



ARBORICULTURAL DEVELOPMENT IMPACT ASSESSMENT REPORT

**Sydney Metro City and South West Line Wide –
Campsie NSW**

**REVISION E
17th August 2021**

**Prepared for
Systems Connect**

Prepared by

Birds Tree Consultancy
Glenn Bird Grad Cert Arboriculture Dip. Hort (Arboriculture) (AQF5)
PO Box 6048 DURAL NSW 2158
PH 0438 892 634
glenn@birdstrees.com.au
www.birdstrees.com.au
ABN 31 105 006 657



Executive Summary

This Arboricultural Development Impact Assessment Report has been commissioned by Hassell to report on trees within the site of Sydney Metro City and South West Line Wide site at Campsie NSW. It has been commissioned to outline the health, condition and stability of these trees as well as their viability for retention. It has been commissioned to outline the health, condition and stability of these trees as well as their viability for retention in the context of the proposed development. The scope of this report includes all trees within areas that may be impacted by the proposed development.

The subject site is Sydney Metro City and South West Line Wide - Campsie NSW. The subject trees are located within or adjacent to the boundaries of this site. The site is currently an undeveloped site within the Railway Corridor adjacent to Lilian Lane Campsie. Refer to Hassell Drawings SMCSWLWC-SYC-TCS-LA-DWG-640300 and 640301 for greater detail of the proposed development.

The subject trees are in good health and condition.

The Tree Protection Zones (TPZ) of Trees 7, 8, 9 and 10 are encroached by the proposed construction and required earthworks required by the Bulk Power Supply (separate Contract) by a total encroachment as defined by *AS4970-2009 Protection of Trees on Development Sites*. This tree will not be viable to be retained due to the bulk power supply works under a separate contract.

Tree 1 has one primary branch that is a long horizontal end weighted branch that overhangs the site and will be impacted by the proposed construction. This primary branch has a diameter of approximately 250mm. This branch will be required to be removed in accordance with the Pruning Specification in Appendix E.

Trees 3, 4, 5 and 6 may require minor crown reduction pruning to less than 10% of the crown of each tree. Refer to the Pruning Specification in Appendix E.

The canopies of Trees 11 and 12 are significantly impacted by the required craneage for the construction works. Craneage clearance requirements require crown reduction pruning of these trees to greater than 50% of the crown of each tree. This will leave both trees with significantly unbalanced crowns and poor form. This unbalanced crown may result in increased risk of failure of the trunk or branches. Due to the required craneage clearance for the project, we recommend the removal of these trees and replacement with suitable replacement street trees.

All other trees are viable to be retained and are to be protected as defined below.

Recommendations for tree retention or removal are summarised as follows:

Tree no.	Species	Recommendations	Comments
1.	<i>Eucalyptus nicholii</i>	Retain	Viable to be retained and protected in accordance with 8.0. Requires removal of two first order branches in accordance with Pruning Specification in Appendix E.

2.	<i>Syncarpia glomulifera</i>	Retain	Viable to be retained and protected in accordance with 8.0.
3.	<i>Callistemon viminalis</i>	Retain	Viable to be retained and protected in accordance with 8.0. Requires crown reduction pruning in accordance with Pruning Specification in Appendix E
4.	<i>Callistemon viminalis</i>	Retain	Viable to be retained and protected in accordance with 8.0. Requires crown reduction pruning in accordance with Pruning Specification in Appendix E
5.	<i>Callistemon viminalis</i>	Retain	Viable to be retained and protected in accordance with 8.0. Requires crown reduction pruning in accordance with Pruning Specification in Appendix E
6.	<i>Callistemon viminalis</i>	Retain	Viable to be retained and protected in accordance with 8.0. Requires crown reduction pruning in accordance with Pruning Specification in Appendix E
7.	<i>Callistemon viminalis</i>	Remove	Not viable to be retained due to bulk power supply (separate contract).
8.	<i>Callistemon viminalis</i>	Remove	Not viable to be retained due to bulk power supply (separate contract).
9.	<i>Callistemon viminalis</i>	Remove	Not viable to be retained due to bulk power supply (separate contract).
10.	<i>Callistemon viminalis</i>	Remove	Not viable to be retained due to bulk power supply (separate contract).
11.	<i>Cinnamomum camphora</i>	Remove	Not viable to be retained due to impact of required craneage on the crown of this tree.
12.	<i>Cinnamomum camphora</i>	Remove	Not viable to be retained due to impact of required craneage on the crown of this tree.

Contents

Executive Summary	2
Contents.....	4
1.0 Scope of Works	5
2.0 Site Analysis.....	6
2.1 Site.....	6
2.2 Topography.....	6
2.3 Identification.....	6
2.4 Soils	6
3.0 Existing Trees.....	7
4.0 Landscape Significance of Trees	8
4.1 Landscape Significance.....	8
4.2 Methodology of Determining Landscape Significance	8
4.3 Landscape Significance of Subject Trees	8
5.0 Subject Tree Retention Value	9
5.1 Tree Retention Value Methodology	9
5.2 Retention Value of Subject Trees.....	9
6.0 Impact of Development.....	10
6.1 Tree Protection Zone.....	10
6.2 Structural Root Zone	10
6.3 Development Impact.....	11
7.0 Recommendations	12
8.0 Pre-Construction Tree Protection Measures.....	14
8.1 General	14
8.2 Identification.....	14
8.3 Protective Fence.....	14
8.4 Mulching	14
8.5 Signage.....	14
9.0 Site Management Issues	15
9.1 Soil Compaction.....	15
9.2 Site Access	15
9.3 Excavation within Tree Protection Area	15
9.4 Possible Contamination / Storage of Materials	15
10.0 Tree Protection Measures During Construction	15
11.0 Environmental / Heritage/ Legislative	
Considerations	17
12.0 References	17
13.0 Disclaimer	17
Appendix A Landscape Significance.....	18
Appendix B Tree Retention Values	20
Appendix C - Tree Inspection Data.....	21
Appendix D Tree Location Plans	22
Appendix E Pruning Specification.....	23

