Arboricultural Impact Assessment

Project

Proposed Child Care Centre

(Drainage Works in Reserve)

Location

73 Murray Farm Road, Carlingford, NSW

Prepared by:

Craig Kenworthy
AQF 5 Consulting Arborist – MAIH, MISA, MAA, TRAQ, MIACA

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PI/ PL Insurance (2022 – 5M/20M)

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This firm is not financially affiliated nor does it have a business relationship with any tree removal/pruning company

Prepared on – 07/11/22

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Abbreviations & Terms

AQF5	Australian Qualification Framework, Level 5
AS4970 -2009	Australian Standards 4970 - 2009, *Protection of trees on development sites*
DBH	Diameter at Breast Height – measured at 1.4m from ground level
Direct Impacts	Impacts such as the footprint, strip footings, services, cut/ fill, concrete slabs, trenches etc that directly impact the tree canopy above and or below ground
Indirect Impacts	Impacts where the tree/s may be subjected to deliveries, stockpiling, preparation of building products, site sheds/ toilets etc.
LGA	Local Government Authority
SRZ	Structural Root Zone
TPZ	Tree Protection Zone

Version	date	by
1	07/11/22	CK

Disclaimer

The trees referred to in this report were living entities and are therefore subject to natural processes. They will be also be subject to changes to their environment caused by human activities, and to ever changing weather conditions.

Sydney Landscape Consultants inspection for this report was ground based and hidden defects which are not readily visible may not be detected and therefore we cannot wholly guarantee the condition and safety of the trees inspected. We recommend regular inspections by minimum qualified AQF level 5 Arborist.

Plans and material referenced within this assessment have been utilised only as provided to our firm in aiding the assessment for the subject site. Our firm cannot be held liable for any superseded or amended plans or reports, that our firm were not provided with.

Our firm provides unbiased Arboricultural Reports based on industry best practice, accreditation, research, site specific facts and the condition of trees, whilst being independent in decision making relating to the retention and or removal of trees. Our assessments are grounded in ensuring the safety of human life, wellbeing of structures, property and environment in accordance with local, State and Federal Governmental policies.

This report does not constitute a report unless all page numbers are sequenced and read in conjunction as a sequenced report for the subject site, assessed.

1. Summary

This report has been compiled on behalf of the owners of 73 Murray Farm Road, Carlingford, NSW. This report is in response to a proposed New Child care centre Development located upon the site and infrastructure required upon the adjacent reserve, via stormwater discharge.

This Arborist report refers to Thirteen (13) trees being located upon Councils reserve. This report will analyse the trees' location, condition, Tree Protection Zone, Structural Root Zone, retention values and any encroachment that the proposed stormwater infrastructure may have on all trees assessed within this report.

The author (Craig Kenworthy) of this report recommends:

- Trees 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12 and 13 to be retained and protected (13 trees).
- The use of this report by Council to better understand the best route to be taken, to plan for stormwater piping and installation of infrastructure within the adjacent reserve, to minimise impacts to both neighbours' trees and Councils reserves trees. The TPZs provided, will best guide the location of excavations, type of and stormwater piping to all trees assessed.
- Attendance and guidance for all excavations within the TPZs of all trees on Councils reserve.
- Tree Protection measures, monitoring and Certification all in accordance with AS4970 – 2009, Section 4 and Section 5.

2. Introduction

Sydney Landscape Consultants have been engaged to assess the trees that may be impacted by the proposed stormwater infrastructure within Councils reserve adjacent to the subject site.

3. Methodology

For the purposes of this report, a Visual Tree Assessment (VTA) method of evaluating structural defects and stability in trees (Mattheck and Breloer, 1994) was undertaken. All inspections were completed from the ground only. No level 3 diagnostic devices were used on the subject trees. Works forming part of this visual assessment include;

- Plotting all the trees assessed within the reserve and those on adjacent sites that may be impacted by stormwater infrastructure.
- Address Parramatta Councils Tree Management Policy as to a prescribed trees height.
- All trees assessed appear upon the Tree Location and Protection Plan provided within this report (A4) and separately upon an A3 scaled drawing.
- No level 3 diagnostic devices were used on the subject trees.

Tree diameter, Diameter at Breast Height (DBH) measured at 1.4m above ground level and recorded in metres, using Australian Standard, *Protection of trees on development sites – AS4970 – 2009*, Appendix A.

Any recommended work relating to pruning and or recommendation / mitigation shall be in accordance with Australian Standard, *Pruning of Amenity trees – AS4373 – 2007.*

Heights of trees taken using a Nikon Forestry 500 Clinometer and measured in Metres, whilst views were obstructed, estimation of several trees had to occur due to limited aspect of several tree heights.

1 – No stormwater plans have been provided, although our firm is of the understanding of Councils preferred option for stormwater route within reserve behind subject site.

Tree Management as per City of Parramatta Tree Management Policy, 5.4 Preservation of Trees or Vegetation - https://www.cityofparramatta.nsw.gov.au/living/trees

5.4.1 Introduction,

Trees to which the control applies:

1. Any tree or palm - whether indigenous, endemic, exotic or introduced species with a height equal to or exceeding 5 metres.

