: 27 October 2021
Ref: 211027-SWMPS-AIA
Rev: C

URBAN ARBOR
The Trusted Name in Tree Management

Table of Contents

Document No: **SMCSWSWM-MTM-WPS-LA-REP-241000**

Revision: 00 **Status: AFC**

COPYRIGHT

URBAN ARBOR
The Trusted Name in Tree Management

1. INTRODUCTION

1.1 Urban Arbor have been instructed by Metron T2M to provide an Arboricultural Impact Assessment Report for trees located within the site and adjoining sites in relation to a proposed development.

1.2 Below is a list of all documents and information provided to Urban Arbor to assist in preparing this report.

A) Punchbowl Landscape Drawings, Metron T2M, Rev E, Including Sheet No: 4, 5 and 6, 6 November 2020.
B) Punchbowl Landscape Drawings, Metron T2M, Rev 00, Including Sheet No: 3, 4 and 6, 14 April 2021.
C) Civil Engineering Package No. 243, Metron T2M, Rev C, 169 Pages in total, 19 June 2020.
D) Punchbowl Station Service Building, Metron T2M, Rev C, 2 December 2020.

1.3 The trees were inspected on 16 December 2019 and 17 December 2020. Access was available to the subject site and the adjoining public areas only. All tree data contained in this report was collected during these site inspections.

2. SCOPE OF THE REPORT

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

2.1.1 Conduct a visual assessment of all significant trees located within 10 metres of development works from ground level. For the purpose of this report, a significant tree is a tree with a height equal to or greater than 5 metres.

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

2.1.3 Provide an assessment of the potential impact the proposed development is likely to cause to the condition of the subject trees in accordance with AS4970 Protection of trees on development sites (2009).

2.1.4 Specify tree protection measures for trees to be retained in accordance with AS4970-2009.

URBAN ARBOR
The Trusted Name in Tree Management

3. LIMITATIONS

3.1 The observations and recommendations are based on the site inspections identified in the introduction (section 1) and the access available at the time of inspection. Findings of this report are based on the observations and site conditions at the time inspection.

3.2 All of the observations were carried out from ground level and none of the surrounding surfaces were lifted or removed during the inspection. No tests were carried out to the subject trees or surrounding area during the inspection.

3.3 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.

3.4 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.

3.5 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*.

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

3.7 Urban Arbor neither guarantees, nor is it responsible for, the accuracy of information provided by others that is contained within this report.

3.8 While an assessment of the subject trees estimated useful life expectancy is included in this report, no specific tree risk assessment has been undertaken for any of trees at the site.

3.9 The ultimate safety of any tree cannot be categorically guaranteed. Even trees apparently free of defects can collapse or partially collapse in extreme weather conditions. Trees are dynamic, biological entities subject to changes in their environment, the presence of pathogens and the effects of ageing. These factors reinforce the need for regular inspections. It is generally accepted that hazards can only be identified from distinct defects or from other failure-prone characteristics of a tree or its locality.

3.10 Alteration of this report invalidates the entire report.

URBAN ARBOR
The Trusted Name in Tree Management

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 above ground level) - millimetres.

4.1.5 Estimated height - metres

4.1.6 Estimated crown spread (diameter of crown) - metres

4.1.7 Health

4.1.8 Structural condition

4.1.9 Amenity value

4.1.10 Estimated remaining contribution years (SULE)[1]

4.1.11 Retention value (Tree AZ)[2]

4.1.12 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 information was imported into our computerised geographical information system (GIS) PT-mapper pro. This software was used to measure/calculate all encroachment estimates included in this report.

4.5 All DBH measurements, tree protection zones, and structural root zones were calculated in accordance with methods set out in AS4970 Protection of trees on development sites (2009) [4] and in some cases estimated. See appendices for information.

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

[1] Barrell Tree Consultancy, *SULE: Its use and status into the New Millennium*, TreeAZ/03/2001, http://www.treeaz.com/.

[2] Barrell Tree Consultancy, *Tree AZ version 10.04-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 (2015).

[4] Council Of Standards Australia, *AS4970 Protection of trees on development sites* (2009).

URBAN ARBOR
The Trusted Name in Tree Management

5. SITE LOCATION AND BRIEF DESCRIPTION

5.1 The site is located in the Canterbury Bankstown Local Government Area (LGA). The trees are subject to protection under the Canterbury Local Environmental Plan (LEP) 2012[5] and Development Control Plan (DCP) 2012.[6] The site is identified as a heritage item (number I155) in the LEP heritage maps.[7]

6. GENERAL INFORMATION IN RELATION TO PROTECTING TREES ON DEVELOPMENT SITES

6.1 **Tree protection zone (TPZ):** The TPZ is the principle means of protecting trees on development sites and is an area required to maintain the viability of trees during development. It is commonly observed that tree roots will extend significantly further than the indicative TPZ, however the TPZ is an area identified in AS4970-2009 to be the area where root loss or disturbance will generally 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 TPZ also incorporates the SRZ (see below for more information about the SRZ). The TPZ is calculated by multiplying the DBH by twelve, with the exception of palms, other monocots, cycads and tree ferns, the TPZ of which have been calculated at one metre outside the crown projection. Additional information about the TPZ is included in Appendix 3.

6.2 **Structural Root Zone (SRZ):** 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 needs to be maintained to preserve a viable tree. The SRZ is calculated using the following formula; (DAB x 50) $^{0.42}$ x 0.64. There are several factors that can vary 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. Soil level changes should also generally be avoided inside the SRZ of trees to be retained. Palms, other monocots, cycads and tree ferns do not have an SRZ. See the appendices for more information about the SRZ.

---

5 *Canterbury Local Environmental Plan 2012*, https://www.legislation.nsw.gov.au/#/view/EPI/2012/673, accessed 23 December 2020.

6 *Canterbury Development Control Plan 2012*, https://www.cbcity.nsw.gov.au/development/planning-control-policies/canterbury-development-control-plan-2012, accessed 23 December 2020.

7 *Canterbury Local Environmental Plan Heritage Map - Sheet HER_001*, https://www.legislation.nsw.gov.au/maps/ecdecb04-2dcb-cdf6-9473-8ead35532c54/1550_COM_HER_001_010_20121105.pdf, 23 December 2020.

URBAN ARBOR
The Trusted Name in Tree Management

6.3 **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.

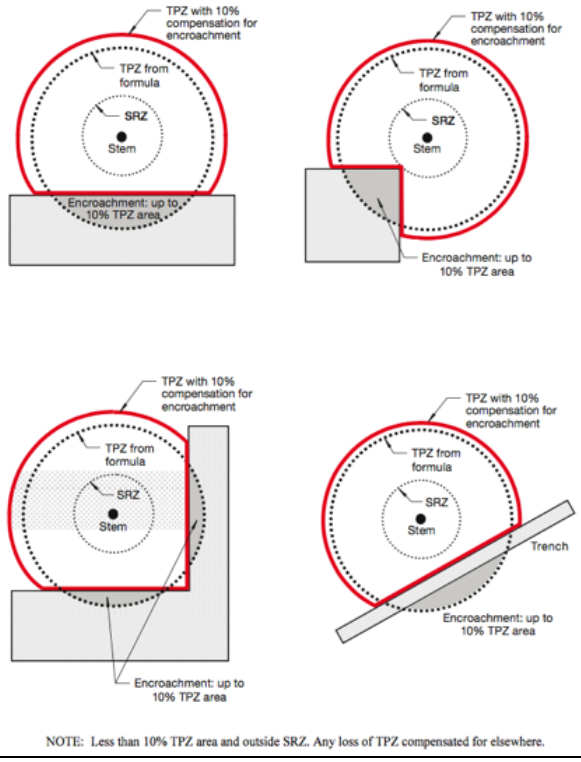


Image 1: Example minor TPZ encroachment from AS4970-2009.

6.4 **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. Root investigations may be required to identify roots that will be impacted during major TPZ encroachment (see Appendix 3 for more information in relation to root investigations).

URBAN ARBOR
The Trusted Name in Tree Management

7. OBSERVATIONS

7.1 **Tree information:** Details of each individual tree assessed, including the observations taken during the site inspection can be found in the tree inspection schedule in Appendix 2, where the indicative tree protection zone (TPZ) for the subject trees has been calculated. The TPZ and SRZ should be measured in radius from the centre of the trunk. The subject trees have been awarded a retention value based on the observations during the site inspection. The system 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 Tree AZ categories sheet (Barrell Tree Consultancy) has been included in the appendices to assist with understanding the retention values. The retention value that has been allocated to the subject trees in this report is not definitive and should only be used as a guideline. This information has been summarised below.

7.2 **Site Plan:** Three site plans have been included in Appendix 1, where the indicative TPZ and SRZ have been overlaid onto the proposed plans provided by the client. The following plans are included in Appendix 1;

- Appendix 1A: Proposed Site Plan North
- Appendix 1B: Proposed Site Plan South
- Appendix 1C: Proposed Service Building

8. ASSESSMENT OF CONSTRUCTION IMPACTS

8.1 Table 1: In the table below, the impact of the proposed development has been assessed for all trees included in the report. The assessed TPZ encroachments include proposed structures and hard landscaping only. All soft landscaping should be completed in accordance with section 11.10.

Tree ID	Species	Retention value	TPZ radius (m)	TPZ area (m^2)	SRZ radius (m)	TPZ encroachment	Discussion/ Conclusion	Recommendation
722	*Corymbia maculata*	A1	4.8	72.4	2.4	None	No encroachment into the TPZ.	Retain and protect
723	*Corymbia citriodora*	A1	3.6	40.7	2.2	None	No encroachment into the TPZ.	Retain and protect
724	*Lophostemon confertus*	A1	4.9	76.0	2.4	None	No encroachment into the TPZ.	Retain and protect
725	*Corymbia citriodora*	A1	4.1	52.3	2.3	None	No encroachment into the TPZ.	Retain and protect
726	*Lophostemon confertus*	A1	5.4	91.6	2.5	None	No encroachment into the TPZ.	Retain and protect
727	*Corymbia citriodora*	Z10	3.9	46.9	2.4	Major	Proposed plaza paving encroaches into the TPZ by 11% (5.4m^2) but not into the SRZ. This is 1% over the threshold for minor TPZ encroachment and the proposed works will not significantly impact the tree.	Retain and protect
728	*Corymbia citriodora*	A1	4.0	49.3	2.2	None	No encroachment into the TPZ.	Retain and protect
729	*Callistemon viminalis*	Z1	2.0	12.6	1.5	Major	The existing concrete/hard surface is to be removed and replaced with new plaza paving in the TPZ and SRZ. Providing that the new hard surfacing is constructed on the existing soil grades in accordance with section 9.2, the tree can be retained in a viable condition.	Retain and protect*
730	*Callistemon viminalis*	Z1	2.0	12.6	1.5	Major	The tree has been identified for removal on the received plans. The proposed plaza paving will encroach significantly into the TPZ and SRZ, indicating the condition and stability of the tree will be impacted. The tree is recommended for removal due to impacts from the proposed development.	Remove

URBAN ARBOR
The Trusted Name in Tree Management

Tree ID	Species	Retention value	TPZ radius (m)	TPZ area (m^2)	SRZ radius (m)	TPZ encroachment	Discussion/ Conclusion	Recommendation
731	*Lophostemon confertus*	A1	6.1	117.7	2.6	Footprint	The trunk of the tree is located within the footprint of the proposed hard surfacing.	Remove
G15	*Elaeocarpus reticulatus*	Z1	2.0	12.6	1.5	Footprint	Group of trees. The tree to the West of the group will be located within the footprint of the proposed hard surfacing. Therefore, the tree to the West of the group is recommended for removal due to impacts from the proposed development. The remaining trees within the group can be retained.	Remove
732	*Corymbia citriodora*	A1	5.3	87.6	2.5	Major	The existing concrete/hard surface is to be removed and replaced with new plaza paving and an elevated walk way in the TPZ and SRZ. Providing that the new hard surfacing is constructed on the existing soil grades in accordance with section 9.2, the tree can be retained in a viable condition.	Retain and protect*
733	*Eucalyptus moluccana*	A1	4.9	76.0	2.3	Major	The existing concrete/hard surfacing to the West is to be removed and replaced with new plaza paving in the TPZ and SRZ. Providing that the new hard surfacing is constructed on the existing soil grades in accordance with section 9.2, the new plaza paving will not significantly impact the tree. The proposed retaining wall will encroach into the TPZ by 23% (17.2m^2) and into the SRZ. This is considered to be a major TPZ encroachment. Section 3.3.4 of AS4970-2009 discusses that the presence of existing or past structures or obstacles affecting root growth should be considered when assessing the impact of TPZ encroachments. There is an existing retaining wall located between the trunk of the tree and the area of the proposed retaining wall. The existing retaining wall has potentially limited or restricted root growth from entering the area where the new wall is proposed. Therefore, the proposed retaining wall should not significantly impact the tree. To ensure the tree is not significantly impacted, the proposed retaining wall footings must be installed in accordance with the tree sensitive construction specifications in section 9.2.3 of this report.	Retain and protect*
734	*Eucalyptus spp*	A1	3.6	40.7	2.3	Footprint	The trunk is within the footprint of proposed retaining wall.	Remove

URBAN ARBOR
The Trusted Name in Tree Management

Tree ID	Species	Retention value	TPZ radius (m)	TPZ area (m^2)	SRZ radius (m)	TPZ encroachment	Discussion/ Conclusion	Recommendation
735	*Grevillea spp*	Z1	2.0	12.6	1.5	Major	Tree not marked on plans provided. A proposed retaining wall and plaza paving encroaches into the TPZ by 14% (1.8m^2) and into the SRZ. If significant roots are severed to construct the retaining wall, the condition and stability of the tree will potentially be impacted.	Remove
736	*Grevillea spp*	Z1	2.0	12.6	1.5	Major	Tree not marked on plans provided. A proposed retaining wall and plaza paving encroach into the TPZ by 14% (1.8m^2) and into the SRZ. If significant roots are severed to construct the retaining wall, the condition and stability of the tree will potentially be impacted.	Remove
737	*Callistemon viminalis*	A1	3.6	40.7	2.1	Minor	A proposed security fence will encroach into the TPZ by less than 5% but not into the SRZ. This is considered to be a minor and acceptable TPZ encroachment, the proposed works will not significantly impact the tree.	Retain and protect
738	*Callistemon viminalis*	A1	3.6	40.7	2.1	Minor	A proposed security fence will encroach into the TPZ by less than 5% but not into the SRZ. This is considered to be a minor and acceptable TPZ encroachment, the proposed works will not significantly impact the tree.	Retain and protect
739	*Callistemon viminalis*	A1	4.2	55.4	2.3	Minor	A proposed security fence will encroach into the TPZ by less than 5% but not into the SRZ. This is considered to be a minor and acceptable TPZ encroachment, the proposed works will not significantly impact the tree.	Retain and protect
3346	*Eucalyptus scoparia*	Z3	4.2	55.4	2.4	Major	The proposed service building crossover, fence and services into the TPZ by 36% (19.9m^2) and into the SRZ. This is considered to be a major TPZ encroachment and the proposed works could potentially impact the condition and stability of the tree. The tree is recommended for removal due to development impacts.	Remove
3347	*Cinnamomum camphora*	Z3	8.4	221.7	2.8	Footprint	The trunk of the tree is located within the footprint of the proposed service building construction area.	Remove
3348	*Eucalyptus pilularis*	A1	3.2	32.2	2.1	Major	A proposed security fence encroaches into the TPZ by 29% (9.3m^2) and into the SRZ. If significant roots are severed in the TPZ and SRZ, the condition and stability of the tree could be impacted. To retain the tree in a viable condition, the fence must be installed in accordance with section 9.2.	Retain and protect*
3349	*Cinnamomum camphora*	Z4	8.4	221.7	3.0	Footprint	The trunk of the tree is located within the footprint of the proposed service building construction area.	Remove

URBAN ARBOR
The Trusted Name in Tree Management

Tree ID	Species	Retention value	TPZ radius (m)	TPZ area (m^2)	SRZ radius (m)	TPZ encroachment	Discussion/ Conclusion	Recommendation
3350	*Olea europaea subsp. cuspidata*	Z3	4.8	72.4	2.3	Footprint	The trunk of the tree is located within the footprint of the proposed service building construction area.	Remove
3351	*Eucalyptus botryoides*	A2	5.9	109.4	2.6	Major	A proposed security fence encroaches into the TPZ by 37% (40.8m^2) and into the SRZ. If significant roots are severed in the TPZ and SRZ, the condition and stability of the tree could be impacted. To retain the tree in a viable condition, the fence must be installed in accordance with section 9.2.	Retain and protect*
3352	*Cinnamomum camphora*	Z3	5.4	91.6	2.7	Footprint	The trunk of the tree is located within the footprint of the proposed service building construction area.	Remove
3353	*Eucalyptus scoparia*	Z3	7.0	153.9	2.8	Major	A proposed security fence encroaches into the TPZ by 39% (60.4m^2) and into the SRZ. If significant roots are severed in the TPZ and SRZ, the condition and stability of the tree could be impacted. To retain the tree in a viable condition, the fence must be installed in accordance with section 9.2.	Retain and protect*
3354	*Cinnamomum camphora*	Z3	3.2	32.2	2.4	Major	A proposed security fence encroaches into the TPZ by 35% (11.4m^2) and into the SRZ. If significant roots are severed in the TPZ and SRZ, the condition and stability of the tree could be impacted. To retain the tree in a viable condition, the fence must be installed in accordance with section 9.2.	Retain and protect*
3355	*Pittosporum undulatum*	Z1	2.0	12.6	1.5	Footprint	The trunk of the tree is located within the footprint of the proposed service building construction area.	Remove
3356	*Cinnamomum camphora*	A1	7.2	162.9	2.8	Footprint	The trunk of the tree is located within the footprint of the proposed service building construction area.	Remove
3357	*Cinnamomum camphora*	Z3	2.5	19.6	2.1	Major	A proposed security fence encroaches into the TPZ by 35% (6.8m^2) and into the SRZ. If significant roots are severed in the TPZ and SRZ, the condition and stability of the tree could be impacted. To retain the tree in a viable condition, the fence must be installed in accordance with section 9.2.	Retain and protect*
3358	*Eucalyptus pilularis*	A1	2.8	24.6	1.9	Major	A proposed security fence encroaches into the TPZ by 25% (6.3m^2) and into the SRZ. If significant roots are severed in the TPZ and SRZ, the condition and stability of the tree could be impacted. To retain the tree in a viable condition, the fence must be installed in accordance with section 9.2.	Retain and protect*

URBAN ARBOR
The Trusted Name in Tree Management

Tree ID	Species	Retention value	TPZ radius (m)	TPZ area (m^2)	SRZ radius (m)	TPZ encroachment	Discussion/ Conclusion	Recommendation
3359	*Acacia spp*	Z1	2.0	12.6	1.5	Footprint	The trunk of the tree is located within the footprint of the proposed service building construction area.	Remove
3360	*Cinnamomum camphora*	A1	11.4	408.3	3.4	Footprint	The trunk of the tree is located within the footprint of the proposed service building construction area.	Remove
3361	*Phoenix canariensis*	Z3	4.0	50.3	NA	Footprint	The trunk of the tree is located within the footprint of the proposed service building construction area.	Remove
3362	*Cinnamomum camphora*	Z3	3.0	28.3	2.3	Major	A proposed security fence encroaches into the TPZ by 45% (12.6m^2) and into the SRZ. If significant roots are severed in the TPZ and SRZ, the condition and stability of the tree could be impacted. To retain the tree in a viable condition, the fence must be installed in accordance with section 9.2.	Retain and protect*
3363	*Phoenix canariensis*	Z3	4.0	50.3	NA	Footprint	The trunk of the tree is located within the footprint of the proposed service building construction area.	Remove
3364	*Eucalyptus pilularis*	A1	4.0	50.3	2.3	Major	A proposed security fence encroaches into the TPZ by 33% (16.8m^2) and into the SRZ. If significant roots are severed in the TPZ and SRZ, the condition and stability of the tree could be impacted. To retain the tree in a viable condition, the fence must be installed in accordance with section 9.2.	Retain and protect*
3365	*Cinnamomum camphora*	A1	12.0	452.4	3.6	Footprint	The trunk of the tree is located within the footprint of the proposed service building construction area.	Remove
3366	*Eucalyptus botryoides*	A1	10.0	314.2	3.3	Major	A proposed security fence will encroach into the TPZ and SRZ. If significant roots are severed in the TPZ and SRZ, the condition and stability of the tree could be impacted. To retain the tree in a viable condition, the fence must be installed in accordance with section 9.2.	Retain and protect*
3367	*Cinnamomum camphora*	Z3	2.3	16.6	2.4	Major	A proposed security fence will encroach into the TPZ and SRZ. If significant roots are severed in the TPZ and SRZ, the condition and stability of the tree could be impacted. To retain the tree in a viable condition, the fence must be installed in accordance with section 9.2.	Retain and protect*

URBAN ARBOR
The Trusted Name in Tree Management

Tree ID	Species	Retention value	TPZ radius (m)	TPZ area (m^2)	SRZ radius (m)	TPZ encroachment	Discussion/ Conclusion	Recommendation
3368	*Cinnamomum camphora*	Z3	2.8	24.6	2.2	Major	A proposed security fence will encroach into the TPZ and SRZ. If significant roots are severed in the TPZ and SRZ, the condition and stability of the tree could be impacted. To retain the tree in a viable condition, the fence must be installed in accordance with section 9.2.	Retain and protect*
3369	*Cinnamomum camphora*	Z3	3.0	28.3	2.0	Major	A proposed security fence will encroach into the TPZ and SRZ. If significant roots are severed in the TPZ and SRZ, the condition and stability of the tree could be impacted. To retain the tree in a viable condition, the fence must be installed in accordance with section 9.2.	Retain and protect*
3370	*Cinnamomum camphora*	Z3	2.0	12.6	1.6	Major	A proposed security fence will encroach into the TPZ and SRZ. If significant roots are severed in the TPZ and SRZ, the condition and stability of the tree could be impacted. To retain the tree in a viable condition, the fence must be installed in accordance with section 9.2.	Retain and protect*
3371	*Eucalyptus botryoides*	A1	5.3	88.2	2.5	Major	A proposed security fence will encroach into the TPZ and SRZ. If significant roots are severed in the TPZ and SRZ, the condition and stability of the tree could be impacted. To retain the tree in a viable condition, the fence must be installed in accordance with section 9.2.	Retain and protect*
3372	*Cinnamomum camphora*	Z3	4.8	72.4	2.3	Major	A proposed security fence will encroach into the TPZ and SRZ. If significant roots are severed in the TPZ and SRZ, the condition and stability of the tree could be impacted. To retain the tree in a viable condition, the fence must be installed in accordance with section 9.2.	Retain and protect*
3373	*Populus nigra 'Italica'*	Z3	5.9	109.4	2.6	Major	A proposed security fence will encroach into the TPZ and SRZ. If significant roots are severed in the TPZ and SRZ, the condition and stability of the tree could be impacted. To retain the tree in a viable condition, the fence must be installed in accordance with section 9.2.	Retain and protect*

URBAN ARBOR
The Trusted Name in Tree Management

Tree ID	Species	Retention value	TPZ radius (m)	TPZ area (m^2)	SRZ radius (m)	TPZ encroachment	Discussion/ Conclusion	Recommendation
3374	*Populus nigra 'Italica'*	Z3	4.0	50.3	2.3	Major	A proposed security fence will encroach into the TPZ and SRZ. If significant roots are severed in the TPZ and SRZ, the condition and stability of the tree could be impacted. To retain the tree in a viable condition, the fence must be installed in accordance with section 9.2.	Retain and protect*

Notes

TPZ Encroachment Percentage: TPZ encroachment percentages are based on new structures and hard surfaces only. New soft landscaping, such as turf or amenity planting areas have not been included in the calculation for TPZ encroachment.
Retain and protect*: The proposed construction must be completed in accordance with section 9.2 to reduce the impact to the tree.

9. CONCLUSIONS

9.1 **Table 2:** Summary of the impact to trees during the development;

Impact	Reason	Category A	Category Z	Total
		A	Z	
Trees to be removed	Building construction, new surfacing and/or proximity, or trees in poor condition.	731, 734, 3356, 3360, 3365 (Five trees)	730, G15, 735, 736, 3346, 3347, 3349, 3350, 3352, 3355, 3359, 3361, 3363 (Twelve trees + One group)	**17 trees + 1 group**
Trees subject to TPZ encroachment greater than 10% requiring tree sensitive design and construction to be retained	Removal of existing surfacing/structures and/or installation of new surfacing/structures.	732, 733, 3348, 3351, 3358, 3364, 3366, 3371 (Eight trees)	729, 3353, 3354, 3357, 3362, 3367, 3368, 3369, 3370, 3372, 3373, 3374 (Twelve trees)	**20 trees**
Retained trees subject to TPZ encroachment of 10% or less	Removal of existing surfacing/structures and/or installation of new surfacing/structures.	722, 723, 724, 725, 726, 728 ,737, 738, 739, (Nine trees)	727 (One tree)	**10 trees**

9.2 **Construction Design/Specification Requirements:** The proposed construction will encroach into the TPZ and SRZ of seven trees, including tree 729, 732, 733, 3348, 3351, 3353, 3354, 3357, 3358, 3362, 3364, 3366, 3367, 3368, 3369, 3370, 3371, 3372, 3373 and 3374. To ensure the trees are not adversely impacted by the construction, it must be demonstrated the following design and construction specifications can be implemented within the TPZ of the trees. If the construction cannot be completed in accordance with these specifications, the trees may not be viable for retention.

9.2.1 **Security Fence:** The proposed security fence will be installed using the tree sensitive method of post and rail type construction. To ensure the trees are not significantly impacted by the works, all post holes must be excavated manually. The post location must be flexible to avoid the severance of significant roots 40mm and greater in diameter. No posts are to be located within the SRZ or root investigations will be required to determine the post location. See Appendix 3 for more information in regard to root investigations. All rails/horizontal materials are to be located on or above existing soil grades. This will allow for the majority of the root system to be retained between the posts, minimising root loss.

9.2.2 **Hard Surfacing:** Areas of the proposed hard surfacing will be replacing the existing hard surfacing. To ensure that tree root systems are not significantly impacted, the proposed hard surfacing must be constructed on or above the existing sub base of the existing hard surfacing. Where the proposed hard surfacing is located outside the footprint of the existing hard surfacing, it should be constructed above existing soil grades. Compaction of lowest sub base materials must be minimised, as this can cause soil compaction and impact the health of trees. The diagram below (Image A) gives an example of a no-dig method for constructing hard surfacing close to trees, retaining pegs avoiding significant roots.

If excavations are essential, they must not exceed 100mm below the existing grades. The excavations should be supervised by a project Arborist with a minimum AQF level 5 qualification. All excavations for the hard surfacing should be carried out manually to avoid impacting retained tree roots. All tree roots greater than 40mm in diameter should be retained unless the project arborist has assessed and advised that the pruning/severing of the root will not impact the condition or stability of the tree. Manual excavation may include the use of pneumatic and hydraulic tools, high-pressure air or a combination of high-pressure water and a vacuum device.

Where tree roots greater than 40mm are encountered that must be retained, the hard surfacing should be elevated over the individual tree root to allow for its retention. Examples of methods that can be used to bridge individual tree roots have been included below (Image B and C). Using pier and beam bridges as per image C is the recommended/preferred method, as it will allow for future growth of the tree roots, reducing future damage to the pavement from the roots.