1.0 Scope of Works

1.1 Background

This Arboricultural Development Impact Assessment Report has been commissioned by Hassell to report on trees within the site of Sydney Metro City and SouthWest Line Wide site at Campsie NSW. It has been commissioned to outline the health, condition and stability of these trees as well as their viability for retention. It has been commissioned to outline the health, condition and stability of these trees as well as their viability for retention in the context of the proposed development. The scope of this report includes all trees within areas that may be impacted by the proposed development.

This report has been prepared in response to CSSI 8256 Conditions of Approval E4 and E5 of the Conditions of Approval, which requires that:

“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.”*

1.2 Methods

On the 12 May 2021, Glenn Bird of Birds Tree Consultancy attended site and inspected the subject trees from the ground. There was no aerial inspection carried out. A Visual Tree Assessment was undertaken in accordance with Visual Tree Assessment (VTA) guidelines (Mattheck and Breloer, 1994). Tree heights were measured using a Nikon Forestry 550 Heightmeter. Glenn was accompanied by Systems Connect personnel including Peter Hennesy, Chris Riley, Bogdan Garwacki and Errol Pather. Input was provided regarding minimising adverse impacts on trees and other flora.

1.3 Structure

The structure of this report is as follows:

- Sections 3, 4 and 5 respond to Condition E5 (a). Section 3 provides a brief description of each tree assessed. Section 4 provides an assessment of the Landscape Significance of each tree, based on the standardised rating system developed by the Institute of Australian Consulting Arborists, and is a factor of the health and condition of the tree, vitality, the form of the tree, environmental, cultural, amenity and heritage value. Section 5 provides the Tree Retention Value of each tree.
- Sections 6 and 7 respond to Condition E5 (b). Options to avoid tree removal were discussed on-site during the inspection on 12 May. Section 6.1 defines Tree Protection Zones (TPZs) for each tree and assesses the encroachment of the works on the TPZs. Section 6.2 considers the likely impact on each tree and makes recommendations on which trees can be retained and which trees will need to be removed. Section 7 summarises the outcome and makes recommendations regarding revised design and construction methods that may be able to be implemented to protect trees of high retention value.
- Section 8 responds to Condition E5 (c) and provides a range of tree protection measures to be implemented prior to and during construction.

2.0 Site Analysis

2.1 Site

The subject site is Sydney Metro City and SouthWest Line Wide - Campsie NSW. The subject trees are located within or adjacent to the boundaries of this site. The site is currently an undeveloped site within the Railway Corridor adjacent to Lilian Lane Campsie. Refer to Hassell Drawings SMCSWLWC-SYC-TCS-LA-DWG-640300 C0.04 and 640301 for greater detail of the proposed development.

2.2 Topography

The site is flat. The area in the vicinity of all trees is flat.

2.3 Identification

Trees are as identified in the attached inspection forms in Appendix C and shown in Tree location Plan A01 in Appendix D.

2.4 Soils

Soil material and horizons were not tested for this report.

3.0 Existing Trees

The following trees were inspected from the ground and the following items identified. Please refer also to the attached inspection data in Appendix C.

3.1. Tree 1. *Eucalyptus nicholii*

This mature tree is approximately 12m tall with a canopy spread of 8m. It has multiple co-dominant trunks from the base with an aggregate diameter at breast height (DBH) of 890mm. This tree is in good health and condition with minimal deadwood and epicormic growth. This tree has one primary branch that is a long horizontal end weighted branch that overhangs the site and will be impacted by the proposed construction.

3.2. Tree 2. *Syncarpia glomulifera*

This semi-mature tree is approximately 6m tall with a canopy spread of 4m. It has multiple co-dominant trunks from the base with an aggregate DBH of 200mm. This tree is in good health and condition with minimal deadwood and epicormic growth.

3.3. Tree 3. *Callistemon viminalis*

This mature tree is approximately 7m tall with a canopy spread of 5m. It has multiple co-dominant trunks from the base with an aggregate DBH of 450mm. This tree is in good health and condition with minimal deadwood and epicormic growth.

3.4. Tree 4. *Callistemon viminalis*

This mature tree is approximately 6m tall with a canopy spread of 5m. It has multiple co-dominant trunks from the base with an aggregate DBH of 400mm. This tree is in good health and condition with minimal deadwood and epicormic growth.

3.5. Tree 5. *Callistemon viminalis*

This mature tree is approximately 7m tall with a canopy spread of 7m. It has multiple co-dominant trunks from the base with an aggregate DBH of 400mm. This tree is in good health and condition with minimal deadwood and epicormic growth.

3.6. Tree 6. *Callistemon viminalis*

This mature tree is approximately 8m tall with a canopy spread of 6m. It has multiple co-dominant trunks from the base with an aggregate DBH of 400mm. This tree is in good health and condition with minimal deadwood and epicormic growth.

3.7. Tree 7. *Callistemon viminalis*

This mature tree is approximately 6m tall with a canopy spread of 5m. It has multiple co-dominant trunks from the base with an aggregate DBH of 370mm. This tree is in good health and condition with minimal deadwood and epicormic growth.