2. Any tree or mangrove vegetation located on public land, irrespective of size.

3. Any tree or plant, irrespective of size:

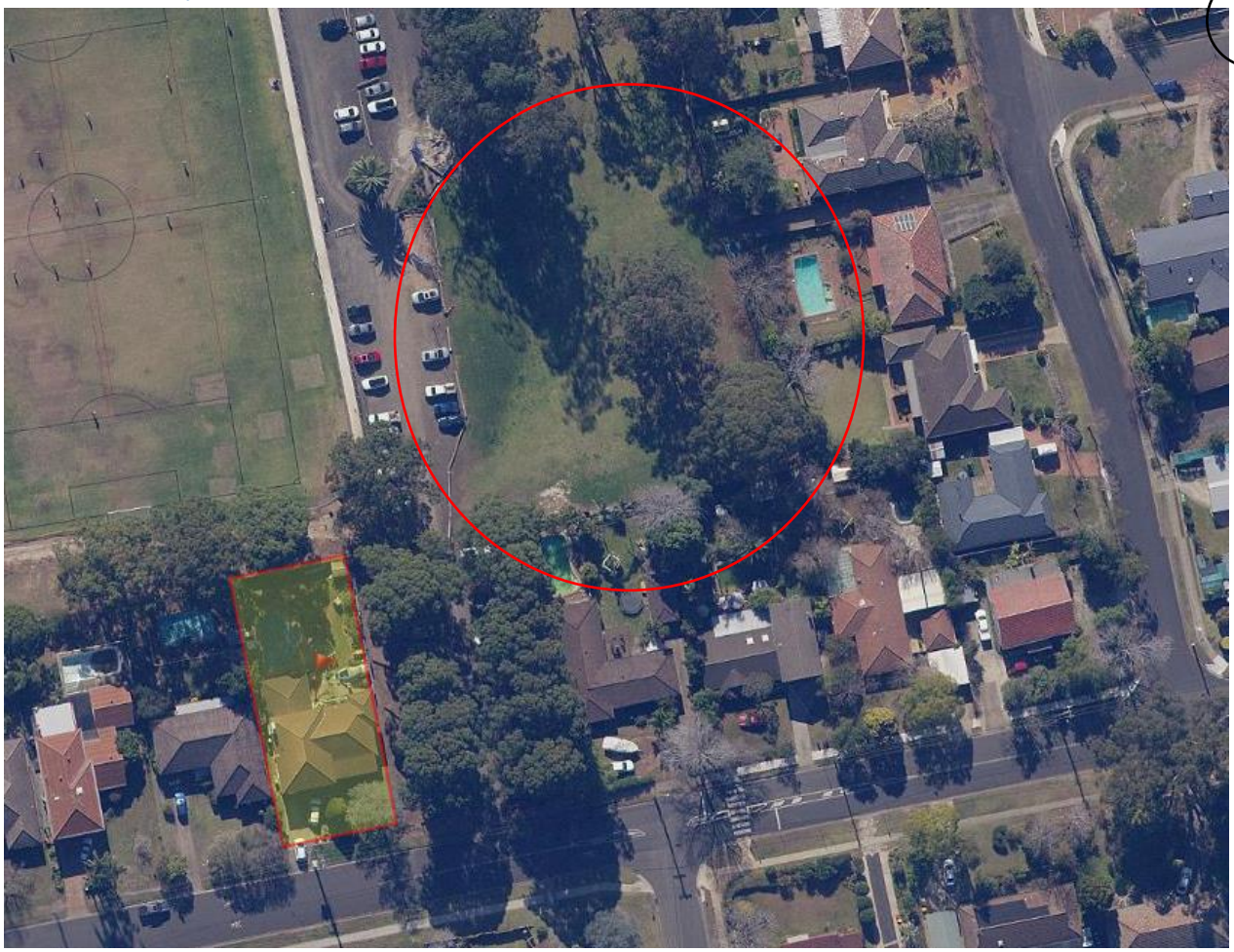
a. that is listed in a Register of Significant Trees; or

b. that is or forms part of a heritage item, or that is within a heritage conservation area; or

c. that is or forms part of an Aboriginal object, or that is within an Aboriginal place of heritage significance.

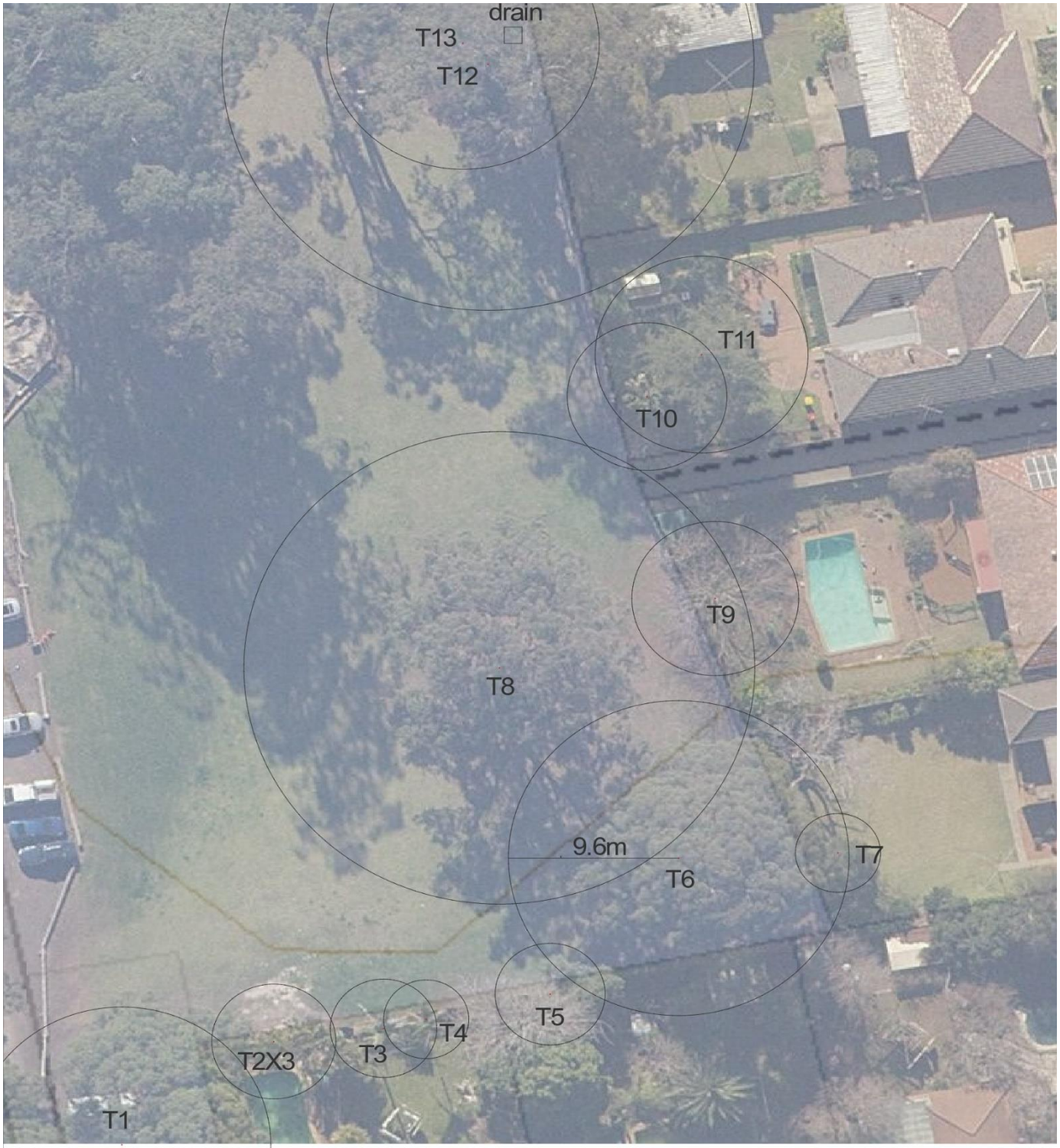
All photographs that appear within this report were taken on the day of the site visit, dated 02/11/22.