URBAN ARBOR
The Trusted Name in Tree Management

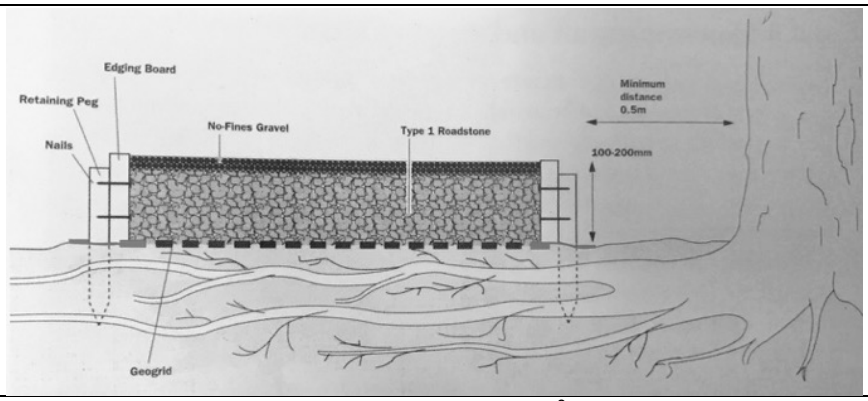


Image A: An image from 'Tree Roots in the Built Environment'[8], showing how to construct hard surfacing above a trees root system without excavation. Type 1 Roadstones are an example of blue metal or crushed sandstone.

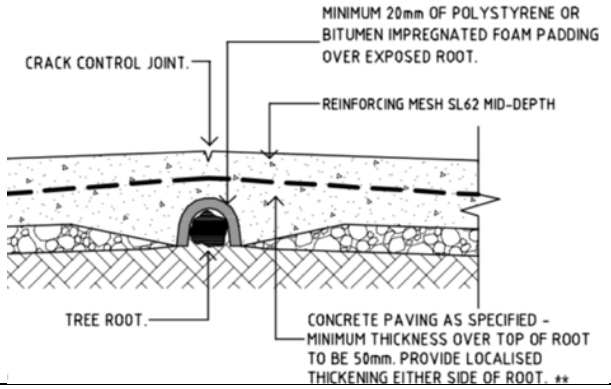


Image B: Example method for bridging concrete footpaths over tree roots provided in the Canterbury Bankstown Council standard drawings.[9]

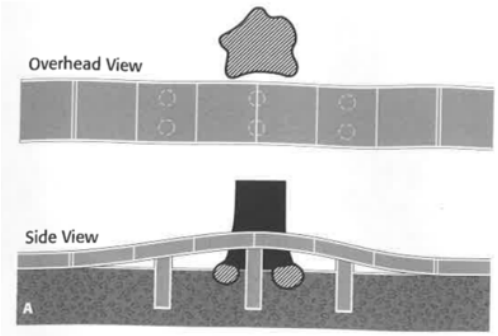


Image C: Example method from Reducing infrastructure damage by tree roots: A compendium of strategies.[10]

8 Roberts, J., Jackson, N., & Smith, M., *Tree Roots in the Built Environment*, The Stationary Office, London, England (2006). Page 305 & 306.

9 *Canterbury Bankstown Council standard drawing S-209 Existing street tree treatments*, https://www.cbcity.nsw.gov.au/development/planning-control-policies/council-standard-drawings, accessed 3 October 2019.

10 Costello, L. R., & Jones, K. S, *Reducing infrastructure damage by tree roots: A compendium of strategies*, Western Chapter of the International Society of Arboriculture, 31883 Success Valley Drive, Porterville, CA (2003), page 27.

9.2.3 **Tree Sensitive Retaining Wall Footings – tree 733**: To minimise root loss in the TPZ of the tree, the footings of the proposed retaining wall should be pier and beam/suspended slab style footings to bridge over significant tree roots and minimise root loss. To ensure that significant tree roots are retained, it must be demonstrated by the project engineer that the following construction methods can be implemented;

- All excavations for piers must be carried out manually under the supervision of the project Arborist (see section 11 for details of manual excavation and project Arborist).
- The location of piers must be flexible to avoid significant roots (roots greater than 40mm in diameter). All roots greater than 40mm in diameter must be retained unless the project arborist has assessed and approved in writing that severing the root will not impact the condition or stability of the tree.
- Cross beams/slabs must be located on or above the existing soil grades.
- The piers should be located a minimum of 200mm from any root to be retained that is greater than 40mm in diameter.

URBAN ARBOR
The Trusted Name in Tree Management

10. RECOMMENDATIONS

10.1 This report assesses the impact of a proposed development at the subject site to forty-seven (47) trees and one group (1) located within the site and adjoining sites, in accordance with AS4970 Protection of trees on development sites (2009).

10.2 Three site plans have been included in Appendix 1, where the indicative TPZ and SRZ have been overlaid onto the proposed plans provided by the client. The following plans are included in Appendix 1;

- Appendix 1A: Proposed Site Plan North
- Appendix 1B: Proposed Site Plan South
- Appendix 1C: Proposed Service Building

10.3 Seventeen (17) trees and one group (1) of trees have been recommended for removal within this report, including tree 730, 731, G15, 734, 735, 736, 3346, 3347, 3349, 3350, 3352, 3355, 3356, 3359, 3360, 3361, 3363 and 3365. Tree 731, 734, 3356, 3360 and 3365 are higher value category A retention value trees. Tree 730, G15, 735, 736, 3346, 3347, 3349, 3350, 3352, 3355, 3359, 3361 and 3363 are lower value category Z retention value trees that generally should not be a constraint to the development. Note that only the Western most tree within G15 is to be removed, the remaining trees within G15 can be retained in a viable condition.

10.4 Twenty (20) trees have been recommended to be retained that will be subject to TPZ encroachments greater than 10%, including tree 729, 732, 733, 3348, 3351, 3353, 3354, 3357, 3358, 3362, 3364, 3366, 3367, 3368, 3369, 3370, 3371, 3372, 3373 and 3374. To reduce the impact to the trees, the proposed construction within the TPZ of the trees must be completed in accordance with section 9.2 of this report.

10.5 The remaining ten (10) trees will be subject to minor and acceptable TPZ encroachments of 10% or less and can be retained in a viable condition, including tree 722, 723, 724, 725, 726, 727, 728, 737, 738 and 739.

10.6 All trees to be retained must be protected for the duration of development, (including demolition and landscaping, in accordance with AS4970-2009). See section 11 for more information.

10.7 See section 11.10 for general landscape guidance when working within the TPZ of trees to be retained.

10.8 Where possible underground services must be located outside the TPZ of trees to be retained. All underground services located inside the TPZ of any tree to be retained must be installed in accordance with section 11.11.

10.9 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. This report should be submitted as supporting evidence with any tree removal/pruning or development application.

URBAN ARBOR
The Trusted Name in Tree Management

11. TREE PROTECTION REQUIREMENTS

11.1 **Use of this report:** All contractors must be made aware of the tree protection requirements prior to commencing works at the site. This report and a copy of the site plan (Appendix 1) drawings must also be made available to any contractor prior to works commencing and during any on site operations.

11.2 **Project Arborist:** Prior to any works commencing at the site a project Arborist should be appointed. The project Arborist should be qualified to a minimum AQF level 5 and/or equivalent qualifications and experience, and should assist with any development issues relating to trees that may arise. If at any time it is not feasible to carryout works in accordance with this, an alternative must be agreed in writing with the project Arborist.

11.3 **Tree work:** All tree work must be carried out by a qualified and experienced Arborist with a minimum of AQF level 2 in arboriculture, in accordance with NSW Work Cover Code of Practice for the Amenity Tree Industry (1998) and AS4373 Pruning of amenity trees (2007).

11.4 **Initial site meeting/on-going regular inspections:** The project Arborist is to hold a pre-construction site meeting with principal contractor to discuss methods and importance of tree protection measures and resolve any issues in relation to tree protection that may arise. In accordance with AS4970-2009, the project Arborist should carryout regular site inspections to ensure works are carried out in accordance with this document throughout the development process. Site inspections are recommended on a one-month frequency.

11.5 **Site Specific Tree Protection Recommendations:** The table below provides recommendations for each tree, including site specific tree protection requirements. All trees to be retained must be protected in accordance with general requirements of AS4970-2009 for the duration of the development, details of which are discussed in further details in this section of the report.

Tree ID	Tree Species	TPZ Radius (m)	SRZ Radius (m)	Recommendations
722	*Corymbia maculata*	4.8	2.4	Retain. Set back from works, no tree protection required.
723	*Corymbia citriodora*	3.6	2.2	Retain. Set back from works, no tree protection required.
724	*Lophostemon confertus*	4.9	2.4	Retain. Set back from works, no tree protection required.
725	*Corymbia citriodora*	4.1	2.3	Retain. Set back from works, no tree protection required.
726	*Lophostemon confertus*	5.4	2.5	Retain and protect. Tree protection fencing is to create a combined exclusion zone for tree 726, 727 and 728. The fencing is to encompass as much of the TPZ area as practical whilst allowing space for construction works. TPZ signage is required on the fencing.

URBAN ARBOR
The Trusted Name in Tree Management

727	*Corymbia citriodora*	3.9	2.4	Retain and protect. See tree protection recommendations for tree 726.
728	*Corymbia citriodora*	4.0	2.2	Retain and protect. See tree protection recommendations for tree 726.
729	*Callistemon viminalis*	2.0	1.5	Retain and protect. Tree protection fencing is to encompass as much of the TPZ area as practical whilst allowing space for construction works. TPZ signage is required on the fencing.
730	*Callistemon viminalis*	2.0	1.5	Remove.
731	*Lophostemon confertus*	6.1	2.6	Remove.
G15	*Elaeocarpus reticulatus*	2.0	1.5	Remove.
732	*Corymbia citriodora*	5.3	2.5	Retain and protect. Tree protection fencing is to encompass as much of the TPZ area as practical whilst allowing space for construction works. TPZ signage is required on the fencing.
733	*Eucalyptus moluccana*	4.9	2.3	Retain and protect. Tree protection fencing is to encompass as much of the TPZ area as practical whilst allowing space for construction works. TPZ signage is required on the fencing.
734	*Eucalyptus spp*	3.6	2.3	Remove.
735	*Grevillea spp*	2.0	1.5	Remove.
736	*Grevillea spp*	2.0	1.5	Remove.
737	*Callistemon viminalis*	3.6	2.1	Retain and protect. Tree protection fencing is to create a combined exclusion zone for tree 737, 738 and 739. The fencing is to encompass as much of the TPZ area as practical whilst allowing space for construction works. TPZ signage is required on the fencing.
738	*Callistemon viminalis*	3.6	2.1	Retain and protect. See tree protection recommendations for tree 737.
739	*Callistemon viminalis*	4.2	2.3	Retain and protect. See tree protection recommendations for tree 737.
3346	*Eucalyptus scoparia*	4.2	2.4	Remove.
3347	*Cinnamomum camphora*	8.4	2.8	Remove.
3348	*Eucalyptus pilularis*	3.2	2.1	Retain and protect. Tree protection fencing is to create a combined exclusion zone for tree 3348, 3351, 3353, 3354, 3357, 3358, 3362 and 3364. The fencing is to encompass the grass area of the nature strip and is to encompass as much of the TPZ area as practical while allowing space for construction works. TPZ signage is required on the fencing.
3349	*Cinnamomum camphora*	8.4	3.0	Remove.
3350	*Olea europaea subsp. cuspidata*	4.8	2.3	Remove.
3351	*Eucalyptus botryoides*	5.9	2.6	Retain and protect. See tree protection recommendations for tree 3348.
3352	*Cinnamomum camphora*	5.4	2.7	Remove.

URBAN ARBOR
The Trusted Name in Tree Management

3353	*Eucalyptus scoparia*	7.0	2.8	Retain and protect. See tree protection recommendations for tree 3348.
3354	*Cinnamomum camphora*	3.2	2.4	Retain and protect. See tree protection recommendations for tree 3348.
3355	*Pittosporum undulatum*	2.0	1.5	Remove.
3356	*Cinnamomum camphora*	7.2	2.8	Remove.
3357	*Cinnamomum camphora*	2.5	2.1	Retain and protect. See tree protection recommendations for tree 3348.
3358	*Eucalyptus pilularis*	2.8	1.9	Retain and protect. See tree protection recommendations for tree 3348.
3359	*Acacia spp*	2.0	1.5	Remove.
3360	*Cinnamomum camphora*	11.4	3.4	Remove.
3361	*Phoenix canariensis*	4.0	NA	Remove.
3362	*Cinnamomum camphora*	3.0	2.3	Retain and protect. See tree protection recommendations for tree 3348.
3363	*Phoenix canariensis*	4.0	NA	Remove.
3364	*Eucalyptus pilularis*	4.0	2.3	Retain and protect. See tree protection recommendations for tree 3348.
3365	*Cinnamomum camphora*	12.0	3.6	Remove.
3366	*Eucalyptus botryoides*	10.0	3.3	Retain and protect. Tree protection fencing is to create a combined exclusion zone for tree 3366, 3367, 3368, 3369, 3370, 3371, 3372, 3373 and 3374. The fencing is to encompass as much of the TPZ area as practical while allowing space for construction works. TPZ signage is required on the fencing.
3367	*Cinnamomum camphora*	2.3	2.4	Retain and protect. See tree protection recommendations for tree 3366.
3368	*Cinnamomum camphora*	2.8	2.2	Retain and protect. See tree protection recommendations for tree 3366.
3369	*Cinnamomum camphora*	3.0	2.0	Retain and protect. See tree protection recommendations for tree 3366.
3370	*Cinnamomum camphora*	2.0	1.6	Retain and protect. See tree protection recommendations for tree 3366.
3371	*Eucalyptus botryoides*	5.3	2.5	Retain and protect. See tree protection recommendations for tree 3366.
3372	*Cinnamomum camphora*	4.8	2.3	Retain and protect. See tree protection recommendations for tree 3366.
3373	*Populus nigra 'Italica'*	5.9	2.6	Retain and protect. See tree protection recommendations for tree 3366.
3374	*Populus nigra 'Italica'*	4.0	2.3	Retain and protect. See tree protection recommendations for tree 3366.

URBAN ARBOR
The Trusted Name in Tree Management

11.6 **Tree protection Specifications:** It is the responsibility of the principal contractor to install tree protection prior to works commencing at the site (prior to demolition works) and to ensure that the tree protection remains in adequate condition for the duration of the development. The tree protection must not be moved without prior agreement of the project Arborist. The project Arborist must inspect that the tree protection has been installed in accordance with this document and AS4970-2009 prior to works commencing.

11.6.1 Protective fencing: Site specific tree protection requirements are in section 11.5. Where it is not feasible to install fencing at the specified location due to factors such restricting access to areas of the site or for constructing new structures, an alternative location and protection specification must be agreed with the project Arborist. Where the installation of fencing in unfeasible due to restrictions on space, trunk and branch protection will be required (see below). The protective fencing must be constructed of 1.8 metre 'cyclone chainmesh fence'. The fencing must only be removed for the landscaping phase and must be authorised by the project Arborist. Any modifications to the fencing locations must be approved by the project Arborist.

11.6.2 TPZ signage: Tree protection signage is to be attached to the protective fencing, displayed in a prominent position and the sign repeated at 10 metres intervals or closer where the fence changes direction. Each sign shall contain in a clearly legible form, the following information:

- Tree protection zone/No access.
- This fence has been installed to prevent damage to the tree/s and their growing environment both above and below ground. Do not move fencing or enter TPZ without the agreement of the project Arborist.
- The name, address, and telephone number of the developer/builder and project Arborist

11.6.3 Trunk and Branch Protection: The trunk must be protected by wrapped hessian or similar material to limit damage. Timber planks (50mm x 100mm or similar) should then be placed around tree trunk. The timber planks should be spaced at 100mm intervals, and must be fixed against the trunk with tie wire, or strapping and connections finished or covered to protect pedestrians from injury. The hessian and timber planks must not be fixed to the tree in any instance. The trunk and branch protection shall be installed prior to any work commencing on site and shall be maintained in good condition for the entire development period.

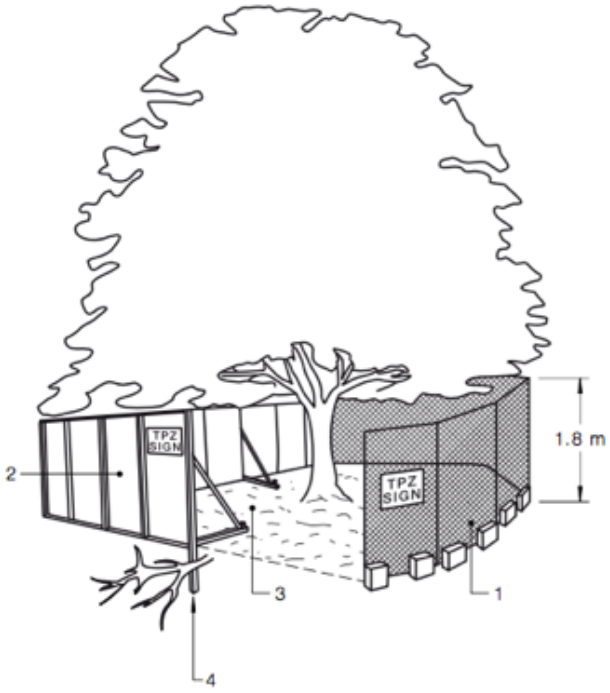
11.6.4 Mulch: Any areas of the TPZ located inside the subject site (only trees to be retained directly adjacent to site works must be mulched to a depth of 75mm with good quality composted wood chip/leaf mulch.

11.6.5 Ground Protection: Ground protection is required to protect the underlying soil structure and root system in areas where it is not practical to restrict access to whole TPZ, while allowing space for construction. Ground protection must consist of good quality composted wood chip/leaf mulch to a depth of between 150-300mm,

URBAN ARBOR
The Trusted Name in Tree Management

laid on top of geo textile fabric. If vehicles are to be using the area, additional protection will be required such as rumble boards or track mats to spread the weight of the vehicle and avoid load points. Ground protection is to be specified by the project Arborist as required.

11.6.6 Temporary irrigation: Temporary irrigation should be set up in the TPZ of all trees to be retained, and should distribute water evenly throughout the area of the TPZ. The irrigation should be used for at minimum one hour daily throughout all stages of the development.

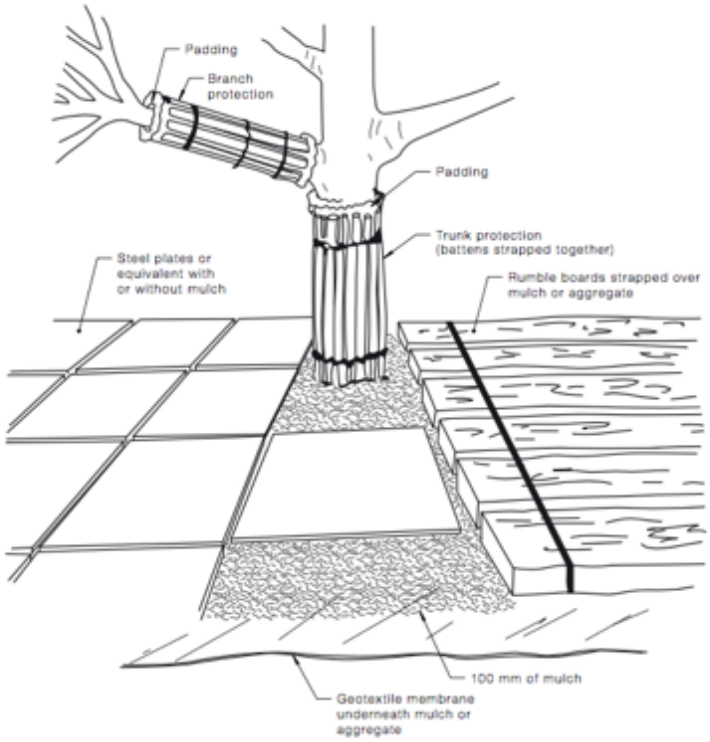


LEGEND:
1 Chain wire mesh panels with shade cloth (if required) attached, held in place with concrete feet.
2 Alternative plywood or wooden paling fence panels. This fencing material also prevents building materials or soil entering the TPZ.
3 Mulch installation across surface of TPZ (at the discretion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

An image from AS4970-2009,[11] with example tree protection.

[11] Council Of Standards Australia, *AS4970 Protection of trees on development sites* (2009), page 16.

URBAN ARBOR
The Trusted Name in Tree Management



NOTES:

1 For trunk and branch protection use boards and padding that will prevent damage to bark. Boards are to be strapped to trees, not nailed or screwed.

2 Rumble boards should be of a suitable thickness to prevent soil compaction and root damage.

An image from AS4970-2009,[12] with example tree protection.

11.7 **Restricted activities inside TPZ:** The following activities must be avoided inside the TPZ of all trees to be retained unless approved by the project Arborist. If at any time these activities cannot be avoided an alternative must be agreed in writing with the project Arborist to minimise the impact to the tree.

A) Machine excavation.
B) Ripping or cultivation of soil.
C) Storage of spoil, soil or any such materials
D) Preparation of chemicals, including preparation of cement products.
E) Refuelling.
F) Dumping of waste.
G) Wash down and cleaning of equipment.
H) Placement of fill.
I) Lighting of fires.
J) Soil level changes.
K) Any physical damage to the crown, trunk, or root system.
L) Parking of vehicles.

[12] Council Of Standards Australia, *AS4970 Protection of trees on development sites* (2009), page 17.

11.8 **Demolition:** The demolition of all existing structures inside or directly adjacent to the TPZ of trees to be retained must be undertaken in consultation with the project Arborist. Any machinery is to work from inside the footprint of the existing structures or outside the TPZ, reaching in to minimise soil disturbance and compaction. If it is not feasible to locate demolition machinery outside the TPZ of trees to be retained, ground protection will be required. The demolition should be undertaken inwards into the footprint of the existing structures, sometimes referred to as the 'top down, pull back' method.

11.9 **Excavations:** The project Arborist must supervise and certify that all excavations and root pruning are in accordance with AS4373-2007 and AS4970-2009. For continuous strip footings, first manual excavation is required along the edge of the structures closest to the subject trees. Manual excavation should be a depth of 1 metre (or to unfavourable root growth conditions such as bed rock or heavy clay, if agreed by project Arborist). Next roots must be pruned back in accordance with AS4373-2007. After all root pruning is completed, machine excavation is permitted within the footprint of the structure. For tree sensitive footings, such as pier and beam, all excavations inside the TPZ must be manual. Manual excavation may include the use of pneumatic and hydraulic tools, high-pressure air or a combination of high-pressure water and a vacuum device. No pruning of roots greater 30mm in diameter is to be carried out without approval of the project arborist. All pruning of roots greater than 30mm in diameter must be carried out by a qualified Arborist/Horticulturalist with a minimum AQF level 3. Root pruning is to be a clean cut with a sharp tool in accordance with AS4373 Pruning of amenity trees (2007).[13] The tree root is to be pruned back to a branch root if possible. Make a clean cut and leave as small a wound as possible.

11.10 **Landscaping:** All landscaping works within the TPZ of trees to be retained are to be undertaken in consultation with a consulting Arborist to minimize the impact to trees. General guidance is provided below to minimise the impact of new landscaping to trees to be retained.

- Level changes should be minimised. The existing ground levels within the landscape areas should not be lowered by more than 100mm or increased by more than 100mm (300mm increase is acceptable if using a coarse free draining material) without assessment by a consulting Arborist.
- New retaining walls should be avoided. Where new retaining walls are proposed inside the TPZ of trees to be retained, they should be constructed from tree sensitive material, such as timber sleepers, that require minimal footings/excavations. If brick retaining walls are proposed inside the TPZ, considerer pier and beam type footings to bridge significant roots that are critical to the trees condition. Retaining walls must be located outside the SRZ and sleepers/beams located above existing soil grades.

[13] Council Of Standards Australia, *AS 4373 Pruning of amenity trees* (2007) page 18

- New footpaths and hard surfaces should be minimised, as they can limit the availability of water, nutrients and air to the trees root system. Where they are proposed, they should be constructed on or above existing soil grades to minimise root disturbance and consider using a permeable surface. Footpaths should be located outside the SRZ where possible.
- Where fill/sub base is used inside the TPZ, fill material should be a coarse granular material that does not restrict the flow of water and air to the root system below. This type of material will also reduce the impact of soil compaction during construction.
- The location of new plantings inside the TPZ of trees to be retained should be flexible to avoid unnecessary damage to tree roots greater than 30mm in diameter.

11.11 **Underground Services:** Where possible underground services should be located outside the TPZ of trees to be retained. All underground services located inside the TPZ of any tree to be retained must be installed via tree sensitive techniques. This should include either directional drilling methods or manual excavations to minimise the impact to trees identified for retention. No roots greater than 40mm in diameter should be severed during the installation of service pipes unless approved in writing by the project Arborist.

11.12 **Sediment and Contamination:** All contamination run off from the development such as but not limited to concrete, sediment and toxic wastes must be prevented from entering the TPZ at all times.

11.13 **Tree Wounding/Injury:** Any wounding or injury that occurs to a tree during the construction process will require the project Arborist to be contacted for an assessment of the injury and provide mitigation/remediation advice. It is generally accepted that trees may take many years to decline and eventually die from root damage. All repair work is to be carried out by the project Arborist, at the contractor's expense.

11.14 **Completion of Development Works:** After all construction works are complete the project Arborist should assess that the subject trees have been retained in the same condition and vigour. If changes to condition are identified the project Arborist should provide recommendations for remediation.

URBAN ARBOR
The Trusted Name in Tree Management

12. CONSTRUCTION HOLD POINTS FOR TREE PROTECTION

12.1 **Hold Points:** Below is a sequence of hold points requiring project Arborist certification throughout the development process**.** It provides a list of hold points that must be checked and certified. All certification must be provided in written format upon completion of the development. The final certification must include details of any instructions for remediation undertaken during the development. The principal contractor should be responsible for implementing all tree protection requirements.

Hold Point	Stage	Date Completed and Signature of Project Arborist Responsible
Project Arborist to hold pre construction site meeting with principal contractor to discuss methods and importance of tree protection measures and resolve any issues in relation to feasibility of tree protection requirements that may arise. Project Arborist to mark all trees approved for removal under DA consent.	Prior to development work commencing	
Project Arborist to assess and certify that tree protection has been installed in accordance with AS4970-2009 prior to works commencing at site.	Prior to development work commencing.	
In accordance with AS4970-2009 the project arborist should carryout regular site inspections to ensure works are carried out in accordance with the recommendations. Site inspections are recommended on a monthly frequency.	On-going throughout the development	
The removal of existing structures inside the TPZ of any tree to be retained, such as the existing buildings and hard surfaces must be supervised by the project Arborist.	Demolition	
Project Arborist to supervise all manual excavations and root pruning inside the TPZ of any tree to be retained. Project Arborist to approve all pruning of roots greater than 30mm inside TPZ. All root pruning of roots greater than 30mm in diameter must be carried out by a qualified Arborist/Horticulturalist with a minimum AQF level 3.	Construction	
Project Arborist to certify that all underground services including storm water inside TPZ of any tree to be retained have been installed in accordance with AS4970-2009.	Construction	
All landscaping works within the TPZ of trees to be retained are to be undertaken in consultation with the project Arborist to minimise the impact to trees.	Construction/ Landscape	
After all demolition, construction and landscaping works are complete the project Arborist should assess that the subject trees have been retained in the same condition and vigour. If changes to condition are identified the project Arborist should provide recommendations for remediation.	Upon completion of development	

URBAN ARBOR
The Trusted Name in Tree Management

13. BIBLIOGRAPHY/REFERENCES

- Council Of Standards Australia, *AS4970 Protection of trees on development sites* (2009).
- Council Of Standards Australia, *AS4373 Pruning of amenity trees* (2007).
- Mattheck, C. & Breloer, H., *The body language of trees - A handbook for failure analysis*, The Stationary Office, London, England (2015).
- Lonsdale, D., *Principles of tree hazard assessment and management*, The Stationary Office, London, England (1999).
- 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).
- 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 Tree Consultancy, *Tree AZ version 10.10-ANZ*, http://www.treeaz.com/.
- *Canterbury Local Environmental Plan 2012*, https://www.legislation.nsw.gov.au/#/view/EPI/2012/673.
- *Canterbury Development Control Plan 2012*, https://www.cbcity.nsw.gov.au/development/planning-control-policies/canterbury-development-control-plan-2012.