3.8. Tree 8. *Callistemon viminalis*

This mature tree is approximately 6m tall with a canopy spread of 5m. It has multiple co-dominant trunks from the base with an aggregate DBH of 330mm. This tree is in good health and condition with minimal deadwood and epicormic growth.

3.9. Tree 9. *Callistemon viminalis*

This mature tree is approximately 6m tall with a canopy spread of 5m. It has multiple co-dominant trunks from the base with an aggregate DBH of 560mm. This tree is in good health and condition with minimal deadwood and epicormic growth.

3.10. Tree 10. *Callistemon viminalis*

This mature tree is approximately 6m tall with a canopy spread of 5m. It has multiple co-dominant trunks from the base with an aggregate DBH of 455mm. This tree is in good health and condition with minimal deadwood and epicormic growth.

3.11. Tree 11. *Cinnamomum camphora*

This mature tree is approximately 15m tall with a canopy spread of 12m. It has two co-dominant trunks from a point approximately 1500mm above the base with a diameter at breast height (DBH) of 800mm. This tree is in good health and condition with minimal deadwood and epicormic growth.

3.12. Tree 12. *Cinnamomum camphora*

This mature tree is approximately 14m tall with a canopy spread of 12m. It has two co-dominant trunks from the base of the trunk with an aggregate diameter at breast height (DBH) of 750mm. This tree is in good health and condition with minimal deadwood and epicormic growth.

4.0 Landscape Significance of Trees

4.1 Landscape Significance

The significance of a tree within the landscape is a factor of the health and condition of the tree, vitality, the form of the tree, environmental, cultural, amenity and heritage value.

4.2 Methodology of Determining Landscape Significance

For the purpose of this report, the Significance of a Tree, Assessment Rating System (STARS) as developed by the Institute of Australian Consulting Arborists (IACA) has been implemented. Please refer to Appendix A for greater detail of this assessment system. This system defines Landscape Significance for individual trees as High, Medium or Low Significance.

4.3 Landscape Significance of Subject Trees

Based on our assessment of the subject trees and implementation of the IACA Significance of a Tree, Assessment Rating System, the Landscape Significance of the Subject Trees was determined as shown in Table 1.

Tree no.	Species	Landscape Significance
1.	<i>Eucalyptus nicholii</i>	Medium
2.	<i>Syncarpia glomulifera</i>	Medium
3.	<i>Callistemon viminalis</i>	Medium
4.	<i>Callistemon viminalis</i>	Medium
5.	<i>Callistemon viminalis</i>	Medium
6.	<i>Callistemon viminalis</i>	Medium
7.	<i>Callistemon viminalis</i>	Medium
8.	<i>Callistemon viminalis</i>	Medium
9.	<i>Callistemon viminalis</i>	Medium
10.	<i>Callistemon viminalis</i>	Medium
11.	<i>Cinnamomum camphora</i>	Medium
12.	<i>Cinnamomum camphora</i>	Medium

Table 1 - Landscape Significance

5.0 Subject Tree Retention Value

5.1 Tree Retention Value Methodology

For the purpose of this report, the Tree Retention Values have been assessed by incorporating Landscape Significance Values as determined in 4.0 with the Useful Life Expectancy of the subject trees and assessing the retention values based on the Tree Retention Value Priority Matrix as developed by the Institute of Australian Consulting Arborists (IACA). Please refer to Appendix B for greater detail of this Tree Retention Value Priority Matrix. This matrix defines Landscape Significance for individual trees as High, Medium or Low Retention Value as well as Priority for Removal.

5.2 Retention Value of Subject Trees

Based on our assessment of the subject trees and implementation of the IACA Tree Retention Value Priority Matrix, the Retention Values of the Subject Trees were determined as shown in Table 2.

Tree no.	Species	Retention Value
1.	<i>Eucalyptus nicholii</i>	Medium
2.	<i>Syncarpia glomulifera</i>	Medium
3.	<i>Callistemon viminalis</i>	Medium
4.	<i>Callistemon viminalis</i>	Medium
5.	<i>Callistemon viminalis</i>	Medium
6.	<i>Callistemon viminalis</i>	Medium
7.	<i>Callistemon viminalis</i>	Medium
8.	<i>Callistemon viminalis</i>	Medium
9.	<i>Callistemon viminalis</i>	Medium

10.	<i>Callistemon viminalis</i>	Medium
11.	<i>Cinnamomum camphora</i>	Medium
12.	<i>Cinnamomum camphora</i>	Medium

Table 2 – Tree Retention Value

6.0 Impact of Development

6.1 Tree Protection Zone

Tree Protection Zones (TPZs) have been defined for the subject trees in order to define the encroachment of the proposed development in accordance with *AS4970-2009*. The TPZs required have been taken as a circular area with a radius 12 x the diameter at breast height of the tree. This requirement is in line with Australian Standard AS 4970-2009 Protection of Trees on Development Sites. This standard defines a maximum of 10% encroachment to be minimal encroachment. Any encroachment over 10% requires the site arborist to give consideration as to the viability of the tree due to the proposed development.

6.2 Structural Root Zone

Structural Root Zone (SRZs) are defined by *AS4970-2009* as the area of root development required for the structural stability of the tree. The SRZ is required to be assessed when an encroachment greater than 10% is considered.