4. Site Locality



Council public reserve, adjacent to site (sixmaps.com.au)

5. Tree Location Plan



tree schedule -

T1 - Eucalyptus microcorys - TPZ = 8.4m, retain
T2 - Dypsis lutescens - TPZ = 3.5m, retain
T3 - Archontophoenix cunninghamiana - TPZ = 3m, retain
T4 - Archontophoenix cunninghamiana - TPZ = 2.4m, retain
T5 - Olea europaea, Cuspidata - TPZ = 3.1m, retain
T6 - Eucalyptus microcorys - TPZ = 9.6m, retain
T7 - Callistemon viminalis - TPZ = 2.4m, retain
T8 - Eucalyptus microcorys - TPZ = 14.4m, retain
T9 - Fraxinus pennsylvanica - TPZ = 4.7m, retain
T10 - Washingtonia robusta - TPZ = 4.5m, retain
T11 - Cedrus deodora - TPZ = 6m, retain
T12 - Eucalyptus saligna - TPZ = 15m, retain
T13 - Syncarpia glomulifera - TPZ = 7.68m, retain

Tree Protection Zone

TREE LOCATION PLAN

Trees TPZ to ascertain Stormwater route

1:200@A3

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6. Findings

The site visit from the author of this report was undertaken on the 3rd November, 2022.

A large open grassed area is located north to northeast of the playing fields and this area is to be assessed for trees within the reserve and trees located within residential backyards that may be impacted by proposed stormwater piping and infrastructure.

This report will address the thirteen (13) trees' condition, significance and retention values and determine the extent of encroachments that may be imposed upon their TPZs and assess a probable direction of travel of stormwater infrastructure to minimise impacts to the least number of trees.

6.1 Vegetation assessed

The subject trees relating to this report are as follows and locations are shown upon the Tree Location and Protection Plan:

Tree 1) ***Eucalyptus microcorys*** - Tallowwood - Located within Councils Street verge fronting the Council reserve.

Tree 2***) Dypsis lutescens*** – Golden Cane Palm - Located within rear yard of No 69 Murray Farm Rd.

Tree 3) ***Archontophoenix cunninghamiana*** – Bangalow Palm - Located within rear yard of No 69 Murray Farm Rd.

Tree 4) ***Archontophoenix cunninghamiana*** – Bangalow Palm - Located within rear yard of No 69 Murray Farm Rd.

Tree 5) ***Olea europaea subsp. europaea -*** African Olive - Located within rear yard of No 67 Murray Farm Rd.

Tree 6) ***Eucalyptus microcorys*** - Tallowwood - Located within Councils reserve.

Tree 7) ***Callistemon viminalis -*** Bottlebrush - Located within rear yard of No 4 Sylvia Ave.

Tree 8) ***Eucalyptus microcorys*** - *Tallowwood* - Located within Councils Reserve.

Tree 9) ***Fraxinus pennsylvanica**** – Green Ash - Located within No 6 Sylvia Ave rear yard.

Tree 10) ***Washingtonia robusta*** – Mexican Fan Palm - Located within No 8 Sylvia Ave rear yard.

Tree 11) ***Cedrus deodora*** - Himalayan cedar - Located within No 8 Sylvia Ave rear yard.

Tree 12) ***Eucalyptus saligna*** – Sydney Bluegum - Located within Councils Reserve, close to existing stormwater pit.

Tree 13) ***Syncarpia glomulifera*** - Turpentine - Located within Councils Reserve, close to existing stormwater pit.

6.2 Tree Assessment

Tree number	Species	Height (M)	Crown Spread (M) N S E W	DBH (M)	Live Crown Ratio %	Vigour/ structure	Age Class	TPZ M	SRZ M	SULE	RET VALUE	STARS	Recommendations
1	*Eucalyptus microcorys*	16m	10, 3, 8, 8	.700	90%	Fair/ fair	Mature	8.4	3.3	2a	high	high	**Retain** tree, protect when implementing stormwater infrastructure.
Mature tree, crown form supressed, canopy to south from adjacent trees. Codominant trunks from 3.5m, high volume of deadwood, outer foliage canopy dieback, past pruning evidenced, secondary leader at 4m has had previous limb removed and or failed, south east.													
Tree number	Species	Height (M)	Crown Spread (M) N S E W	DBH (M)	Live Crown Ratio %	Vigour/ structure	Age Class	TPZ M	SRZ M	SULE	RET VALUE	STARS	Recommendations
2	*Dypsis lutescens (stand of 3x clumps)*	4.5/5	2.5, 2.5, 2.5, 2.5	multistem med	100%	Good/ good	mature	*3.5	2	2d	low	low	**Retain** neighbours' palms.
Mature stand of palms, multistemmed and typical of species. Located 1m from fence.													
Tree number	Species	Height (M)	Crown Spread (M) N S E W	DBH (M)	Live Crown Ratio %	Vigour/ structure	Age Class	TPZ M	SRZ M	SULE	RET VALUE	STARS	Recommendations
3	*Archontophoenix cunninghamiana*	9.5m	2.5, 2.5, 2.5, 2.5	.250	80%	Fair/good	mature	3m	1.85	2d	low	low	**Retain** neighbours' palm, protect when implementing stormwater infrastructure.
Mature palm, planted at 1.5m in from boundary fence.													
Tree number	Species	Height (M)	Crown Spread (M) N S E W	DBH (M)	Live Crown Ratio %	Vigour/ Structure	Age Class	TPZ M	SRZ M	SULE	RET VALUE	STARS	Recommendations
4	*Archontophoenix cunninghamiana*	7.5m	2.5, 2.5, 2.5, 2.5	.200	80%	Fair/good	Mature	2.4	1.7	2d	low	low	**Retain** neighbours' palm, protect when implementing stormwater infrastructure.
Mature palm, planted at 1.5m in from boundary fence.													
Tree number	Species	Height (M)	Crown Spread (M) N S E W	DBH (M)	Live Crown Ratio %	Vigour/ structure	Age Class	TPZ M	SRZ M	SULE	RET VALUE	STARS	Recommendations
5	*Olea europaea subsp. europaea*	6.5m	3.5, 4. 4. 4	.260	80%	fair/ poor	Mature	3.1	1.89	3a	low	low	**Retain** neighbours' tree, protect when implementing stormwater infrastructure.
Mature tree growing close to rear fence of No 67 Murray Farm Rd. Minimum of 4x trunks forming domed canopy of tree. Overhanging reserve by 3.5m													