14. LIST OF APPENDICES

The following are included in the appendices:
Appendix 1A - Proposed Site Plan North
Appendix 1B - Proposed Site Plan South
Appendix 1C - Proposed Service Building
Appendix 2 - Tree Inspection Schedule
Appendix 3 - Further information of methodology

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

TO SYDNEY

TO BANKSTOWN

ADJOINS DRAWINGS SMCSWSWM-MTM-WPS-LA-DG-241720

PLATFORM

PLATFORM BUILDING

722 723 724 725 726 727 728 730 731 732 733 734 735 736

EXISTING TREE (*Callistemon viminalis*) TO BE REMOVED

BIN (BIN-1)

DRINKING FOUNTAIN (DF-1)

EXISTING SYDNEY TRAINS COMMUNICATION CABINET TO BE RETAINED ENSURE 1.5m CLEAR ZONE MAINTAINED SURROUNDING UNIT

10 x BIKE HOOPS (BH-1)

FUTURE RETAIL LOCATION

EXISTING TREE (*Elaeocarpus reticulatus*) TO BE REMOVED

IN STORAGE AREA

EXISTING HEDGE (Elaeocarpus reticulatus) TO BE RETAINED

FUTURE KIOSK RETAIL

2 NOS. ELEAOCARPUS. RETICULATUS TRANSPLANTED FROM SITE. REFER TO SMCSWSWM-MTM-WPS-LA-DWG-241702 FOR EXISTING LOCATION.

LIMIT OF WORKS

ELEVATED WALKWAY REFER TO DETAIL PLAN SMCSWSWM-MTM-WPS-LA-DWG-241764

REST PARK

REINSTATE EXISTING PARK SIGNAGE

EXISTING BUS STOP

PROPOSED PEDESTRIAN CROSSING SUBJECT TO FURTHER INVESTIGATION

KERB DETAIL - REFER TO CIVIL PACKAGE 243 STAIR HANDRAIL DETAIL - REFER TO ARCHITECTURAL DRAWING NO. SMCSWSWM-MTM-WPS-AT-DWG-241501

PROVIDE MAKE GOOD WORKS ALONG FENCELINE. STABLISE SLOPE WITH SANDSTONE ROCKS TO ALL DISTURBED AREAS.

GARDEN BED PLANTING WITH COIR MESH (MS-1) - REFER TO DETAIL ON SMCSWSWM-MTM-WPS-LA-DWG-241753

EXISTING TREE (*Lophostemon confertus*) TO BE REMOVED

EXISTING LIGHT POLE TO BE RETAINED

PROPOSED SEATING (ST-2)

STRATA VAULT REFER TO DETAILS

IN-SITU CONCRETE WALL (W-2)

CONCRETE STAIR WITH L-04 LIGHTING FIXTURE. LIGHTING REFER TO MATERIALS SCHEDULE

METRO TOTEM TO WAYFINDING PACAKGE

PLANTING REFER TO PLANTING PLAN SMCSWSWM-MTM-WPS-LA-DWG-241741

IN-SITU CONCRETE WALL (W-1)

EXISTING CONCRETE FOOTPATH TO BE RETAINED

01

THROW SCREEN - REFER TO URBAN DESIGN PACKAGE 241810

NEW 2.4m SECURITY FENCING - REFER TO FENCING PACKAGE

PUNCHBOWL ROAD UNDERPASS PATHWAY WIDENING - REFER TO CIVIL PACKAGE 243 FOR DETAILS AND SET OUT

EXISTING UNDERPASS

RE-PAINT BRIDGE ABUTMENT AND SOFFIT REFER TO MATERIAL SCHEDULE

PUNCHBOWL ROAD

BREUST PLACE

HIGHCLERE AVENUE

LEGEND

EXISTING

- EXISTING TREES TO BE RETAINED
- EXISTING TREES TO BE REMOVED
- EXISTING ELECTRICAL POLE
- EXISTING LIGHT

GENERAL

- RAILCORP PROPERTY BOUNDARY
- EXTENT OF LANDSCAPE WORKS

FENCES/WALLS

- 2.4m HIGH CLOSE SPACED WELDED MESH FENCE AND GATE REFER TO FENCING PACKAGE
- CHAIN MESH FENCE TO BIN STORAGE
- THROW SCREEN REFER TO URBAN DESIGN PACKAGE 241810

LANDSCAPE

- NEW PLANTING
- PROPOSED TREE
- RELOCATED TREE
- SV-1 STRATAVAULT CELL
- LAWN

HARDSCAPE

- PAV-1 PLAZA PAVING
- TGS-1 WARNING TACTILE INDICATORS
- TGS-1A DIRECTIONAL TACTILE INDICATORS
- W-1 IN-SITU CONCRETE WALL (500mm WIDE)
- W-2 IN-SITU CONCRETE WALL (300mm WIDE)
- EP-1 ELEVATED WALKWAY

STREET FURNITURE

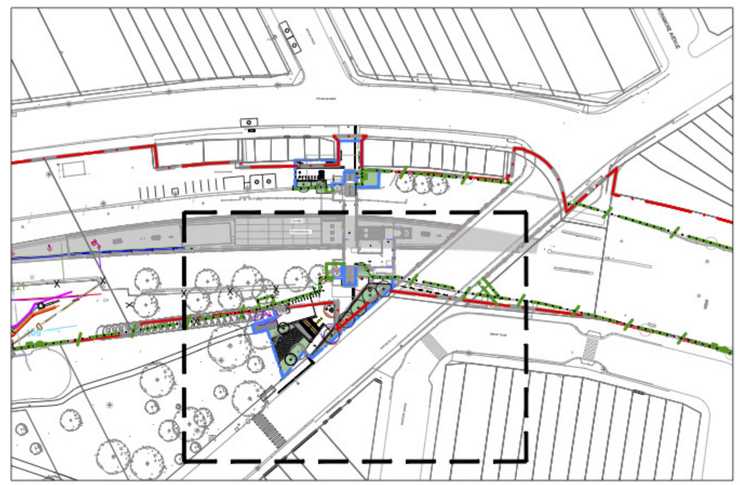
- ST-2 PROPOSED SEATING
- BH-1 BIKE PARKING (HOOPS)
- BIN-1 BIN
- DF-1 NEW DRINKING FOUNTAIN
- NEW METRO TOTEM

LIGHTING

- LP-1 LIGHTING POLE
- L-2 PEDESTRIAN LIGHTING FOR UNDERPASS
- L-4 IN-GROUND LIGHTING

NOTES:

- THE DESIGN IS BASED ON SYDNEY METRO CHAINAGE. PLEASE REFER TO CIVIL DRAWINGS FOR SYDNEY METRO CHAINAGE ALIGNMENT (PACKAGE NO. 103).
- REFER TO CIVIL DESIGN PACKAGE 243 FOR ALL FOOTPATH LEVELS.
- REFER TO FENCING PACKAGE 243 FOR ALL FENCING SET OUT AND LOCATIONS.
- REFER TO UTILITIES PACKAGE 243 FOR ALL SERVICES LAYOUTS.
- REFER TO ARCHITECTURAL PACKAGE 241 FOR ALL STATION CONCOURSE, BUILDING AND PLATFORM WORKS.
- REFER TO LIGHTING PACKAGE 243 FOR ALL ELECTRICAL AND LIGHTING LAYOUTS.
- REFER TO ARBORIST'S ARBORICULTURAL IMPACT ASSESSMENT REPORT FOR TREE PROTECTION WORKS
- REFER TO MITIGATION MEASURES DETAILED IN THE HERITAGE REPORT FOR WORKS AROUND PUNCHBOWL STATION WITHIN PAD02.



Map Legend

- Fencing
- Tree Crown
- Tree Protection Zone
- Structural Root Zone

0 30m

Urban Arbor Pty Ltd

PO Box 450 Turramurra NSW 2074

sales@urbanarbor.com.au

Site Location: Punchbowl Station
Punchbowl NSW

SCALE :	DATE :
1 : 200 @ A1	10/27/2021

URBAN ARBOR
The Trusted Name in Tree Management

Appendix 1A - Proposed Site Plan North

Prepared by: Bryce Claasens, Urban Arbor Pty Ltd

TO SYDNEY

TO BANKSTOWN

ARTHUR STREET

EXISTING TAXI BAY TO BE RETAINED

THE BOULEVARDE

NEW KISS AND RIDE BAY

PLANTING REFER TO PLANTING PLAN SMCSWSWM-MTM-WPS-LA-DWG-241740

NEW PLAZA PAVING TO LIFT LANDING AND CARPARK EDGE REFER TO PAVING PLAN SMCSWSWM-MTM-WPS-LA-DWG-241730

EXISTING TREES *(3 x Callistemon viminalis)* TO BE RETAINED

NEW 2.4m SECURITY FENCING - REFER TO FENCING PACKAGE

SEAT (ST-1)

KERB TO EDGE OF PLAZA - REFER TO CIVIL PACKAGE 243 FOR KERB ALIGNMENT, PRAM RAMP, SETOUT AND DETAILS

EXISTING CAR PARKING LIGHTING TO BE RETAINED

4 x BOLLARDS (BOL-1) REFER TO CIVIL PACKAGE 243 FOR SETOUT, LOCATION AND ALL DETAILS ASSOCIATED

EXISTING CAR PARK

BIN (BIN-1)
SEAT (ST-1)
SEAT (ST-1)

EXISTING GATE TO RETAIL BACK LANE TO BE RETAINED

737 738 739

METRO SIGNAGE TO BE MOUNTED ON STAIR COLUMN - REFER TO WAYFINDING PACKAGE

IN-SITU CONCRETE WALL (W-3)

7 x BIKE HOOPS (BH-1)

PLATFORM

PLATFORM BUILDING

PUNCHBOWL ROAD OVERBRIDGE

THROW SCREEN - REFER TO URBAN DESIGN PACKAGE 241810

ADJOINS DRAWINGS SMCSWSWM-MTM-WPS-LA-DWG-241721

LEGEND

EXISTING

- EXISTING TREES TO BE RETAINED
- EXISTING TREES TO BE REMOVED
- EXISTING ACCESSIBLE PARKING
- EXISTING LIGHT

GENERAL

- RAILCORP PROPERTY BOUNDARY
- EXTENT OF LANDSCAPE WORKS

FENCES/WALLS

- 2.4m HIGH CLOSE SPACED WELDED MESH FENCE AND GATE REFER TO FENCING PACKAGE
- THROW SCREEN REFER TO URBAN DESIGN PACKAGE 241810

LANDSCAPE

- NEW PLANTING
- PROPOSED TREE

HARDSCAPE

- PAV-1 NEW PAVING ON PLAZA
- PAV-2 ADELEIDE BLACK (EXFOLIATED)
- TGS-1 WARNING TACTILE INDICATORS
- TGS-1A DIRECTIONAL TACTILE INDICATORS
- W-3 IN-SITU CONCRETE WALL (550mm WIDE)
- W-3 IN-SITU CONCRETE WALL (400mm WIDE)

STREET FURNITURE

- BH-1 BIKE PARKING (HOOPS)
- BOL-1 BOLLARDS
- BIN-1 BIN
- ST-1 SEAT
- NEW METRO TOTEM

STREETSCAPE

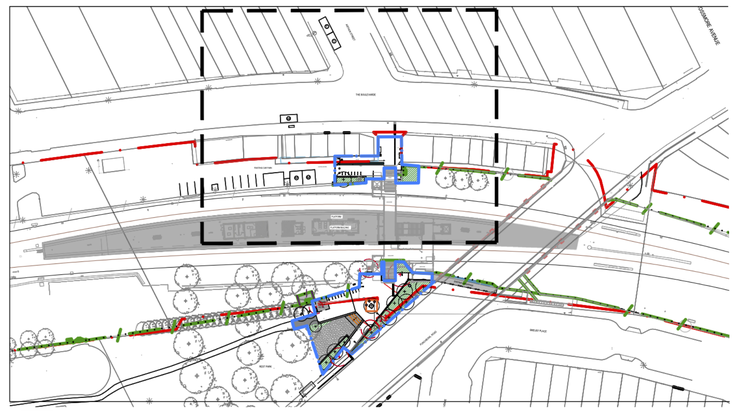
- KISS AND RIDE PARKING
- TAXI PARKING

LIGHTING

- LP-2 LIGHTING POLE

NOTES:

- THE DESIGN IS BASED ON SYDNEY METRO CHAINAGE. PLEASE REFER TO CIVIL DRAWINGS FOR SYDNEY METRO CHAINAGE ALIGNMENT (PACKAGE NO. 103).
- REFER TO CIVIL DESIGN PACKAGE 243 FOR ALL FOOTPATH LEVELS.
- REFER TO FENCING PACKAGE 243 FOR ALL FENCING SET OUT AND LOCATIONS.
- REFER TO UTILITIES PACKAGE 243 FOR ALL SERVICES LAYOUTS.
- REFER TO ARCHITECTURAL PACKAGE 241 FOR ALL STATION CONCOURSE, BUILDING AND PLATFORM WORKS.
- REFER TO LIGHTING PACKAGE 243 FOR ALL ELECTRICAL AND LIGHTING LAYOUTS.
-REFER TO ARBORIST'S ARBORICULTURAL IMPACT ASSESSMENT REPORT FOR TREE PROTECTION WORKS
-REFER TO MITIGATION MEASURES DETAILED IN THE HERITAGE REPORT FOR WORKS AROUND PUNCHBOWL STATION WITHIN PAD02.



KEY PLAN
1:1000

Map Legend

- Fencing
- Tree Crown
- Tree Protection Zone
- Structural Root Zone

0 30m

DRAWING COLOUR CODED - PRINT ALL COPIES IN COLOUR

NOT FOR CONSTRUCTION

Urban Arbor Pty Ltd
PO Box 450 Turramurra NSW 2074
sales@urbanarbor.com.au

Site Location: Punchbowl Station
Punchbowl NSW

SCALE :	DATE :
1 : 200 @ A1	23/12/2020

URBAN ARBOR
The Trusted Name in Tree Management

Appendix 1B - Proposed Site Plan South

Prepared by: Bryce Claassens, Urban Arbor Pty Ltd

FROM SYDENHAM

NON-SECTIONABLE OVERLAP
UP AND DOWN METRO
TO EL0001110

TO BANKSTOWN

EXISTING CCTV POLE TO BE RETAINED AND PROTECTED.

RETAINING WALL TO BE UNDERTAKEN AS PART OF STRUCTURAL PACKAGE.

4.5m LONG FENCE PANELS

BUILDING

PADMOUNT

EXISTING POWER POLE TO BE RETAINED AND PROTECTED

EXISTING 900mm DIA STORMWATER CULVERT

4.5m LONG FENCE PANELS

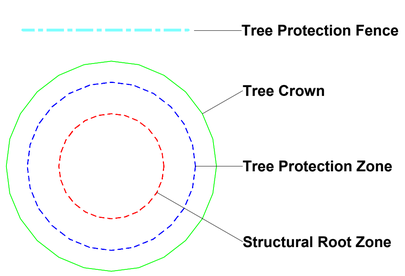
URUNGA PDE

RICKARD ST

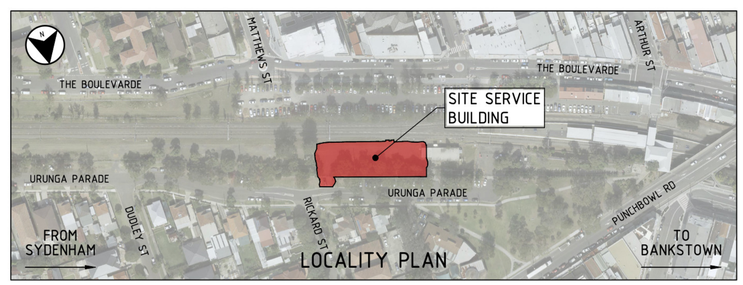
SYDNEY METRO TO DEMOLISH THE BUILDING AND PROVIDE AN AREA SUITABLE FOR CRANE MANOEUVRING AND OPERATING. THIS NEEDS TO BE ESTABLISHED BEFORE CRANE PROGRESS WITH INSTALLATION OF PADMOUNT, CHILLERS AND OTHER EQUIPMENTS.

PLAN
SCALE 1:200

Tree Legend



0 30m



LOCALITY PLAN

DRAWING COLOUR CODED - PRINT ALL COPIES IN COLOUR

CHECK PRINT

Urban Arbor Pty Ltd
PO Box 450, Turramurra, NSW, 2074
sales@urbanarbor.com.au, (02) 8004 2802

Site Location: Punchbowl Station, Punchbowl, NSW

SCALE : 1 : 200 @ A1	DATE : 23/12/2020	URBAN ARBOR The Trusted Name in Tree Management
Appendix 1C: Proposed Service Building		

Prepared by: Bryce Claassens

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
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.
723	Lemon Scented Gum	*Corymbia citriodora*	Mature	24	5	300					300	360	Good	Good	High	1. Long	A1	3.6	2.2	Located within corridor. DBH estimated.
724	Queensland Brushbox	*Lophostemon confertus*	Mature	7	4	410					410	460	Good	Good	Medium	1. Long	A1	4.9	2.4	Located within corridor. DBH estimated.
725	Lemon Scented Gum	*Corymbia citriodora*	Mature	21	5	340					340	410	Good	Good	High	1. Long	A1	4.1	2.3	Located within corridor. DBH estimated.
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.
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.
728	Lemon Scented Gum	*Corymbia citriodora*	Mature	18	5	330					330	390	Good	Good	High	1. Long	A1	4.0	2.2	Located within corridor. DBH estimated.
729	Weeping Bottlebrush	*Callistemon viminalis*	Semi-mature	3	1	100					100	110	Good	Good	Low	5. Small/Young	Z1	2.0	1.5	Located within corridor. DBH estimated.
730	Weeping Bottlebrush	*Callistemon viminalis*	Semi-mature	3	1	100					100	110	Good	Good	Low	5. Small/Young	Z1	2.0	1.5	Located within corridor. DBH estimated.
731	Queensland Brushbox	*Lophostemon confertus*	Mature	9	4	240	450				510	580	Good	Good	High	1. Long	A1	6.1	2.6	Asymmetric crown shape.
G15	Blueberry Ash	*Elaeocarpus reticulatus*	Semi-mature	3	1	100					100	120	Good	Good	Low	5. Small/Young	Z1	2.0	1.5	Group of trees.
732	Lemon Scented Gum	*Corymbia citriodora*	Mature	20	8	440					440	510	Good	Good	High	1. Long	A1	5.3	2.5	None.
733	Grey Box	*Eucalyptus moluccana*	Semi-mature	10	5	410					410	420	Good	Good	High	1. Long	A1	4.9	2.3	Asymmetric crown shape.
734	Eucalypt	*Eucalyptus spp*	Mature	7	4	240	180				300	400	Good	Good	Medium	1. Long	A1	3.6	2.3	Long narrow leaf, urn shaped fruit.
735	Grevillea	*Grevillea spp*	Young	2	1	100					100	120	Good	Good	Low	5. Small/Young	Z1	2.0	1.5	None.
736	Grevillea	*Grevillea spp*	Young	2	1	100					100	120	Good	Good	Low	5. Small/Young	Z1	2.0	1.5	None.
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.
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.
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.
3346	Wallangarra White Gum	*Eucalyptus scoparia*	Mature	9	4	220	270				348	450	Good	Good	Medium	2. Medium	Z3	4.2	2.4	Located within nature strip. Exempt species.
3347	Camphor Laurel	*Cinnamomum camphora*	Mature	6	4	700					700	700	Good	Fair	Low	1. Long	Z3	8.4	2.8	Multi stem tree. Exempt species.
3348	Blackbutt	*Eucalyptus pilularis*	Semi-mature	12	3	270					270	330	Good	Good	Medium	1. Long	A1	3.2	2.1	Located within nature strip.
3349	Camphor Laurel	*Cinnamomum camphora*	Mature	12	6	700					700	780	Fair	Fair	Medium	3. Short	Z4	8.4	3.0	Significant apical dieback. Tree is in decline.
3350	African Olive	*Olea europaea subsp. cuspidata*	Mature	6	4	400					400	400	Good	Fair	Very Low	2. Medium	Z3	4.8	2.3	Exempt species. Suppressed.
3351	Bangalay	*Eucalyptus botryoides*	Mature	13	9	490					490	560	Fair	Fair	High	2. Medium	A2	5.9	2.6	Asymmetric crown shape. Low foliage density for species.
3352	Camphor Laurel	*Cinnamomum camphora*	Mature	9	5	350	150	150	130	130	449	600	Good	Fair	Low	2. Medium	Z3	5.4	2.7	Under 10m - exempt species.
3353	Wallangarra White Gum	*Eucalyptus scoparia*	Mature	15	8	580					580	650	Good	Good	Medium	2. Medium	Z3	7.0	2.8	Located within nature strip. Exempt species.
3354	Camphor Laurel	*Cinnamomum camphora*	Semi-mature	7	3	120	120	140	110	110	269	480	Good	Fair	Low	2. Medium	Z3	3.2	2.4	Under 10m - exempt species.
3355	Sweet Pittosporum	*Pittosporum undulatum*	Young	4	2	90	80	70			139	160	Good	Fair	Low	5. Small/Young	Z1	2.0	1.5	None.
3356	Camphor Laurel	*Cinnamomum camphora*	Mature	11	6	600					600	680	Good	Good	Medium	2. Medium	A1	7.2	2.8	None.
3357	Camphor Laurel	*Cinnamomum camphora*	Semi-mature	7	3	100	110	140			204	350	Good	Fair	Low	2. Medium	Z3	2.5	2.1	Under 10m - exempt species.
3358	Blackbutt	*Eucalyptus pilularis*	Semi-mature	9	3	230					230	280	Good	Fair	Medium	2. Medium	A1	2.8	1.9	Located within nature strip. Asymmetric crown shape.
3359	Wattle	*Acacia spp*	Young	5	1	90					90	100	Good	Good	Low	5. Small/Young	Z1	2.0	1.5	None.
3360	Camphor Laurel	*Cinnamomum camphora*	Mature	13	9	450	450	700			946	1100	Good	Good	Medium	1. Long	A1	11.4	3.4	None.
3361	Canary Palm	*Phoenix canariensis*	Semi-mature	6	3	400					400	NA	Good	Fair	Low	5. Small/Young	Z3	4.0	NA	Exempt species.
3362	Camphor Laurel	*Cinnamomum camphora*	Semi-mature	7	3	130	210				247	400	Good	Fair	Low	5. Small/Young	Z3	3.0	2.3	Half of tree is located within nature strip. Under 10m - exempt species. Growing through fence.
3363	Canary Palm	*Phoenix canariensis*	Semi-mature	7	3	400					400	NA	Good	Fair	Low	5. Small/Young	Z3	4.0	NA	Exempt species.
3364	Blackbutt	*Eucalyptus pilularis*	Mature	16	5	330					330	420	Good	Good	High	1. Long	A1	4.0	2.3	Located within nature strip.
3365	Camphor Laurel	*Cinnamomum camphora*	Mature	14	9	1000					1000	1200	Good	Good	Medium	1. Long	A1	12.0	3.6	None.
3366	Bangalay	*Eucalyptus botryoides*	Mature	16	10	330	600	400	260		835	990	Good	Good	Very High	1. Long	A1	10.0	3.3	Located within nature strip.
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.
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.
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.
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.
3371	Bangalay	*Eucalyptus botryoides*	Mature	14	6	440					440	490	Good	Good	High	1. Long	A1	5.3	2.5	Located within nature strip.
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.

Appendix 2 - Tree Inspection Schedule

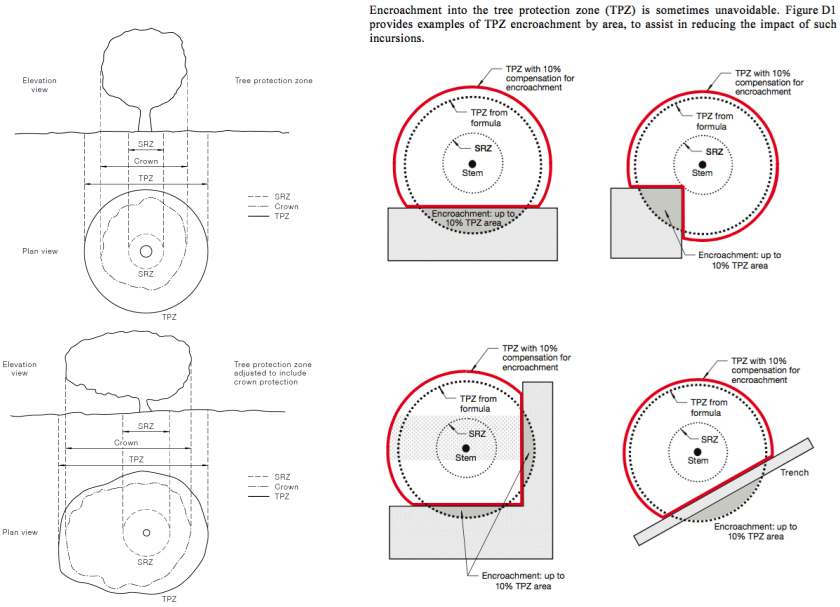
Tree ID	Common Name	Botanical Name	Age Class	Height (m)	Canopy Spread Radius (m)	Stem 1	Stem 2	Stem 3	Stem 4	Stem 5	DBH (mm)	DAB (mm)	Health	Structure	Amenity Value	SULE	Retention Value	TPZ Radius (m)	SRZ Radius (m)	Notes
3373	Lombardy Poplar	*Populus nigra 'Italica'*	Mature	16	2	490					490	580	Fair	Fair	Low	3. Short	Z3	5.9	2.6	Located within nature strip. Exempt species. In decline.
3374	Lombardy Poplar	*Populus nigra 'Italica'*	Mature	15	1	330					330	400	Fair	Fair	Low	3. Short	Z3	4.0	2.3	Located within nature strip. Exempt species. In decline.

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.

URBAN ARBOR
The Trusted Name in Tree Management

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

URBAN ARBOR
The Trusted Name in Tree Management

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 12 PUNCHBOWL AIA (PLATEAU TREES)

PLATEAUTREES
Safety. Quality. Progress.

Date: 13 March 2021

Re: Additional tree removals at Punchbowl Station as part of the Southwest Metro Package.

At the request of Downer Group an onsite inspection was undertake at Punchbowl Station. It has been asked to identify and record additional tree removals beyond those recommended within the Arboricultural Impact Assessment (AIA) prepared by Urban Arbor, dated 15 January 2020, Ref 20/01/15/SWMPB. On the 5 March a site walkthrough was undertaken by myself and a representative from Downer Group. Additional tree removals were identified with respects to the proposed Southwest Metro Package works.

Based upon the information, rational and justification provided within the AIA Report I can confirm that trees 733, 734, 735 and 736 shall require removal to accommodate the proposed works.

Additional tree removals where there is direct design clash and 100% impact to the TPZ and SRZ have been identified as trees 729 and 730 *Callistemon viminalis* (BottleBrush). These trees were initially identified for retention within the AIA report. However, it has since been confirmed that they shall require removal to accommodate the construction of a lift to the railway line overpass. Reference should be made to the AIA report for their respective tree data. Image 1 shows the location of the two trees. Image 2 shows the two trees. Drawing 1 shows their design clash.

The trees are considered to be in good health and condition and provide minor screening of the rail corridor from the area adjacent the station entry. They are

Plateau Tree Service Pty Ltd
PO BOX 1522, DEE WHY NSW 2099 Australia
P: 02 9939 5350 | F: 02 9905 7569
E: info@plateautrees.com.au | W: www.plateautrees.com.au
ABN : 17 090 798 002

not representative of an endangered or threatened species or ecological community.

Image 1: Aerial image of Punchbowl Station showing the location of trees 729 and 730.

Image 2: Trees 729 and 730 are to be removed to accommodate the lift shaft works.