Tree no.	Species	TPZ Radius (m)	Encroachment (%)	SRZ Radius (m)
1.	<i>Eucalyptus nicholii</i>	10.68	7	3.17
2.	<i>Syncarpia glomulifera</i>	2.4	0	1.85
3.	<i>Callistemon viminalis</i>	5.4	0	2.67
4.	<i>Callistemon viminalis</i>	4.8	0	2.37
5.	<i>Callistemon viminalis</i>	4.8	0	2.37
6.	<i>Callistemon viminalis</i>	4.8	10	2.25
7.	<i>Callistemon viminalis</i>	4.44	100	2.30
8.	<i>Callistemon viminalis</i>	3.96	100	2.20
9.	<i>Callistemon viminalis</i>	6.72	100	2.67
10.	<i>Callistemon viminalis</i>	5.46	100	2.47
11.	<i>Cinnamomum camphora</i>	9.6	0	N/A
12.	<i>Cinnamomum camphora</i>	9.0	0	N/A

6.3 Development Impact

6.3.1. Tree 1. *Eucalyptus nicholii*

The Tree Protection Zone (TPZ) of this tree in accordance with AS 4970-2009 Protection of Trees on Development Sites will be encroached by the proposed development by 7% which is less than the minor encroachment as defined by AS 4970-2009. This tree will be viable to be retained under the proposed development. This tree has one primary branch that is a long horizontal end weighted branch that overhangs the site and will be impacted by the proposed construction. Another primary branch on the eastern side of the trunk will obstruct required construction transport traffic.

6.3.2. Tree 2. *Syncarpia glomulifera*

The Tree Protection Zone (TPZ) of this tree in accordance with AS 4970-2009 Protection of Trees on Development Sites will not be further encroached by the proposed development. This tree will be viable to be retained under the proposed development.

6.3.3. Tree 3. *Callistemon viminalis*

The Tree Protection Zone (TPZ) of this tree in accordance with AS 4970-2009 Protection of Trees on Development Sites will not be further encroached by the proposed development. This tree will be viable to be retained under the proposed development. This tree will require crown reduction pruning to less than 10% of the canopy to provide the required clearance for craneage.

6.3.4. Tree 4. *Callistemon viminalis*

The Tree Protection Zone (TPZ) of this tree in accordance with AS 4970-2009 Protection of Trees on Development Sites will not be further encroached by the proposed development. This tree will be viable to be retained under the proposed development. This tree will require crown reduction pruning to less than 10% of the canopy to provide the required clearance for craneage.

6.3.5. Tree 5. *Callistemon viminalis*

The Tree Protection Zone (TPZ) of this tree in accordance with AS 4970-2009 Protection of Trees on Development Sites will not be further encroached by the proposed development. This tree will be viable to be retained under the proposed development. This tree will require crown reduction pruning to less than 10% of the canopy to provide the required clearance for craneage.

6.3.6. Tree 6. *Callistemon viminalis*

The Tree Protection Zone (TPZ) of this tree in accordance with AS 4970-2009 Protection of Trees on Development Sites will be encroached by the proposed development by 10% which is equal to the minor encroachment as defined by AS 4970-2009. This tree will be viable to be retained under the proposed development. This tree will require crown reduction pruning to less than 10% of the canopy to provide the required clearance for craneage.

6.3.7. Tree 7. *Callistemon viminalis*

The Tree Protection Zone (TPZ) of this tree in accordance with AS 4970-2009 *Protection of Trees on Development Sites* will be totally encroached by the required bulk power supply contract. This tree will not be viable to be retained due to the bulk power supply works under a separate contract.

6.3.8. Tree 8. *Callistemon viminalis*

The Tree Protection Zone (TPZ) of this tree in accordance with AS 4970-2009 *Protection of Trees on Development Sites* will be totally encroached by the required bulk power supply contract. This tree will not be viable to be retained due to the bulk power supply works under a separate contract.

6.3.9. Tree 9. *Callistemon viminalis*

The Tree Protection Zone (TPZ) of this tree in accordance with AS 4970-2009 *Protection of Trees on Development Sites* will be totally encroached by the required bulk power supply contract. This tree will not be viable to be retained due to the bulk power supply works under a separate contract.

6.3.10. Tree 10. *Callistemon viminalis*

The Tree Protection Zone (TPZ) of this tree in accordance with AS 4970-2009 *Protection of Trees on Development Sites* will be totally encroached by the required bulk power supply contract. This tree will not be viable to be retained due to the bulk power supply works under a separate contract.

6.3.11. Tree 11. *Cinnamomum camphora*

The Tree Protection Zone (TPZ) of this tree in accordance with AS 4970-2009 *Protection of Trees on Development Sites* will not be encroached by the proposed construction works however more than 50% of the crown will be impacted by the required craneage.

6.3.12. Tree 12. *Cinnamomum camphora*

The Tree Protection Zone (TPZ) of this tree in accordance with AS 4970-2009 *Protection of Trees on Development Sites* will not be encroached by the proposed construction works however more than 50% of the crown will be impacted by the required craneage.

7.0 Recommendations

The subject trees are in good health and condition.

The Tree Protection Zones (TPZ) of Trees 7, 8, 9 and 10 are encroached by the proposed construction and required earthworks required by the Bulk Power Supply (separate Contract) by a total encroachment as defined by AS4970-2009 *Protection of Trees on Development Sites*. This tree will not be viable to be retained due to the bulk power supply works under a separate contract.

Tree 1 has one primary branch that is a long horizontal end weighted branch that overhangs the site and will be impacted by the proposed construction. Additionally there is a primary branch on the southern side of the crown that will be impacted by the required construction transport traffic (requiring 5.2m clearance). These primary branches have a diameter of approximately 250mm. These branches will be required to be removed in accordance with the Pruning Specification in Appendix E.