Tree number	Species	Height (M)	Crown Spread (M) N S E W	DBH (M)	Live Crown Ratio %	Vigour/ structure	Age Class	TPZ M	SRZ M	SULE	RET VALUE	STARS	Recommendations
6	*Eucalyptus microcorys*	15m	10, 10, 10, 10	.800	80%	fair/ fair	Mature	9.6	3.6	2a	high	high	**Retain** tree, protect when implementing stormwater infrastructure.
Mature symmetrical tree crown form dominant, broad domed canopy. Single trunk tree to 2.5m, high volumes of deadwood, large dead and decayed end branching, Stormwater/ sewer pit less than 2.5m(within SRZ) from trunk of tree, north east, high volume of epicormic shoots, tree appears to be in decline.													
Tree number	Species	Height (M)	Crown Spread (M) N S E W	DBH (M)	Live Crown Ratio %	Vigour/ structure	Age Class	TPZ M	SRZ M	SULE	RET VALUE	STARS	Recommendations
7	*Callistemon viminalis*	6m	3, 3, 3, 3	.212	80%	low/fair	mature	2.4	1.7	3a	low	low	**Retain** tree, protect when implementing stormwater infrastructure.
Small tree within No 4 Sylvia Ave and 1.8m from back fence. Foliage is 1m over into reserve.													
Tree number	Species	Height (M)	Crown Spread (M) N S E W	DBH (M)	Live Crown Ratio %	Vigour/ structure	Age Class	TPZ M	SRZ M	SULE	RET VALUE	STARS	Recommendations
8	*Eucalyptus microcorys*	16m	10, 8.5, 8, 8	1.2m	75%	Fair/fair	Over mature	14.4	3.8	2a	high	high	**Retain** tree, protect when implementing stormwater infrastructure, above and below ground
Large over mature tree, crown form dominant, single trunk to 2m, then 3 dominant trunks forming canopy of tree. Tree presents with high volume of deadwood, girdled roots surrounding base, high volume of epicormic shoots that have died, decay pocket at base, north face trunk. Surface roots exposed and damaged. Large amount of fallen branching.													
Tree number	Species	Height (M)	Crown Spread (M) N S E W	DBH (M)	Live Crown Ratio %	Vigour/ Structure	Age Class	TPZ M	SRZ M	SULE	RET VALUE	STARS	Recommendations
9	*Fraxinus pennsylvanica**	9m	5, 6, 6, 6	5x.175 (avg) - .391	80%	Good/fair	Mature	4.7	2.17	2d	med	med	**Retain** tree, protect when implementing stormwater infrastructure, above and below ground
Mature tree growing approx. 2m from fence within No 6 Sylvia Ave, branching is overhanging into reserve by 4m. *Identification close to Genus and Species. Assumed DBH/DAB as in private yard													
Tree number	Species	Height (M)	Crown Spread (M) N S E W	DBH (M)	Live Crown Ratio %	Vigour/ structure	Age Class	TPZ M	SRZ M	SULE	RET VALUE	STARS	Recommendations
10	*Washingtonia robusta*	11m	1.5, 1.5, 1.5, 1.5	.375	80%	fair/ good	Mature	4.5	2.2	2d	med	med	**Retain** tree, protect when implementing stormwater infrastructure, below ground.
Mature palm in poor to fair condition. 1.7m from the boundary fence. Typical of habit, form and species.													
Tree number	Species	Height (M)	Crown Spread (M) N S E W	DBH (M)	Live Crown Ratio %	Vigour/ structure	Age Class	TPZ M	SRZ M	SULE	RET VALUE	STARS	Recommendations
11	*Cedrus deodora*	11m	4.5, 4.5, 4, 4	.500	85%	Fair/ fair	Mature	6m	2.85	2d	med	med	**Retain** tree
Mature tree growing close to T10 and conflicting, tree with low to medium volumes of deadwood. Assumed DBH/DAB as in private yard													

Tree number	Species	Height (M)	Crown Spread (M) N S E W	DBH (M)	Live Crown Ratio %	Vigour/ structure	Age Class	TPZ M	SRZ M	SULE	RET VALUE	STARS	Recommendations
12	*Eucalytpus saligna*	9m	6, 9, 10, 5	1.450	80%	Fair/poor	mature	15m	4	3a	med	med	**Retain** tree, protect when implementing stormwater infrastructure, below ground and trunk protection.
Large mature tree, crown form dominant. Tree in poor condition with large wound face at base measuring 2m x 1m wide, borer damage evident, hollow soundings with sounding hammer to wound face. Ground modifications to surround ground with drain culvert north east within SRZ, raised soil levels south and west to create a swale for surface water redirection. Concrete against fence above drain culvert. Possible fauna habit in main trunk and upper crown location.													
Tree number	Species	Height (M)	Crown Spread (M) N S E W	DBH (M)	Live Crown Ratio %	Vigour/ structure	Age Class	TPZ M	SRZ M	SULE	RET VALUE	STARS	Recommendations
13	*Syncarpia glomulifera*	10m	6, 3.5, 6, 3	.640 2x cdmts	75%	Fair/poor	mature	7.68	3.2	3a	med	med	**Retain** tree, protect when implementing stormwater infrastructure, below ground and trunk protection.
Mature tree growing 3.5m from tree 12. Suppressed form, codominant trunks from base													

6.3 Encroachment

Encroachment refers to the likelihood of interference within the SRZ and or TPZ of each tree, and is calculated in a percentage form.

