

ARBORICULTURAL IMPACT ASSESSMENT

REPTILE & AMPHIBIAN CONSERVATION CENTRE (RACC)



ARBORICULTURAL IMPACT ASSESSMENT

Prepared for:

Paul De Alwis (Project Manager)
Taronga Conservation Society Australia

Site:

Taronga Zoo
Bradleys Head Road, Mosman NSW 2088

Published by:

MATHEW PHILLIPS

Dip. Arboriculture (AQF-5)

M: 0433 085 573

QTRA No.6067

E: sydneymarbor@hotmail.com



Registered User

SYDNEY ARBOR TREES Pty Ltd

ARBORICULTURE/CONSULTATION/HABITAT CREATION

Tel: (02) 96666821

ABN: 39 106 413 610

www.sydneymarbor.com.au



1 TABLE OF CONTENTS

1	TABLE OF CONTENTS	2
2	SUMMARY OF ASSESSMENT	3
3	INTRODUCTION.....	4
3.1	Instruction	4
3.2	Purpose	4
3.3	Scope	4
3.4	Documents & Information Provided	4
3.5	Objectives Considered.....	4
3.6	Brief Site Description	4
3.7	Taronga Zoo Precinct Map.....	5
3.8	Reptile & Amphibian Conservation Centre proposed Location.....	6
4	IMPACT ASSESSMENT.....	7
4.1	Summary of the Impact on trees	7
4.1.1	Summary of Tree Significance	7
4.1.2	Summary of Tree Retention and Removal	7
4.2	Detailed Impact Assessment.....	8
4.2.1	High significance trees to be removed	8
4.2.2	Potential impact to high significance trees	8
4.2.3	Medium Significance Trees to be Removed	9
4.2.4	Low Significance Trees to be Retained.....	9
4.2.5	Low Significance Trees to be Removed	9
4.3	Potential Impact Mitigation.....	9
4.3.1	Tree Protection.....	9
4.3.2	Off-set Landscape Plan	9
4.3.3	Impact on Amenity	9

5	RECOMMENDATIONS.....	10
6	STATEMENT OF LIMITATIONS	15
7	REFERENCES.....	16
8	APPENDICES.....	17
8.1	APPENDIX 1: Assessment Methodology.....	18
8.2	APPENDIX 2: Significance of a Tree Assessment Rating System.....	21
8.3	APPENDIX 3: IACA Tree Retention Value- Priority Matrix	22
8.4	APPENDIX 4: Tree Schedule.....	23
8.5	APPENDIX 5: Tree Survey	27
8.6	APPENDIX 6: Review of plans and proposed impacts	30
8.7	APPENDIX 7: Site-Specific Tree Protection Strategy.....	33

2 SUMMARY OF ASSESSMENT

This Arboricultural Impact Assessment (AIA) was prepared for Paul De Alwis of Taronga Conservation Society Australia. This report specifically discusses seventy-three (73) tree species within the proposed development site.

The proposed development includes the demolition of the existing Meerkat exhibit, the partial demolition of the heritage Aviary Walls, existing pathways and staircase, and the proposed development of the new Reptile and Amphibian Conservation Centre (RACC).

A Visual Tree Assessment (VTA) and site inspection was conducted on the 27th May 2021 with the supplied plans to determine the impact of the proposed development on tree species. I have inspected all trees that could be impacted and list their details in Appendix 4. Based on this information, I provided guidance to the project Architect on the constraints these trees impose on the use of the site.

Nine (9) high significance trees, four (4) medium significance trees and thirty-seven (37) low significance trees are proposed to be removed to facilitate the development. A further six (6) High Significance trees have been identified as a priority for transplant, pending a feasibility study by an appropriately qualified expert experienced in tree transplanting.

The proposed landscaping plan has been designed to mitigate these losses and include the planting of locally indigenous trees. Through complying with the recommended mitigation measures, as set out in Sections 4, Section 5, and the Site-Specific Tree Protection Strategy, this proposal is not expected to have any direct impact to a further six (6) high significance Heritage trees and nine (9) low significance trees surrounding the development. If adequate precautions to protect the retained trees are specified and implemented through the Site-Specific Tree Protection Strategy included in this report, the development proposal will not have an adverse impact on the contribution of the retained trees.

Table 1 shows the significance of tree species identified for retention, removal and potential transplant.

TREE RETENTION AND REMOVAL							
Retention Value	High Priority for Retention	Medium Consider for Retention	Low Consider for Removal	Remove Priority for Removal			
Retained Tree that may be impacted	1,2,3,4,5,6.		11,12, 52,53,54,55, 58,59,59a,59b,60.				
Priority for Transplant	9,10,16,21,23,24.						
Tree to be Removed	13,14,15,17,19,20, 22,65,66.	18,42,43,63.	7,8, 25,26,27,28,29, 31,32,32a,33,34,35, 36,37,38,39,40,41, 44,45,46,47,48,48a, 49,50,51,51a,51b, 56,57,61,62,64,67.	30.			

Table 1

3 INTRODUCTION

3.1 Instruction

Sydney Arbor Trees Pty Ltd have been instructed by Taronga Conservation Society to provide an Arboricultural Impact Assessment to accompany a development application (DA), State Significant Development (SSD) for the proposed Reptile and Amphibian Conservation Centre. This AIA specifically investigates the impact of the proposed development on trees and further provides the following instruments for the appropriate management and protection of trees to be retained:

- 3.1.1 A detailed schedule of all tree species 5m in height and above, in accordance with Taronga Zoo Policy and Mosman City Council DCP. Not limited to health, condition and significance.
- 3.1.2 An Assessment of the proposed development.
- 3.1.3 A Site-Specific Tree Protection Strategy outlining all appropriate protection measures for retained trees.

3.2 Purpose

This Arborist report provides an assessment of the impact of the proposed development on trees with site specific guidance on the appropriate management and protection of the retained trees. The primary purpose of this report is for the State Significant Development to review the tree related information in support of a planning submission.

3.3 Scope

This report is concerned with Seventy-three (73) trees within the proposed development site that are categorised under the State Environmental Planning Policy 'Vegetation in Non-Rural Areas 2017', Part 3 applying to:

- 3.3.1 Are 5m or more in height,
- 3.3.2 Have a circumference of 450mm or more measured 300mm above ground level.

3.4 Documents & Information Provided

The following documents and information were provided:

- 3.4.1 Site Plan (Site Analysis) PDF, by Taronga Zoo, not dated.
- 3.4.2 14952 RACC Detail Survey Rev C, by Hammond Smeallie & Co Pty Ltd dated 26 May 2021,
- 3.4.3 SEARS Requirements Reptile and Amphibian Conservation Centre (SSD-17483577) not dated,
- 3.4.4 Landscape Development Plan by Context landscape Architecture dated June 2021,
- 3.4.5 Development Application Documentation by dwp dated 23 June 2021,
- 3.4.6 The Heritage Items at Site, May 2021,
- 3.4.7 Civil plans by Meinhardt Bonacci C001, C005, C007, C010, C011, C012, C030 and C050,
- 3.4.8 Services plans by CNF and Associates, and David Power.

3.5 Objectives Considered

In preparing this report, the author has considered the objectives of:

- 3.5.1 The State environmental Planning Policy 'Vegetation in Non-Rural Areas 2017'
- 3.5.2 AS 4970 Protection of Trees on Development Sites (2009),
- 3.5.3 AS 4373 Pruning of Amenity Trees (2007),
- 3.5.4 Mosman DCP & LEP 2012.

3.6 Brief Site Description

Taronga Zoo is located on Bradleys Head Road in the suburb of Mosman as shown in Figure 1. The site is to the west of the road, with National park to the east of the road and residential development to the immediate north of the site. The site consists of Taronga Zoo Precinct largely vegetated with ornamental, indigenous, coniferous and introduced sometimes rare tree species.

3.7 Taronga Zoo Precinct Map



Figure 1 Shows the Taronga Zoo precinct courtesy of 6maps.

3.8 Reptile & Amphibian Conservation Centre proposed Location



Figure 2 Shows the RACC proposed development location courtesy of 6maps.

4 IMPACT ASSESSMENT

4.1 Summary of the Impact on trees

The impact on trees has been assessed by the extent of disturbance within the Tree Protection Zone (TPZ) and the encroachment of structures within the Structural Root Zone (SRZ), as outlined within Appendix 1.

4.1.1 Summary of Tree Significance

Significance was determined using the Tree Significance- Assessment Criteria of the IACA Significance of a Tree Rating System (STARS)© (IACA, 2010), as outlined within Appendix 3.

TREE SIGNIFICANCE VALUE			
Significance Scale	High	Medium	Low
Tree No.	1,2,3,4,5,6,9,10,13,14,15,16,17,19,20,21,22,23,24,65,66	18,42,43,62,63	7,8,11,12,25,26,27,28,29,30,31,32,33,34,35,36,37,38,39,40,41,44,45,46,47,48,49,50,51,52,53,54,55,56,57,58,59,60,61,62,64,67

Table 2

4.1.2 Summary of Tree Retention and Removal

Table 3 outlines trees identified for removal to facilitate the development and their retention value, which was determined by using the Retention Value- Priority Matrix of the IACA Significance of a Tree Assessment Rating System (STARS)© (IACA 2010) Appendix 2. The tree retention value is formulated using the IACA Significance of a Tree, Assessment Rating System (STARS) scaled against the Estimated Life Expectancy (ELE). This rating relates to the tree significance and the tree estimated life expectancy, the result is a retention merit. Trees to be removed and retained trees that may be affected by the development.