Trees 3, 4, 5 and 6 may require minor crown reduction pruning to less than 10% of the crown of each tree. Refer to the Pruning Specification in Appendix E.

The canopies of Trees 11 and 12 are significantly impacted by the required craneage for the construction works. Craneage clearance requirements require crown reduction pruning of these trees to greater than 50% of the crown of each tree. This will leave both trees with significantly unbalanced crowns and poor form. This unbalanced crown may result in increased risk of failure of the trunk or branches. Due to the required craneage clearance for the project, we recommend the removal of these trees and replacement with suitable replacement street trees.

All other trees are viable to be retained and are to be protected as defined below.

Recommendations for tree retention or removal are summarised as follows:

Tree no.	Species	Recommendations	Comments
1.	<i>Eucalyptus nicholii</i>	Retain	Viable to be retained and protected in accordance with 8.0. Requires removal of two first order branches in accordance with Pruning Specification in Appendix E.
2.	<i>Syncarpia glomulifera</i>	Retain	Viable to be retained and protected in accordance with 8.0.
3.	<i>Callistemon viminalis</i>	Retain	Viable to be retained and protected in accordance with 8.0. Requires crown reduction pruning in accordance with Pruning Specification in Appendix E
4.	<i>Callistemon viminalis</i>	Retain	Viable to be retained and protected in accordance with 8.0. Requires crown reduction pruning in accordance with Pruning Specification in Appendix E
5.	<i>Callistemon viminalis</i>	Retain	Viable to be retained and protected in accordance with 8.0. Requires crown reduction pruning in accordance with Pruning Specification in Appendix E
6.	<i>Callistemon viminalis</i>	Retain	Viable to be retained and protected in accordance with 8.0. Requires crown reduction pruning in accordance with Pruning Specification in Appendix E
7.	<i>Callistemon viminalis</i>	Remove	Not viable to be retained due to bulk power supply (separate contract).
8.	<i>Callistemon viminalis</i>	Remove	Not viable to be retained due to bulk power supply (separate contract).

9.	<i>Callistemon viminalis</i>	Remove	Not viable to be retained due to bulk power supply (separate contract).
10.	<i>Callistemon viminalis</i>	Remove	Not viable to be retained due to bulk power supply (separate contract).
11.	<i>Cinnamomum camphora</i>	Remove	Not viable to be retained due to impact of required craneage on the crown of this tree.
12.	<i>Cinnamomum camphora</i>	Remove	Not viable to be retained due to impact of required craneage on the crown of this tree.

8.0 Pre-Construction Tree Protection Measures

8.1 General

All tree protection works shall be carried out before excavation, grading and site works commence. Tree protection works shall be inspected and approved by a Consulting Arborist meeting AQF Level 5 prior to construction works commencing.

Storage of materials, mixing of materials, vehicle parking, disposal of liquids, machinery repairs and refueling, site office and sheds, and the lighting of fires, stockpiling of soil, rubble or any debris shall not be carried out within the TPZ of existing trees. No backfilling shall occur within the TPZ of existing trees. Trees shall not be removed or lopped unless specific instruction is given in writing by the Superintendent.

8.2 Identification

All trees to be protected shall be clearly identified and all TPZs surveyed.

8.3 Protective Fence

Fencing is to be erected around existing trees to be retained. In addition to this protective fencing within the site, Protective Fencing is to be installed to the full extent of the TPZs within the site. This fencing is to be erected prior to any materials being brought on site or before any site, civil works or construction works commence. The fence shall enclose a sufficient area so as to prevent damage to the TPZ as defined on Appendix D Tree Protection Plan and as defined in 5.1 above. Fence to comprise 1800mm high chain wire mesh fixed to 50mm diameter Galvanised steel posts. Panels should be securely fixed top and bottom to avoid separation. No storage of building materials, tools, paint, fuel or contaminants and the like shall occur within the fenced area.

8.4 Mulching

Install mulch to the extent of all tree protection fencing. Use a leaf mulch conforming to AS 4454 which is free of deleterious and extraneous matter such as soil, weeds, sticks and stones and consisting of a minimum of 90% recycled content compliant with AS 4454 (1999) and AS 4419 (1998). All trees marked as to be removed on the proposed development are to be chipped and reused for this purpose. Place mulch evenly and to a depth of 100mm.

8.5 Signage

Prior to works commencing, tree protection signage is to be attached to each tree protection zone, 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.

- This fence has been installed to prevent damage to the trees and their growing environment both above and below ground and access is restricted.
- No Access within Tree Protection Zone
- The name, address, and telephone number of the developer.

The name and telephone number of the Site Arborist.

9.0 Site Management Issues

9.1 Soil Compaction

Plant and pedestrian traffic during the construction period will cause significant soil compaction. This will be exacerbated by increased water expected on these soils as result of adjacent construction and weather. Compaction of the soil within the TPZ will reduce the voids between soil peds or particles therefore will reduce the gaseous exchange capacity of the root system which will slow critical metabolic processes such as respiration which produces Adenosine Triphosphate (ATP) which provides energy for the photosynthesis, which in turn provides photosynthates such as glucose. These photosynthates provide the carbohydrates required for tree extension growth, girth expansion, reproduction and pest and disease resistance. No pedestrian or plant access is permissible to the TPZ.

9.2 Site Access

Sufficient access is required to enable efficient construction. It is essential to delineate access zones or corridors which will provide suitable access without damaging the existing trees to be retained or causing compaction to the root zone.