TPZ – Tree Protection Zone = DBH X 12 METRES

DBH = Diameter at Breast Height (1.4 metres)

SRZ – Structural Root Zone = $(D \times 50)^{.42} \times .64$

D = trunk diameter measured above the root buttress

Tree 1) ***Eucalyptus microcorys*** - Tallowwood - Located within Councils Street verge fronting the Council reserve. This tree has a TPZ of 8.4m and is approx. 5.5m south of the edge corner of the adjacent backyards corner fence. If stormwater piping is to be excavated and installed, it is recommended to be conducted upon the northern edge of this trees TPZ, to minimise impacts to this tree.

Tree 2*)* ***Dypsis lutescens (x3)*** – Golden Cane Palm - Located within rear yard of No 69 Murray Farm Rd. This palm is a collection of clumps located close to the back fence of No 69. Being a palm and in accordance with AS4970 -2009, Section 3, 3.2, the TPZ should not be less than 1m outside the crown's projection. Therefore, these palms having a crown projection of approx. 2.5m in a northerly aspect, the TPZ has been calculated at 3.5m and the stormwater piping needs to be located upon the 3.5m TPZ projection, or further away.

Tree 3) ***Archontophoenix cunninghamiana*** – Bangalow Palm - Located within rear yard of No 69 Murray Farm Rd. Being a palm and in accordance with AS4970 - 2009, Section 3, 3.2, the TPZ should not be less than 1m outside the crown's projection. Therefore, this palm having a crown projection of approx. 2.5m in a northerly aspect and located approx. 1.5m away from the back fence, the TPZ has been calculated at 3.5m and the stormwater piping needs to be located upon the 3.5m TPZ projection, or further away.

Tree 4) ***Archontophoenix cunninghamiana*** – Bangalow Palm - Located within rear yard of No 69 Murray Farm Rd. Being a palm and in accordance with AS4970 -2009, Section 3, 3.2, the TPZ should not be less than 1m outside the crown's projection. Therefore, this palm having a crown projection of approx. 2.5m in a northerly aspect and located approx. 1.5m away from the back fence as well, the TPZ has been calculated at 3.5m and the stormwater piping needs to be located upon the 3.5m TPZ projection, or further away, into the reserve.

Tree 5) ***Olea europaea subsp. europaea -*** African Olive - Located within rear yard of No 67 Murray Farm Rd. This tree having a TPZ of 3.1m, the proposed piping could be located upon the outer edges of this trees TPZ, without impact this tree.

Tree 6) ***Eucalyptus microcorys*** - Tallowwood - Located within Councils reserve. This tree has a TPZ of 9.6m and encapsulates the entire corner of this reserve and therefore any excavations will

impact this trees southern, south eastern and eastern TPZ. It may be a better option to redirect the stormwater alignment prior to this trees TPZ and divert around Tree 8 to avoid this trees TPZ all together?.

Tree 7) ***Callistemon viminalis -*** Bottlebrush - Located within rear yard of No 4 Sylvia Ave. This small tree has a TPZ of 2.4m and stormwater piping could be located outside this trees TPZ, although that would impact tree 6s TPZ. These small trees western canopy extends approx. 1m over into the reserve with no impacts from machinery envisaged.

Tree 8) ***Eucalyptus microcorys*** - Tallowwood - Located within Councils Reserve. This large tree has a TPZ of 14.4m and extends well into adjacent neighbouring sites. If stormwater piping ran down the rear back fence of the neighbours, this would constitute as a major incursion to tree 8. A better option may be to redirect the stormwater alignment prior to this trees TPZ and divert around the western edge of this trees TPZ all together?

Tree 9) ***Fraxinus pennsylvanica**** – Green Ash - Located within No 6 Sylvia Ave rear yard. This tree has a TPZ of 4.7m radially out from its trunk and its TPZ cojoins with Tree 8. If stormwater piping ran down the back fence of this trees TPZ, it would constitute as a major incursion. A better option would be to divert the stormwater piping around T6 and 8s western TPZ and avoid conflicting with Tree 9 altogether.

Tree 10) ***Washingtonia robusta*** – Mexican Fan Palm - Located within No 8 Sylvia Ave rear yard. This palm has a calculated TPZ of 4.5m out from its trunk. This palm is approx. 1.7m in from the boundary fence and therefore its TPZ extends approx. 2.8m into the reserve. Stormwater piping could extend over to this palms TPZ and not closer than 3m from the boundary fence, to minimise impacts to this palms TPZ.

Tree 11) ***Cedrus deodora*** - Himalayan cedar - Located within No 8 Sylvia Ave rear yard. This tree has a TPZ of 6m and its outer western TPZ extends into the reserve by approx. 1 – 1.5m only and therefore, no impacts would be envisaged.

Tree 12) ***Eucalyptus saligna*** – Sydney Bluegum - Located within Councils Reserve, close to existing stormwater pit. This large tree has a TPZ of 15m radially out from its trunk, although the stormwater connection is proposed very close to this tree. Proposed excavations are recommended to be conducted using air spade, or hydro vac or underground boring to ensure minimal impacts to tree 12 are encountered. All works must be performed under the guidance and supervision of the AQF 5 Project arborist and signed off as compliant as per AS4970 - 2009.