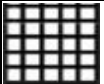

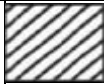
TREE RETENTION AND REMOVAL						
Retention Value	High Priority for Retention 	Medium Consider for Retention 	Low Consider for Removal 	Remove Priority for Removal 		
Retained Tree that may be impacted	1,2,3,4,5,6.		11,12,52,53,54,55,58,59,59a,59b,60.			
Priority for Transplant	9,10,16,21,23,24.					
Tree to be Removed	13,14,15,17,19,20,22,65,66.	18,42,43,63.	7,8,25,26,27,28,29,31,32,32a,33,34,35,36,37,38,39,40,41,44,45,46,47,48,48a,49,50,51,51a,51b,56,57,61,62,64,67.	30.		

Table 3

4.2 Detailed Impact Assessment

4.2.1 High significance trees to be removed

The proposed development will necessitate the removal of nine (9) High Significance trees, **13,14,15,17,19,20,22,65 & 66**. These trees have been assessed to have good health and good condition with medium 15-40 years estimated life expectancy. This tree group provides a high level of amenity.

The proposed development will further necessitate the removal of six (6) High Significance trees, **9,10,16,21,23 and 24**, however, these six trees have been identified as a priority for transplant pending a feasibility study. These trees have been assessed to have good health and good condition with medium 15-40 years estimated life expectancy. This tree group provides a high level of amenity. Tree **9 & 10** are unique to the Zoo, being Blunt-leaved Forest Figs, *Ficus craterostoma* and have potential for retention and transplanting. The pair have been planted together forming a single canopy, the species originates from the forests of south-eastern and tropical Africa. Palms **16,21,23 and 24** have potential for retention and transplanting. Palm **24** is a high priority for retention and transplanting, the palm is consistent in age, height, health and condition as the two Heritage palms **5 and 6**.

4.2.2 Potential impact to high significance trees

Six (6) high significance trees have the potential to be impacted through TPZ disturbance. Tree **1,2,3 and 4** are Section 170 Heritage items 163L, and palms **5 and 6** are Section 170 Heritage items 202L. These trees are important trees contributing amenity to the existing site and the proposed development.

4.2.2.1 Tree 1 Weeping Lilly Pilly – Heritage item 163L

Proposed works in the SRZ & TPZ include:

- Demolition of the existing stairs and pavement,
- New pavement treatment,
- Existing footpath to be widened, and
- New entry portal structure widening of the existing path (deck).

4.2.2.2 Tree 2 Weeping Lilly Pilly – Heritage item 163L

Proposed works within the SRZ & TPZ include:

- Demolition of post and part of the existing Heritage Aviary walls,
- New timber deck to match existing deck,
- Widening of the existing path (deck), and
- Existing stairs to be demolished and replaced with a new planter with a new landscaping zone.

4.2.2.3 Tree 3 Weeping Lilly Pilly – Heritage item 163L

Proposed works within the SRZ & TPZ include:

- Demolition of post and part of the existing Heritage Aviary walls,
- Trench excavation and Installation of 90 diameter UPVC agricultural drain north of the existing aviary wall and north of the proposed new footpath,
- Demolition of tree 7,
- Demolition of a rock structure, and
- Construction of a new path

4.2.2.4 Tree 4 Weeping Lilly Pilly – Heritage item 163L

Proposed works within the SRZ & TPZ include:

- Demolition of part of the existing Heritage Aviary walls,
- Demolition of a rock structure,
- Excavation and construction of a retaining wall, and
- Trench excavation and Installation of 90 diameter UPVC agricultural drain north of the existing aviary wall, north of the proposed new footpath and north of the proposed retaining wall.

4.2.2.5 Palm 5 & 6 Cabbage Palm – Heritage item 202
Potential for adverse impact during the development.

4.2.3 Medium Significance Trees to be Removed

The proposed development will necessitate the removal of four (4) Medium Significance trees, **18,42,43 & 63**. These trees have been assessed to have good health and good to fair condition with medium 15-40 years estimated life expectancy. The supplied plans show that these trees require removal being within the footprint of the proposed building. The loss of these tree species can be offset with new plantings to the site.

4.2.4 Low Significance Trees to be Retained

Eleven Low Significance trees, **11,12,52,53,54,55,56,57,58,59** and **60** will remain unaffected by the proposal if appropriate protective measures are properly specified and controlled through a detailed arboricultural method statement.

4.2.5 Low Significance Trees to be Removed

The proposed development will necessitate the removal of thirty-seven (37) Low Significance trees and one (1) dead tree **7,8,25,26,27,28,29,31, 32,32a,33,34,35,36,37,38,39,40,41,44,45,46,47,48,48a,49,50,51,51a,51b, 56,57,61,62,64,67 & 30**. These trees have been assessed to have varying health and fair to poor condition. The supplied plans show that these trees require removal being within the footprint of the proposed building. The loss of these tree species can be offset with new plantings to the site.

4.3 Potential Impact Mitigation

4.3.1 Tree Protection

In order to successfully retain trees that have been identified for retention the Site-Specific Tree Protection Strategy within Appendix 7 requires implementation through effective administrative procedures to ensure protective measures remain in place throughout the development. The

Site-Specific Tree Protection Strategy can be specifically referred to in the planning conditions.

4.3.2 Off-set Landscape Plan

In the context of the loss of trees, a comprehensive landscaping scheme is proposed through the Landscape Development Application by Context Landscape Architects, including locally indigenous trees to be planted within available areas in prominent locations. The new trees will have the potential to reach a significant height without excessive inconvenience and be sustainable into the long term, significantly improving the potential of the site to contribute to local amenity and character.

4.3.3 Impact on Amenity

Nine (9) high significance trees, four (4) medium significance and thirty-seven (37) low significance trees are required to be removed to facilitate this proposal. A comprehensive landscaping scheme to mitigate these losses is proposed, outlining the planting of locally indigenous trees. Further potential for Transplanting trees **9,10,16,21,23** and **24** will reduce the impact on amenity where transplanted in locations that support future growth. Through complying with the recommended mitigation measures, as set out here in Section 4, the proposal is not expected to have any direct impact to a further six (6) high significance trees and eleven (11) low significance trees surrounding the development. If adequate precautions to protect the retained trees are specified and implemented through the Site-Specific Tree Protection Strategy included in this report, the development proposal will have no adverse impact on the contribution of the retained trees.

5 RECOMMENDATIONS

5.1 Tree removals

5.1.1 High significance trees

The removal of High Significant trees **13,14,15,17,19,20,22, 65 & 66** is supported in order to facilitate the proposed development under consent from the consent authority.

5.1.2 Medium significance trees

The removal of Medium Significant trees **18,42,43 & 63** is supported to facilitate the development under consent from the consent authority.

5.1.3 Low significance trees

The removal of Low Significant trees **7,8,25,26,27,28,29,31,32,32a,33,34, 35,36,37,38,39,40,41,44,45,46,47,48,48a,49,50,51,51a,51b,56,57,61,62, 64, 67 & 30** is supported to facilitate the development under consent from the consent authority.

5.1.4 Conduct of tree removal

5.1.4.1 Inspection

Prior to the removal of tree species, these shall be inspected for fauna actively using the structure as habitat.

5.1.4.2 Physical removal

The tree species shall be removed without impact to retained tree species by a suitably qualified and experienced AQF-3 Arborist in accordance with:

- (AS4373 – 2007) Pruning of Amenity Trees.
- SafeWork NSW Code of Practice for the Amenity Tree Industry 1998.
- Work Health and Safety (WHS) Regulations 2011.
- Safe Work Guide to managing Risks of Tree Trimming and Removal Work 2016.

5.2 Tree transplanting

A transplanting feasibility study for trees **9,10,16,21,23 & 24** should be conducted to assess the feasibility for transplanting these species within the proposed development site as indicated within the Landscape Plan by Context Landscape Architecture dated June 2021, or within adjacent areas of the Zoo. The study should be conducted by an experienced and qualified tree and palm transplanting expert with consideration to the following:

5.2.1 Palm 24

should be a high priority for transplanting, it is the same species, height, size and maturity as the Heritage palms **5** and **6**.

5.2.2 Tree 9 and 10

should be a High priority for transplanting. These are a grouped planting, unique to the Zoo with a high potential for transplanting and a high estimated life expectancy of 40 or more years.

5.2.3 Palm 16

Palm **16** should be a High priority for transplanting. This specimen is a very slow growing palm species.

5.2.4 Palm 21 and 23

Should be a medium priority for transplanting, they are situated in proximity to built structures and below the existing rock system behind the Meerkat exhibit.