9.3 Excavation within Tree Protection Area

No excavation is to be carried out within the TPZs of retained trees without the permission and supervision of the site arborist (AQF5)

9.4 Possible Contamination / Storage of Materials

The construction site will require the use of many chemicals and materials that are possible contaminants which if not managed will pose a risk to the existing trees. These possible contaminants include fuels, herbicides, solvents and the like. A site-specific Environmental Management Plan shall be provided, and this specific risk identified and addressed.

10.0 Tree Protection Measures During Construction

10.1 Maintenance of Pre-Construction Tree Protection Measures

The Pre-Construction Tree Protection Measures identified in 5.0 above are to be maintained in good and serviceable condition throughout the construction period.

10.2 Possible Contaminants

Do not store or otherwise place bulk materials and harmful materials under or near trees. Do not place spoil from excavations within the TPZs. Prevent wind-blown

materials such as cement from harming trees. All possible contaminants are to be stored in a designated and appropriate area with secure chemical spill measures such as a bund in place.

10.3 Physical Damage

Prevent damage to tree. Do not attach stays, guys and the like to trees. No personnel, plant, machinery or materials are to be allowed within the tree protection fencing.

10.4 Compaction

No filling or compaction shall occur over tree roots zones within tree protection fenced areas. Where construction occurs close to or the TPZ of trees to be retained it shall be necessary to install protection to avoid compaction of the ground surface. This protection is to be planks supported clear of the ground fixed to scaffolding.

10.5 Trenching

No Trenching should be necessary within the TPZs or within tree protection fencing. No further trenching is to be carried out without the approval of the Superintendent. Should any further trenching be required within the TPZs identified, this work is to be carried out by hand and under the supervision of a qualified Arborist.

10.6 Irrigation/Watering

Contractor is to ensure that soil moisture levels are adequately maintained. Apply water at an appropriate rate suitable for the species during periods of little or no rainfall.

10.7 Site Sheds / Amenities/ Storage

Site sheds, site amenities, ablutions and site storage shall be in the area clear of all TPZ. Chemicals and potential contaminants are to be stored appropriately and this storage area is to be enclosed by a chemical spill bund to prevent the potential run off of contaminants in the event of a spillage or accident.

11.0 Environmental / Heritage/ Legislative Considerations

None of the subject trees are identified as threatened species or elements of endangered ecological communities within the Threatened Species Conservation Act 1995.

12.0 References

Mattheck, C. Breloer, K. 1993, The Body Language of Trees: A Handbook for Failure Analysis, 12th Impression 2010 The Stationery Office.
AS4970-2009 Protection of Trees on Development Sites: Standards Australia

13.0 Disclaimer

This Appraisal has been prepared for the exclusive use of the Client and Birds Tree Consultancy.

Birds Tree Consultancy accepts no responsibility for its use by other persons. The Client acknowledges that this Appraisal, and any opinions, advice or recommendations expressed or given in it, are based on the information supplied by the Client and on the data inspections, measurements and analysis carried out or obtained Birds Tree Consultancy and referred to in the Appraisal. The Client should rely on the Appraisal, and on its contents, only to that extent.

Every effort has been made in this report to include, assess and address all defects, structural weaknesses, instabilities and the like of the subject trees. All inspections were made from ground level using only visual means and no intrusive or destructive means of inspection were used. For many structural defects such as decay and inclusions, internal inspection is required by means of Resistograph or similar. No such investigation has been made in this case. Trees are living organisms and are subject to failure through a variety of causes not able to be identified by means of this inspection and report.

IACA Significance of a Tree, Assessment Rating System (STARS) © (IACA 2010) ©

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 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.

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.

Tree Significance - Assessment Criteria



1. 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.

2. 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*.

3. 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 monocultural stand in its entirety e.g. hedge.

Appendix B Tree Retention Values

		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					
Legend for Matrix Assessment 						
		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 <i>Protection of trees on development sites</i> . 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.				

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 Ltd 2001, *Footprint Green Tree Significance & Retention Value Matrix*, Avalon, NSW Australia, www.footprintgreen.com.au