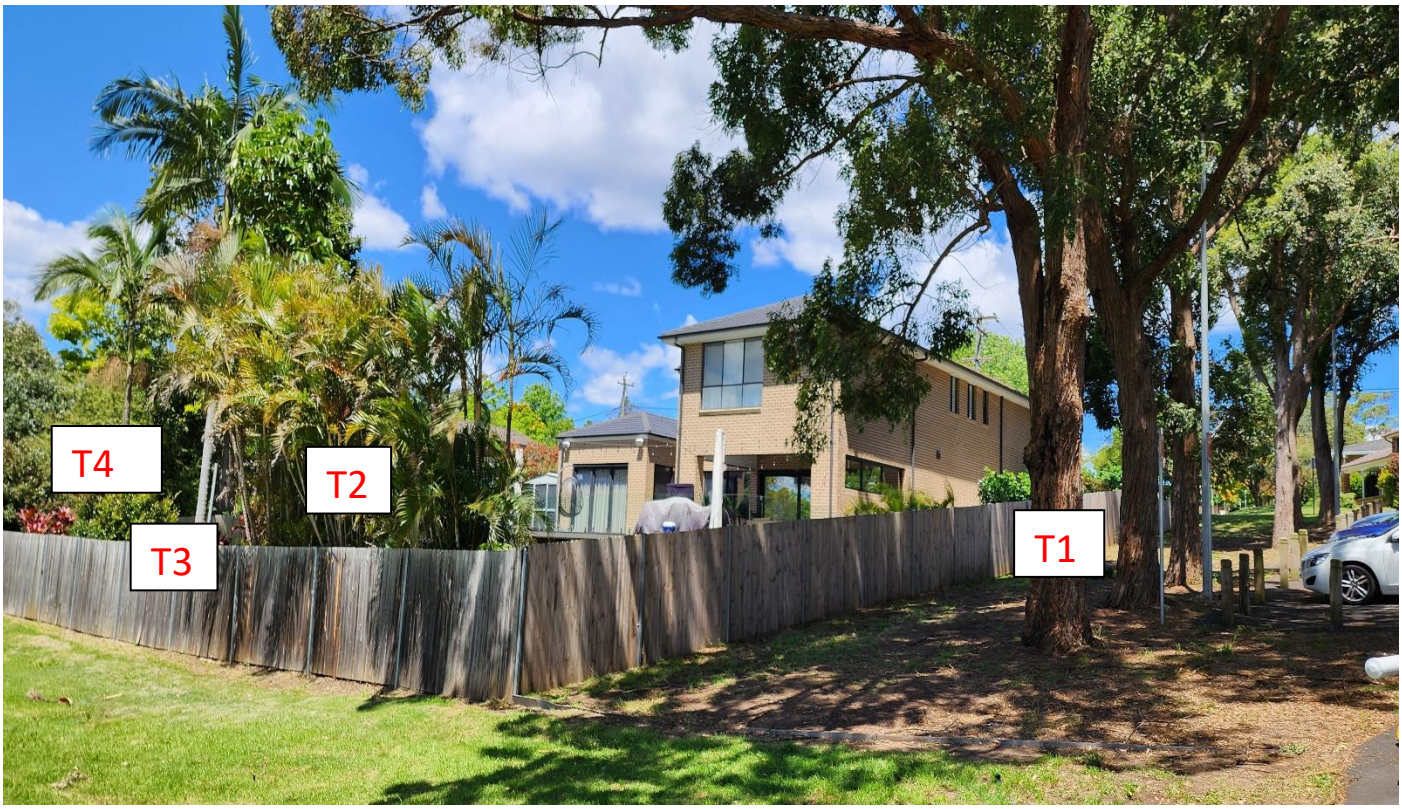
Tree 13) ***Syncarpia glomulifera*** - Turpentine - Located within Councils Reserve, close to existing stormwater pit. This tree having a TPZ of 7.68m radially out from its trunk, although the stormwater connection is proposed very close to this tree. Proposed excavations are recommended to be conducted using air spade, or hydro vac or underground boring non-destructive excavation techniques to ensure minimal impacts to tree 13 are encountered. All works must be performed

under the guidance and supervision of the AQF 5 Project arborist and signed off as compliant as per AS4970 - 2009.

* Closeness to Species as keyed.

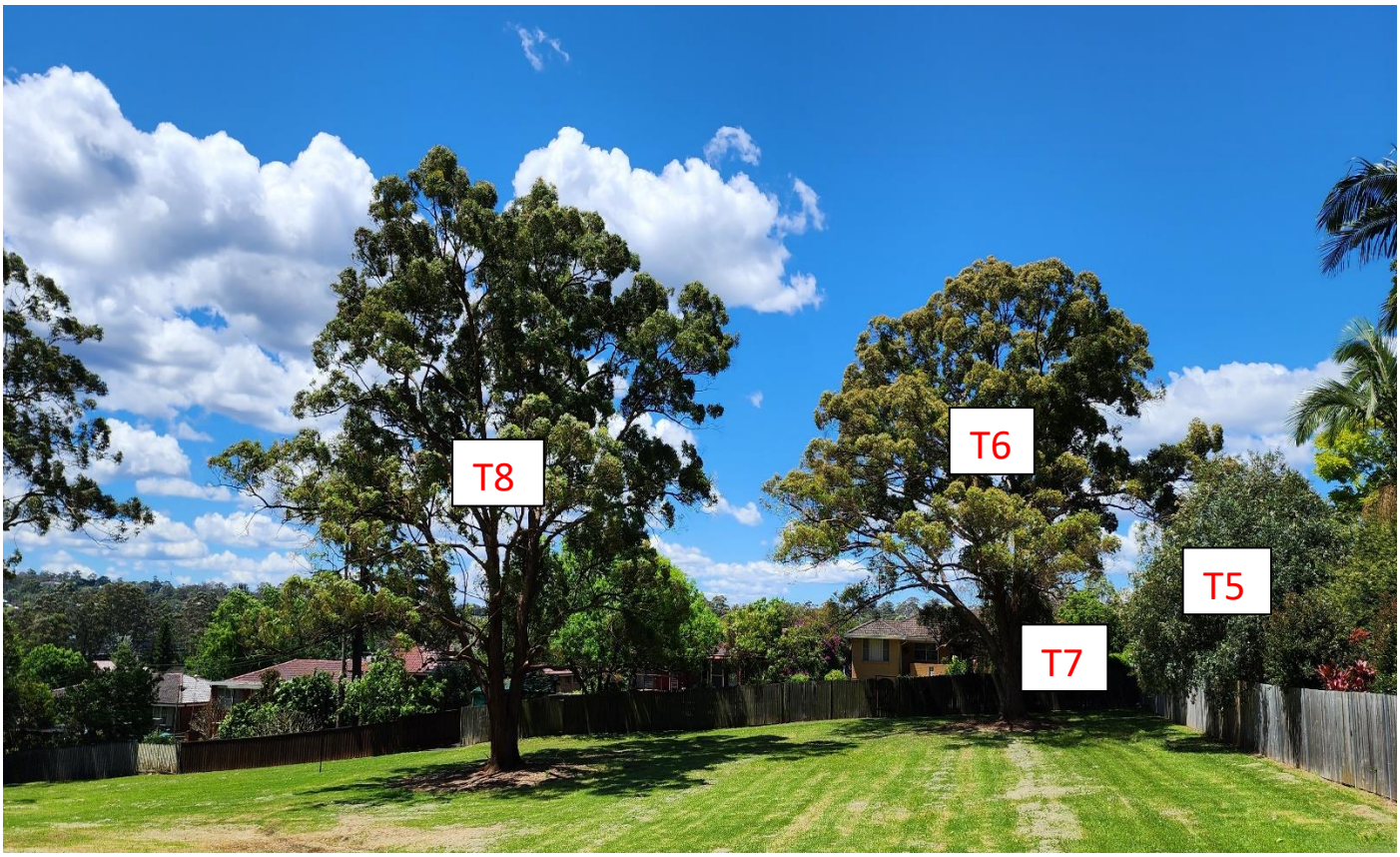
Construction impacts to trees often include some degree of root injury, soil compaction, removal of leaf area through pruning, loss of rooting space and changes in soil moisture and microbiology. These impacts do not occur all at once. Rather, a series of changes occur to which the tree must respond and adapt. First, roots are injured and the site micro climate altered by clearing. Then further changes occur during grading and installation of improvements. Construction of adjacent structures causes another series of damages. Finally, finish grading and landscaping further encroach into root area and alter the trees microsite. Trees may respond to these impacts in a variety of ways, from slower growth and poor foliage colour to dieback and death[1].