5.2.5 Nutrient amendments

Nutri-Tech solutions 'Black Gold' should be amended to the tree root zones of tree **9,10,16,21,23** and **24** to aid in increasing plant health and reducing the potential stress of transplanting. These shall be conducted fortnightly for 2 months prior to transplanting as per the manufacturer's guidance.

5.3 Non-destructive root exploration

5.3.1 Tree 4 Weeping Lilly Pilly – Heritage item 163L

The proposed retaining wall within the TPZ of this tree is supported, however non-destructive root exploration to assess the extent of tree roots in this location is required. The following factors contribute to this:

5.3.1.1 Retaining wall

The proposed retaining wall is a major encroachment of 11.4% into the TPZ of the tree with a significant cut. The supplied plans do not show a proposed batter for the cut or if the cut will be piled.

5.3.1.2 Civil Works

The supplied plans show that '90 diameter UPVC agricultural drain' is to be installed north of the proposed retaining wall further increasing the major encroachment to an estimated 14.5% encroachment, if the trench is 500mm in width.

5.3.1.3 Root Exploration

Non-destructive root exploration should be conducted as indicated within Figure 3, 500mm further into the TPZ from the proposed retaining wall.

5.3.1.3.1 Conduct

Non-destructive root exploration should be conducted by an experienced AQF-5 Arborist to a depth of 800mm.

5.3.1.3.2 Reporting

A root mapping report shall be published with the following findings:

- The location of any observed roots along the exploration trench,
- Tree root diameters and depths below ground level,
- Tree root distance from the tree trunk,
- An assessed accumulated loss of tree roots and the potential impact to the subject tree.
- Detailed pictures of the extent of the exploration trench and each root.

5.3.1.3.3 Root exploration plan

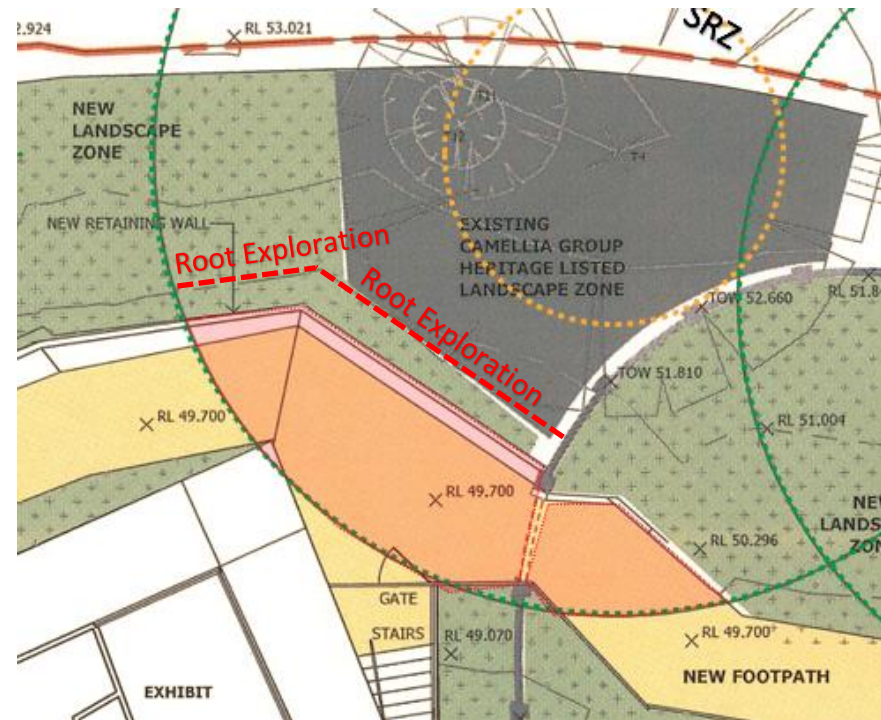


Figure 3

5.3.1.3.4 Design modification

Where tree roots greater than 50mm diameter are encountered and the project Arborist finds that root pruning will have an adverse effect on the subject tree the design in this location shall be modified.

5.3.2 Tree 3 & 4 Weeping Lilly Pilly – Heritage items 163L

The proposed path within the TPZ of these trees is supported, however requires non-destructive root exploration to assess the extent of tree roots in this location.

5.3.2.1 Path

The proposed path contributes to the major encroachment of 11.4% into the TPZ of tree 4 and a minor encroachment into the TPZ of tree 3. Whilst there may not be tree roots inside the heritage aviary this needs to be confirmed through non-destructive root exploration.

5.3.2.2 Root Exploration

Non-destructive root exploration should be conducted as indicated within Figure 4, 500mm further into the TPZ from the proposed retaining wall.

5.3.2.2.1 Conduct

Non-destructive root exploration should be conducted by an experienced AQF-5 Arborist to a depth of 500mm.

5.3.2.2.2 Reporting

A root mapping report shall be published with the following findings:

- The location of any observed roots along the exploration trench,
- Tree root diameters and depths below ground level,
- Tree root distance from the tree trunk,
- An assessed accumulated loss of tree roots and the potential impact to the subject tree.
- Detailed pictures of the extent of the exploration trench and each root.

5.3.2.2.3 Root exploration plan

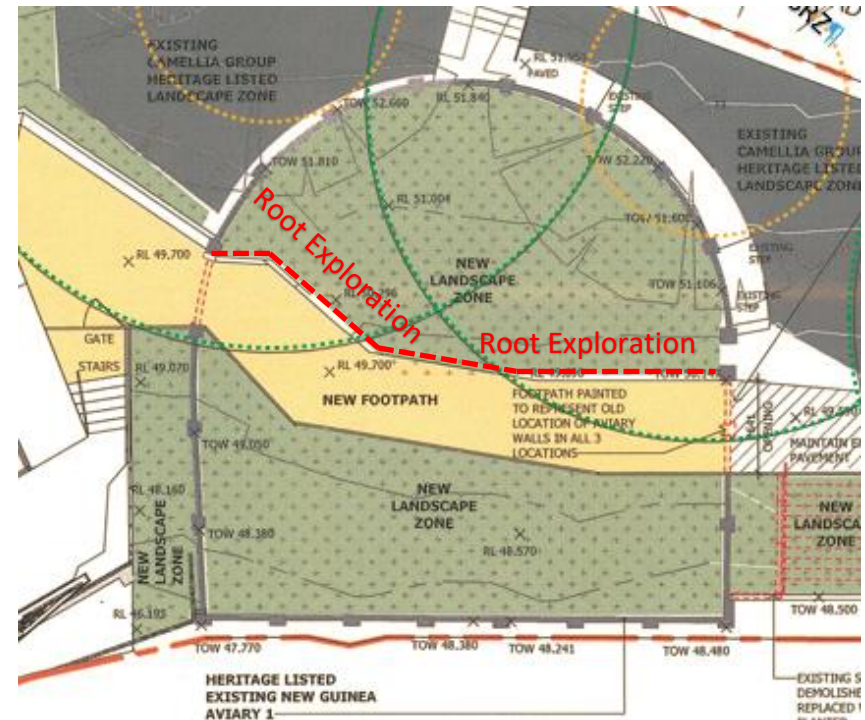


Figure 4

5.3.2.2.4 Design modification

Where tree roots greater than 50mm diameter are encountered and the project Arborist finds that root pruning will have an adverse effect on the subject tree the design in this location shall be modified to:

5.3.2.2.4.1 Pier and beam construction with no strip footings.

5.4 Physical tree protection

Physical Tree protection shall be installed prior to any works starting onsite by an AQF-3 Arborist in accordance with the 'Site Specific Tree Protection Strategy', and be subject to the following:

5.4.1 Trunk protection

Shall be installed to Trees **1,2,3 & 4** and Palms **5 & 6** and consist of the following elements:

5.4.1.1 Hessian

Double wrapped to a height of 2m above ground level.

5.4.1.2 Timber Wraps

Wrapped with 35mm x 90mm H2 or non-structural timbers at 50mm spacing with a length of 2m.

5.4.2 Temporary fencing

Once trunk protection has been installed, 1.8m high chain-link temporary fencing shall be installed in accordance with the 'Site Specific Tree Protection Strategy' by suitably experienced contractors.

5.5 Tree protection certification

5.5.1 Prior to works starting onsite

Once tree protection is installed in accordance with the 'Site Specific Tree Protection Strategy' these shall be inspected by the project Arborist with written certification documentation supplied to the chief certifying authority or senior project manager.

5.5.2 Post development and prior to occupation certificate

Once all works are completed including landscaping the physical tree protection can be removed under direction from the project Arborist. The project Arborist shall conduct a visual tree assessment and compile a final certification outlining the tree protection.

5.6 Site-specific tree protection strategy

5.6.1 The Site-Specific Tree Protection Strategy should be implemented as a condition of consent in order to protect retained tree species of the development site.

5.6.2 Any works conducted within the Tree Protection Zone of the retained trees shall be supervised by the project Arborist.