TO SYDNEY

TO BANKSTOWN

ADJOINS DRAWINGS SMCSWSWM-MTM-WPS-LA-DG-241720

PLATFORM

PLATFORM BUILDING

EXISTING TREE (*Callistemon viminalis*) TO BE REMOVED TREE 729 AND 730 IN URBAN ARBOR REPORT

BIN (BIN-1)

DRINKING FOUNTAIN (DF-1)

EXISTING SYDNEY TRAINS COMMUNICATION CABINET TO BE RETAINED ENSURE 1.5m CLEAR ZONE MAINTAINED SURROUNDING UNIT

FUTURE RETAIL LOCATION

EXISTING TREE (*Elaeocarpus reticulatus*) TO BE REMOVED

BIN STORAGE AREA

10 x BIKE HOOPS (BH-1)

EXISTING HEDGE (Elaeocarpus reticulatus) TO BE RETAINED

FUTURE POP UP RETAIL

2 NOS. ELEAOCARPUS RETICULATUS TRANSPLANTED FROM SITE. REFER TO SMCSWSWM-MTM-WPS-LA-DWG-241702 FOR EXISTING LOCATION.

ELEVATED WALKWAY REFER TO DETAIL PLAN SMCSWSWM-MTM-WPS-LA-DWG-241764

REST PARK

REINSTATE EXISTING PARK SIGNAGE

EXISTING BUS STOP

LIMIT OF WORKS

KERB DETAIL - REFER TO CIVIL PACKAGE 243
STAIR HANDRAIL DETAIL - REFER TO ARCHITECTURAL DRAWING NO. SMCSWSWM-MTM-WPS-AT-DWG-241501

GARDEN BED PLANTING WITH COIR MESH (MS-1) - REFER TO DETAIL ON SMCSWSWM-MTM-WPS-LA-DWG-241753

EXISTING TREE (*Lophostemon confertus*) TO BE REMOVED

EXISTING LIGHT POLE TO BE RETAINED

PROPOSED SEATING (ST-2)

IN-SITU CONCRETE WALL (W-2)

CONCRETE STAIR

METRO TOTEM TO WAYFINDING PACAKGE

PLANTING REFER TO PLANTING PLAN SMCSWSWM-MTM-WPS-LA-DWG-241741

IN-SITU CONCRETE WALL (W-1)

EXISTING CONCRETE FOOTPATH TO BE RETAINED

PROPOSED PEDESTRIAN CROSSING SUBJECT TO FURTHER INVESTIGATION

THROW SCREEN - REFER TO URBAN DESIGN PACKAGE 241810

NEW 2.4m SECURITY FENCING - REFER TO FENCING PACKAGE

PUNCHBOWL ROAD UNDERPASS PATHWAY WIDENING - REFER TO CIVIL PACKAGE 243 FOR DETAILS AND SET OUT

PUNCHBOWL ROAD OVERBRIDGE

EXISTING UNDERPASS

RE-PAINT BRIDGE ABUTMENT AND SOFFIT REFER TO MATERIAL SCHEDULE

PUNCHBOWL ROAD

BREUST PLACE

HIGHCLERE AVENUE

LEGEND

EXISTING
- EXISTING TREES TO BE RETAINED
- EXISTING TREES TO BE REMOVED
- EXISTING ELECTRICAL POLE
- EXISTING LIGHT

GENERAL
- RAILCORP PROPERTY BOUNDARY
- EXTENT OF LANDSCAPE WORKS

FENCES/WALLS
- 2.4m HIGH CLOSE SPACED WELDED MESH FENCE AND GATE REFER TO FENCING PACKAGE
- CHAIN MESH FENCE TO BIN STORAGE
- THROW SCREEN REFER TO URBAN DESIGN PACKAGE 241810

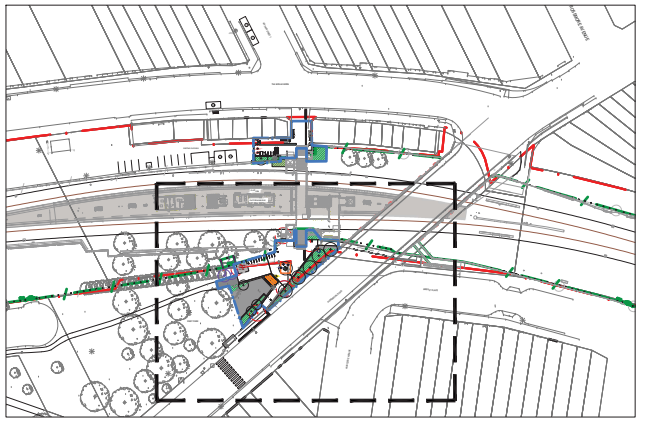
LANDSCAPE
- NEW PLANTING
- PROPOSED TREE
- RELOCATED TREE
- SV-1 STRATAVAULT CELL
- LAWN

HARDSCAPE
- PAV-1 PLAZA PAVING
- TGS-1 WARNING TACTILE INDICATORS
- TGS-1A DIRECTIONAL TACTILE INDICATORS
- W-1 IN-SITU CONCRETE WALL (500mm WIDE)
- W-2 IN-SITU CONCRETE WALL (300mm WIDE)
- EP-1 ELEVATED WALKWAY

STREET FURNITURE
- ST-2 PROPOSED SEATING
- BH-1 BIKE PARKING (HOOPS)
- BIN-1 BIN
- DF-1 NEW DRINKING FOUNTAIN
- NEW METRO TOTEM

LIGHTING
- LP-1 LIGHTING POLE
- L-2 PEDESTRIAN LIGHTING FOR UNDERPASS
- L-4 IN-GROUND LIGHTING

NOTES:
- THE DESIGN IS BASED ON SYDNEY METRO CHAINAGE. PLEASE REFER TO CIVIL DRAWINGS FOR SYDNEY METRO CHAINAGE ALIGNMENT (PACKAGE NO. 103).
- REFER TO CIVIL DESIGN PACKAGE 243 FOR ALL FOOTPATH LEVELS.
- REFER TO FENCING PACKAGE 243 FOR ALL FENCING SET OUT AND LOCATIONS.
- REFER TO UTILITIES PACKAGE 243 FOR ALL SERVICES LAYOUTS.
- REFER TO ARCHITECTURAL PACKAGE 241 FOR ALL STATION CONCOURSE, BUILDING AND PLATFORM WORKS.
- REFER TO LIGHTING PACKAGE 243 FOR ALL ELECTRICAL AND LIGHTING LAYOUTS.
-REFER TO ARBORIST'S ARBORICULTURAL IMPACT ASSESSMENT REPORT FOR TREE PROTECTION WORKS
-REFER TO MITIGATION MEASURES DETAILED IN THE HERITAGE REPORT FOR WORKS AROUND PUNCHBOWL STATION WITHIN PAD02.



KEY PLAN
1:1000

DRAWING COLOUR CODED - PRINT ALL COPIES IN COLOUR

NOT FOR CONSTRUCTION

REV.	BY	DATE	DESCRIPTION	APPD.
E	ME	06/11/2020	UPDATED STAGE 3 ISSUE	LP
D	ME	17/06/2020	ISSUED FOR STAGE 3	LP
C	ME	08/05/2020	ISSUED FOR STAGE 3	LP
B	ME	25/10/2019	ISSUED FOR STAGE 2	LP
A	ME	05/07/2019	ISSUED FOR STAGE 1	LP

SCALES
2 0 2 4 6 8m
1 : 200 FULL SIZE A1

CLIENT: NSW GOVERNMENT | sydney METRO

SERVICE PROVIDERS: METRON T2M

DRAWN	D. LEE	06/11/2020
DESIGNED	M. ENOCH	06/11/2020
DRG CHECK	M. ENOCH	06/11/2020
DESIGN CHECK	G. DAVIES	06/11/2020
APPROVED	L. PALMER	06/11/2020

SYDNEY METRO
PUNCHBOWL (16.886km to 17.217km)
LANDSCAPE DESIGN
DETAIL PLAN
PUNCHBOWL ROAD

STATUS: STAGE 3 | SHEET 6 of 37 | ©

DRG No. SMCSWSWM-MTM-WPS-LA-DWG-241721 | REV. E

A1 Original | Co-ordinate System: MGA Zone 56 | Height Datum: A.H.D. | This sheet may be prepared using colour and may be incomplete if copied | NOTE: Do not scale from this drawing. | ALT. DRG No. SMCSWSWM-MTM-WPS-LA-DWG-241721 P01

Cad File: X:\2 Projects\2019P181671 Southwest\Metro Design Services\02 CAD\80_WPS_Punchbowl\Plots\SMCSWSWM-MTM-WPS-LA-DWG-241721.dwg
Plot Date: 12/11/20 - 17:25
100mm AT FULL SIZE

All appropriate approvals and consents are to be obtained prior to tree and vegetation removal works commencing. All tree removal works are to be undertaken by suitably qualified tree workers and in accordance with Safe Work Australia's Guide to Managing Risks of Tree Trimming and Removal Works.

Please feel free to contact me should you require any further assistance regarding this matter.

Regards.

Owen Tebbutt

Consulting Arborist
Plateau Tree Service

APPENDIX 12.1 PUNCHBOWL AIA (PLATEAU TREES)

PLATEAUTREES
Safety. Quality. Progress.

Date: 31st May 2021

Re: Tree inspection at Punchbowl Station as part of the Southwest Metro Package.

At the request of Downer Group an onsite arboricultural inspection at Punchbowl Station was conducted on the 18th May 2021.Weather conditions were fine.
The reason for this inspection was to assess and identify trees within the area proposed for the construction of mechanical services building.
A walkthrough the site was conducted in the presence of Downer Group representatives.
Upon inspection it was concluded that the that all trees shown within the attached aerial image (and Appendix 1) will require removal to facilitate the proposed construction to take place.
All trees have been assessed as being insignificant.
It can be confirmed from the on-site inspection conducted by Plateau Trees on May 18th 2021, that all the defined trees for clearing (Appendix 1) have both the Structural Root Zone (STZ) and Tree Protection Zone (TPZ) within the area of the Project permanent design.

Best Regards
Colin Curtis

Level 5 Consulting Arborist
Tree Risk Assessment Qualification (TRAQ)
Member of Arboriculture Australia #2332
Member of the International Society of Arboriculture (ISA) # 228182

Image 1:Subject trees displayed and numbered.

Appendix 1: Tree Assessment Schedule

PLATEAUTREES
Safety. Quality. Progress.

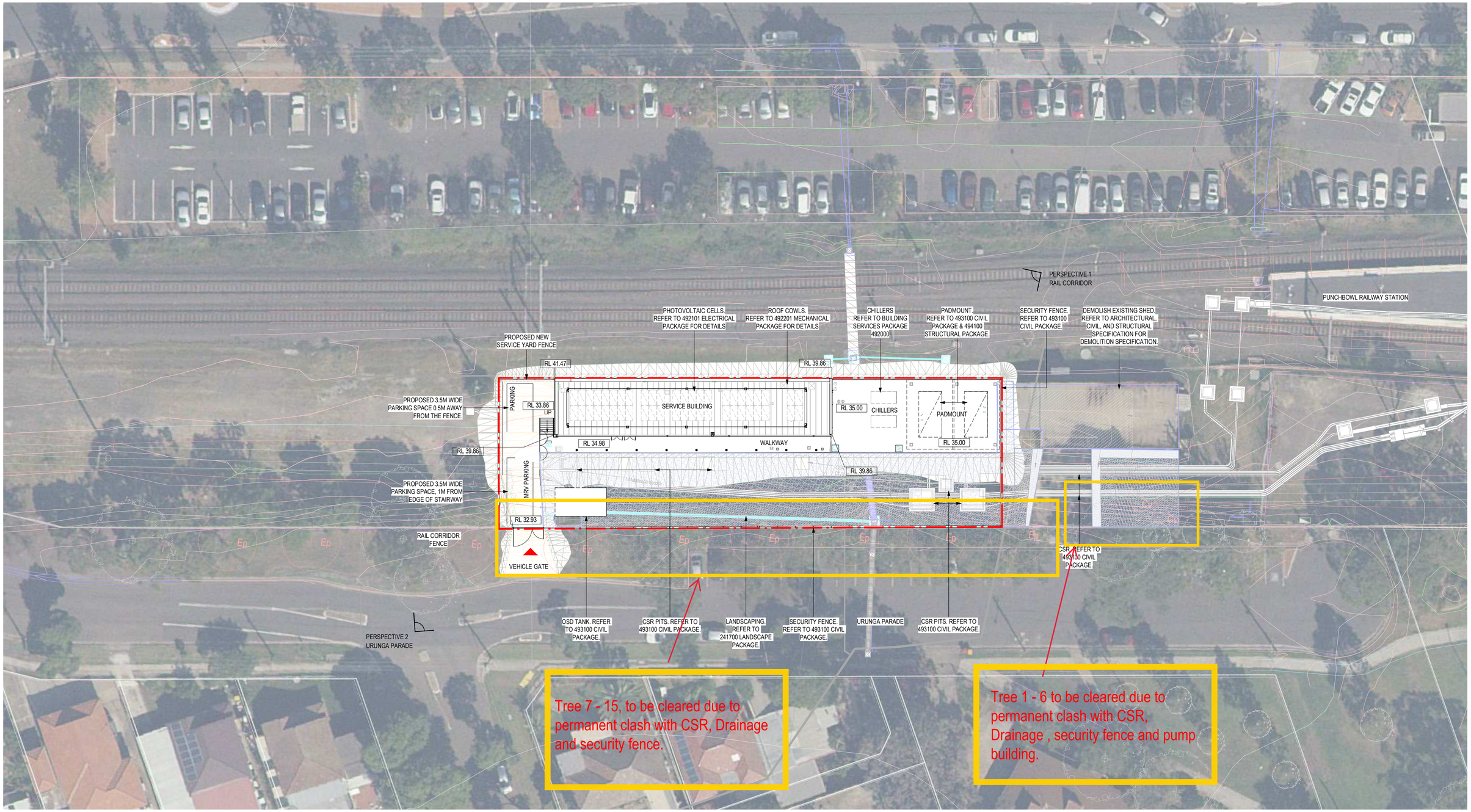
Tree number	Tree name	Tree dimensions				Vigour	Condition	Age class	ULE	Amenity and Visual Value	Native or Exotic	TPZ (m)	SRZ (m)	Comments	Remove or Retain
	Botanical name **Common name**	**Height (m)**	**Spread (m)**	**D.B.H. (mm)**	**D.A.B. (mm)**										
1	*Cinnamomum camphora* (Camphor Laurel)	5	4	12	N/A	N	F	M	M	L	E	2	N/A	Clash with permanent CSR, drainage, security fence and pump building	Remove
2	*Cinnamomum camphora* (Camphor Laurel)	6	4	12	N/A	N	F	M	M	L	E	2	N/A	Clash with permanent CSR, drainage, security fence and pump building	Remove
3	*Cinnamomum camphora* (Camphor Laurel)	5	3	15	N/A	N	F	M	M	L	E	2	N/A	Clash with permanent CSR, drainage, security fence and pump building	Remove
4	*Cinnamomum camphora* (Camphor Laurel)	5	4	12	N/A	N	F	M	M	L	E	2	N/A	Clash with permanent CSR, drainage, security fence and pump building	Remove
5	*Cinnamomum camphora* (Camphor Laurel)	8	4	100	N/A	N	F	M	M	L	E	12	N/A	Clash with permanent CSR, drainage, security fence and pump building	Remove
6	*Phoenix canariensis* (Date Palm)	4	3	N/A	N/A	N	F	M	M	L	E	2.5	N/A	Clash with permanent CSR, drainage, security fence and pump building	Remove
7	*Phoenix canariensis* (Date Palm)	4	3	N/A	N/A	N	F	M	M	L	E	2.5	N/A	Clash with permanent CSR, drainage and security fence.	Remove
8	*Cinnamomum camphora* (Camphor Laurel)	6	3	70	N/A	N	F	M	M	L	E	8.4	N/A	Clash with permanent CSR, drainage and security fence.	Remove
9	*Pittosporum undulatum* (Native daphne)	4	2	10	N/A	N	F	M	M	L	N	2	N/A	Clash with permanent CSR, drainage and security fence.	Remove
10	*Cinnamomum camphora* (Camphor Laurel)	4	3	12	N/A	N	F	M	M	L	E	2	N/A	Clash with permanent CSR, drainage and security fence.	Remove
11	*Cinnamomum camphora* (Camphor Laurel)	5	4	55	N/A	N	F	M	M	L	E	6.6	N/A	Clash with permanent CSR, drainage and security fence.	Remove
12	*Cinnamomum camphora* (Camphor Laurel)	4	3	35	N/A	N	F	M	M	L	E	4.2	N/A	Clash with permanent CSR, drainage and security fence.	Remove
13	*Olea europaea* (African Olive)	4	2	10	N/A	N	F	M	M	L	E	2	N/A	Clash with permanent CSR, drainage and security fence.	Remove
14	*Cinnamomum camphora* (Camphor Laurel)	10	8	65	N/A	N	F	M	M	L	E	7.8	N/A	Clash with permanent CSR, drainage and security fence.	Remove

15	*Cinnamomum camphora* (Camphor Laurel)	4	3	30	N/A	N	F	M	M	L	E	3.6	N/A	Clash with permanent CSR, drainage and security fence.	Remove

N

CENTRAL / CITY

BANKSTOWN



FOR CONSTRUCTION

100mm AT FULL SIZE Plot Date & Time 19/04/2021 1:24:42 AM

REV.	BY	DATE	DESCRIPTION	APPD.
00	BN	14/04/2021	APPROVED FOR CONSTRUCTION	LP

2.5 0 2.5 5 7.5 10m
1:250 FULL SIZE A1

A1 Original | Co-ordinate System: MGA Zone 56 | Height Datum: A.H.D. | This sheet may be prepared using colour and may be incomplete if copied

NOTE: Do not scale from this drawing. | ALT. DRG No. SMCSWSWM-MTM-WPS-AT-DWG-491120

CLIENT

NSW GOVERNMENT | sydney METRO

SERVICE PROVIDERS

METRON T2M

DRAWN E. GUYOT
DESIGNED B. NOVANTO
DRG CHECK M. LODGE
DESIGN CHECK G. DAVIES
APPROVED L. PALMER 14/04/2021

SYDNEY METRO

PUNCHBOWL
ARCHITECTURAL
OVERALL ARRANGEMENT
SITE PLAN – SERVICE BUILDING

STATUS: FOR CONSTRUCTION | SHEET 1 OF 1 | ©

DRG No. SMCSWSWM-MTM-WPS-AT-DWG-491120 | REV. 00

Appendix 2: Tree Assessment Criteria

Tree number: Identifying number given to individual (or group) trees.
Botanical Name: Latin name for tree showing genus and species.
Common Name: The common name given to the tree.
Tree Dimensions: The physical dimensions of the tree.

- **Height**: Estimated or measured height of tree in meters.
- **Spread**: Estimated or measured radial canopy spread of tree in meters.
- **Diameter at Breast Height (DBH)**: The estimated or measured diameter of trunk given in mm measured at 1.4m from ground.
- **Diameter Above Base (DAB)**: The estimated or measured diameter of trunk given in mm measured above the root flare. Used to calculate the structural root zone of the tree.

Age Class: An estimation of how old the tree is in relation to its life expectancy.

- **Young** – Age less than 20% of life expectancy of tree in situ
- **Mature** – Age 20% - 80% of life expectancy of tree in situ
- **Old** – Age greater than 80% of life expectancy of tree in situ
- **Dead** – Tree is dead

Vigour: Ability of a tree to sustain its life processes. This is independent of the condition of a tree but may impact upon it. Vigour can appear to alter rapidly with change of seasons (seasonality) e.g., dormant, deciduous or semi-deciduous trees. Vigour can be categorised as Dormant, Low, Normal and High.

- **Dormant Vigour** – Determined by the existing turgidity in the lower order branches in the outer extremity of the crow, with good bud set and formation, and where the last extension growth is distinct from those most recently preceding it, evident by bud scale scars. Normal vigour during dormancy is achieved when such growth is evident on a majority of branches throughout the crown.
- **Low Vigour** – Reduced ability of a tree to sustain its life processes. This may be evident by the atypical growth of leaves, reduced crown cover and reduced crown density, branches, roots and trunk, and a deterioration of their functions with reduced resistance to predation. This is independent of the condition of a tree but may impact upon it, and especially the ability of a tree to sustain itself against predation.
- **Normal Vigour** – Ability of a tree to maintain and sustain its life processes. This may be evident by the typical growth of leaves, crown cover and crown density, branches, roots and trunk and resistance to predation. This is independent of the condition of a tree but may impact upon it, and especially the ability of a tree to sustain itself against predation.
- **High Vigour** – Accelerated growth of a tree due to incidental or deliberate artificial changes to its growing environment that are seemingly beneficial, but may result in premature aging or failure if the favourable conditions cease, or promote prolonged senescence if the favourable conditions remain, e.g. water from a leaking pipe, water and nutrients from a leaking or disrupted sewer pipe, nutrients from animal waste, a tree growing next to a chicken coop, or a stock feed lot, or a regularly used stockyard, a tree subject to stringent watering and fertilisation program, or some trees may achieve an extended lifespan from continuous pollarding practices over the life of the tree.

Condition: A tree's crown form and growth habit, as modified by its environment (aspect, suppression by other trees, soils) the stability and viability of the root plate, trunk and structural branches (first (1st) and possibly (2nd) order branches), including structural defects such as wounds, cavities or hollows, crooked trunk or weak trunk/branch junctions and the effects of predation by pests and diseases. These may not be directly connected with vigour and it is possible for a tree to be of normal vigour but in poor condition. Condition can be categorised as Dead, Poor, Fair and Good.

- **Dead Condition** – Tree is no longer capable of performing any of the following processes or is exhibiting any of the following symptoms; Photosynthesis via its foliage crown (as indicated by the presence of moist, green or other coloured leaves), Osmosis (the ability of the roots system to take up water), Turgidity (the ability of the plant to sustain moisture pressure in its cells), Epicormic shoots or epicormic strands in Eucalypts (the production of new shoots as a response to stress, generated from latent or adventitious buds or from a lignotuber), Permanent leaf loss, Permanent leaf wilting (the loss of turgidity which is marked by desiccation of stems leaves and roots), Abscission of the epidermis (bark desiccates and peels off to the beginning of the sap wood).
- **Poor Condition** - Tree is of good habit or misshapen, a form that may be severely restricted for space and light, exhibits symptoms of advanced and irreversible decline such as fungal, or bacterial infestation, major die-back in the branch and foliage crown, structural deterioration from insect damage e.g. termite infestation, or storm damage or lightning strike, ring barking from borer activity in the trunk, root damage or instability of the tree, or damage from physical wounding impacts or abrasion, or from altered local environmental conditions and has been unable to adapt to such changes and may decline further to death regardless of remedial works or other modifications to the local environment that would normally be sufficient to provide for its basic survival if in good to fair condition. Deterioration physically, often characterised by a gradual and continuous reduction in vigour but may be independent of a change in vigour, but characterised by a proportionate increase in susceptibility to, and predation by pests and diseases against which the tree cannot be sustained. Such conditions may also be evident in trees of advanced senescence due to normal phenological processes, without modifications to the growing environment or physical damage having been inflicted upon the tree. This may be independent from, or contributed to by vigour.
- **Fair Condition** - Tree is of good habit or misshapen, a form not severely restricted for space and light, has some physical indication of decline due to the early effects of predation by pests and diseases, fungal, bacterial, or insect infestation, or has suffered physical injury to itself that may be contributing to instability or structural weaknesses, or is faltering due to the modification of the environment essential for its basic survival. Such a tree may recover with remedial works where appropriate, or without intervention may stabilise or improve over time, or in response to the implementation of beneficial changes to its local environment. This may be independent from, or contributed to by vigour.

- **Good Condition** - Tree is of good habit, with crown form not severely restricted for space and light, physically free from the adverse effects of predation by pests and diseases, obvious instability or structural weaknesses, fungal, bacterial or insect infestation and is expected to continue to live in much the same condition as at the time of inspection provided conditions around it for its basic survival do not alter greatly. This may be independent from, or contributed to by vigour.

Useful Life Expectancy (ULE) ULE is the length of time that the arborist assesses an individual tree can be retained with an acceptable level of risk based on the information available at the time of inspection. It is a snapshot in time of the potential an individual tree has for survival in the eyes of the assessor. ULE is not static – it is closely related to tree health and the surrounding conditions. Alterations in these variables may result in changes to the ULE assessment. Consequently, the reliability all ULE assessments have will decrease as time passes from the initial assessment and the potential for changes in variables increases.

- **Remove –** Trees that should be removed within the next 5 years
- **Short –** Trees that appear to be retainable at the time of the assessment for 5-15 years with an acceptable level of risk.
- **Medium –** Trees that appear to be retainable at the time of the assessment for 15-40 years with an acceptable level of risk.
- **Long –** Trees that appear to be retainable at the time of the assessment for 40+ years with an acceptable level of risk.

Amenity and Visual Value – For the purposes of assessing the visual and landscape value of each tree the IACA Significance of a Tree, Assessment Rating System (STARS) © (IACA 2010) © has been adopted. **-** The landscape significance of a tree is an essential criterion to establish the importance that a particular tree may have on a site. The system uses a scale of High, Medium and Low significance in the landscape.

High significance in landscape

- The tree is in good condition and good vigour
- The tree has a form typical for the species
- The tree is a remnant or is a planted locally indigenous specimen and/or is rare or uncommon in the local area or of botanical interest or of substantial age
- The tree is listed as a heritage item, threatened species or part of an endangered ecological community or listed on council's significant tree register
- The tree is visually prominent and visible from a considerable distance when viewed from most directions within the landscape due to its size and scale and makes a positive contribution to the local amenity
- The tree supports social and cultural sentiments or spiritual associations, reflected by the broader population or community group or has commemorative values
- The tree's growth is unrestricted by above and below ground influences, supporting its ability to reach dimensions typical for the taxa in situ – tree is appropriate to the site conditions

Medium significance in landscape

- The tree is in fair-good condition and good or low vigour
- The tree has form typical or atypical of the species
- The tree is a planted locally indigenous or a common species with its taxa commonly planted in the local area
- The tree is visible from surrounding properties, although not visually prominent as partially obstructed by other vegetation or buildings when viewed from the street
- The tree provides a fair contribution to the visual character and amenity of the local area
- The tree's growth is moderately restricted by above or below ground influences, reducing its ability to reach dimensions typical for the taxa in situ

Low significance in landscape

- The tree is in fair-poor condition and good or low vigour
- The tree has form atypical of the species
- The tree is not visible or is partly visible from the surrounding properties as obstructed by other vegetation or buildings
- The tree provides a minor contribution or has a negative impact on the visual character and amenity of the local area
- The tree is a young specimen which may or may not have reached dimensions to be protected by local Tree Preservation Orders or similar protection mechanisms and can easily be replaced with a suitable specimen
- The tree's growth is severely restricted by above or below ground influences, unlikely to reach dimensions typical for the taxa in situ – tree is inappropriate to the site conditions
- The tree is listed as exempt under the provisions of the local Council Tree Preservation Order or similar protection mechanisms
- The tree has a wound or defect that has the potential to become structurally unsound
- **Environmental Pest / Noxious Weed Species**
- The tree is an environmental pest species due to its invasiveness or poisonous/allergenic properties.
- The tree is a declared noxious weed by legislation
- **Hazardous / Irreversible Decline**
- The tree is structurally unsound and/or unstable and is considered potentially dangerous
- The tree is dead, or is in irreversible decline, or has the potential to fail or collapse in full or in part in the immediate to short term

The tree is to have a minimum of three (3) criteria in a category to be classified in that group.

In the development of this document IACA acknowledges the contribution and original concept of the Footprint Green Tree Significance & Retention Value Matrix, developed by Footprint Green Pty Ltd in June 2010.

The Australian Standard 4970-2009 Protection of Trees on Development Sites defines the requirements for assessing trees with respect to development. It provides the guidance on how to decide which trees are appropriate for retention and on the means of protecting them during construction works. It describes the areas and offsets, referred to as the Tree Protection Zone (TPZ) and Structural Root Zone (SRZ) required to be free from development works to maintain tree vitality and stability. This report has been prepared in accordance with the conditions set out within the standard.

- **Tree Protection Zone** – The tree protection zone is defined as a specified area above and below ground set aside for the protection of the tree's roots and crown. It is expressed as a radial measurement taken from the centre of the trunk at ground level.
- **Structural Root Zone** – The structural root zone is defined as a specified area around the base of a tree required to maintain its stability within the ground. It is expressed as a radial measurement taken from the center of the trunk at ground level. Excavation and development works are not recommended within the structural root zone unless additional investigation as to root size and location is undertaken

APPENDIX 12.2 PUNCHBOWL AIA (PLATEAU TREES)

PLATEAUTREES
Safety. Quality. Progress.