7. Photographs of trees



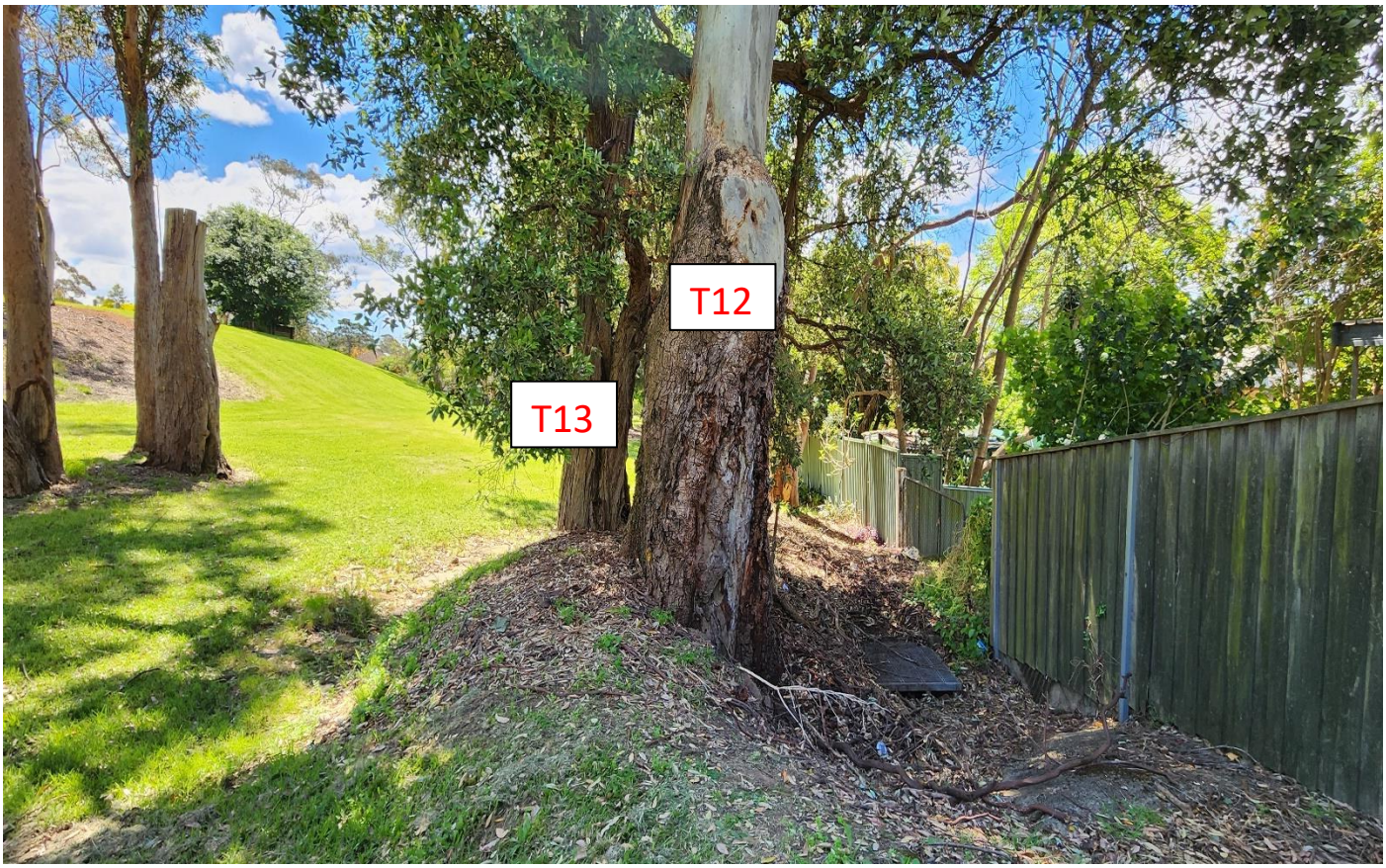
Photograph 1, above looking south east to trees 1, 2, 3 and 4.

[1] Arboriculture, Fourth Edition, Integrated Management of Landscape Trees, Shrubs, and Vines/ Richard W. Harris, James R. Clark, Nelda P. Matheny/ 2004/ Prentice Hall/ Chapter 11, Preserving Existing Trees, Pg. 263



Photograph 2, above looking east to trees 5, 6, 7 and 8.

Photograph 3, above looking south to trees 8, 9, 10 and 11.



Photograph 4, above looking north to trees 12 and 13.

8. Mitigation / Recommendations

The author (Craig Kenworthy) of this report recommends:

- Trees 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12 and 13 to be retained and protected (13 trees).

- The use of this report by Council to better understand the best route to be taken, to plan for stormwater piping and installation of infrastructure within the adjacent reserve, to minimise impacts to both neighbours' trees and Councils reserves trees. The TPZs provided, will best guide the location of excavations, type of and stormwater piping to all trees assessed. The author recommends diverting the piping prior to trees 6 and 8 and stay north to north west of both trees TPZ.

- Attendance and guidance for all excavations within the TPZs of all trees on Councils reserve and conduct non-destructive excavations such as air spade, hydro vac when close to and within the TPZ of trees 12 and 13.

- Tree Protection measures, monitoring and Certification all in accordance with AS4970 – 2009, Section 4 and Section 5.

- Council should inspect the condition and structural integrity to tree 12, going forward.