5.7 Built structures in tree protection zones

5.7.1 There shall be no built structures within the tree protection zones of any retained tree species unless:

5.7.1.1 They are built where there is an existing structure, and they maintain the existing footprint.

5.7.1.2 They are approved by the project Arborist.

5.7.1.3 The works are supervised by the project Arborist.

5.7.1.4 No roots greater than 50mm diameter are impacted during works.

5.7.1.5 A construction methodology statement for built structures within the TPZ of retained trees should be produced and reviewed by the Project Arborist.

5.8 The project Arborist

5.8.1 The project Arborist shall:

- 5.8.1.1 Conduct tree protection certification as outlined within section 5.5.
- 5.8.1.2 Supervise all works within TPZ's of retained trees.
- 5.8.1.3 Conduct monthly site inspections to ensure compliance with the 'Site-Specific Tree Protection Strategy'.
- 5.8.1.4 Enforce a stop work order where tree protection has been breached, notifying the chief certifying authority or project manager.
- 5.8.1.5 Produce a statement of observations where compliance is breached and recommendations for remediations where mechanical injury or adverse impact has occurred to retained tree species.
- 5.8.1.6 Record all works within TPZ's with photographs in order to compile any required statement for issue to the principal tree risk assessor ArborSafe in accordance with the ArborPlan.

5.9 Existing trees and shrubs

- 5.9.1 The existing tube stock plantings within the heritage aviary and throughout the proposed development site shall be transplanted, outside the development footprint by the Taronga Zoo Horticulture team in areas that will support future growth.

6 STATEMENT OF LIMITATIONS

6.1 This Assessment report was undertaken by an Arborist with AQF level V (Diploma of Arboriculture) qualification. Mathew Phillips is a registered user of the Quantified Tree Risk Assessment[®] (QTRA) methodology. Only registered licence holders having received training and regular updates from Quantified Tree Risk Assessment Limited are permitted to use the QTRA system.

6.2 It is important to note that the QTRA risk assessment does Not evaluate risk exposure during unexpected, unusual, unpredictable, severe, or unseasonal weather, weather at the extremes of the historical distribution. The risk assessment provided is valid for 12 months only.

6.3 This assessment was based on a comprehensive site inspection, observations made at the time of the inspection and information provided by the client and their employees. Any and all conclusions reached, or tree works recommended, do not imply that the tree will withstand adverse natural conditions such as environmental influences, soil failure and erosion, severe storms, works carried out or near it, land development and mechanical impact, miss-management or maintenance or changes in the growing environment, may impact the validity of the conclusions.

6.4 Any written or verbal submission, statements taken from the results, discussions, conclusions or recommendations made herein, may only be used where the whole of the original report is referenced in, and directly attached to that submission, report or presentation.

6.5 All care has been taken to obtain all information from reliable sources. All data collected has been verified insofar as practically possible: however, the author can neither guarantee nor be responsible for the accuracy of information provided by others. Information contained herein, covers only those trees that were surveyed, examined and scheduled and reflects the condition of those trees at the time of inspection.

6.6 This report is Not a warranty or guarantee, expressed or implied, that problems or deficiencies of the subject trees may not arise in the future, but a professional opinion of the current status and condition of the tree. Whilst all care has been taken to prepare this report, the author takes no responsibility for the continued vitality of the tree mentioned or for any damage that it may cause in the future.

If you have any questions regarding this report or require any further information, please contact me on the details below.

Regards,



Mathew Phillips
P: 0433 085 573
AQF-5 Consulting Arborist
Dip. Arboriculture
Quantified Tree Risk Assessor ID. 6067
E: sydneyarbor@hotmail.com



7 REFERENCES

- Australian Standard AS4373-2007 Pruning of Amenity Trees. Standards Australia.*
- Australian Standard AS4970-2009 Protection of trees on development sites. Standards Australia.*
- Burrows, G. (2002). *Epocormic strand structure in Angophora, Eucalyptus and Lophostemon (Myrtaceae)-implications for fire resistance and recovery.* New Phytologist 153.
- Draper, D. B., & Richards, P. A. (2009). *Dictionary for Managing Trees in Urban Environments.* Collingwood: CSIRO publishing.
- Lonsdale, D. (1999). *Principles of Tree Hazard Assessment and Management.* London, Great Britain: The Stationary Office (TSO).
- Mattheck, C., & Breloer, H. (1997). *The Body Language of Trees. A handbook for Failure Analysis.* London, England: Department of Environment.
- Mattheck, C. (2007) Updated Field Guide for Visual Tree Assessment.
- SEPP. (2017). *State Environmental Planning Policy (Vegetation in Non-Rural Areas) 2017.* Retrieved from Legislation.nsw.gov.au: <https://legislation.nsw.gov.au/EPIs/2017-454.pdf>.

8 APPENDICES

The subject tree(s) was assessed by using the Visual Tree Assessment criteria as described in *The Body Language of Trees- A Handbook for Failure Analysis*. (Mattheck & Breloer, 1997). These assessments were limited to a visual examination of the subject tree. Internal diagnostic testing was not conducted. Leaf samples were taken from the mid canopy layer to assess health and pest and disease influences. Tissue samples or soil samples were not undertaken as part of this assessment.

Tree Locations, Numbers & Dimensions

The location of the subject tree(s) has been indicated within the site map. Tree trunk diameters, defects, defect heights and tree height were measured.

Tree 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 Good Vigour, High Vigour, Low Vigour and Dormant Tree Vigour.

Good 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 a stringent watering and fertilising program; or some trees may achieve an extended lifespan from continuous pollarding practices over the life of the tree.

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.

Dormant Tree Vigour. Determined by existing turgidity in lowest order branches in the outer extremity of the crown, 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. Good vigour during dormancy is achieved when such growth is evident on a majority of branches throughout the crown.

Age

Most trees have a stable biomass for the major proportion of their life. The estimation of the age of a tree is based on the knowledge of the expected lifespan of the taxa in situ divided into three distinct stages of measurable biomass, when the exact age of the tree from its date of cultivation or planting is unknown and can be categorized as Young, Mature and Over-mature.

Young. Tree aged less than <20% of life expectancy, in situ.

Mature. Tree aged 20-80% of life expectancy, in situ.

Over-mature. Tree aged greater than >80% of life expectancy, in situ, or senescent with or without reduced vigour, and declining gradually or rapidly but irreversibly to death.

Periods of Time

Periods of Time The life span of a tree in the urban environment may often be reduced by the influences of encroachment and the dynamics of the environment and can be categorized as Immediate, Short Term, Medium Term and Long Term.

Short Term A period less than <1 – 15 years.

Medium Term A period 15 – 40 years.

Long Term A period greater than >40 years.

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 second (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 good vigour but in poor condition. Condition can be categorized as Good Condition, Fair Condition, Poor Condition and Dead.

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.

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.

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.

Dead. Tree is no longer capable of performing any of the following processes or is exhibiting any of the following symptoms.

- Processes
- Photosynthesis via its foliage crown (as indicated by the presence of moist, green, or other coloured leaves).
- Osmosis (the ability of the root 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).
- Symptoms
- Permanent leaf loss.
- Permanent 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 sapwood).

The Structural Root Zone (SRZ)

The SRZ is described in AS-4970 as the area around the base of a tree required for the tree’s stability in the ground. Severance of structural roots within the SRZ is not recommended as it may lead to the destabilisation and/or demise of the tree.

The Tree Protection Zone (TPZ)

As described within AS-4970 as 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. TPZ’s are calculated by multiplying the diameter at breast height by 12. This results in a setback distance radially from the trunk.

Schedule of Tools Used

TOOL	FUNCTION	USED	EXPLANATION
Visual Tree Assessment (VTA)	Assesses Health and Condition of the subject tree.	Yes	
Diameter Measuring Tape	Measures trunk diameter to calculate the SRZ and TPZ.	Yes	
Forestry Laser height Measuring Tool.	Measures the height of targets.	Yes	
IACA S.T.A.R.S	Assesses Tree Significance within the landscape.	Yes	Appendix 3
IACA Tree Retention Value Matrix	Assigns a retention value	Yes	Appendix 4

Table 4

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. An example of its use in an Arboricultural report is shown as Appendix A.

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.

IACA 2010, IACA Significance of a Tree, Assessment Rating System (STARS), Institute of Australian Consulting Arboriculturists, www.iaca.org.au

		Significance				
		1. High Significance in Landscape	2. Medium Significance in Landscape	3. Low 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		INSTITUTE OF AUSTRALIAN ARBORICULTURISTS CONSULTING ARBORICULTURISTS
	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.	