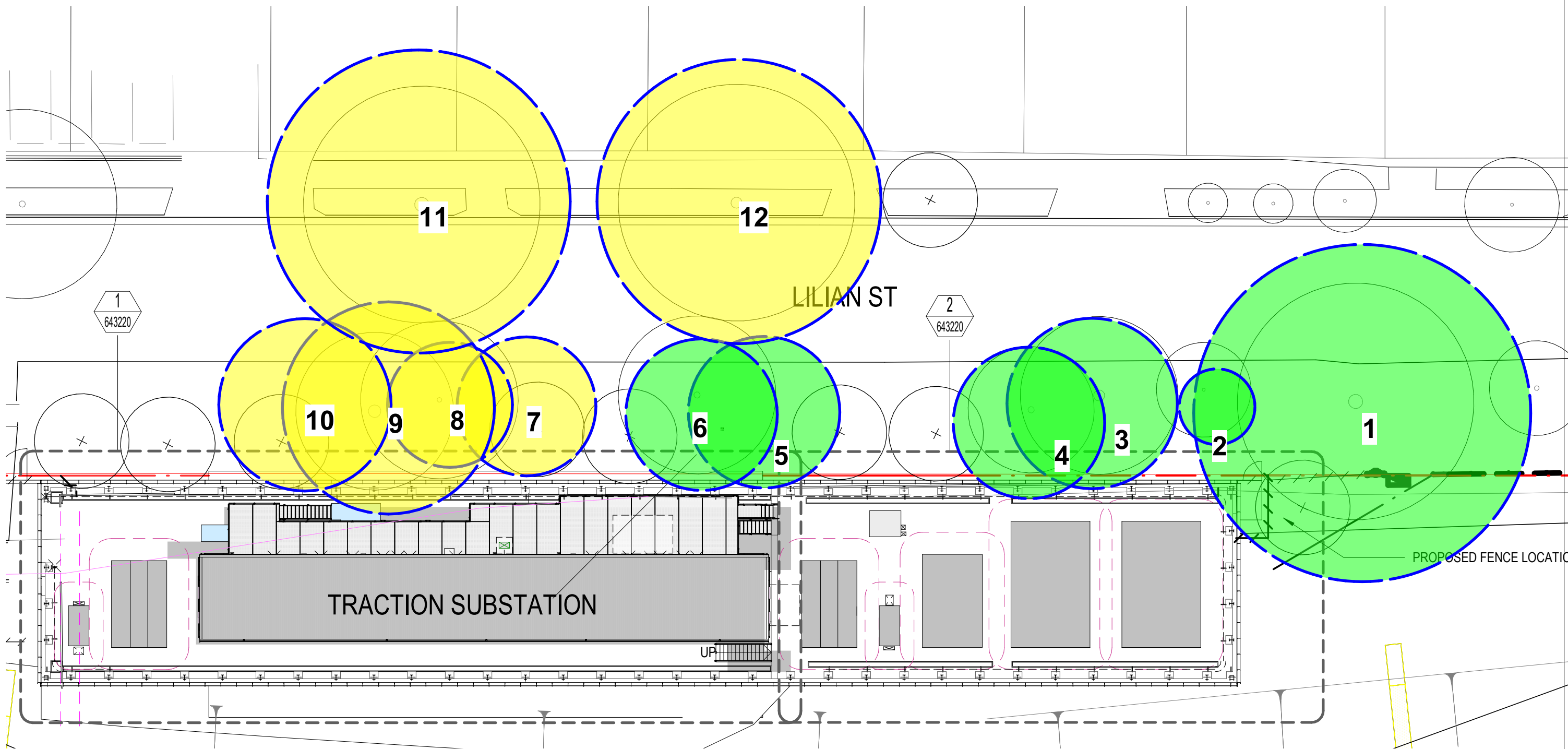
Appendix C - Tree Inspection Data

Birds Tree Consultancy






Consulting Arborist • Project Management • Horticultural Consultancy • Landscape Management

Inspection Data
Campsie 27-Aug-20

Tree no.	Species	Height (m)	Spread(m)	DBH (mm)	TPZ Radius (m)	DAB Radius (mm)	SRZ Radius (m)	Maturity	Trunk (single, twin, multiple @)	Trunk lean	Form/Crown shape	Branching Habit	Crown Distribution	Stability	Branching Structure	Pruning History	Defects	Damage	Overall Health & Vigour	Canopy Density	Foliage	Deadwood	Epicormic Growth	Pest Infestation	Disease	Life expectancy	Env. & Landcape significance	Retention Value	Notes/Comments
1	Eucalyptus nicholii	12	8	890	10.68	900	3.17	Mature	Single	NIL	Normal	Normal	Balanced	Stable	Stable	Line clearance	Nil	Nil	Good	Normal	Normal	<5%	<5%	No evidence	No evidence	15-40y	Medium	Medium	
2	Syncarpia glomulifera	6	4	200	2.4	250	1.85	Semi-mature	Single	NIL	Normal	Normal	Balanced	Stable	Stable	No evidence	Nil	Nil	Good	Normal	Normal	<5%	<5%	No evidence	No evidence	40y+	Medium	Medium	
3	Callistemon viminalis	7	5	450	5.4	600	2.67	Mature	Multiple @ base	NIL	Normal	Normal	Balanced	Stable	Stable	No evidence	Nil	Nil	Good	Normal	Normal	<5%	<5%	No evidence	No evidence	15-40y	Medium	Medium	
4	Callistemon viminalis	6	5	400	4.8	450	2.37	Mature	Multiple @ base	NIL	Normal	Normal	Balanced	Stable	Stable	No evidence	Nil	Nil	Good	Normal	Normal	<5%	<5%	No evidence	No evidence	15-40y	Medium	Medium	
5	Callistemon viminalis	7	7	400	4.8	450	2.37	Mature	Multiple @ base	NIL	Normal	Normal	Balanced	Stable	Stable	No evidence	Nil	Nil	Good	Normal	Normal	<5%	<5%	No evidence	No evidence	15-40y	Medium	Medium	
6	Callistemon viminalis	8	6	400	4.8	400	2.25	Mature	Multiple @ base	NIL	Normal	Normal	Balanced	Stable	Stable	No evidence	Nil	Nil	Good	Normal	Normal	<5%	<5%	No evidence	No evidence	15-40y	Medium	Medium	
7	Callistemon viminalis	6	5	370	4.44	420	2.30	Mature	Multiple @ base	NIL	Normal	Normal	Balanced	Stable	Stable	No evidence	Nil	Nil	Good	Normal	Normal	<5%	<5%	No evidence	No evidence	15-40y	Medium	Medium	
8	Callistemon viminalis	6	5	330	3.96	380	2.20	Mature	Multiple @ base	NIL	Normal	Normal	Balanced	Stable	Stable	No evidence	Nil	Nil	Good	Normal	Normal	<5%	<5%	No evidence	No evidence	15-40y	Medium	Medium	
9	Callistemon viminalis	6	5	560	6.72	600	2.67	Mature	Multiple @ base	NIL	Normal	Normal	Balanced	Stable	Stable	No evidence	Nil	Nil	Good	Normal	Normal	<5%	<5%	No evidence	No evidence	15-40y	Medium	Medium	
10	Callistemon viminalis	6	5	455	5.46	500	2.47	Mature	Multiple @ base	NIL	Normal	Normal	Balanced	Stable	Stable	No evidence	Nil	Nil	Good	Normal	Normal	<5%	<5%	No evidence	No evidence	15-40y	Medium	Medium	