ARBORICULTURAL IMPACT ASSESSMENT

PUNCHBOWL TRAIN STATION UPGRADE

Prepared by Colin Curtis
AQF 5 Arboriculture Diploma
Tree Risk Assement Qualified (TRAQ)
Member of Arboriculture Australia #2332
Member of the International Society of Arboriculture #228182
completearbor@gmail.com
0413 801 557

Prepared for: Downer Group P/L

15/06/021

EXECUTIVE SUMMARY

Plateau Trees has been commissioned by Downer Group P/L to produce an Arboricultural Impact Assessment (AIA) regarding the development of Punchbowl Train Station Upgrade

Eight (8) x trees located upon Canterbury Bankstown Council land (adjacent to the subject site) were assessed to produce this report.

Following an assessment of construction impacts (detailed in section 5 of this report) the following recommendations (detailed in section 7 of this report) have been developed.

7.1 Due to the major TPZ/SRZ encroachments required to undertake the proposed works, all the subject trees have been recommended to be removed (subject to council approval).

7.2 To ensure that the biodiversity of the area is maintained, tree/s recommended to be removed, must be replaced. Tree/s selected for replacement plantings should be endemic species that will attain a similar height & canopy spread of those removed. These trees are to be chosen in accordance with AS 2303-2015 (Tree Stock for Landscape Use) & planting is to be undertaken by a suitably qualified AQF[1] person/s.

7.3 Approved tree removal works must be undertaken by an AQF level 3 arborist in accordance with the Work Cover Amenity Code of Practice (1998) and the Work Safe Guide to tree Trimming and Removal (2006).

7.4 It is recommended that an AQF Level 5 Arborist is engaged to oversee/meet any arboricultural matters that may arise if the proposed works are approved.

[1] Australian Qualification Framework

CONTENTS

1. INTRODUCTION

1.1 Plateau Trees has been commissioned by Downer Group P/L to produce an Arboricultural Impact Assessment (AIA) regarding the development of Punchbowl Train Station (Upgrade).

1.2 This AIA has been prepared following the guidelines provided in Australian Standard (AS) 4970-2009, Protection of Trees on Development Sites.

2. THE SITE

Figure 1: Street view of the subject trees taken from Urunga Parade, Punchbowl (*nearmap 2021*).

Figure 2: Location of the subject trees shown in red (*nearmap 2021*).

3. METHOD

3.1 The subject site and trees were visually assessed from ground level on the 27th May 2021.The *Genus/ species* of the subject trees were recorded as well as dimensions of Diameter at Breast Height (DBH) and Diameter at Base (DAB). Height, age and canopy spread of the trees were estimated. The subject trees were given a health / condition rating. Structural defects were looked for and comments recorded.

3.2 Calculations have been made using guidelines supplied in AS 4970-2009, specifically in relation to:

- Tree Protection Zone (TPZ)
- Structural Root Zone (SRZ)

3.3 The trees have been allocated a landscape significance rating of Low, Medium or High using the *IACA Significance of a Tree, Assessment Rating System* (STARS)© (IACA, 2010). Stars assessment criteria includes:

- Condition and Vigour
- Form, species specific
- Provenance, age and botanical significance
- Heritage and Ecological significance
- Size, shape, and local amenity value
- Restrictions to tree growth

Appendix B contains the assessment criteria in full.

3.4 The trees have been given a Useful Life Expectancy (ULE) rating, categorised as either:

- Long – 40+ years
- Medium – 15-40 years
- Short – 5-15 years
- Consider for removal - <5 years

4. OBSERVATIONS/DATA

Tree No.	Common Name *Genus Species*	Age	Height	Spread	DBH	DAB	SRZ	TPZ	Vigour / Condition	Native or Exotic	ULE	Amenity & Visual Value	Comments
1	Blackbutt *Eucalyptus pilularis*	M	12	8	36	44	2.34	4.32	F/F	N	S	M	Clash with permanent CSR, drainage and security fence.
2	Blackbutt *Eucalyptus pilularis*	M	9	6	23	32	2.05	2.76	F/F	N	S	M	Clash with permanent CSR, drainage and security fence.
3	Camphor Laurel *Cinnamomum camphora*	M	6	6	24	35	2.13	2.88	P/F	E	R	L	Clash with permanent CSR, drainage and security fence.
4	Camphor Laurel *Cinnamomum camphora*	M	7	7	23	40	2.25	2.76	F/F	E	R	L	Clash with permanent CSR, drainage and security fence.
5	Scribbly Gum *Eucalyptus haemastoma*	M	12	10	57	64	2.74	6.84	F/F	N	S	M	Clash with permanent CSR, drainage and security fence.
6	Tallowood *Eucalyptus microcorys*	M	10	10	50	56	2.59	6	F/F	N	S	M	Clash with permanent CSR, drainage and security fence.
7	Blackbutt *Eucalyptus pilularis*	M	10	6	27	36	2.15	3.42	F/F	N	S	M	Clash with permanent CSR, drainage and security fence.
8	Willow Gum *Eucalyptus scoporia*	M	10	8	37	40	2.39	4.42	F/F	N	S	L	Clash with permanent CSR, drainage and security fence.

5.CONSTRUCTION IMPACTS

Tree No.	Proposed encroachments into TPZ and/or canopy	Likely Impacts from the proposed construction (Discussion)
1-8	Major 40-50% encroachments into the TPZ/SRZ for the installation of fencing and drainage.	Loss of structural woody and non woody roots resulting in reduced water uptake, along with a high lilkehood of tree decline/failure.

6. DOCUMENTS USED IN THE PREPARATION OF THIS REPORT

Document type	Source/ Author	Title	Date	Summary
Plan	None	Punch Bowl Station – Location of Trees on Street	No Date	Locations of trees as discussed in this report.
Plan	Plateau Trees	TPZ/SRZ Plans	2/06/2021	TPZ/SRZ plans shown over the development.
Plan	Metro T2M	For Construction	21/04/2021	DWG.SMCSWSWM-MTM-WPS-CE-DWG-493156 shown over the development.

7. RECOMMENDATIONS/CONCLUSIONS

7.1 Due to the major TPZ/SRZ encroachments required to undertake the proposed works, all the subject trees have been recommended to be removed (subject to council approval).

7.2 To ensure that the biodiversity of the area is maintained, tree/s recommended to be removed, must be replaced. Tree/s selected for replacement plantings should be endemic species that will attain a similar height & canopy spread of those removed. These trees are to be chosen in accordance with AS 2303-2015 (Tree Stock for Landscape Use) & planting is to be undertaken by a suitably qualified AQF person/s.

7.3 Approved tree removal works must be undertaken by an AQF level 3 arborist in accordance with the Work Cover Amenity Code of Practice (1998) and the Work Safe Guide to tree Trimming and Removal (2006).

7.4 It is recommended that an AQF Level 5 Arborist is engaged to oversee/meet any arboricultural matters that may arise if the proposed works are approved.

8. LIMITATIONS ON THE USE OF THIS REPORT

This report is to be utilised in its entirety only. Any written or verbal submission, report or presentation that includes statements taken from the findings, discussions, conclusions or recommendations made in this report, may only be used where the whole of the original report (or a copy) is referenced in, & directly attached to that submission, report or presentation.

9. ASSUMPTIONS

Care has been taken to obtain information from reliable resources. All data has been verified insofar as possible; however, the author of this report can neither guarantee nor be responsible for the accuracy of information provided by others.

Unless stated otherwise:

Information contained in this report covers only the trees that were examined & reflects the condition of the trees at the time of inspection.

The inspection was limited to visual examination of the subject trees without dissection, excavation, probing or coring. There is no warranty or guarantee, expressed or implied, that problems or deficiencies of the subject trees may not arise in the future.

This report does not represent or contain a tree risk assessment.

10. REFERENCES

IACA, 2010. *IACA Significance of a Tree, Asessment Rating System (STARS), Institute of Australian Consulting Arboriculturists, Australia.* [Online] Available at: www.iaca.org.au [Accessed 19th June 2015].

Nearmap, 2016. [Online] Available at: http://maps.au.nearmap.com/ [Accessed 1/06/2021].

NSW Government, 2019. *NSW Planning Portal.* [Online]
Available at: https://www.planningportal.nsw.gov.au/find-a-property

Standards Australia, 2009. AS 4970-2009, Protection of trees on development sites. Sydney: Standards Australia.

RELEVANT APPENDICES - APPENDIX A: GLOSSARY OF TERMS

Photographs – all images have been taken from near maps.

Common Name/*Genus species* - the common name and genus/ species of the tree.

Age Class- assessment of the trees current age.

Immature (IM) - refers to a tree at growth stages between immaturity and full size**.**

Semi-mature (SM) - refers to a full-sized tree with some capacity for further growth.

Mature (M)-refers to a full-sized tree with some capacity for further growth.

Over-mature (OM) - a mature tree has reached a near stable size (biomass) above and below the ground. Trees can have a Mature Age Class for > 90% of their life span. Over-mature (**OM**) trees show symptoms of irreversible decline and decreasing biomass.

Live Stag (LS) - refers to a tree in a significant state of decline. This is the last stage of a tree prior to death.

Height -estimated overall height of the tree.

Diameter at Breast Height (DBH) - the trunk diameter at breast height (in metres) of the tree, 1.4 meters above ground level.

Diameter above the Buttress (**DAB) -** refers to the tree trunk diameter measured above the root buttress and is used to calculate the radius of the SRZ.

Tree Protection Zone (TPZ) - is a "No Go Zone" surrounding a tree to aid in its ability to cope with disturbances associated with construction works. Tree protection involves minimising root damage that is caused by activities such as construction. Tree protection also reduces the chance of a tree's decline in health or death & the possibly damage to structural stability of the tree from root damage.

Structural Root Zone (SRZ) – the structural root zone is the area required for the tree's stability. A larger area is required to maintain a viable tree. The SRZ is only needed to be calculated when a major encroachment into the TPZ is proposed. There are many factors that affect the size of the SRZ (e.g. tree height, crown area, soil type, soil moisture). The SRZ may also be influenced by natural or built structures, such as rock and footings.

Vigour - **Good (G), Fair (F) or Poor (P) –** this refers to the trees vigour as exhibited by the crown density, leaf colour, presence of epicormic shoots, ability to withstand disease invasion and the degree of dieback.

Condition – **Excellent (E), Very Good (VG), Good (G), Fair (F), Declining (D), Poor (P),Very Poor (VP).**this refers to the tree's form & growth habit, as modified by its environment (aspect suppression by other tree/s, soils,) & the state of the scaffold (i.e. trunk & major branches),including structural defects such as cavities, crooked trunks or weak trunk/branch junctions. These are not directly connected with health & it is possible for a tree to be healthy but in poor condition/vigour.

Useful Life Expectancy (ULE) ULE is the length of time that the arborist assesses an individual tree can be retained with an acceptable level of risk based on the information available at the time of inspection. It is a snapshot in time of the potential an individual tree has for survival in the eyes of the assessor. ULE is not static – it is closely related to tree health and the surrounding conditions. Alterations in these variables may result in changes to the ULE assessment. Consequently, the reliability all ULE assessments have will decrease as time passes from the initial assessment and the potential for changes in variables increases.

- **Remove –** Trees that should be removed within the next 5 years.
- **Short –** Trees that appear to be retainable at the time of the assessment for 5-15 years with an acceptable level of risk.
- **Medium –** Trees that appear to be retainable at the time of the assessment for 15-40 years with an acceptable level of risk.
- **Long –** Trees that appear to be retainable at the time of the assessment for 40+ years with an acceptable level of risk.

Crown Spread - the greatest width from drip line to drip line of a branch across the trees crown.

APPENDIX B: SIGNIFICANCE OF A TREE, ASSESSMENT RATING SYSTEM* (IACA 2010) – S.T.A.R.S. ©

Significance of a Tree, Assessment Rating System* (IACA 2010) – S.T.A.R.S. ©

The landscape significance of a tree is an essential criterion to establish the importance that a particular tree may have on a site. However, rating the significance of a tree becomes subjective and difficult to ascertain in a consistent and repetitive fashion due to assessor bias. It is therefore necessary to have a rating system utilising structured qualitative criteria to assist in determining the retention value for a tree. To assist this process all definitions for terms used in the *Tree Significance - Assessment Criteria* and *Tree Retention Value - Priority Matrix*, are taken from the IACA Dictionary for Managing Trees in Urban Environments 2009.

This rating system will assist in the planning processes for proposed works, above and below ground where trees are to be retained on or adjacent a development site. The system uses a scale of *High*, *Medium* and *Low* significance in the landscape. Once the landscape significance of an individual tree has been defined, the retention value can be determined. An example of its use in an Arboricultural report is shown as Appendix A.

Tree Significance - Assessment Criteria

High Significance in landscape

- The tree is in Good condition and Good vigour.
- The tree has a form typical for the species;
- The tree is a remnant or is a planted locally indigenous specimen and/or is rare or uncommon in the local area or of botanical interest or of substantial age;
- The tree is listed as a Heritage Item, Threatened Species or part of an endangered ecological community or listed on Councils Significant Tree Register;
- The tree is visually prominent and visible from a considerable distance when viewed from most directions within the landscape due to its size and scale and makes a positive contribution to the local amenity;
- The tree supports social and cultural sentiments or spiritual associations, reflected by the broader population or community group or has commemorative values;
- The tree's growth is unrestricted by above and below ground influences, supporting its ability to reach dimensions typical for the taxa *in situ* - tree is appropriate to the site conditions.

Medium Significance in landscape

- The tree is in Fair-Good condition and Good or Low vigour;
- The tree has form typical or atypical of the species;
- The tree is a planted locally indigenous or a common species with its taxa commonly planted in the local area
- The tree is visible from surrounding properties, although not visually prominent as partially obstructed by other vegetation or buildings when viewed from the street,
- The tree provides a fair contribution to the visual character and amenity of the local area,
- The tree's growth is moderately restricted by above or below ground influences, reducing its ability to reach dimensions typical for the taxa *in situ*.

Low Significance in landscape

- The tree is in fair-poor condition and good or low vigour;
- The tree has form atypical of the species;
- The tree is not visible or is partly visible from surrounding properties as obstructed by other vegetation or buildings,
- The tree provides a minor contribution or has a negative impact on the visual character and amenity of the local area,
- The tree is a young specimen which may or may not have reached dimension to be protected by local Tree Preservation orders or similar protection mechanisms and can easily be replaced with a suitable specimen,
- The tree's growth is severely restricted by above or below ground influences, unlikely to reach dimensions typical for the taxa *in situ* - tree is inappropriate to the site conditions,
- The tree is listed as exempt under the provisions of the local Council Tree Preservation Order or similar protection mechanisms,
- The tree has a wound or defect that has potential to become structurally unsound.

Environmental Pest / Noxious Weed Species
- The tree is an Environmental Pest Species due to its invasiveness or poisonous/ allergenic properties,
- The tree is a declared noxious weed by legislation.

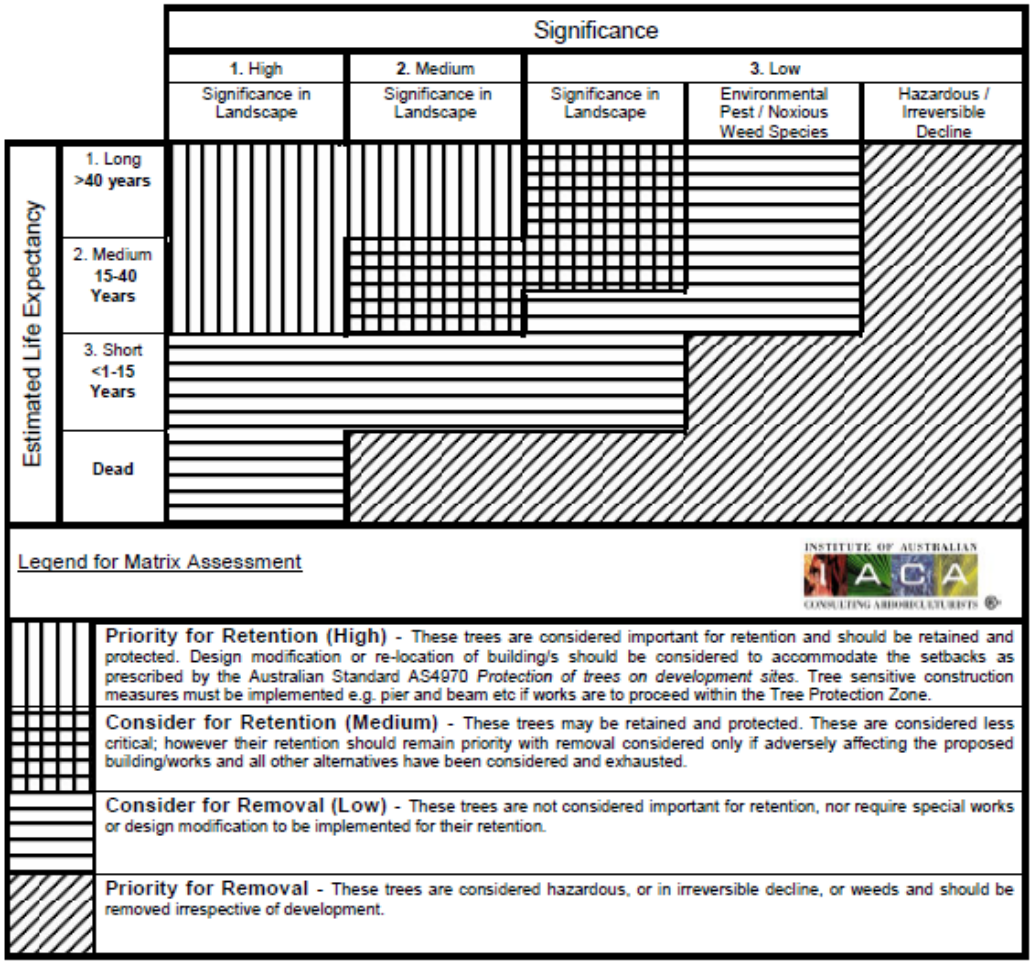
Hazardous/Irreversible Decline
- The tree is structurally unsound and/or unstable and is considered potentially dangerous,
- The tree is dead, or is in irreversible decline, or has the potential to fail or collapse in full or part in the immediate to short term.

The tree is to have a minimum of three (3) criteria in a category to be classified in that group.

Note: The assessment criteria are for individual trees only, however, can be applied to a monoculture stand in its entirety e.g. hedge.

Institute of Australian Consulting Arboriculturists (IACA 2010), *IACA Significance of a Tree, Assessment Rating System (STARS)*, www.iaca.org.au

Table 1.0 Tree Retention Value - Priority Matrix.



USE OF THIS DOCUMENTAND REFERENCING The IACA Significance of a Tree, Assessment Rating System (STARS) is free to use, but only in its entirety and must be cited as follows', 2010, *IACA Significance of a Tree, Assessment Rating System (STARS)*, Institute of Australian Consulting Arboriculturists, Australia, www.iaca.org.au

REFERENCES Australia ICOMOS Inc. 1999, *The Burra Charter –The Australian ICOMOS Charter for Places of Cultural Significance*, International Council of Monuments and Sites, www.icomos.org/australia Draper BD and Richards PA 2009, *Dictionary for Managing Trees in Urban Environments*, Institute of Australian Consulting Arboriculturists(IACA), CSIRO Publishing, Collingwood, Victoria, Australia. Footprint Green Pty Ltd2001, *Footprint Green Tree Significance & Retention Value Matrix*, Avalon, NSW Australia, www.footprintgreen.com.auIACA 2010, *IACA Significance of a Tree, Assessment Rating System (STARS)*, Institute of Australian Consulting Arboriculturists, www.iaca.org.au

APPENDIX 12.3 PUNCHBOWL AIA (PLATEAU TREES)

Date: 2nd July 2021

Arborist Assessment Punchbowl Station

At the request of Downer Group an onsite arboricultural inspection at Punchbowl Station was conducted on the 29th June 2021.Weather conditions were overcast.

The reason for this inspection was to assess and identify one (1) x tree required to be removal as to allow for the construction of a new extended stairway.

A walkthrough of the site was conducted in the presence of a Downer Group representative.

Upon inspection it was concluded that the subject tree (shown within the attached images below), will require removal to facilitate the proposed construction to take place.

Best Regards
Colin Curtis

Level 5 Consulting Arborist
Tree Risk Assessment Qualification (TRAQ)
Member of Arboriculture Australia #2332
Member of the International Society of Arboriculture (ISA) # 228182

Image of the subject tree taken on the 29th June 2021.

Location of the subject tree circled in red (*Metromap 2021*)

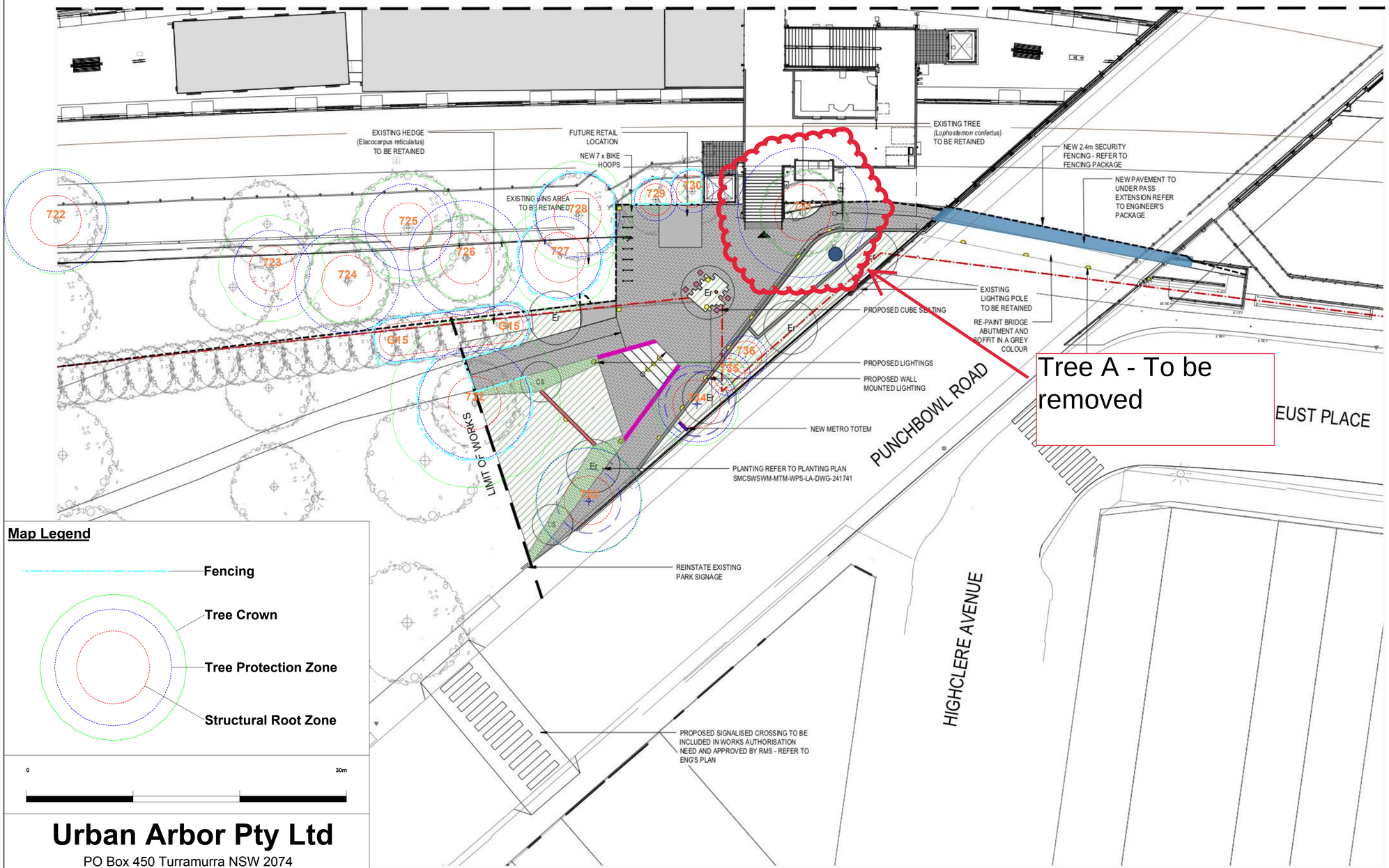
Appendix 1: Tree Assessment Schedule

Tree number	Tree name	Tree dimensions				Vigour	Condition	Age class	ULE	Amenity and Visual Value	Native or Exotic	TPZ (m)	SRZ (m)	Comments	Remove or Retain
	Botanical name **Common name**	**Height (m)**	**Spread (m)**	**DBH (mm)**	**DAB (mm)**										
A	*Lophostemon confertus* Brush Box	9	7	35	50	NV	F	M	M	L	N	4.2	2.47	Clash with permanent stairs design.	Remove

TO SYDNEY

TO BANKSTOWN

ADJOINS DRAWINGS SMCSWSWM-MTM-WPS-LA-DWG-241720



LEGEND

GENERAL
- RAILCORP PROPERTY BOUNDARY

FENCES/WALLS
- NEW 2.4m HIGH SECURITY FENCE

TREES
- EXISTING TREES TO BE RETAINED
- EXISTING TREES TO BE REMOVED

LANDSCAPE
- NEW PLANTING
- NEW BUSH TUCKER GARDEN
- Er *Elaeocarpus reticulatus*
- Cs *Corymbia 'Summer Red'*

HARDSCAPE
- NEW PLAZA PAVING
- NEW SEATING WALL
- NEW RETAINING WALL
- NEW CONCRETE STEP
- NEW TACTILES
- PROPOSED CUBE SEATING
- EXTRA CONCRETE FOR UNDERPASS

STREET FURNITURE
- BIKE PARKING (HOOPS)
- NEW METRO TOTEM

LIGHTING
- NEW LIGHTING TO BE CO-ORDINATED WITH LIGHTING ENGINEER
- NEW WALL MOUNTED LIGHTING TO BE CO-ORDINATED WITH LIGHTING ENGINEER
- NEW UP LIGHTING TO BE CO-ORDINATED WITH LIGHTING ENGINEER

STREETSCAPE
- EXISTING ELECTRICAL POLE

Map Legend

- Fencing
- Tree Crown
- Tree Protection Zone
- Structural Root Zone

0 30m

Urban Arbor Pty Ltd
PO Box 450 Turramurra NSW 2074
sales@urbanarbor.com.au

Site Location: Punchbowl Station
Punchbowl NSW

SCALE :	DATE :
1 : 200 @ A1	1/14/2020

URBAN ARBOR
The Trusted Name in Tree Management

Appendix 1A - Proposed Site Plan North

Prepared by: Jack Williams, Urban Arbor Pty Ltd

Appendix 2: Tree Assessment Criteria

Tree number: Identifying number given to individual (or group) trees.
Botanical Name: Latin name for tree showing genus and species.
Common Name: The common name given to the tree.
Tree Dimensions: The physical dimensions of the tree.

- **Height**: Estimated or measured height of tree in meters.
- **Spread**: Estimated or measured radial canopy spread of tree in meters.
- **Diameter at Breast Height (DBH)**: The estimated or measured diameter of trunk given in mm measured at 1.4m from ground.
- **Diameter Above Base (DAB)**: The estimated or measured diameter of trunk given in mm measured above the root flare. Used to calculate the structural root zone of the tree.

Age Class: An estimation of how old the tree is in relation to its life expectancy.

- **Young** – Age less than 20% of life expectancy of tree in situ
- **Mature** – Age 20% - 80% of life expectancy of tree in situ
- **Old** – Age greater than 80% of life expectancy of tree in situ
- **Dead** – Tree is dead

Vigour: Ability of a tree to sustain its life processes. This is independent of the condition of a tree but may impact upon it. Vigour can appear to alter rapidly with change of seasons (seasonality) e.g., dormant, deciduous or semi-deciduous trees. Vigour can be categorized as Dormant, Low, Normal and High.