- Tree Protection measures, monitoring and Certification all in accordance with AS4970 – 2009, Section 4 and Section 5.

- The implementation and signing off, of Hold Points and Certification table as per below 8.1 Hold Points & Certification.

8.1 Hold Points & Certification

TIMING / SITE VISITS	PROCEDURE	AUTHORITY	CERTIFICATION	SIGNATURES
Hold Point **1** – Letter of Engagement	To provide the applicant and PCA with a Letter of Engagement for Arboricultural Services	Project Arborist to provide PCA	Letter of Engagement	AQF 5 Arborist: date Project Manager:
Hold Point **2** - Before ANY works and prior to a Construction Certificate	**Retain and protect** trees 1, 2, 3, 4, 5, 6, 8, 9, 10, 11, 12 and 13.	Project Arborist to attend to view Tree Protection Fencing, mulch and signage has been installed and to sign off if compliant.	Certificate of Compliance for Certifier	AQF 5 Arborist: date Project Manager:
Hold Point **3** – Excavations	To monitor all excavations, within TPZ of all trees.	Project Arborist to attend	Certificate of findings if Compliance has been met or not, for Certifier	AQF 5 Arborist: date Project Manager:
Hold Point **4** – Periodically (Monthly)	Monitor maintenance to protection measures. TPZ/SRZ mulched and watered.	Project Arborist	Certificate of Compliance for Certifier if compliant or not.	AQF 5 Arborist: date Project Manager:
Hold Point **5** – Prior Occupation Certificate	To view condition of TPZ and condition of protected trees before OC.	Project Arborist	Certificate of Compliance for Certifier	AQF 5 Arborist: date Project Manager:

9. Conclusion

This report has focused on the proposed stormwater infrastructure within the Council reserve, that's associated with 73 Murray Farm Road, Carlingford, NSW, for a proposed Childcare facility to be built upon the subject site.

All thirteen (13) within Councils reserve and or neighbouring sites can be retained with minimal impacts to their ongoing viability. We have assessed all the trees within the reserve that may be impacted by stormwater infrastructure and assessment of their TPZs, with a recommendation to divert stormwater piping prior to trees 6 and 8, to ensure all the neighbours' trees and these two high significant trees can be maintained and proposed works are away from these trees growing environments.

10. Appendices

10.1 Tree protection zones (TPZ)

The Tree Protection Zone (TPZ) is the principal means of protecting trees on development sites. The TPZ is a combination of the root area and crown area requiring protection. This is an area that is prohibited from any construction work. TPZs have been calculated for each tree (3) within this report. The TPZ for each tree has been formulated using calculations based on the Australian Standard, *Protection of trees on development sites, AS 4970 – 2009*

10.2 Structural Root Zone (SRZ)

The SRZ is a specified distance measured from the trunk that is set aside for the protection of the tree's structural roots. This zone is paramount for protection measures as is necessary for the stability of a tree. The SRZ is a radial measurement from the trunk. Roots within the SRZ are not to be touched. The SRZ have been calculated using the Australian Standard, *Protection of trees on development sites, AS 4970 – 2009*

10.3 SULE (Safe Useful Life Expectancy)

SULE categories (after Barrell, 2001)[1]

SULE Category	Description
Long	Trees that appeared to be retainable at the time of assessment for more than 40 years with an acceptable level of risk.
1a	Structurally sound trees located in positions that can accommodate for future growth
1b	Trees that could be made suitable for retention in the long term by remedial tree care.
1c	Trees of special significance that would warrant extraordinary efforts to secure their long term retention.
Medium	Trees that appeared to be retainable at the time of assessment for 15-40 years with an acceptable level of risk.
2a	Trees that may only live for 15-40 years
2b	Trees that could live for more than 40 years but may be removed for safety or nuisance reasons
2c	Trees that could live for more than 40 years but may be removed to prevent interference with more suitable individuals or to provide for new planting.
2d	Trees that could be made suitable for retention in the medium term by remedial tree care.
Short	Trees that appeared to be retainable at the time of assessment for 5-15 years with an acceptable level of risk.
3a	Trees that may only live for another 5-15 years
3b	Trees that could live for more than 15 years but may be removed for safety or nuisance reasons.
3c	Trees that could live for more than 15 years but may be removed to prevent interference with more suitable individuals or to provide for a new planting.
3d	Trees that require substantial remedial tree care and are only suitable for retention in the short term.
Remove	Trees that should be removed within the next five years.
4a	Dead, dying, suppressed or declining trees.
4b	Dangerous trees because of instability or loss of adjacent trees
4c	Dangerous trees because of structural defects
4d	Damaged trees not safe to retain.
4e	Trees that could live for more than 5 years but may be removed to prevent interference with more suitable individuals or to provide for a new planting.
4f	Trees that are damaging or may cause damage to existing structures within 5 years.
Small	Small, or young trees that can be reliably moved or replaced.
5a	Small trees less than 5m in height.
5b	Young trees less than 15 years old but over 5m in height.

1 (Barrell,J. (2001) "SULE: Its use and status into the new millennium" in *Management of mature trees*, Proceedings of the 4th NAAA Tree Management Seminar, NAAA, Sydney.

10.4 IACA Significance of a Tree Assessment Rating System (STARS)

Criteria for Assessment of Landscape Significance

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.

Estimated Life Expectancy	Significance				
	1. High	**2.** Medium	**3.** Low		
	Significance in Landscape	Significance in Landscape	Significance in Landscape	Environmental Pest / Noxious Weed Species	Hazardous / Irreversible Decline
1. Long **>40 years**					
2. Medium **15-40 Years**					
3. Short **<1-15 Years**					
Dead					

Legend for Matrix Assessment

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	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.

11. Bibliography

Arboriculture, Fourth Edition, Integrated Management of Landscape Trees, Shrubs, and Vines/ Richard W. Harris, James R. Clark, Nelda P. Matheny/ 2004/ Prentice Hall.

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http://www.treetec.net.au/TPZ_SRZ_DBH_calculator.php

Tree Management as per City of Parramatta Tree Management Policy, 5.4 Preservation of Trees or Vegetation - https://www.cityofparramatta.nsw.gov.au/living/trees

Regards

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AQF Level 5 - Arboriculture

AQF Level 5 – Landscape Design

AQF Level 5 – Horticulture

AQF Level 4 – Workplace Training and Assessment

AQF Level 3 – Landscape Construction, NSW

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