Legend

-  Tree to be Retained and Protected
-  Tree to be Removed
-  Tree Not Viable to be Retained due to Proposed Development
-  Tree Protection Zone (TPZ) in accordance with AS4970-2009
-  Structural Root Zone (SRZ) in accordance with AS4970-2009

Birds Tree Consultancy

0438 892 634
glenn@birdstrees.com.au
www.birdstrees.com.au

Project: Sydney Metro - Campsie
Client: Hassell
DWG: A01 REV E
Plan: Tree Location Plan 01
Date: 17 Aug 2021 Scale : 1:250 @ A3

Birds Tree Consultancy

Consulting Arborist AQF5/AQF 8 • Expert Witness • Environmental Arboriculture • Resistograph Testing



PRUNING SPECIFICATION

**Sydney Metro City and SouthWest Line Wide –
Campsie NSW**

REVISION B

17th August 2021

**Prepared for
Hassell**

Prepared by

Birds Tree Consultancy
Glenn Bird Dip. Hort (Arboriculture) (AQF5)
PO Box 6048 DURAL NSW 2158
PH 0438 892 634
glenn@birdstrees.com.au
www.birdstrees.com.au
ABN 31 105 006 657



Contents

Contents..... 2

1.0 Scope of Works 3

2.0 Site Analysis..... 3

2.1 Site..... 3

2.2 Identification..... 3

3.0 Existing Trees..... 3

4.0 Pruning Specification 4

4.1 Tree 1 4

4.2 Trees 5 and 6..... 5

1.0 Scope of Works

This Pruning Specification has been commissioned by Hassell to provide specification for pruning requirements to resolve the potential impact of the proposed construction Sydney Metro City and SouthWest Line Wide site at Campsie NSW as defined in Birds Tree Consultancy Development Impact Assessment Report Revision B dated 19 May 2021. It has been commissioned to outline the pruning requirements to allow construction of the Corridor Traction Substation.

On the 12th May 2021, Glenn Bird of Birds Tree Consultancy attended site and inspected the subject tree from the ground.

2.0 Site Analysis

2.1 Site

The subject site is Sydney Metro City and SouthWest Line Wide - Campsie NSW. The subject trees are located within or adjacent to the boundaries of this site. The site is currently an undeveloped site within the Railway Corridor adjacent to Lilian Lane Campsie that is proposed for development including the construction of new Corridor Traction Substation. Refer to Hassell Drawings SMCSWLWC-SYC-TCS-LA-DWG-640300 and 640301 for greater detail of the proposed development.

2.2 Identification

The subject tree is Tree 1 as defined by Birds Tree Consultancy Development Impact Assessment Report Revision A dated 19 May 2021.

3.0 Existing Trees

3.1 *Eucalyptus nicholii*

This mature tree is approximately 12m tall with a canopy spread of 8m. It has multiple co-dominant trunks from the base with an aggregate diameter at breast height (DBH) of 890mm. This tree is in good health and condition with minimal deadwood and epicormic growth. This tree has one primary branch that is a long horizontal end weighted branch that overhangs the site and will be impacted by the proposed construction.



Figure 1 – Primary branch overhanging site.

4.0 Pruning Specification

4.1 Tree 1

Selective pruning is required to provide canopy clearance for construction on the northern side of Tree 1 and to provide 5.5m clearance for construction transport traffic on the southern side of the crown of Tree 1. One primary branch is required to be removed on the northern side of the crown as shown in Figure 2 at Location A to provide canopy clearance for construction. One primary branch is required to be removed on the southern side of the crown overhanging Lilian Street as shown in Figure 3 at Location B to provide 5.5m clearance for construction transport traffic.

All pruning is to be carried out under the supervision of the Site Arborist (AQF Level 5) by an arborist with qualifications of AQF Level 3 or higher. All pruning is to be in accordance with *AS4373-2007 Pruning of Amenity Trees*.

Pruning Location A is a primary branch with a diameter at the pruning location of approximately 250mm. This branch extends in a northerly direction. This branch is to be pruned at the primary branch junction at the branch collar at the location shown in figure 2.



Figure 2 - Pruning Location A

Pruning Location B is a primary branch with a diameter at the pruning location of approximately 250mm. This branch extends in a southerly direction. This branch is to be pruned at the primary branch junction at the branch collar at the location shown in figure 3.



Figure 3 - Pruning Location B

4.2 Trees 3, 4, 5 and 6

Minor crown reduction pruning to less than 10% of the crown is required on the western side of the crown of Trees 5 and 6 to provide canopy clearance for construction as well as on the southern side of the trunk of trees 3, 4, 5 and 6 to provide clearance for construction transport and craneage. All pruning is to be carried out under the supervision of the Site Arborist (AQF Level 5) by an arborist with qualifications of AQF Level 3 or higher. All pruning is to be in accordance with *AS4373-2007 Pruning of Amenity Trees*.