- **Dormant Vigour** – Determined by the existing turgidity in the lower order branches in the outer extremity of the crow, with good bud set and formation, and where the last extension growth is distinct from those most recently preceding it, evident by bud scale scars. Normal vigour during dormancy is achieved when such growth is evident on a majority of branches throughout the crown.
- **Low Vigour** – Reduced ability of a tree to sustain its life processes. This may be evident by the atypical growth of leaves, reduced crown cover and reduced crown density, branches, roots and trunk, and a deterioration of their functions with reduced resistance to predation. This is independent of the condition of a tree but may impact upon it, and especially the ability of a tree to sustain itself against predation.
- **Normal Vigour** – Ability of a tree to maintain and sustain its life processes. This may be evident by the typical growth of leaves, crown cover and crown density, branches, roots and trunk and resistance to predation. This is independent of the condition of a tree but may impact upon it, and especially the ability of a tree to sustain itself against predation.
- **High Vigour** – Accelerated growth of a tree due to incidental or deliberate artificial changes to its growing environment that are seemingly beneficial, but may result in premature aging or failure if the favourable conditions cease, or promote prolonged senescence if the favourable conditions remain, e.g. water from a leaking pipe, water and nutrients from a leaking or disrupted sewer pipe, nutrients from animal waste, a tree growing next to a chicken coop, or a stock feed lot, or a regularly used stockyard, a tree subject to stringent watering and fertilisation program, or some trees may achieve an extended lifespan from continuous pollarding practices over the life of the tree.

Condition: A tree's crown form and growth habit, as modified by its environment (aspect, suppression by other trees, soils) the stability and viability of the root plate, trunk and structural branches (first (1^{st}) and possibly (2^{nd}) order branches), including structural defects such as wounds, cavities or hollows, crooked trunk or weak trunk/branch junctions and the effects of predation by pests and diseases. These may not be directly connected with vigour, and it is possible for a tree to be of normal vigour but in poor condition. Condition can be categorized as Dead, Poor, Fair and Good.

- **Dead Condition** – Tree is no longer capable of performing any of the following processes or is exhibiting any of the following symptoms; Photosynthesis via its foliage crown (as indicated by the presence of moist, green or other coloured leaves), Osmosis (the ability of the roots system to take up water), Turgidity (the ability of the plant to sustain moisture pressure in its cells), Epicormic shoots or epicormic strands in Eucalypts (the production of new shoots as a response to stress, generated from latent or adventitious buds or from a lignotuber), Permanent leaf loss, Permanent leaf wilting (the loss of turgidity which is marked by desiccation of stems leaves and roots), Abscission of the epidermis (bark desiccates and peels off to the beginning of the sap wood).
- **Poor Condition** - Tree is of good habit or misshapen, a form that may be severely restricted for space and light, exhibits symptoms of advanced and irreversible decline such as fungal, or bacterial infestation, major die-back in the branch and foliage crown, structural deterioration from insect damage e.g. termite infestation, or storm damage or lightning strike, ring barking from borer activity in the trunk, root damage or instability of the tree, or damage from physical wounding impacts or abrasion, or from altered local environmental conditions and has been unable to adapt to such changes and may decline further to death regardless of remedial works or other modifications to the local environment that would normally be sufficient to provide for its basic survival if in good to fair condition. Deterioration physically, often characterised by a gradual and continuous reduction in vigour but may be independent of a change in vigour, but characterised by a proportionate increase in susceptibility to, and predation by pests and diseases against which the tree cannot be sustained. Such conditions may also be evident in trees of advanced senescence due to normal phenological processes, without modifications to the growing environment or physical damage having been inflicted upon the tree. This may be independent from or contributed to by vigour.

- **Fair Condition** - Tree is of good habit or misshapen, a form not severely restricted for space and light, has some physical indication of decline due to the early effects of predation by pests and diseases, fungal, bacterial, or insect infestation, or has suffered physical injury to itself that may be contributing to instability or structural weaknesses, or is faltering due to the modification of the environment essential for its basic survival. Such a tree may recover with remedial works where appropriate, or without intervention may stabilise or improve over time, or in response to the implementation of beneficial changes to its local environment. This may be independent from or contributed to by vigour.
- **Good Condition** - Tree is of good habit, with crown form not severely restricted for space and light, physically free from the adverse effects of predation by pests and diseases, obvious instability or structural weaknesses, fungal, bacterial or insect infestation and is expected to continue to live in much the same condition as at the time of inspection provided conditions around it for its basic survival do not alter greatly. This may be independent from or contributed to by vigour.

Useful Life Expectancy (ULE) ULE is the length of time that the arborist assesses an individual tree can be retained with an acceptable level of risk based on the information available at the time of inspection. It is a snapshot in time of the potential an individual tree has for survival in the eyes of the assessor. ULE is not static – it is closely related to tree health and the surrounding conditions. Alterations in these variables may result in changes to the ULE assessment. Consequently, the reliability all ULE assessments have will decrease as time passes from the initial assessment and the potential for changes in variables increases.

- **Remove –** Trees that should be removed within the next 5 years
- **Short –** Trees that appear to be retainable at the time of the assessment for 5-15 years with an acceptable level of risk.
- **Medium –** Trees that appear to be retainable at the time of the assessment for 15-40 years with an acceptable level of risk.
- **Long –** Trees that appear to be retainable at the time of the assessment for 40+ years with an acceptable level of risk.

Amenity and Visual Value – For the purposes of assessing the visual and landscape value of each tree the IACA Significance of a Tree, Assessment Rating System (STARS) © (IACA 2010) © has been adopted. - The landscape significance of a tree is an essential criterion to establish the importance that a particular tree may have on a site. The system uses a scale of High, Medium and Low significance in the landscape.

High significance in landscape

- The tree is in good condition and good vigour
- The tree has a form typical for the species
- The tree is a remnant or is a planted locally indigenous specimen and/or is rare or uncommon in the local area or of botanical interest or of substantial age
- The tree is listed as a heritage item, threatened species or part of an endangered ecological community or listed on council's significant tree register
- The tree is visually prominent and visible from a considerable distance when viewed from most directions within the landscape due to its size and scale and makes a positive contribution to the local amenity
- The tree supports social and cultural sentiments or spiritual associations, reflected by the broader population or community group or has commemorative values
- The tree's growth is unrestricted by above and below ground influences, supporting its ability to reach dimensions typical for the taxa in situ – tree is appropriate to the site conditions

Medium significance in landscape

- The tree is in fair-good condition and good or low vigour
- The tree has form typical or atypical of the species
- The tree is a planted locally indigenous or a common species with its taxa commonly planted in the local area
- The tree is visible from surrounding properties, although not visually prominent as partially obstructed by other vegetation or buildings when viewed from the street
- The tree provides a fair contribution to the visual character and amenity of the local area
- The tree's growth is moderately restricted by above or below ground influences, reducing its ability to reach dimensions typical for the taxa in situ

Low significance in landscape

- The tree is in fair-poor condition and good or low vigour
- The tree has form atypical of the species
- The tree is not visible or is partly visible from the surrounding properties as obstructed by other vegetation or buildings
- The tree provides a minor contribution or has a negative impact on the visual character and amenity of the local area
- The tree is a young specimen which may or may not have reached dimensions to be protected by local Tree Preservation Orders or similar protection mechanisms and can easily be replaced with a suitable specimen
- The tree's growth is severely restricted by above or below ground influences, unlikely to reach dimensions typical for the taxa in situ – tree is inappropriate to the site conditions
- The tree is listed as exempt under the provisions of the local Council Tree Preservation Order or similar protection mechanisms
- The tree has a wound or defect that has the potential to become structurally unsound
- **Environmental Pest / Noxious Weed Species**
- The tree is an environmental pest species due to its invasiveness or poisonous/allergenic properties.
- The tree is a declared noxious weed by legislation
- **Hazardous / Irreversible Decline**

- The tree is structurally unsound and/or unstable and is considered potentially dangerous
- The tree is dead, or is in irreversible decline, or has the potential to fail or collapse in full or in part in the immediate to short term

The tree is to have a minimum of three (3) criteria in a category to be classified in that group.

In the development of this document IACA acknowledges the contribution and original concept of the Footprint Green Tree Significance & Retention Value Matrix, developed by Footprint Green Pty Ltd in June 2010.

The Australian Standard 4970-2009 Protection of Trees on Development Sites defines the requirements for assessing trees with respect to development. It provides the guidance on how to decide which trees are appropriate for retention and on the means of protecting them during construction works. It describes the areas and offsets, referred to as the Tree Protection Zone (TPZ) and Structural Root Zone (SRZ) required to be free from development works to maintain tree vitality and stability. This report has been prepared in accordance with the conditions set out within the standard.

- **Tree Protection Zone** – The tree protection zone is defined as a specified area above and below ground set aside for the protection of the tree's roots and crown. It is expressed as a radial measurement taken from the centre of the trunk at ground level.
- **Structural Root Zone** – The structural root zone is defined as a specified area around the base of a tree required to maintain its stability within the ground. It is expressed as a radial measurement taken from the centre of the trunk at ground level. Excavation and development works are not recommended within the structural root zone unless additional investigation as to root size and location is undertaken

APPENDIX 12.4 PUNCHBOWL AIA (PLATEAU TREES)

PLATEAUTREES
Safety. Quality. Progress.

Date: 28 September 2021

Re: Additional tree removals at Punchbowl Station as part of the Southwest Metro Package.

At the request of Downer Group an onsite inspection was undertake at Punchbowl Station. It has been asked to identify and record additional tree removals beyond those recommended within the Arboricultural Impact Assessment (AIA) prepared by Urban Arbor, dated 15 January 2020, Ref 20/01/15/SWMPB. On the 17 September a site walkthrough was undertaken by myself. Additional tree removals were identified under guidance of a Downer Group representative.

The subject trees consist of a line planting of five *Elaeocarpus reticulatus* (Blueberry Ash) located adjacent the rail corridor, refer to Appendix 1 Site photographs. They are identified as tree G15 within the AIA report prepared by Urban Arbor. Appendix 2 Tree Assessment Schedule details the data relating to the trees.

At the time of the inspection the trees were found to be in good health and condition, consistent with their species type, age class and growing environment.

It was advised that the trees are located within the footprint of a concrete slab to be installed as part of the station entry precinct. As such, they cannot be retained under the current design. Their removal is not through to pose a significant impact upon local amenity when taking into consideration the wider station upgrade works. Replacement planting with advanced tree stock is to be undertaken to offset the tree removals.

Plateau Tree Service Pty Ltd
PO BOX 1522, DEE WHY NSW 2099 Australia
P: 02 9939 5350 | F: 02 9905 7569
E: info@plateautrees.com.au | W: www.plateautrees.com.au
ABN : 17 090 798 002

All appropriate approvals and consents are to be obtained prior to tree and vegetation removal works commencing. All tree pruning and removal works are to be undertaken by suitably qualified tree workers and in accordance with *AS4373-2007 Pruning of Amenity Trees* and the Safe Work Australia's Guide to Managing Risks of Tree Trimming and Removal Works.

Please feel free to contact me should you require any further assistance regarding this matter.

Regards.
Owen Tebbutt

Consulting Arborist
Plateau Tree Service

Appendix 1: Site Photographs

Photograph 1: Showing the five *Elaeocarpus reticulatus* (Blueberry Ash) to be removed.

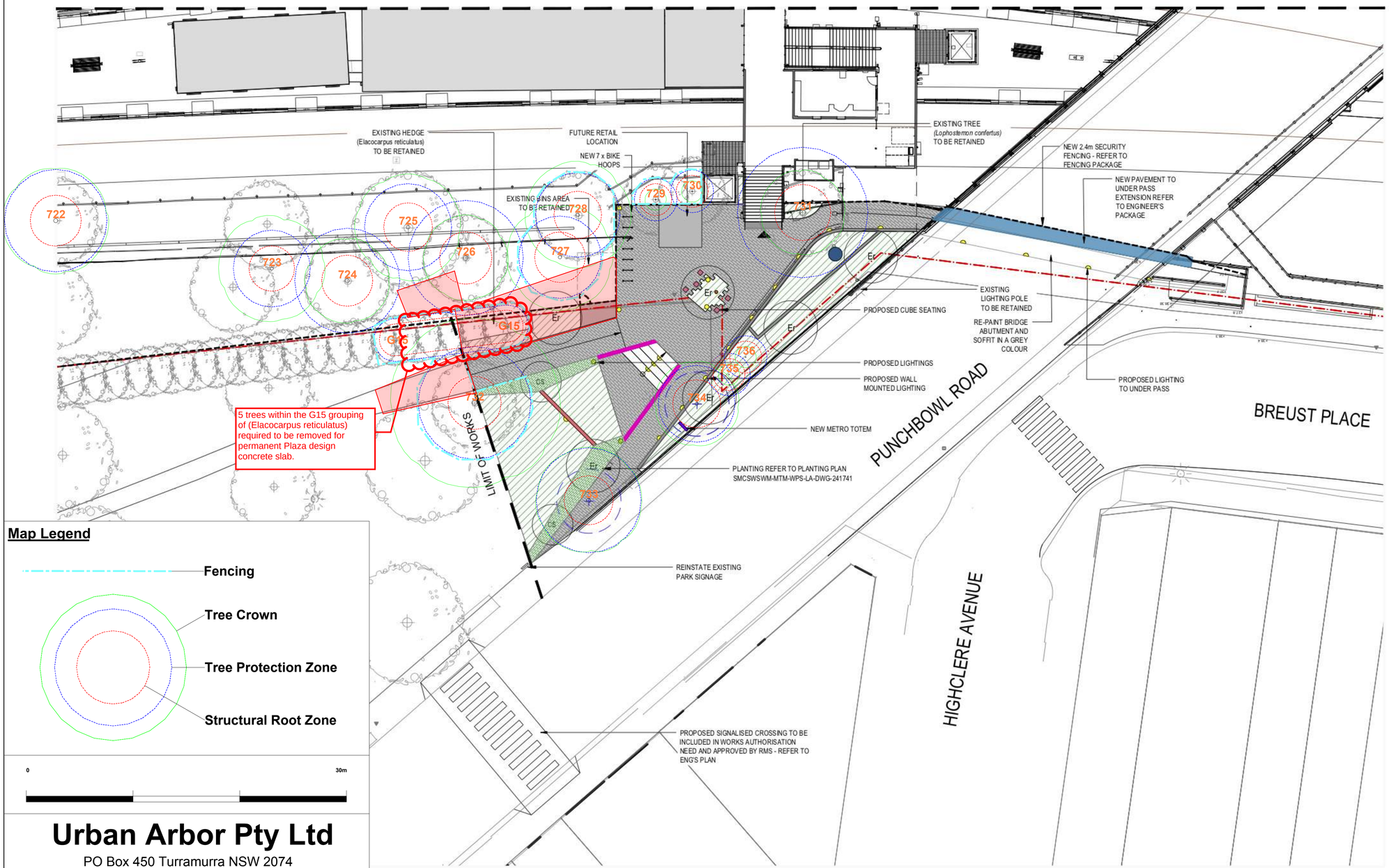
Appendix 2: Tree Assessment Schedule

Tree number	Tree name	Tree dimensions				Vigour	Condition	Age class	ULE	Amenity and Visual Value	Native or Exotic	TPZ (m)	SRZ (m)	Comments	Remove or Retain
	Botanical name Common name	Height (m)	Spread (m)	D.B.H. (mm)	D.A.B. (mm)										
G15	*Elaeocarpus reticulatus* (Blueberry Ash)	1-5	1x1	≈70	≈100	N	G	Y	M	L	N	2	1.5	Grouping of five individual specimens at the western end of the line planting. Trees located within footprint of proposed Plaza concrete slab. DBH and DAB are average estimated measurements. Minimum TPZ and SRZ apply. Canopy density of eastern most tree considered to be low.	Remove

TO SYDNEY

TO BANKSTOWN

ADJOINS DRAWINGS SMCSWSWM-MTM-WPS-LA-DWG-241720



LEGEND

GENERAL
- RAILCORP PROPERTY BOUNDARY

FENCES/WALLS
- NEW 2.4m HIGH SECURITY FENCE

TREES
- EXISTING TREES TO BE RETAINED
- EXISTING TREES TO BE REMOVED

LANDSCAPE
- NEW PLANTING
- NEW BUSH TUCKER GARDEN
- *Elaeocarpus reticulatus*
- *Corymbia 'Summer Red'*

HARDSCAPE
- NEW PLAZA PAVING
- NEW SEATING WALL
- NEW RETAINING WALL
- NEW CONCRETE STEP
- NEW TACTILES
- PROPOSED CUBE SEATING
- EXTRA CONCRETE FOR UNDERPASS

STREET FURNITURE
- BIKE PARKING (HOOPS)
- NEW METRO TOTEM

LIGHTING
- NEW LIGHTING TO BE CO-ORDINATED WITH LIGHTING ENGINEER
- NEW WALL MOUNTED LIGHTING TO BE CO-ORDINATED WITH LIGHTING ENGINEER
- NEW UP LIGHTING TO BE CO-ORDINATED WITH LIGHTING ENGINEER

STREETSCAPE
- EXISTING ELECTRICAL POLE

Map Legend

- Fencing
- Tree Crown
- Tree Protection Zone
- Structural Root Zone

0 30m

Urban Arbor Pty Ltd
PO Box 450 Turramurra NSW 2074
sales@urbanarbor.com.au

Site Location: Punchbowl Station
Punchbowl NSW

SCALE :	DATE :
1 : 200 @ A1	1/14/2020

URBAN ARBOR
The Trusted Name in Tree Management

Appendix 1A - Proposed Site Plan North

Prepared by: Jack Williams, Urban Arbor Pty Ltd

APPENDIX 12.5 PUNCHBOWL AIA (PLATEAU TREES)

PLATEAUTREES
Safety. Quality. Progress.

Date: 21 December 2021

Re: Additional tree removals at Punchbowl Station as part of the Southwest Metro Package.

At the request of Downer Group an onsite inspection was undertake at Punchbowl Station. It has been asked to identify and record additional tree removals beyond those recommended within the Arboricultural Impact Assessment (AIA) prepared by Urban Arbor, dated 15 January 2020, Ref 20/01/15/SWMPB. On the 20 December a site walkthrough was undertaken by myself. Additional tree removals were identified under guidance of a Downer Group representative.

Two trees, being *Sapium sebiferum* (Chinese Tallowwood) tree 1 and *Cinnamomum camphora* (Camphor Laurel) tree 2 have been identified for removal. The trees are located within the alignment of excavations required to install the new high voltage and combined services route (CSR) conduits. As such, under the current design the trees cannot be retained.

At the time of the inspection the trees were found to be in good health and fair condition, consistent with their species type, age class and growing environment. Photographs of the trees can be found as **Appendix 1** Site Photographs. Tree data can be found as **Appendix 2** Tree assessment Schedule. **Appendix 3** details the tree assessment criteria.

Removal of the trees is not thought to pose a significant impact upon local amenity when taking into consideration the wider station upgrade works. Replacement planting with advanced tree stock is to be undertaken to offset the tree removals.

Plateau Tree Service Pty Ltd
PO BOX 1522, DEE WHY NSW 2099 Australia
P: 02 9939 5350 | F: 02 9905 7569
E: info@plateautrees.com.au | W: www.plateautrees.com.au
ABN : 17 090 798 002

The trees are not representative of an endangered or threatened species or ecological community.

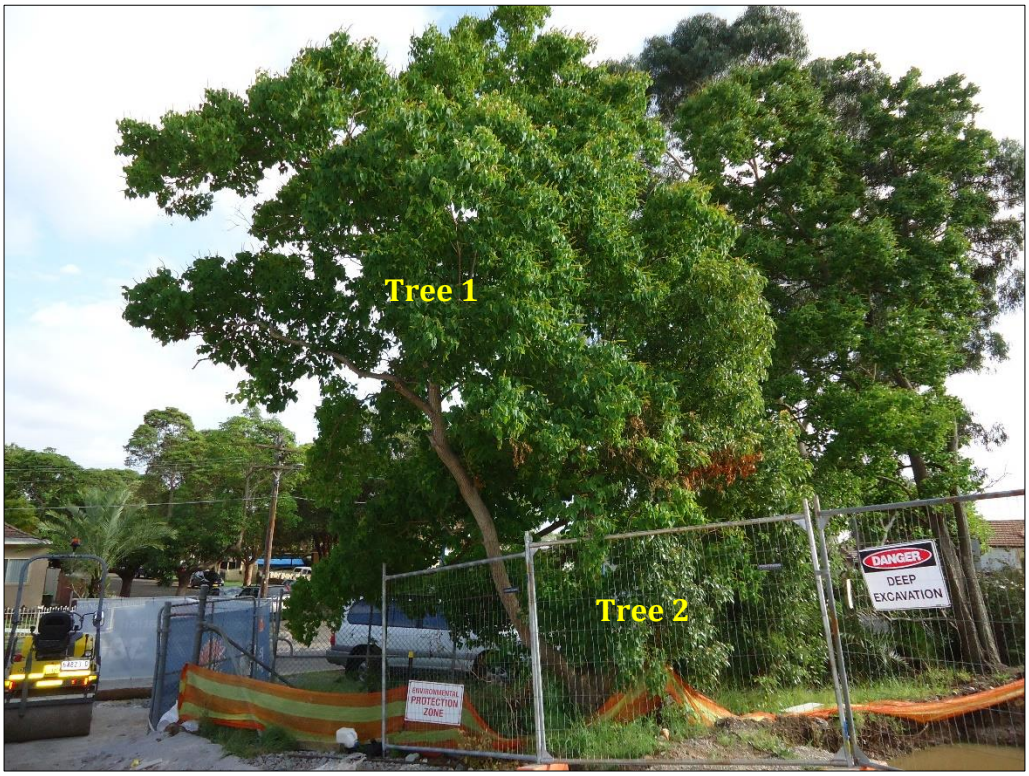
All appropriate approvals and consents are to be obtained prior to tree and vegetation removal works commencing. All tree removal works are to be undertaken by suitably qualified tree workers in accordance with Safe Work Australia's Guide to Managing Risks of Tree Trimming and Removal Works.

Please feel free to contact me should you require any further assistance regarding this matter.

Regards.
Owen Tebbutt

Plateau Trees

Appendix 1: Site Photographs



Photograph 1: The subject trees as seen from within the rail corridor. Tree 1 *Sapium sebiferum* (Chinese Tallowwood), tree 2 *Cinnamomum camphora* (Camphor Laurel).

Photograph 1: Showing the individual trunks of the subject trees.

Appendix 2: Tree Assessment Schedule

Tree number	Tree name Botanical name Common name	Tree dimensions Height (m)	Spread (m)	D.B.H. (mm)	D.A.B. (mm)	Vigour	Condition	Age class	ULE	Amenity and Visual Value	Native or Exotic	TPZ (m)	SRZ (m)	Comments	Remove or Retain
1	*Sapium sebiferum* (Chinese Tallowwood)	10-15	4x4	300 200	450	N	G	M	S	M	E	4.32	2.37	Tree has been pruned around overhead wires.Canopy offset from position of trunk. Tree trunk and root base is within the footprint of the permanent in-ground combined service route.	Remove
2	*Cinnamomum camphora* (Camphor Laurel)	5-10	0.5x0.5	100	200	N	G	Y	S	L	E	2	1.68	Tree likely to be self-seeded or sucker growth off root stock of adjacent tree. Suppressed by adjacent Chinese Tallowwood (Tree 1). Listed weed species under the Biosecurity Act 2015. Tree trunk and root base is within the footprint of the permanent in-ground combined service route.	Remove

Appendix 3: Tree Assessment Criteria

Tree number: Identifying number given to individual (or group) trees.
Botanical Name: Latin name for tree showing genus and species.
Common Name: The common name given to the tree.
Tree Dimensions: The physical dimensions of the tree.

- **Height**: Estimated or measured height of tree in meters.
- **Spread**: Estimated or measured radial canopy spread of tree in meters.
- **Diameter at Breast Height (DBH)**: The estimated or measured diameter of trunk given in mm measured at 1.4m from ground.
- **Diameter Above Base (DAB)**: The estimated or measured diameter of trunk given in mm measured above the root flare. Used to calculate the structural root zone of the tree.

Age Class: An estimation of how old the tree is in relation to its life expectancy.

- **Young** – Age less than 20% of life expectancy of tree in situ
- **Mature** – Age 20% - 80% of life expectancy of tree in situ
- **Old** – Age greater than 80% of life expectancy of tree in situ
- **Dead** – Tree is dead

Vigour: Ability of a tree to sustain its life processes. This is independent of the condition of a tree but may impact upon it. Vigour can appear to alter rapidly with change of seasons (seasonality) e.g., dormant, deciduous or semi-deciduous trees. Vigour can be categorised as Dormant, Low, Normal and High.

- **Dormant Vigour** – Determined by the existing turgidity in the lower order branches in the outer extremity of the crow, with good bud set and formation, and where the last extension growth is distinct from those most recently preceding it, evident by bud scale scars. Normal vigour during dormancy is achieved when such growth is evident on a majority of branches throughout the crown.
- **Low Vigour** – Reduced ability of a tree to sustain its life processes. This may be evident by the atypical growth of leaves, reduced crown cover and reduced crown density, branches, roots and trunk, and a deterioration of their functions with reduced resistance to predation. This is independent of the condition of a tree but may impact upon it, and especially the ability of a tree to sustain itself against predation.
- **Normal Vigour** – Ability of a tree to maintain and sustain its life processes. This may be evident by the typical growth of leaves, crown cover and crown density, branches, roots and trunk and resistance to predation. This is independent of the condition of a tree but may impact upon it, and especially the ability of a tree to sustain itself against predation.
- **High Vigour** – Accelerated growth of a tree due to incidental or deliberate artificial changes to its growing environment that are seemingly beneficial, but may result in premature aging or failure if the favourable conditions cease, or promote prolonged senescence if the favourable conditions remain, e.g. water from a leaking pipe, water and nutrients from a leaking or disrupted sewer pipe, nutrients from animal waste, a tree growing next to a chicken coop, or a stock feed lot, or a regularly used stockyard, a tree subject to stringent watering and fertilisation program, or some trees may achieve an extended lifespan from continuous pollarding practices over the life of the tree.

Condition: A tree's crown form and growth habit, as modified by its environment (aspect, suppression by other trees, soils) the stability and viability of the root plate, trunk and structural branches (first (1st) and possibly (2nd) order branches), including structural defects such as wounds, cavities or hollows, crooked trunk or weak trunk/branch junctions and the effects of predation by pests and diseases. These may not be directly connected with vigour and it is possible for a tree to be of normal vigour but in poor condition. Condition can be categorised as Dead, Poor, Fair and Good.

- **Dead Condition** – Tree is no longer capable of performing any of the following processes or is exhibiting any of the following symptoms; Photosynthesis via its foliage crown (as indicated by the presence of moist, green or other coloured leaves), Osmosis (the ability of the roots system to take up water), Turgidity (the ability of the plant to sustain moisture pressure in its cells), Epicormic shoots or epicormic strands in Eucalypts (the production of new shoots as a response to stress, generated from latent or adventitious buds or from a lignotuber), Permanent leaf loss, Permanent leaf wilting (the loss of turgidity which is marked by desiccation of stems leaves and roots), Abscission of the epidermis (bark desiccates and peels off to the beginning of the sap wood).
- **Poor Condition** - Tree is of good habit or misshapen, a form that may be severely restricted for space and light, exhibits symptoms of advanced and irreversible decline such as fungal, or bacterial infestation, major die-back in the branch and foliage crown, structural deterioration from insect damage e.g. termite infestation, or storm damage or lightning strike, ring barking from borer activity in the trunk, root damage or instability of the tree, or damage from physical wounding impacts or abrasion, or from altered local environmental conditions and has been unable to adapt to such changes and may decline further to death regardless of remedial works or other modifications to the local environment that would normally be sufficient to provide for its basic survival if in good to fair condition. Deterioration physically, often characterised by a gradual and continuous reduction in vigour but may be independent of a change in vigour, but characterised by a proportionate increase in susceptibility to, and predation by pests and diseases against which the tree cannot be sustained. Such conditions may also be evident in trees of advanced senescence due to normal phenological processes, without modifications to the growing environment or physical damage having been inflicted upon the tree. This may be independent from, or contributed to by vigour.
- **Fair Condition** - Tree is of good habit or misshapen, a form not severely restricted for space and light, has some physical indication of decline due to the early effects of predation by pests and diseases, fungal, bacterial, or insect infestation, or has suffered physical injury to itself that may be contributing to instability or structural weaknesses, or is faltering due to the modification of the environment essential for its basic survival. Such a tree may recover with remedial works where appropriate, or without intervention may stabilise or improve over time, or in response to the implementation of beneficial changes to its local environment. This may be independent from, or contributed to by vigour.
- **Good Condition** - Tree is of good habit, with crown form not severely restricted for space and light, physically free from the adverse effects of predation by pests and diseases, obvious instability or structural weaknesses, fungal, bacterial or insect infestation and is expected to continue to live in much the same condition as at the time of inspection provided conditions around it for its basic survival do not alter greatly. This may be independent from, or contributed to by vigour.