IACA 2010, Significance of a tree, Assessment rating System (STARS), Institute of Australian Consulting Arboriculturists, 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 Ltd 2001, Footprint Green Tree Significance & Retention Value Matrix, Avalon, NSW Australia www.footprintgreen.com.au

8.4 APPENDIX 4: Tree Schedule

REPTILE & AMPHIBIAN CONSERVATION CENTRE TREE SCHEULE

Tree No.	ArborPlan No.	Heritage No.	Genus Species (Common Name)	Height (m)	Canopy Spread				1st Branch Height (m)	Diameter (m)		SRZ	TPZ	Age Class (STARS)	Health (VTA)	Vigour (STARS)	Condition (STARS)	E.L.E (STARS)	Significance (STARS)	Development Outcome
					N	E	S	W		@1.4m	Base									
1	250	163L	Waterhousia floribunda (Weeping Lily Pily)	12.3	6	9.7	7.1	5.9	3.3	0.815	0.97	3.3	9.8	MATURE	GOOD	GOOD	FAIR	15>40	HIGH	Retain & Protect
2	251	163L	Waterhousia floribunda (Weeping Lily Pily)	11	8.5	8.6	5.5	6.4	4.7	0.82	0.99	3.3	9.8	MATURE	GOOD	LOW	FAIR	15>40	HIGH	Retain & Protect
3	253	163L	Waterhousia floribunda (Weeping Lily Pily)	13.2	10.2	6.6	7	7.4	1.9	0.78	0.93	3.2	9.4	MATURE	GOOD	GOOD	GOOD	15>40	HIGH	Retain & Protect
4	254	163L	Waterhousia floribunda (Weeping Lily Pily)	12.1	7.1	7.8	5	7.1	0.8	0.84	0.82	3.0	10.1	MATURE	FAIR	LOW	FAIR	15>40	HIGH	Retain & Protect
5		202L	Livistona australis (Cabbage Tree Palm)	12.5	2	2	2	2	N/A	0.35	0.5	2.5	4.2	MATURE	GOOD	GOOD	GOOD	15>40	HIGH	Retain & Protect
6		202L	Livistona australis (Cabbage Tree Palm)	12.6	2	2	2	2	N/A	0.35	0.5	2.5	4.2	MATURE	GOOD	GOOD	GOOD	15>40	HIGH	Retain & Protect
7			Flindersia Schottiana (Bumpy Ash)	8.1	2	2	2	2	1	0.15	0.2	1.7	1.8	YOUNG	GOOD	GOOD	GOOD	15>40	LOW	Remove For Development
8			Flindersia Schottiana (Bumpy Ash)	7.5	2	2	2	2	5	0.1	0.15	1.5	1.2	YOUNG	GOOD	GOOD	GOOD	15>40	LOW	Remove For Development
9			Ficus craterostoma (Blunt-Leaved Forest Fig)	7	4.5	5	5	2	0.5	0.35	0.35	2.1	4.2	MATURE	GOOD	GOOD	GOOD	>40	HIGH	Retain & Relocate
10			Ficus craterostoma (Blunt-Leaved Forest Fig)	7	4	2	5	5	1	0.3	0.3	2.0	3.6	MATURE	GOOD	GOOD	GOOD	>40	HIGH	Retain & Relocate
11			Polyscias elegans (Black Pencil Cedar)	8.4	3	3	1	1.5	4.3	0.4	0.4	2.3	4.8	MATURE	GOOD	GOOD	FAIR	15>40	LOW	Retain & Protect
12			Polyscias elegans (Black Pencil Cedar)	6.9	1	1	2	1	3	0.2	0.2	1.7	2.4	MATURE	GOOD	GOOD	FAIR	15>40	LOW	Retain & Protect
13			Archontophoenix cunninghamiana (Bangalow Palm)	10.4	2	2	2	2	N/A	0.2	0.3	2.0	2.4	MATURE	GOOD	GOOD	GOOD	15>40	HIGH	Remove For Development
14			Archontophoenix cunninghamiana (Bangalow Palm)	5.5	2	2	2	2	N/A	0.15	0.2	1.7	1.8	MATURE	GOOD	GOOD	GOOD	15>40	HIGH	Remove For Development
15			Allocauarina littoralis (Black She-Oak)	8	2	4	5	2	1.6	0.55	0.5	2.5	6.6	MATURE	GOOD	GOOD	GOOD	15>40	HIGH	Remove For Development
16			Howeia forsteriana (Kentia palm)	6.3	3	3	3	3	N/A	0.2	0.2	1.7	2.4	MATURE	GOOD	GOOD	GOOD	15>40	HIGH	Retain & Relocate
17			Allocauarina littoralis (Black She-Oak)	5.2	6	4	4	5	0.5	0.35	0.35	2.1	4.2	MATURE	GOOD	GOOD	GOOD	15>40	HIGH	Remove For Development
18			Allocauarina littoralis (Black She-Oak)	5.2	2	2	3	3	1.6	0.15	0.15	1.5	1.8	MATURE	GOOD	GOOD	FAIR	15>40	MEDIUM	Remove For Development
19	255		Polyscias elegans (Black Pencil Cedar)	8	5	6	6	6	2	0.55	0.7	2.8	6.6	MATURE	GOOD	GOOD	GOOD	15>40	HIGH	Remove For Development
20			Archontophoenix cunninghamiana (Bangalow Palm)	12	2	2	2	2	N/A	0.25	0.35	2.1	3.0	MATURE	GOOD	GOOD	GOOD	15>40	HIGH	Remove For Development

Table 5

REPTILE & AMPHIBIAN CONSERVATION CENTRE TREE SCHEULE

Tree No.	ArborPlan No.	Heritage No.	Genus Species (Common Name)	Height (m)	Canopy Spread				1st Branch Height (m)	Diameter (m)		SRZ	TPZ	Age Class (STARS)	Health (VTA)	Vigour (STARS)	Condition (STARS)	E. L. E (STARS)	Significance (STARS)	Development Outcome
					N	E	S	W		@1.4m	Base									
21			Livistona australis (Cabbage Tree Palm)	8	3	3	3	3	N/A	0.4	0.4	2.3	4.8	MATURE	GOOD	GOOD	GOOD	15>40	HIGH	Retain & Relocate
22			Livistona australis (Cabbage Tree Palm)	6	3	3	3	3	N/A	0.4	0.4	2.3	4.8	MATURE	GOOD	GOOD	GOOD	15>40	HIGH	Remove For Development
23			Livistona australis (Cabbage Tree Palm)	8	3	3	3	3	N/A	0.4	0.4	2.3	4.8	MATURE	GOOD	GOOD	GOOD	15>40	HIGH	Retain & Relocate
24			Livistona australis (Cabbage Tree Palm)	13	3	3	3	3	N/A	0.5	0.6	2.7	6.0	MATURE	GOOD	GOOD	GOOD	15>40	HIGH	Retain & Relocate
25			Banksia integrifolia (Coast Banksia)	6	1	3	3	1	0.8	0.15	0.2	1.7	1.8	MATURE	GOOD	GOOD	FAIR	<1-15	LOW	Remove For Development
26			Acacia implexa (Hickory Wattle)	8.5	1	1	3	1	5	0.1	0.1	1.3	1.2	MATURE	GOOD	GOOD	GOOD	<1-15	LOW	Remove For Development
27			Banksia integrifolia (Coast Banksia)	6	1	1	3	1	0.5	0.1	0.1	1.3	1.2	MATURE	FAIR	LOW	FAIR	<1-15	LOW	Remove For Development
28			Acacia decurrens (Green/Black Wattle)	8	2	2	2	1	3	0.15	0.2	1.7	1.8	MATURE	POOR	LOW	POOR	<1-15	LOW	Remove For Development
29			Casuarina species (forest she-oak)	5.5	1	3	2	3	2.5	0.15	0.2	1.7	1.8	MATURE	GOOD	GOOD	GOOD	15>40	LOW	Remove For Development
30			Acacia decurrens (Green/Black Wattle)	8	0	0	0	0	0	0	0	0.0	0.0	OVER MATURE	DEAD	DEAD	DEAD	DEAD	DEAD	Remove For Development
31			Acacia implexa (Hickory Wattle)	6.5	0.5	2	2	0.5	2.5	0.1	0.1	1.3	1.2	MATURE	GOOD	GOOD	POOR	<1-15	LOW	Remove For Development
32			Acacia implexa (Hickory Wattle)	8	1	1	1	1	4	0.1	0.1	1.3	1.2	MATURE	GOOD	GOOD	FAIR	<1-15	LOW	Remove For Development
32a			Acacia implexa (Hickory Wattle)	6	0.5	1	1	1	3	0.1	0.1	1.3	1.2	MATURE	GOOD	GOOD	FAIR	<1-15	LOW	Remove For Development
33			Acacia decurrens (Green/Black Wattle)	9	3	4	6	6	1	0.25	0.3	2.0	3.0	MATURE	GOOD	GOOD	FAIR	<1-15	LOW	Remove For Development
34			Acacia decurrens (Green/Black Wattle)	9	2	3	5	5	2.5	0.2	0.2	1.7	2.4	MATURE	GOOD	GOOD	FAIR	<1-15	LOW	Remove For Development
35			Acacia decurrens (Green/Black Wattle)	7	2	1	5	4	2	0.15	0.15	1.5	1.8	MATURE	FAIR	GOOD	POOR	<1-15	LOW	Remove For Development
36			Acacia decurrens (Green/Black Wattle)	7	4	4	0.5	4	0.8	0.3	0.3	2.0	3.6	MATURE	FAIR	GOOD	FAIR	<1-15	LOW	Remove For Development
37			Acacia decurrens (Green/Black Wattle)	7	2	1	4	3	1	0.25	0.25	1.8	3.0	MATURE	FAIR	GOOD	FAIR	<1-15	LOW	Remove For Development
38			Acacia decurrens (Green/Black Wattle)	7	2	2	1	0.5	1	0.15	0.15	1.5	1.8	MATURE	FAIR	GOOD	FAIR	<1-15	LOW	Remove For Development
39			Acacia implexa (Hickory Wattle)	7	0.5	0.5	1	1	5	0.1	0.1	1.3	1.2	MATURE	GOOD	GOOD	FAIR	<1-15	LOW	Remove For Development