Useful Life Expectancy (ULE) ULE is the length of time that the arborist assesses an individual tree can be retained with an acceptable level of risk based on the information available at the time of inspection. It is a snapshot in time of the potential an individual tree has for survival in the eyes of the assessor. ULE is not static – it is closely related to tree health and the surrounding conditions. Alterations in these variables may result in changes to the ULE assessment. Consequently, the reliability all ULE assessments have will decrease as time passes from the initial assessment and the potential for changes in variables increases.

- **Remove –** Trees that should be removed within the next 5 years
- **Short –** Trees that appear to be retainable at the time of the assessment for 5-15 years with an acceptable level of risk.
- **Medium –** Trees that appear to be retainable at the time of the assessment for 15-40 years with an acceptable level of risk.
- **Long –** Trees that appear to be retainable at the time of the assessment for 40+ years with an acceptable level of risk.

Amenity and Visual Value – For the purposes of assessing the visual and landscape value of each tree the IACA Significance of a Tree, Assessment Rating System (STARS) © (IACA 2010) © has been adopted. - The landscape significance of a tree is an essential criterion to establish the importance that a particular tree may have on a site. The system uses a scale of High, Medium and Low significance in the landscape.

High significance in landscape

- The tree is in good condition and good vigour
- The tree has a form typical for the species
- The tree is a remnant or is a planted locally indigenous specimen and/or is rare or uncommon in the local area or of botanical interest or of substantial age
- The tree is listed as a heritage item, threatened species or part of an endangered ecological community or listed on council's significant tree register
- The tree is visually prominent and visible from a considerable distance when viewed from most directions within the landscape due to its size and scale and makes a positive contribution to the local amenity
- The tree supports social and cultural sentiments or spiritual associations, reflected by the broader population or community group or has commemorative values
- The tree's growth is unrestricted by above and below ground influences, supporting its ability to reach dimensions typical for the taxa in situ – tree is appropriate to the site conditions

Medium significance in landscape

- The tree is in fair-good condition and good or low vigour
- The tree has form typical or atypical of the species
- The tree is a planted locally indigenous or a common species with its taxa commonly planted in the local area
- The tree is visible from surrounding properties, although not visually prominent as partially obstructed by other vegetation or buildings when viewed from the street
- The tree provides a fair contribution to the visual character and amenity of the local area
- The tree's growth is moderately restricted by above or below ground influences, reducing its ability to reach dimensions typical for the taxa in situ

Low significance in landscape

- The tree is in fair-poor condition and good or low vigour
- The tree has form atypical of the species
- The tree is not visible or is partly visible from the surrounding properties as obstructed by other vegetation or buildings
- The tree provides a minor contribution or has a negative impact on the visual character and amenity of the local area
- The tree is a young specimen which may or may not have reached dimensions to be protected by local Tree Preservation Orders or similar protection mechanisms and can easily be replaced with a suitable specimen
- The tree's growth is severely restricted by above or below ground influences, unlikely to reach dimensions typical for the taxa in situ – tree is inappropriate to the site conditions
- The tree is listed as exempt under the provisions of the local Council Tree Preservation Order or similar protection mechanisms
- The tree has a wound or defect that has the potential to become structurally unsound
- **Environmental Pest / Noxious Weed Species**
- The tree is an environmental pest species due to its invasiveness or poisonous/allergenic properties.
- The tree is a declared noxious weed by legislation
- **Hazardous / Irreversible Decline**
- The tree is structurally unsound and/or unstable and is considered potentially dangerous
- The tree is dead, or is in irreversible decline, or has the potential to fail or collapse in full or in part in the immediate to short term

The tree is to have a minimum of three (3) criteria in a category to be classified in that group.

In the development of this document IACA acknowledges the contribution and original concept of the Footprint Green Tree Significance & Retention Value Matrix, developed by Footprint Green Pty Ltd in June 2010.

The Australian Standard 4970-2009 Protection of Trees on Development Sites defines the requirements for assessing trees with respect to development. It provides the guidance on how to decide which trees are appropriate for retention and on the means of protecting them during construction works. It describes the areas and offsets, referred to as the Tree Protection Zone (TPZ) and Structural Root Zone (SRZ) required to be free from development works to maintain tree vitality and stability. This report has been prepared in accordance with the conditions set out within the standard.

- **Tree Protection Zone** – The tree protection zone is defined as a specified area above and below ground set aside for the protection of the tree's roots and crown. It is expressed as a radial measurement taken from the centre of the trunk at ground level.
- **Structural Root Zone** – The structural root zone is defined as a specified area around the base of a tree required to maintain its stability within the ground. It is expressed as a radial measurement taken from the center of the trunk at ground level. Excavation and development works are not recommended within the structural root zone unless additional investigation as to root size and location is undertaken

APPENDIX 12.6 PUNCHBOWL AIA (PLATEAU TREES)

PLATEAUTREES
Safety. Quality. Progress.

Tree Pruning Report

Prepared for: Downer Group

Site Address: Punchbowl Station
Punchbowl Road
Punchbowl
NSW
2196

Date: 22 January 2022

Prepared by: Owen Tebbutt
Consulting Arborist
Plateau Tree Service
Diploma in Horticulture (Arboriculture) Ryde TAFE 2006

PLATEAU TREES PTY LTD
A PO BOX 1522, DEE WHY NSW 2099 AUSTRALIA ABN 17 090 798 002
P 02 9939 5350 F 02 9905 7569
E info@plateautrees.com.au W www.plateautrees.com.au

Table of Contents

1.0 Introduction

1.1 Background

1.1.1 This tree pruning report has been prepared for Downer Group. It has been asked to identify and assess the pruning requirements needed to provide vegetation clearances to allow for crane lifting operations at Punchbowl Station as part of the Southwest Metro Project.

1.1.2 The station upgrade works involve the installation of prefabricated lift shafts. It has been advised that the prefabricated lift shafts arrive onsite on the semi-trailers and are to be lifted into place using a mobile slew crane. One tree being *Populus nigra 'Italica'* (Lombardy Poplar) located within the car park area adjacent The Boulevarde has been identified for selective pruning to allow for clearances to undertake these operations.

1.1.3 The following documentation was reviewed and assists in the preparation of this report:

- Bankstown Development Control Plan (DCP) 2015 Part B11, Tree Management Order
- Bankstown Tree Management Manual, June 2015, V. 1 Ref.602

1.1.4 This report is to be used in its entirety only. Any written or verbal submission, report or presentation that includes statements taken from the findings, discussions, conclusions or recommendations made in this report may only be used where the whole original report (or a copy) is referenced to and directly attached to that submission, report or presentation. Information contained in the report covers only the trees that were inspected and reflects the trees condition at the time of the inspection. There is no guarantee, expressed or implied, that problems or deficiencies of the subject trees may not arise in the future.

2.0 Inspection Methodology

2.1 On the 20 January 2022 an inspection of the tree was undertaken.

2.2 A 5m high clearance envelop has been identified in order to undertake the lifting operations. Branches thought to conflict with the lifting operations were identified for pruning through selective removal or reduction. The diameter of the branch, at the branch collar or growth point, has been recorded along with the approximate percentage of the total canopy volume they represent.

2.3 Data collected during the on-site inspection of the tree can be found as **Appendix 1** Tree Assessment and Pruning Schedule. The tree(s) were assessed using the principles of a ground based Visual Tree Assessment (VTA)[1] and methods consistent with modern arboriculture. No aerial (climbing) inspection, tissue sampling or diagnostic testing was undertaken as part of the inspection process unless otherwise stated.

2.4 Photographs of the tree can be found as **Appendix 2**. Where possible individual branches required for removal have been identified and are highlighted within the photographs.

2.5 Tree assessment criteria can be found as **Appendix 3**.

2.6 Pruning recommendations take into consideration the requirements of AS4373-2007 Pruning of Amenity Trees.

3.0 The Tree

3.1 General

3.1.1 The assessed tree has been identified as *Populus nigra 'Italica' (*Lombardy Poplar) At the time of the inspection, they were found to be in generally good health and condition, consistent with its species type, age class and growing

[1] Mattheck, C. and Breloer, H (2006), *The Body Language of Trees – A Handbook for Failure Analysis*, The Stationary Office. Pages 118-122.

environment. **Appendix 2** photograph 1 shows the tree and illustrates the required clearance requirements.

3.1.2 Poplar species are identified as exempt from tree management controls under point 2.4(b) of Part B11 of the Bankstown DCP 22015. The station is not located within a Bankstown Conservation Corridor.

3.2 Wildlife and Habitat

3.2.1 No hollows or cavities that may contain, or are considered suitable for, wildlife nesting or habitation were observed within the tree. No arboreal mammals or birds were observed within the tree during the inspection.

3.3 Threatened Species and/or Ecological Communities

3.3.1 The tree is not listed as a threatened species or form part of an endangered ecological community under the Threatened Species Conservation Act 1995 or the Environment Protection and Biodiversity Conservation Act 1999.

3.4 Trees Located on Private Property

3.4.1 The trees are not located within private property.

3.5 Heritage

3.5.1 The subject tree and the site are not identified under Schedule 5 Environmental Heritage of the Bankstown Environment Plan 2015 nor are they located within a heritage conservation area.

4.0 Assessed Pruning Works

4.1 All branches identified for removal were assessed with respect to AS4373-2007 pruning of Amenity Trees. Under the provisions of AS4373 the assessed pruning works fall within the selective pruning class. This class of pruning is applicable to all tree species. Pruning method has been provided as part 5 of this report.

4.2 Tree 1 has been assessed as requiring the removal and reduction of three first order branches identified as A, B and C. Branch A is a dead branch 100mm in diameter located at 4m height. This branch is to be removed at the collar. Branch B is 120mm diameter located at 4m height. This branch is to be removed at the

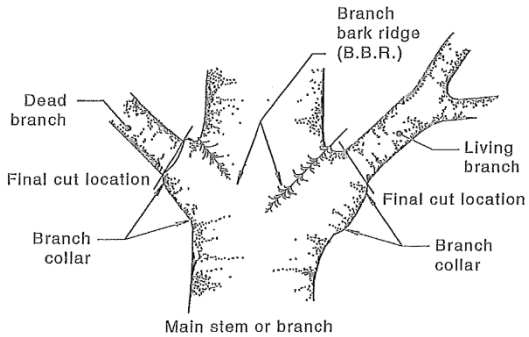
collar. Branch C is 150mm diameter located at 4m height. The branch is to be reduced to suitable growth point. Various epicormic shoots originating from the base of the trunk shall require removal. Additional second order branches less than 60mm in diameter may require removal to achieve clearances. These are to be removed as required to obtain the required clearances. The total pruning works constitute less than 10% of the total canopy volume of the tree and are considered to be minor pruning works. A short-term reduction in growth and physiological function can be expected as a result of the pruning works. Pruning wounds for branches A, B and C shall expose internal woody tissues which may become points of infection for decay causing fungi. **Appendix 2** photographs 2 and 3 shows branches identified for pruning.

4.5 The visual amenity of the tree is not expected to be significantly altered as a result of the prescribed pruning. Sightlines to the trees are thought to be limited to vehicles and pedestrians using the carpark and the junction of The Boulevarde and Mathews Street.

5.0 Pruning Method

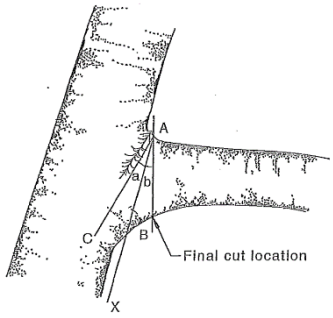
5.1 All tree pruning works are to be undertaken by suitably qualified tree workers (minimum AQF level 3 or equivalent) and in accordance with AS4373-2007 Pruning of Amenity Trees and Safe Work Australia's Guide to Managing Risks of Tree Trimming and Removal Works. All appropriate approvals and consents are to be obtained prior to tree removal works commencing.

5.2 Natural target pruning is the removal of branches, stems, and stubs such that final cuts are achieved as close as possible to the branch collar without cutting into it, or leaving a protruding stub. The branch collar is an area of overlapping trunk and branch tissue forming a swelling around the base of many branches. It contains defensive chemicals that prevent infection from bacterial



and/or fungal pathogens. The associated diagram shows final cut locations when undertaking pruning works.

5.3 On branches where the branch bark collar cannot be found, the branch bark ridge is to be used as a pruning guide. Line A to X is a line parallel to the trunk occurring just outside the branch bark ridge. Line A to C indicates the angle of the branch bark ridge and line A to B represents the angle and location of the final cut. Angle 'a' should equal angle 'b'.



5.4 The cutting of branches which results in a stub, referred to as lopping, is regarded as an unacceptable practice, except in certain circumstances. Lopping may result in:

- An increased rate of shoot production and elongation, which is weakly attached to the parent tree
- Decay of the stubs
- Poor form and visual amenity
- Reduced life expectancy of the tree
- Pre-disposing the tree to pathogenic infection and insect attack

6.0 Conclusions

6.1 At the time of the inspection the subject tree was found to be in generally good health and condition.

6.2 The prescribed pruning works are considered to be minor and are unlikely to significantly impact upon the health, condition and vitality of the tree in the short-term. The visual impacts of the pruning works are not considered to be significant given their extent.

6.3 Pruning works are to be undertaken as prescribed within this report.

6.4 In the interests of maintaining tree health and to minimise its visual impact all pruning works are to be kept to the minimal amount required to achieve the required 5m clearances. Where possible the final cuts are to be made so that the smallest wound area is left on the tree.

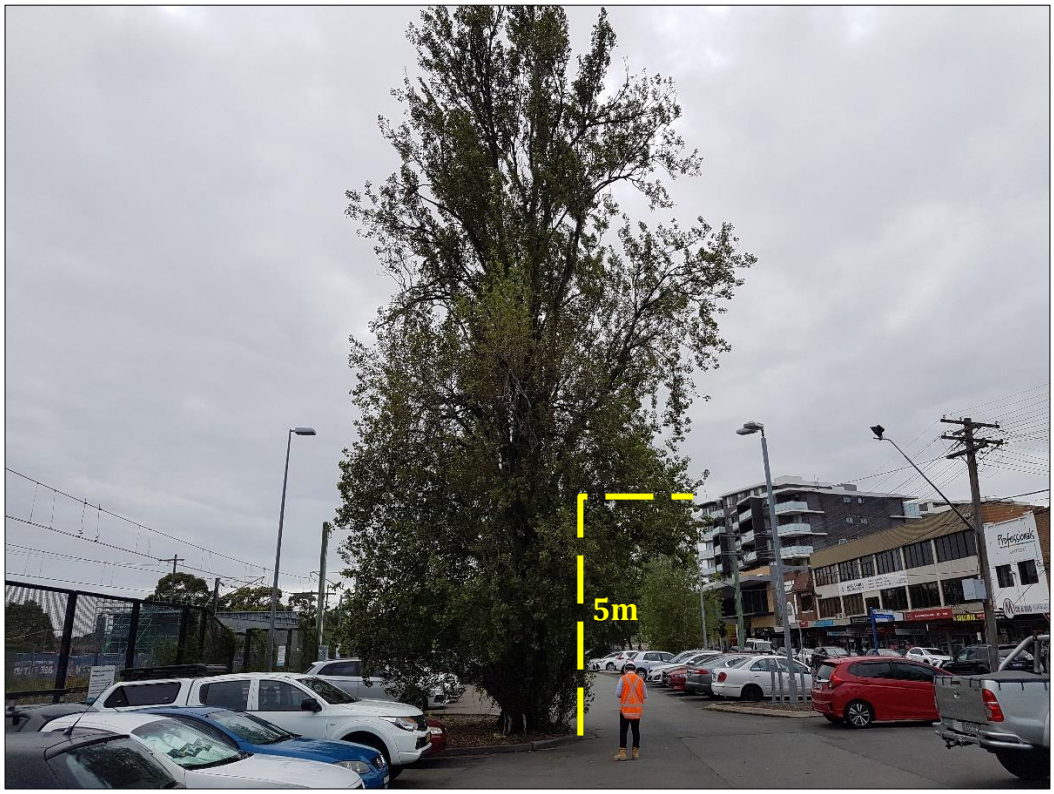
6.5 The trees are to be inspected by a suitably qualified arborist (minimum AQF 5 or equivalent) 12 months after completion of pruning works. At a minimum the inspection is to include:

- An assessment of the vigour, vitality and condition of the tree
- An assessment for the presence of decay at the pruning sites
- An assessment of the development of wound wood around the pruning site
- An assessment of the development of epicormic shoots at or near to the pruning site

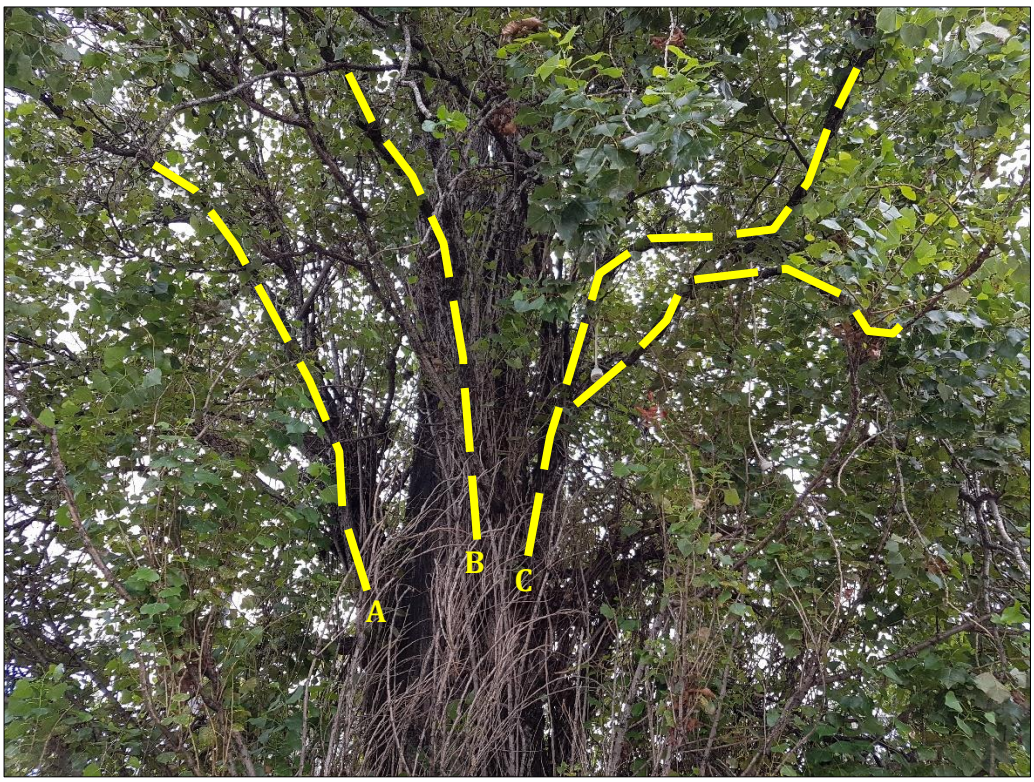
Appendix 1: Tree Assessment and Pruning Schedule

Tree number	Tree name Botanical name Common name	Tree dimensions Height (m)	 Spread (m)	 D.B.H. (mm)	Vigour	Condition	Age class	ULE	Landscape Significance	Pruning Requirements	Estimated % of Live Canopy Loss	Impacts/Comments
1	*Populus nigra 'Italica'* (Lombardy Poplar)	20-25	4x4	900	N	G	M	S	M	Branch A- 100mm diameter first order dead branch at 4m height, remove branch to collar Branch B- 120mm diameter first order branch at 4m height, remove branch to collar Branch C- 150mm diameter first order branch at 4m height, remove branch to collar Various epicormic shoots <30mm in diameter originating from the base of the trunk Various secondary branches <60mm diameter as and where needed to obtain clearances.	<10%	Short-term reduction in tree growth and physiological function. Pruning wounds large enough to expose internal woody tissues. Potential exists for wound area to be infected with decay causing fungi. Possible epicormic response throughout canopy.

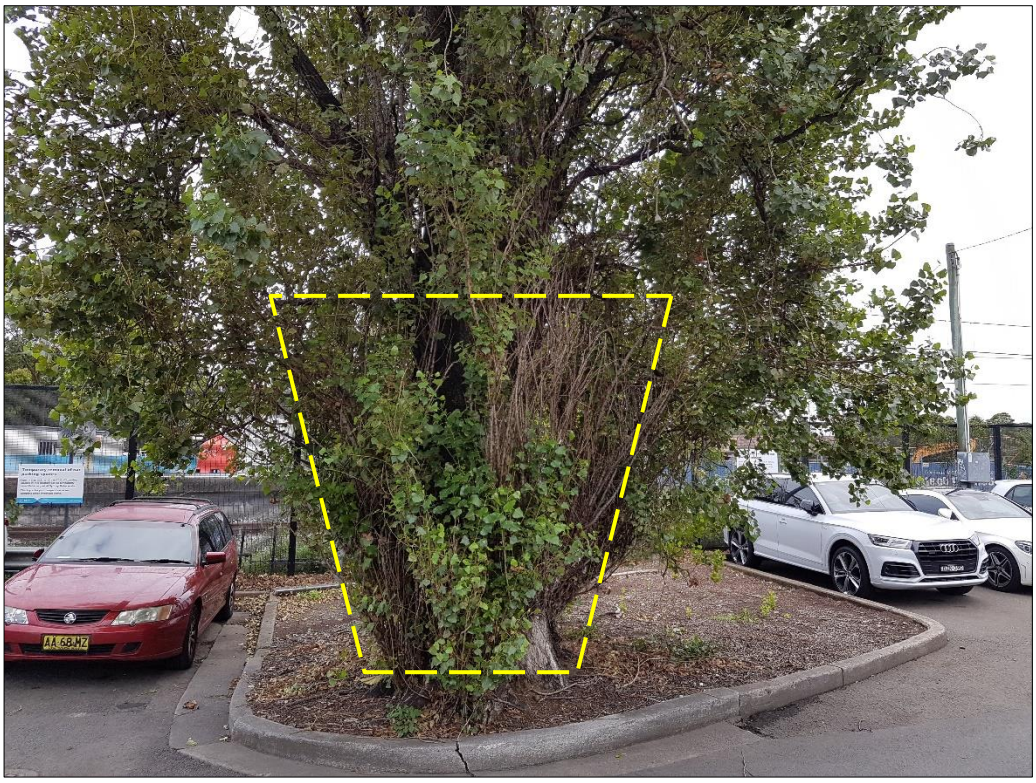
Appendix 2: Photographs



Photograph 1: Tree 1 *Populus nigra 'Italica'* (Lombardy Poplar as seen from the carpark area adjacent The Boulevarde. 5m of vertical clearance is required from the outside edge of kerb adjacent the base of the tree.



Photograph 2: Branches A, B and C identified for removal.



Photograph 3: Multiple epicormic shoots originating from the base of the trunk are to be removed.

Appendix 3: Tree Assessment Criteria

Tree number: Identifying number given to individual (or group) trees.
Botanical Name: Latin name for tree showing genus and species.
Common Name: The common name given to the tree.
Tree Dimensions: The physical dimensions of the tree.

- **Height**: Estimated or measured height of tree in meters.
- **Spread**: Estimated or measured radial canopy spread of tree in meters.
- **Diameter at Breast Height (DBH)**: The estimated or measured diameter of trunk given in mm measured at 1.4m from ground.

Age Class: An estimation of how old the tree is in relation to its life expectancy.

- **Young** – Age less than 20% of life expectancy of tree in situ
- **Mature** – Age 20% - 80% of life expectancy of tree in situ
- **Old** – Age greater than 80% of life expectancy of tree in situ
- **Dead** – Tree is dead

Vigour: Ability of a tree to sustain its life processes. This is independent of the condition of a tree but may impact upon it. Vigour can appear to alter rapidly with change of seasons (seasonality) e.g., dormant, deciduous or semi-deciduous trees. Vigour can be categorised as Dormant, Low, Normal and High.

- **Dormant Vigour** – Determined by the existing turgidity in the lower order branches in the outer extremity of the crow, with good bud set and formation, and where the last extension growth is distinct from those most recently preceding it, evident by bud scale scars. Normal vigour during dormancy is achieved when such growth is evident on a majority of branches throughout the crown.
- **Low Vigour** – Reduced ability of a tree to sustain its life processes. This may be evident by the atypical growth of leaves, reduced crown cover and reduced crown density, branches, roots and trunk, and a deterioration of their functions with reduced resistance to predation. This is independent of the condition of a tree but may impact upon it, and especially the ability of a tree to sustain itself against predation.
- **Normal Vigour** – Ability of a tree to maintain and sustain its life processes. This may be evident by the typical growth of leaves, crown cover and crown density, branches, roots and trunk and resistance to predation. This is independent of the condition of a tree but may impact upon it, and especially the ability of a tree to sustain itself against predation.
- **High Vigour** – Accelerated growth of a tree due to incidental or deliberate artificial changes to its growing environment that are seemingly beneficial, but may result in premature aging or failure if the favourable conditions cease, or promote prolonged senescence if the favourable conditions remain, e.g. water from a leaking pipe, water and nutrients from a leaking or disrupted sewer pipe, nutrients from animal waste, a tree growing next to a chicken coop, or a stock feed lot, or a regularly used stockyard, a tree subject to stringent watering and fertilisation program, or some trees may achieve an extended lifespan from continuous pollarding practices over the life of the tree.

Condition: A tree's crown form and growth habit, as modified by its environment (aspect, suppression by other trees, soils) the stability and viability of the root plate, trunk and structural branches (first (1st) and possibly (2nd) order branches), including structural defects such as wounds, cavities or hollows, crooked trunk or weak trunk/branch junctions and the effects of predation by pests and diseases. These may not be directly connected with vigour and it is possible for a tree to be of normal vigour but in poor condition. Condition can be categorised as Dead, Poor, Fair and Good.

- **Dead Condition** – Tree is no longer capable of performing any of the following processes or is exhibiting any of the following symptoms; Photosynthesis via its foliage crown (as indicated by the presence of moist, green or other coloured leaves), Osmosis (the ability of the roots system to take up water), Turgidity (the ability of the plant to sustain moisture pressure in its cells), Epicormic shoots or epicormic strands in Eucalypts (the production of new shoots as a response to stress, generated from latent or adventitious buds or from a lignotuber), Permanent leaf loss, Permanent leaf wilting (the loss of turgidity which is marked by desiccation of stems leaves and roots), Abscission of the epidermis (bark desiccates and peels off to the beginning of the sap wood).
- **Poor Condition** - Tree is of good habit or misshapen, a form that may be severely restricted for space and light, exhibits symptoms of advanced and irreversible decline such as fungal, or bacterial infestation, major die-back in the branch and foliage crown, structural deterioration from insect damage e.g. termite infestation, or storm damage or lightning strike, ring barking from borer activity in the trunk, root damage or instability of the tree, or damage from physical wounding impacts or abrasion, or from altered local environmental conditions and has been unable to adapt to such changes and may decline further to death regardless of remedial works or other modifications to the local environment that would normally be sufficient to provide for its basic survival if in good to fair condition. Deterioration physically, often characterised by a gradual and continuous reduction in vigour but may be independent of a change in vigour, but characterised by a proportionate increase in susceptibility to, and predation by pests and diseases against which the tree cannot be sustained. Such conditions may also be evident in trees of advanced senescence due to normal phenological processes, without modifications to the growing environment or physical damage having been inflicted upon the tree. This may be independent from, or contributed to by vigour.
- **Fair Condition** - Tree is of good habit or misshapen, a form not severely restricted for space and light, has some physical indication of decline due to the early effects of predation by pests and diseases, fungal, bacterial, or insect infestation, or has suffered physical injury to itself that may be contributing to instability or structural weaknesses, or is faltering due to the modification of the environment essential for its basic survival. Such a tree may recover with remedial works where appropriate, or without intervention may stabilise or improve over time, or in response to the implementation of beneficial changes to its local environment. This may be independent from, or contributed to by vigour.
- **Good Condition** - Tree is of good habit, with crown form not severely restricted for space and light, physically free from the adverse effects of predation by pests and diseases, obvious instability or structural weaknesses, fungal, bacterial or insect infestation and is expected to continue to live in much the same condition as at the time of inspection provided conditions around it for its basic survival do not alter greatly. This may be independent from, or contributed to by vigour.