Table 6

REPTILE & AMPHIBIAN CONSERVATION CENTRE TREE SCHEULE

Tree No.	ArborPlan No.	Heritage No.	Genus Species (Common Name)	Height (m)	Canopy Spread				1st Branch Height (m)	Diameter (m)		SRZ	TPZ	Age Class (STARS)	Health (VTA)	Vigour (STARS)	Condition (STARS)	E.L.E (STARS)	Significance (STARS)	Development Outcome
					N	E	S	W		@1.4m	Base									
40			Acacia implexa (Hickory Wattle)	8	2	0.5	2	2	1.8	0.2	0.2	1.7	2.4	MATURE	GOOD	GOOD	GOOD	<1-15	LOW	Remove For Development
41			Acacia decurrens (Green/Black Wattle)	7	4	4	2	5	1	0.4	0.4	2.3	4.8	MATURE	GOOD	GOOD	FAIR	<1-15	LOW	Remove For Development
42			Banksia integrifolia (Coast Banksia)	6	1	1	1.5	1	0.5	0.15	0.15	1.5	1.8	SEMI MATURE	GOOD	GOOD	GOOD	15>40	MEDIUM	Remove For Development
43			Banksia integrifolia (Coast Banksia)	6	1	1	1	1	0.5	0.15	0.15	1.5	1.8	SEMI MATURE	GOOD	GOOD	GOOD	15>40	MEDIUM	Remove For Development
44			Acacia implexa (Hickory Wattle)	8	1	2	2	1	1	0.2	0.2	1.7	2.4	MATURE	GOOD	GOOD	GOOD	<1-15	LOW	Remove For Development
45			Acacia decurrens (Green/Black Wattle)	8	3	1	0.5	2	1	0.15	0.15	1.5	1.8	MATURE	GOOD	GOOD	FAIR	<1-15	LOW	Remove For Development
46			Banksia integrifolia (Coast Banksia)	7	1	1	1	1	0.5	0.2	0.2	1.7	2.4	MATURE	GOOD	GOOD	GOOD	15>40	LOW	Remove For Development
47			Acacia decurrens (Green/Black Wattle)	6	4	0	1	5	2	0.3	0.35	2.1	3.6	MATURE	GOOD	GOOD	POOR	<1-15	LOW	Remove For Development
48			Banksia integrifolia (Coast Banksia)	5.5	1	2	1	1	0.5	0.15	0.15	1.5	1.8	SEMI MATURE	GOOD	GOOD	GOOD	15>40	LOW	Remove For Development
48a			Banksia integrifolia (Coast Banksia)	5	1	1	1	1	1	0.15	0.15	1.5	1.8	SEMI MATURE	GOOD	GOOD	GOOD	15>40	LOW	Remove For Development
49			Acacia implexa (Hickory Wattle)	6	1	2	1	1	2	0.1	0.1	1.3	1.2	SEMI MATURE	GOOD	GOOD	GOOD	<1-15	LOW	Remove For Development
50			Acacia implexa (Hickory Wattle)	8	0.5	0.5	0.5	0.5	2	0.1	0.1	1.3	1.2	MATURE	FAIR	GOOD	FAIR	<1-15	LOW	Remove For Development
51			Banksia integrifolia (Coast Banksia)	6	1	1	1	1	1.5	0.15	0.15	1.5	1.8	SEMI MATURE	GOOD	GOOD	GOOD	15>40	LOW	Remove For Development
51a			Banksia integrifolia (Coast Banksia)	7	2	1	2	1	1.6	0.15	0.15	1.5	1.8	SEMI MATURE	GOOD	GOOD	GOOD	15>40	LOW	Remove For Development
51b			Banksia integrifolia (Coast Banksia)	7	3	2	2	1	0.5	0.15	0.15	1.5	1.8	SEMI MATURE	GOOD	GOOD	GOOD	15>40	LOW	Remove For Development
52			Acacia decurrens (Green/Black Wattle)	6	4	4	4	6	1	0.2	0.2	1.7	2.4	MATURE	GOOD	GOOD	GOOD	<1-15	LOW	Retain & Protect
53			Banksia integrifolia (Coast Banksia)	5	2	2	1	0.5	0.8	0.2	0.2	1.7	2.4	MATURE	GOOD	GOOD	GOOD	15>40	LOW	Retain & Protect
54			Banksia integrifolia (Coast Banksia)	6	3	2	2	3	1	0.2	0.2	1.7	2.4	MATURE	GOOD	GOOD	GOOD	15>40	LOW	Retain & Protect
55			Acacia implexa (Hickory Wattle)	8	3	3	4	1	0.5	0.2	0.2	1.7	2.4	MATURE	FAIR	GOOD	FAIR	<1-15	LOW	Retain & Protect
56			Acacia implexa (Hickory Wattle)	11	4	3	3	6	2	0.35	0.4	2.3	4.2	MATURE	GOOD	GOOD	GOOD	<1-15	LOW	Remove For Development

Table 7

REPTILE & AMPHIBIAN CONSERVATION CENTRE TREE SCHEULE

Tree No.	ArborPlan No.	Heritage No.	Genus Species (Common Name)	Height (m)	Canopy Spread				1st Branch Height (m)	Diameter (m)		SRZ	TPZ	Age Class (STARS)	Health (VTA)	Vigour (STARS)	Condition (STARS)	E. L. E (STARS)	Significance (STARS)	Development Outcome
					N	E	S	W		@1.4m	Base									
57			Acacia decurrens (Green/Black Wattle)	11	4	5	5	4	1	0.35	0.45	2.4	4.2	MATURE	FAIR	GOOD	FAIR	<1-15	LOW	Remove For Development
58			Acacia implexa (Hickory Wattle)	9	6	1	0	3	0.25	0.45	0.5	2.5	5.4	MATURE	GOOD	GOOD	POOR	<1-15	LOW	Retain & Protect
59			Banksia integrifolia (Coast Banksia)	6	1	5	4	1	0.5	0.2	0.2	1.7	2.4	MATURE	GOOD	GOOD	GOOD	15>40	LOW	Retain & Protect
59a			Banksia integrifolia (Coast Banksia)	6	2	4	0.5	1	1	0.1	0.1	1.3	1.2	SEMI MATURE	GOOD	GOOD	GOOD	15>40	LOW	Retain & Protect
59b			Banksia integrifolia (Coast Banksia)	6	1	1	1	1	0.5	0.15	0.15	1.5	1.8	SEMI MATURE	GOOD	GOOD	GOOD	15>40	LOW	Retain & Protect
60			Eucalyptus saligna (Sydney Blue Gum)	6	1	1	1	1	2	0.1	0.1	1.3	1.2	YOUNG	GOOD	GOOD	GOOD	>40	LOW	Retain & Protect
61			Acacia decurrens (Green/Black Wattle)	8	2	2	1	3	3	0.25	0.25	1.8	3.0	OVER MATURE	POOR	LOW	POOR	<1-15	LOW	Remove For Development
62			Eucalyptus saligna (Sydney Blue Gum)	6	1	4	1	1	2.5	0.15	0.15	1.5	1.8	YOUNG	GOOD	GOOD	FAIR	15>40	LOW	Remove For Development
63			Banksia integrifolia (Coast Banksia)	9	2	1	1	1	1.5	0.15	0.15	1.5	1.8	MATURE	GOOD	GOOD	GOOD	15>40	MEDIUM	Remove For Development
64			Acacia decurrens (Green/Black Wattle)	10	5	3	6	5	1.7	0.25	0.25	1.8	3.0	MATURE	GOOD	GOOD	FAIR	<1-15	LOW	Remove For Development
65			Harpullia pendula (Tulipwood)	9	4	3	5	4	1.4	0.3	0.3	2.0	3.6	MATURE	GOOD	GOOD	GOOD	15>40	HIGH	Remove For Development
66	153		Harpullia pendula (Tulipwood)	9	5	5	6	3	2	0.4	0.45	2.4	4.8	MATURE	GOOD	GOOD	GOOD	15>40	HIGH	Remove For Development
67			Banksia integrifolia (Coast Banksia)	6.5	2	1	1	1	1	0.1	0.1	1.3	1.2	SEMI MATURE	GOOD	GOOD	GOOD	15>40	LOW	Remove For Development