Useful Life Expectancy (ULE) ULE is the length of time that the arborist assesses an individual tree can be retained with an acceptable level of risk based on the information available at the time of inspection. It is a snapshot in time of the potential an individual tree has for survival in the eyes of the assessor. ULE is not static – it is closely related to tree health and the surrounding conditions. Alterations in these variables may result in changes to the ULE assessment. Consequently, the reliability all ULE assessments have will decrease as time passes from the initial assessment and the potential for changes in variables increases.

- **Remove –** Trees that should be removed within the next 5 years
- **Short –** Trees that appear to be retainable at the time of the assessment for 5-15 years with an acceptable level of risk.
- **Medium –** Trees that appear to be retainable at the time of the assessment for 15-40 years with an acceptable level of risk.
- **Long –** Trees that appear to be retainable at the time of the assessment for 40+ years with an acceptable level of risk.

Landscape significance – For the purposes of assessing the visual and landscape value of each tree the IACA Significance of a Tree, Assessment Rating System (STARS) © (IACA 2010) © has been adopted. - The landscape significance of a tree is an essential criterion to establish the importance that a particular tree may have on a site. The system uses a scale of High, Medium and Low significance in the landscape.

High significance in landscape

- The tree is in good condition and good vigour
- The tree has a form typical for the species
- The tree is a remnant or is a planted locally indigenous specimen and/or is rare or uncommon in the local area or of botanical interest or of substantial age
- The tree is listed as a heritage item, threatened species or part of an endangered ecological community or listed on council's significant tree register
- The tree is visually prominent and visible from a considerable distance when viewed from most directions within the landscape due to its size and scale and makes a positive contribution to the local amenity
- The tree supports social and cultural sentiments or spiritual associations, reflected by the broader population or community group or has commemorative values
- The tree's growth is unrestricted by above and below ground influences, supporting its ability to reach dimensions typical for the taxa in situ – tree is appropriate to the site conditions

Medium significance in landscape

- The tree is in fair-good condition and good or low vigour
- The tree has form typical or atypical of the species
- The tree is a planted locally indigenous or a common species with its taxa commonly planted in the local area
- The tree is visible from surrounding properties, although not visually prominent as partially obstructed by other vegetation or buildings when viewed from the street
- The tree provides a fair contribution to the visual character and amenity of the local area
- The tree's growth is moderately restricted by above or below ground influences, reducing its ability to reach dimensions typical for the taxa in situ

Low significance in landscape

- The tree is in fair-poor condition and good or low vigour
- The tree has form atypical of the species
- The tree is not visible or is partly visible from the surrounding properties as obstructed by other vegetation or buildings
- The tree provides a minor contribution or has a negative impact on the visual character and amenity of the local area
- The tree is a young specimen which may or may not have reached dimensions to be protected by local Tree Preservation Orders or similar protection mechanisms and can easily be replaced with a suitable specimen
- The tree's growth is severely restricted by above or below ground influences, unlikely to reach dimensions typical for the taxa in situ – tree is inappropriate to the site conditions
- The tree is listed as exempt under the provisions of the local Council Tree Preservation Order or similar protection mechanisms
- The tree has a wound or defect that has the potential to become structurally unsound
- **Environmental Pest / Noxious Weed Species**
- The tree is an environmental pest species due to its invasiveness or poisonous/allergenic properties.
- The tree is a declared noxious weed by legislation
- **Hazardous / Irreversible Decline**
- The tree is structurally unsound and/or unstable and is considered potentially dangerous
- The tree is dead, or is in irreversible decline, or has the potential to fail or collapse in full or in part in the immediate to short term

The tree is to have a minimum of three (3) criteria in a category to be classified in that group.

In the development of this document IACA acknowledges the contribution and original concept of the Footprint Green Tree Significance & Retention Value Matrix, developed by Footprint Green Pty Ltd in June 2010.

APPENDIX 12.7 PUNCHBOWL AIA (ACTIVE GREEN SERVICES)

ARBORICULTURAL MEMORANDUM

Prepared for

Downer Group

Site Address

Punchbowl Train Station, Punchbowl NSW

January 2023

Prepared by

Iain Dunsmuir
Diploma of Arboriculture (AQF Level 5)

Location	Punchbowl, NSW 2203
Project	Punchbowl Station Sydney Metro Upgrade
Contact	Holly Hofland (Downer Group)
Prepared by	Iain Dunsmuir (AQF 5 Diploma of Arboriculture)
Date of Visit	09.01.2023
Site Attendees	Iain Dunsmuir

1 Introduction

i. Active Green Services has been engaged by Downer Group to assess thirty-one (31) trees at the Punchbowl Station Upgrade. The purpose of this document is to record the attending AQF Level 5 Arborist observations, comments and conclusions with regards to the site visit that was conducted on the 9th of January 2023.

2 Scope

i. Assess the vitality of trees within the provided survey area which have been noted to be in decline.

3 Arboricultural Findings

i. A stand of approximately thirty-one (31) *Elaeocarpus reticulatus* were assessed on the 9th of January 2023.

ii. With regards to this stand of assessed trees five (5) were found to be dead.

iii. Please note that there was no visible indicative factors present to suggest that the current construction activities were directly responsible for the mortality of these trees at the time of inspection. (However, some socketing of the root ball was observed which is a likely indicator of 'root rot'. Root rot can result from a combination of poor planting, poor stock and/or poor post-planting Plant Health Care Management. Hence a post-planting Tree Management Plan is always advisable).

4 Visual Tree Assessment Data

(Visual Tree Assessment Data Table: 09/01/2023)

Tree	Botanical Name Common Name	Age Class	Height	Canopy Spread	DBH (cm)	Structure Form	Vitality Vigour	Landscape Significance	ELE	Retention Value
T18	*Eleaocarpus reticulatus* (Blueberry Ash)	Semi-Mature	3m	N/S: 1m E/W: 1m	5cm	Poor Poor	Dead Dead	Low	Dead	Low **Remove**
T25	*Eleaocarpus reticulatus* (Blueberry Ash)	Semi-Mature	3m	N/S: 1m E/W: 1m	4cm	Poor Poor	Dead Dead	Low	Dead	Low **Remove**
T26	*Eleaocarpus reticulatus* (Blueberry Ash)	Semi-Mature	3m	N/S: 1m E/W: 1m	7cm	Poor Poor	Dead Dead	Low	Dead	Low **Remove**
T27	*Eleaocarpus reticulatus* (Blueberry Ash)	Semi-Mature	3m	N/S: 1m E/W: 1m	6cm	Poor Poor	Dead Dead	Low	Dead	Low **Remove**
T28	*Eleaocarpus reticulatus* (Blueberry Ash)	Semi-Mature	3m	N/S: 1m E/W: 1m	5cm	Poor Poor	Dead Dead	Low	Dead	Low **Remove**

5 Conclusion

i. Five (5) trees in the subject group of the thirty-one (31) assessed trees were deemed to be dead.

ii. With regards to the mortality of these subject five (5) trees, there was no visual indication to suggest that the adjacent construction works were directly responsible for the decline and subsequent demise of these trees.

6 Recomendations

i. Remove the subject five (5) dead trees concurrent with Compensatory Replanting and a site-specific Plant Health Care regimen.

7 Tree locations

The subject trees in situ

8 Photo Sets

The subject vegetation

Dead trees

Tree socketing in the ground from possible root rot

Dead foliage

9 Appendix

Institute of Australian Consulting Arboriculturists (IACA) Significance of a Tree, Assessment Rating System (STARS) **The tree is to have a minimum of 3 criteria in a category to be classified in that group*		
Low	**Medium**	**High**
The tree is in fair-poor condition and good or low vigour. The tree has form atypical of the species. The tree is not visible or is partly visible from the surrounding properties or obstructed by other vegetation or buildings. The tree provides a minor contribution or has a negative impact on the visual character and amenity of the local area. The tree is a young specimen which may or may not have reached dimensions to be protected by local Tree Preservation Orders or similar protection mechanisms and can easily be replaced with a suitable specimen. The tree's growth is severely restricted by above or below ground influences, unlikely to reach dimensions typical for the taxa in situ – tree is inappropriate to the site conditions. The tree is listed as exempt under the provisions of the local Council Tree Preservation Order or similar protection mechanisms. The tree has a wound or defect that has the potential to become structurally unsound. ENVIRONMENTAL PEST/NOXIOUS WEED The tree is an environmental pest species due to its invasiveness and/or poisonous/allergenic, properties/ declared noxious weed. HAZRADOUS / IRREVERSIBLE DECLINE The tree is structurally unsound unstable and considered potentially dangerous. The tree is dead or in irreversible decline with the potential to fail/collapse.	The tree is in fair to good condition. The tree has form typical or atypical of the species. The tree is a planted locally indigenous or a common species with its taxa commonly planted in the local area. The tree is visible from surrounding properties, although not visually prominent as partially obstructed by other vegetation or buildings when viewed from the street. The tree provides a fair contribution to the visual character and amenity of the local area. The tree's growth is Mediumly restricted by above or below ground influences, reducing its ability to reach dimensions typical for the taxa in situ.	The tree is in good condition and good vigour. The tree has a form typical for the species. The tree is a remnant or is a planted locally indigenous specimen and/or is rare or uncommon in the local area or of botanical interest or of substantial age. The tree is listed as a heritage item, threatened species or part of an endangered ecological community or listed on councils' significant/notable tree register. The tree is visually prominent and visible from a considerable distance when viewed from most directions within the landscape due to its size and scale and makes a positive contribution to the local amenity. The tree supports social and cultural sentiments or spiritual associations, reflected by the broader population or community group or has commemorative values. The tree's growth is unrestricted by above and below ground influences, supporting its ability to reach dimensions typical for the taxa in situ – tree is appropriate to the site conditions.

(STARS) Tree Retention Value - Priority Matrix

Significance of a Tree, Assessment Rating System (STARS), Institute of Australian Consulting Arboriculturists, Australia, 2010.

		Significance				
		1.High	**2.Medium**	**3.Low**		
		Significance in Landscape	Significance in Landscape	Significance in Landscape	Environmental Pest/Noxious Weed Species	Hazardous / Irreversible Decline
Estimated Life Expectancy	1.Long **>40 Years**					
	2.Medium **15-40 Years**					
	3.Short **<1-15 Years**					
	Dead					

	Priority for Retention (High) - These trees are considered important for retention and should be retained and protected. Design modification or re-location of building/s should be considered to accommodate the setbacks as prescribed by the Australian Standard AS4970 Protection of trees on development sites. Tree sensitive construction measures must be implemented e.g. pier and beam etc if works are to proceed within the Tree Protection Zone.
	Consider for Retention (Medium) - These trees may be retained and protected. These are considered less critical; however, their retention should remain priority with removal considered only if adversely affecting the proposed building/works and all other alternatives have been considered and exhausted.
	Consider for Removal (Low) - These trees are not considered important for retention, nor require special works or design modification to be implemented for their retention.
	Priority for Removal - These trees are considered hazardous, or in irreversible decline, or weeds and should be removed irrespective of development.

10 Assumptions & Limiting Conditions

1) Active Green Services Pty Ltd (herein after referred to as AGS) contracts with you on the basis that you promise that all legal information which you provide, including land title and ownership of other property, are correct. Active Green Services is not responsible for verifying or ascertaining any of these issues.
2) AGS contracts with you on the basis that your promise that all affected property complies with all applicable statutes and subordinate legislation.
3) AGS will take all reasonable care to obtain necessary information from reliable sources and to verify data. However, AGS neither guarantees nor is responsible for the accuracy of information provided by others.
4) If, after delivery of this report, you later require a representative of AGS to attend court to give evidence or to assist in the preparation for a hearing because of this report, you must pay an additional hourly fee at our then current rate for expert evidence.
5) Alteration of this report invalidates the entire report.
6) AGS retains the copyright in this report. Possession of the original or a copy of this report does not give you or anyone else any right of reproduction, publication or use without the written permission of AGS.
7) The contents of this report represent the professional opinion of the consultant. AGS consultancy fee for the preparation of this report is in no way contingent upon the consultant reporting a particular conclusion of fact, nor upon the occurrence of a subsequent event.
8) Sketches, diagrams, graphs and photographs in this report are intended as visual aids, are not to scale unless stated to be so, and must not be construed as engineering or architectural reports or as surveys.
9) Unless expressly stated otherwise:
    a. The information in this report covers only those items which were examined and reflects the condition of those items at the time of the inspection.
    b. Our inspection is limited to visual examination of accessible components without dissection, excavation or probing. There is no warranty or guarantee, express or implied, that even if they were not present during our inspection, problems or defects in plants or property examined may not arise in the future.
10) This Report supersedes all prior discussions and representations between AGS and the client on the subject.

APPENDIX 12.8 CCBC APPROVAL FOR TREE REMOVAL AT PUNCHBOWL STATION

Holly Hofland

From: Mario Vescio <Mario.Vescio@cbcity.nsw.gov.au>
Sent: Monday, 6 March 2023 9:42 AM
To: Holly Hofland
Cc: James Magsipoc
Subject: RE: Package 5 Sydney Metro - Approval sought for tree removal on Council Land - Punchbowl Station Urunga Parade

Morning Holly.

I hope you are well.

I have communicated with the team leader of open spaces, and I can confirm there are no objections to include T18 as per the Arborist report as part of the removals given its condition.

Kind regards,

CANTERBURY BANKSTOWN

Mario Vescio - Project Officer
T 9707 9672
E Mario.Vescio@cbcity.nsw.gov.au
www.cbcity.nsw.gov.au

@ourcbcity
Like & follow us

From: Holly Hofland <Holly.Hofland@downergroup.com>
Sent: Friday, March 3, 2023 11:59 AM
To: Mario Vescio <Mario.Vescio@cbcity.nsw.gov.au>; James Magsipoc <James.Magsipoc@cbcity.nsw.gov.au>
Subject: Package 5 Sydney Metro - Approval sought for tree removal on Council Land - Punchbowl Station Urunga Parade

Hi Mario,

I'm the Environment & Sustainability Advisor for Package 5 Sydney Metro – Punchbowl Station.
Could you please review the attached arborist report and confirm the following depicted trees at Urunga Parade can be removed? If you're the wrong person to ask would you please direct me to the correct person?

Four of the trees currently identified in the report have been previously approved by council for removal as they fall within the final Project design, the only tree not currently approved is identified as Tree T18 in the report.

Feel free to contact me should you require any further detail or clarification.

Kind Regards,
Holly Hofland
Environment & Sustainability Advisor
Infrastructure Projects

Downer
Relationships creating success

M | 0423651360
E | Holly.Hofland@downergroup.com
Gate 99, Bridge Road
Belmore New South Wales 2192
www.downergroup.com

Holly Hofland
Environment & Sustainability Advisor
Downer Group

Downer
Relationships creating success

T | 0478522247 **M** | 0478522247
E | Holly.Hofland@downergroup.com
Gate 99, Bridge Road
Belmore New South Wales 2192
www.downergroup.com

Downer

expressed in this message are those of the individual sender, except where the message states otherwise and the sender is authorized to state them to be the views of any such entity.

ACKNOWLEDGEMENT OF TREE REMOVAL AND TREE PRUNING

Date: 29 June 2021
Location: Punchbowl Station, Urunga Parade
Contractor: Downer

This Notice serves as Council's acknowledgement of Package 5 Sydney Metro - Tree Removal on Council Land - Punchbowl Station, Urunga Parade, proposal to prune/remove 8 Council street trees, as identified in the Aboricultural Impact Assessment (AIA), to facilitate the works subject to approved State Significant Infrastructure 8256 (SSI).

At the conclusion of removal and/or pruning works, you are requested to confirm the extent of trees removed and/or pruned for the purpose of Council updating its asset register.

I note that, pursuant to Condition E4, replacement plantings shall be:

1. At a ratio of 2:1
2. Replacement trees must be planted within the project boundary or on public land up to 500 metres of the project boundary.

Accordingly, please liaise with the undersigned for the purposes of consulting on the replacement planting, where relevant.

Wayne Bromfield
Team Leader Open Space Services

Mark Trethewy

From: James Magsipoc <James.Magsipoc@cbcity.nsw.gov.au>
Sent: Tuesday, 29 June 2021 3:16 PM
To: Luke Fraser
Cc: Mark Trethewy; Ash Jarvis; Ben Webb; Peter Anderson
Subject: FW: Package 5 Sydney Metro - Approval sought for Tree Removal on Council Land - Punchbowl Station, Urunga Parade
Attachments: Tree Removal and Pruning-Punchbowl Station. (002).doc

Hi Luke,

Herewith attach copy of Council approval to remove **8 trees** in Punchbowl Station.
Please return email if you did receive the attachment.

Best regards,

CANTERBURY BANKSTOWN

James Magsipoc - Project Officer
T 02 9707 9771
E James.Magsipoc@cbcity.nsw.gov.au
www.cbcity.nsw.gov.au

@ourcbcity
Like & follow us

From: Luke Fraser <Luke.Fraser@Downergroup.com>
Sent: Friday, 18 June 2021 4:02 PM
To: James Magsipoc <James.Magsipoc@cbcity.nsw.gov.au>
Cc: Ash Jarvis <Ash.Jarvis2@transport.nsw.gov.au>; Mark Trethewy <Mark.Trethewy@downergroup.com>
Subject: RE: Package 5 Sydney Metro - Approval sought for Tree Removal on Council Land - Punchbowl Station, Urunga Parade

James,

Do we have any update on the below vegetation clearance request.

Regards,

Luke Fraser
Interface Manager

Infrastructure Projects

Downer
Relationships creating success

M | 0437495678
E | Luke.Fraser@Downergroup.com
Unit 2, 6-16 Galleghan Street
Hexham NSW 2322

From: Mark Trethewy <Mark.Trethewy@downergroup.com>
Sent: Wednesday, 9 June 2021 1:37 PM
To: James Magsipoc <James.Magsipoc@cbcity.nsw.gov.au>
Cc: Ash Jarvis <Ash.Jarvis2@transport.nsw.gov.au>; Luke Fraser <Luke.Fraser@Downergroup.com>
Subject: RE: Package 5 Sydney Metro - Approval sought for Tree Removal on Council Land - Punchbowl Station, Urunga Parade

Hi James,

Thank you very much, please let me know when you would like to inspect.

Regards,

Mark Trethewy
Environment and Sustainability Advisor
Infrastructure Projects

Downer
Relationships creating success

T | +61 427 299 517
E | Mark.Trethewy@downergroup.com
T3, Triniti Business Campus, 39 Delhi Road
North Ryde NSW 2113

From: James Magsipoc <James.Magsipoc@cbcity.nsw.gov.au>
Sent: Wednesday, 9 June 2021 12:59 PM
To: Mark Trethewy <Mark.Trethewy@downergroup.com>
Cc: Ash Jarvis <Ash.Jarvis2@transport.nsw.gov.au>
Subject: RE: Package 5 Sydney Metro - Approval sought for Tree Removal on Council Land - Punchbowl Station, Urunga Parade

Hi Mark,

We will update you and will organise site inspection of 8 trees as soon I have a schedule from Council Tree Management team.

Best regards,

James Magsipoc - Project Officer
T 02 9707 9771
E James.Magsipoc@cbcity.nsw.gov.au
www.cbcity.nsw.gov.au

@ourcbcity
Like & follow us

From: Mark Trethewy <Mark.Trethewy@downergroup.com>
Sent: Wednesday, 9 June 2021 12:38 PM
To: James Magsipoc <James.Magsipoc@cbcity.nsw.gov.au>
Cc: Luke Fraser <Luke.Fraser@Downergroup.com>; Ash.Jarvis2@transport.nsw.gov.au; Kevin.Cao@transport.nsw.gov.au; Paul Cejka <Paul.Cejka2@Downergroup.com>; Ryan O'Leary <Ryan.OLeary@Downergroup.com>; Gareth O'Brien <Gareth.OBrien@Downergroup.com>
Subject: Package 5 Sydney Metro - Approval sought for Tree Removal on Council Land - Punchbowl Station, Urunga Parade

Hi James,

I'm the Environment & Sustainability Advisor for Package 5 Sydney Metro – Punchbowl Station.

Could you please review the attached arborist report and confirm the following depicted trees at Urunga Parade can be removed?

The trees in question (identified below), are currently within the final Project design and as such require removal to facilitate the construction of the Project.

In total 8 trees are required to be removed that reside on council land.

Feel free to contact me should you require any further detail or clarification.

2. THE SITE

Figure 1: Street view of the subject trees taken from Urunga Parade, Punchbowl (*nearmap 2021*).

Figure 2: Location of the subject trees shown in red (*nearmap 2021*).

Regards,

Mark Trethewy
Environment and Sustainability Advisor
Infrastructure Projects

Downer
Relationships creating success

T | +61 427 299 517
E | Mark.Trethewy@downergroup.com
T3, Triniti Business Campus, 39 Delhi Road
North Ryde NSW 2113

Downer

Disclaimer

Disclaimer

This email (including all the attachments) is intended solely for the named addressee. It is confidential and may be subject to legal or other professional privilege. Confidentiality or privilege is not waived because this email is sent to you by mistake. If you have received it in error, please let me know by reply email, delete it from your system and destroy any copies. This email is also subject to copyright. No part of it should be reproduced, adapted or communicated without the written consent of the copyright owner. Although reasonable precautions are taken, the sender does not warrant that this transmission or attachments are free from viruses or similar malicious code and does not accept liability for any consequences to the recipient . You are strongly advised to check any attachments prior to use.

CANTERBURY BANKSTOWN

MEMO FROM CITY DESIGN

From: Nina Kierath, Senior Landscape Architect

Date: 11 November 2021

Subject: South West Metro, Punchbowl Station, Punchbowl

I refer to the application for tree removal at South West Metro, Punchbowl Station, Punchbowl.

I have reviewed the Arboricultural Impact Assessment Report (Ref; 211027-SWMPS-AIA, rev; C) prepared by Jack Williams and Bryce Claassens of Urban Arbor PL on the 27th of October 2021 and Sydney Metro Southwest Punchbowl Station Landscape design package No. 241 both submitted to Council on the 4th of November 2021 and recommend the following:

- The following trees are to be retained and protected during demolition and construction (the tree numbers relate to the numbering used to identify each tree in the Arboricultural Impact Assessment Report (Ref; 211027-SWMPS-AIA, rev; C);

Tree No.	Botanical Name	Common Name	TPZ/SRZ m radius
722	*Corymbia maculata*	Spotted gum	4.8m/2.4m
723	*Corymbia citriodora*	Lemon Scented Gum	3.6m/2.2m
724	*Lophostemon confertus*	Brushbox	4.9m /2.4m
725	*Corymbia citriodora*	Lemon Scented Gum	4.1m /2.3m
726	*Lophostemon confertus*	Brushbox	5.4m /2.5m
727	*Corymbia citriodora*	Lemon Scented Gum	3.9m /2.4m
728	*Corymbia citriodora*	Lemon Scented Gum	4.0m/2.2m
729	*Callstemon viminalis*	Weeping Bottlebrush	2.0m/1.5m
732	*Corymbia citriodora*	Lemon Scented Gum	5.3m/2.5m
733	*Eucalyptus moluccana*	Grey box	4.9m/2.3m
737	*Callstemon viminalis*	Weeping Bottlebrush	3.6m/2.1m
738	*Callstemon viminalis*	Weeping Bottlebrush	3.6m/2.1m
739	*Callstemon viminalis*	Weeping Bottlebrush	4.2m/2.3m
3348	*Eucalyptus pilularis*	Blackbutt	3.2m/2.1m
3351	*Eucalyptus botryoides*	Woolybutt	5.9m/2.6m
3353	*Eucalyptus scoparia*	Wallangarra White gum	7.0m/2.8m

3354	*Cinnamomum camphora*	Camphor laurel	3.2m/2.4m
3357	*Cinnamomum camphora*	Camphor laurel	2.5m/2.1m
3358	*Eucalyptus pilularis*	Blackbutt	2.8m/1.9m
3362	*Cinnamomum camphora*	Camphor laurel	3.0m/2.3m
3364	*Eucalyptus pilularis*	Blackbutt	4.0m/2.3m
3366	*Eucalyptus botryoides*	Woolybutt	10.0m/3.3m
3367	*Cinnamomum camphora*	Camphor laurel	2.3m/2.4m
3368	*Cinnamomum camphora*	Camphor laurel	2.8m/2.2m
3369	*Cinnamomum camphora*	Camphor laurel	3.0m/2.0m
3370	*Cinnamomum camphora*	Camphor laurel	2.0m/1.6m
3371	*Eucalyptus botryoides*	Woolybutt	5.3m/2.5m
3372	*Cinnamomum camphora*	Camphor laurel	4.8m/2.3m
3373	*Populus nigra 'Italica'*	Lombardy Poplar	5.9m/2.6m
3374	*Populus nigra 'Italica'*	Lombardy Poplar	4.0m/2.3m

These trees are to be retained and protected during demolition and construction in accordance with all recommendations, advise and guidelines provided in a Tree Management Plan, to be prepared by an AQF Level 5 Registered Consulting Arborist with a minimum 5 years industry experience and submitted to Council. The Tree Management Plan is to include but is not limited to;

1. All recommendations, advise and guidelines provided in the Arboricultural Impact Assessment report (prepared by Jack Williams and Bryce Claassens of Urban Arbor PL on the 27th of October 2021and submitted to council the 4th of November 2021) and the Australian Standard AS 4970-2009 Protection of trees on development sites.

2. The engagement of an AQF Level 5 Registered Arborist as a project arborist to supervise the building works and certify compliance with all Tree protection measures as specified above. Contact details of this project arborist are to be forwarded to council.

3. The project arborist shall be employed by the applicant to carry out the following:

- Carry out the protection of the trees to be retained during demolition and construction in accordance with all recommendations, advise and guidelines provided in the Tree Management Plan.

- Establishment of the tree protection zone and erection of fencing and signage as per the above mentioned requirements.
- Attendance on site regularly in accordance with section 5.4.1 of AS 4970 - 2009. Particularly, during any demolition and construction within the tree protection zones.

- Any roots greater than 25mm in diameter that is exposed within 1m of the TPZ must be cleanly cut and kept moist.

- Any remedial works that might be required for the tree, should these conditions and the tree protection plan have not been complied with.

- Provide a final assessment of the tree condition, details of any works conducted to the tree and provision of certification that the tree protection works have been carried out in accordance with the requirements listed above at minimum as set out in Section 5.5.2 of AS 4970-2009. This certification is to be provided to the principle certifying authority and council at practical completion. The report must also include the following items at min:

  1. Full name, business address, telephone numbers, evidence of qualifications and experience of consulting arborist.
  2. Full address of the site
  3. Full name and details of the person/company the report is being prepared for.
  4. Details of their attendance on site
  5. Details of any work they had to complete on site

- The following trees may be removed to accommodate construction (the tree numbers relate to the numbering used to identify each tree in the Arboricultural Impact Assessment Report (Ref; 211027-SWMPS-AIA, rev; C);

  - 731, 734, 730, G15, 735, 736, 3346, 3347, 3349, 3350, 3352, 3355, 3356, 3359, 3360, 3361, 3363, 3365.

  All tree removal is conditional on the replacement planting ratio of 3:1 as agreed with Council.

Yours sincerely,

Nina Kierath
SENIOR LANDSCAPE ARCHITECT