Table 8

8.5 APPENDIX 5: Tree Survey

8.5.1 Tree Survey



8.5.2 Tree Removal and Potential Transplant Plan

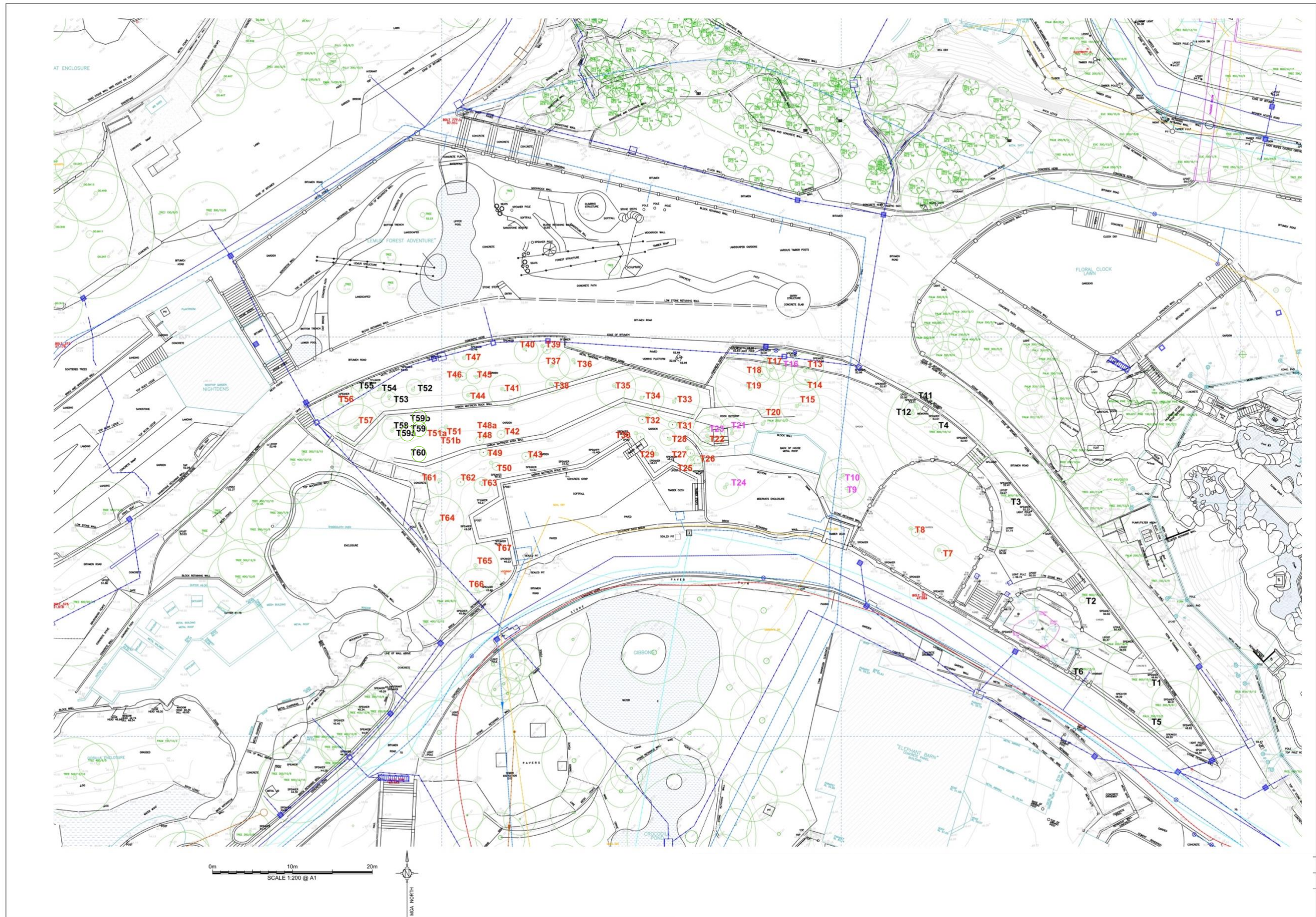
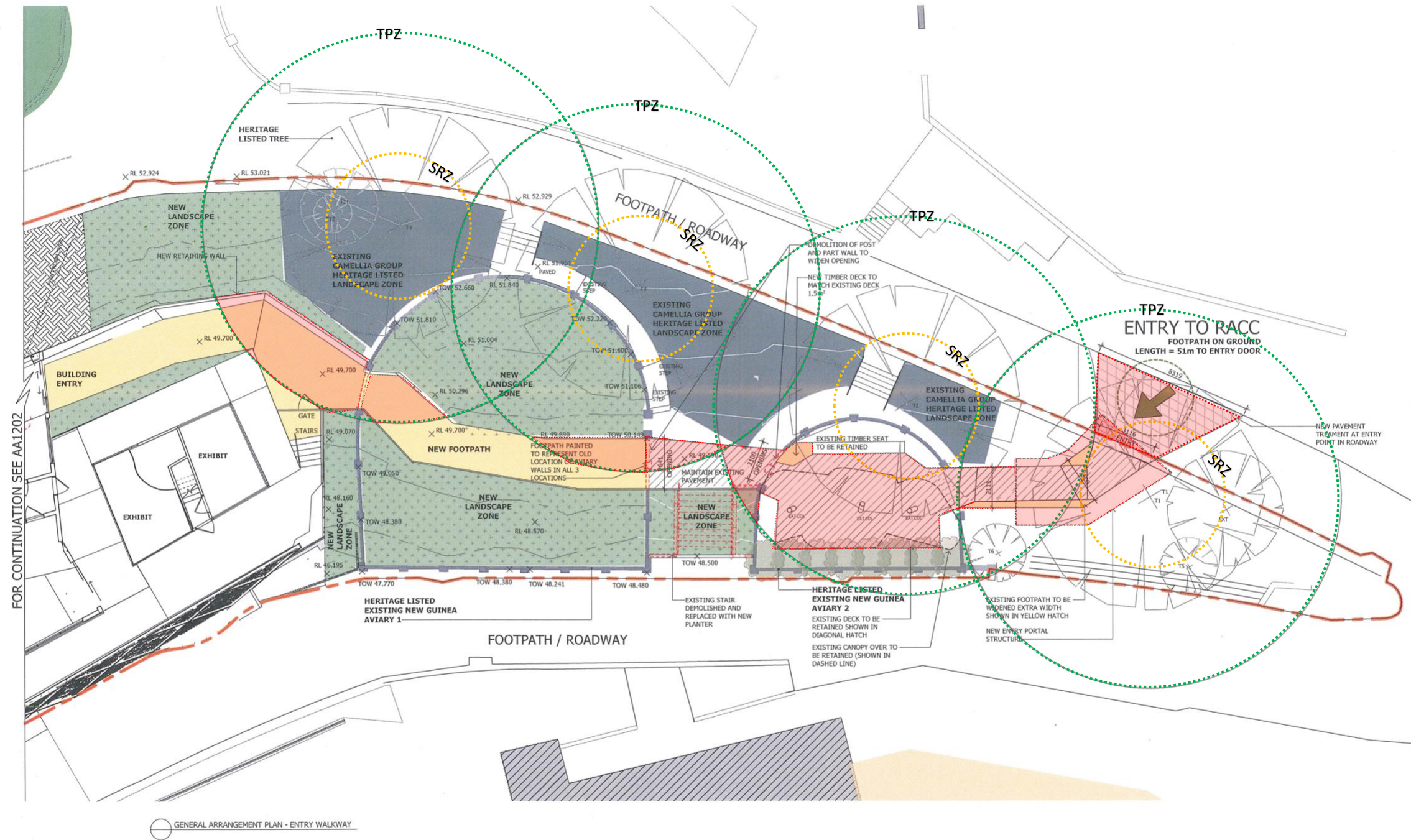


Figure 5 Shows Black trees to be retained, Pink trees to be transplanted and Red trees to be removed.

8.6 APPENDIX 6: Review of plans and proposed impacts

8.6.1 General Arrangement Plan -Entry + Landscaping mark-up showing proposed impacts to tree 1-6 (TPZ & SRZ to scale)



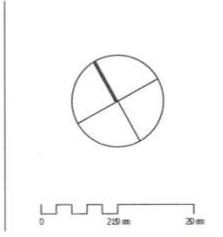
GENERAL ARRANGEMENT PLAN - ENTRY WALKWAY

Notes
 The information contained in this document is copyright and may not be used or reproduced for any other project or purpose.
 Verify all dimensions and levels on site and report any discrepancies to dwp for direction prior to the commencement of work.
 Drawings are to be read in conjunction with all other contract documents.
 Use figured dimensions only. Do not scale from drawings. dwp cannot guarantee the accuracy of content and format for copies of drawings issued electronically. The completion of the Issues Details Checked and Authorized section (confirmation of the status of the drawing). This drawing shall not be used for construction unless endorsed 'For Construction' and authorized for issue.
 © dwp Australia Pty Ltd
 Registered Business Name: dwp Australia ABN 37 509 328 935
 David Stone (Incorporated Architect) 1659 488 982
 © Copyright 2011 dwp.
 ALL RIGHTS RESERVED.
 Reproduction prohibited unless authorized in writing by dwp.

LEGEND

- TARONGA PROPOSED DEVELOPMENT SITE
- NEW LANDSCAPE ZONE
- NEW ENTRY FOOTPATH
- HERITAGE LISTED TREES TO BE RETAINED
- HERITAGE LISTED WALLS TO BE RETAINED AND PROTECTED
- HERITAGE LISTED VEGETATION TO BE RETAINED AND PROTECTED
- EXISTING BUILDINGS
- EXISTING FOOTPATH
- EXISTING ITEMS TO BE DEMOLISHED

NOTE:
 REFER TO LANDSCAPE ARCHITECT'S DRAWINGS FOR DETAILS ON NEW LANDSCAPE PLANTING AND PAVEMENT TREATMENTS
 REFER TO CIVIL ENGINEER'S DRAWINGS FOR PROPOSED DRAINAGE AND PAVEMENT DETAILS



SCHEMATIC DESIGN
 NOT TO BE USED DURING CONSTRUCTION

Issue	Description	Date	CHK	Auth
A	FOR COORDINATION	14.05.2021	CB	KD
B	FOR CLIENT REVIEW	21.05.2021	CB	KD
C	FOR CLIENT REVIEW	27.05.2021	CB	KD
D	FOR CLIENT REVIEW	11.06.2021	CB	KD
E	FOR DEVELOPMENT APPLICATION SUBMISSION	23.06.2021	CB	KD

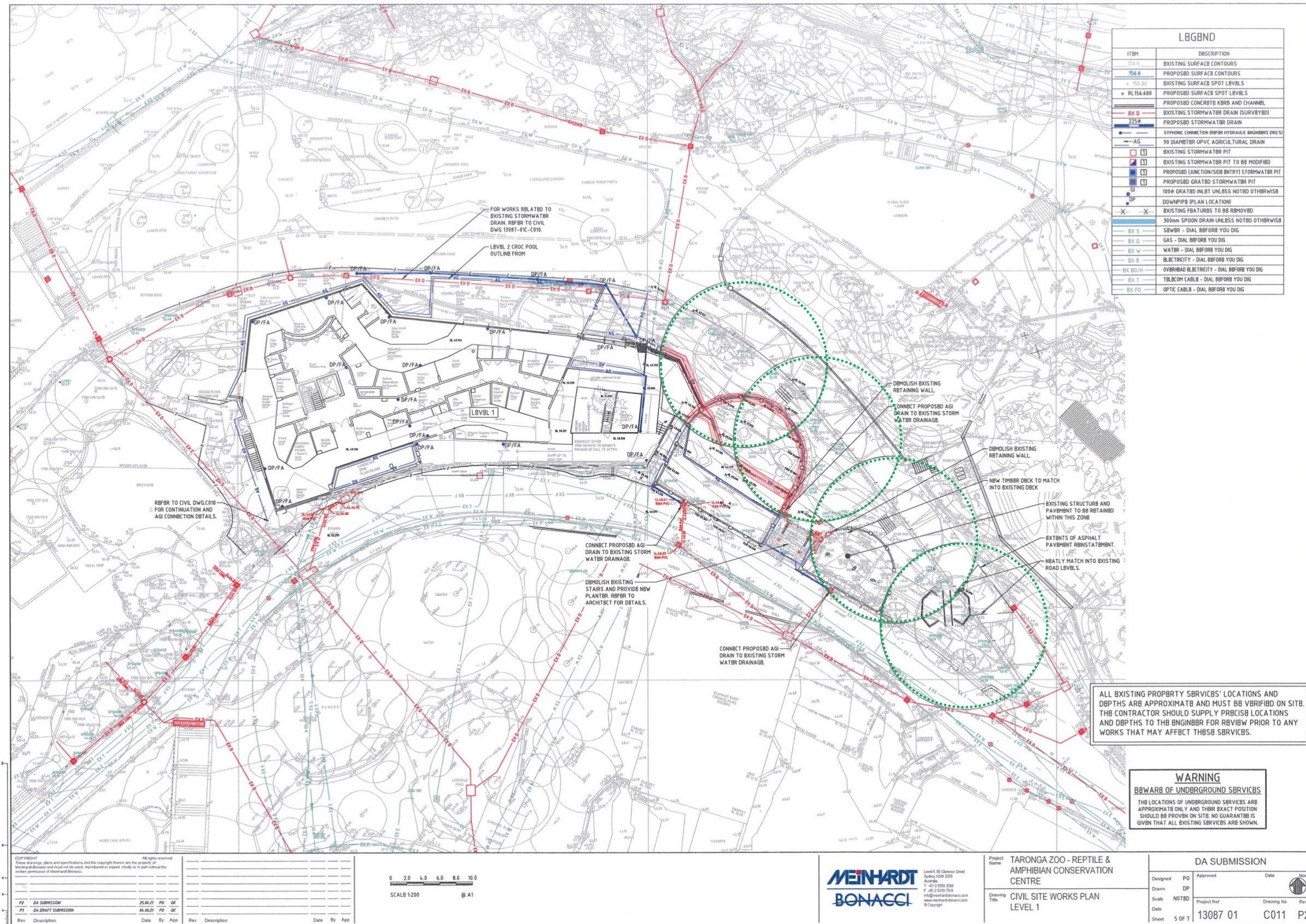
Architect/Designer
dwp
 www.dwp.com
 Client
TARONGA ZOO
 Location
 Bradleys Head Road, Mosman

Project
 TARONGA ZOO
 REPTILE + AMPHIBIAN CONSERVATION CENTRE
 Drawing
GENERAL ARRANGEMENT PLAN - ENTRY + LANDSCAPING
 Scale (A1)
 1 : 100
 Date Printed
 6/23/2021 3:27:23 PM

Project Number
RACC 20-0527
 Drawing Number
AA1200
 Issue
E

File Name: B:\161270-0527_Taronga Wildlife Hospital & Conservation Centre\05-0527_AA1200.dwg

8.6.2 Civil site works plan mark-up showing proposed impacts to tree 1-6 (TPZ to scale)



8.7 APPENDIX 7: Site-Specific Tree Protection Strategy

SITE-SPECIFIC TREE PROTECTION STRATEGY

Prepared for:

Paul De Alwis (Project Manager)

Taronga Conservation Society Australia

Site:

Taronga Zoo

Bradleys Head Road, Mosman NSW 2088

Published by:

MATHEW PHILLIPS

Dip. Arboriculture (AQF-5)

M: 0433 085 573

QTRA No.6067

E: sydneyarbor@hotmail.com



SYDNEY ARBOR TREES Pty Ltd
ARBORICULTURE/CONSULTATION/HABITAT CREATION

Tel: (02) 96666821

ABN: 39 106 413 610

www.sydneyarbor.com.au



8.7.1 SITE SPECIFIC TREE PROTECTION STRATEGY AND GUIDANCE EXPLANATION

- 8.7.1.1 This 'Site-Specific Tree Protection Strategy' is based on the Australian Standards AS 4970 Protection of Trees on Development Sites (2009) and outlines general principles that must be followed in order to protect trees that have been identified for protection during the proposed development.
- 8.7.1.2 This guidance is specifically for all parties associated with the proposed development to help them understand what has been agreed under consent and explain what is required to fully meet their obligations in regard to protect trees.
- 8.7.1.3 All personnel working on the site and specifically within 'Tree Protection Zones' must be properly briefed about their responsibilities towards important trees based on this guidance.
- 8.7.1.4 This guidance should be kept onsite, form part of the site-specific induction and be used in conjunction with the Tree Management Plan (TMP).

8.7.2 GUIDANCE 1. (G1) The Project Arborist

- 8.7.2.1 A project Arborist (Minimum AQF-5) shall be engaged prior to the commencement of any works on-site.
- 8.7.2.2 A pre-start meeting with the project manager and project Arborist shall be conducted to discuss the establishment of tree protection measures prior to demolition and construction.
- 8.7.2.3 A written Certificate that certifies the tree protection and documents the current status of the protected trees is to be issued to the project manager and principal certifying authority prior to any works starting onsite.

8.7.3 GUIDANCE 2. (G2) Compliance

- 8.7.3.1 The Tree Protection Strategy shall be kept onsite, and form part of the site-specific induction. All contractors and site workers shall receive a copy of these specifications prior to commencing work on-site. Any works conducted within the 'Tree Protection Zones' shall be supervised by the project Arborist or an AQF-5 qualified Arborist.
- 8.7.3.2 The project Arborist shall undertake a site inspection prior to works being started onsite to certify that tree protection is in place, in accordance with this strategy and the conditions of consent.
- 8.7.3.3 Compliance documentation shall be prepared by the project Arborist following any inspections. Compliance documentation shall include documentary evidence of compliance with the tree protection measures and methods as outlined within this strategy.
- 8.7.3.4 Where compliance has been breached, the project manager will be notified immediately and also in writing where a 'Stop Work Order will be issued to the contractor responsible for the development and the principal certifying authority until tree protection has been established and or damage to protected trees has be remediated under direction from the project Arborist.
- 8.7.3.5 The project Arborist shall conduct monthly compliance inspections with written certification or statements delivered to the project manager.
- 8.7.3.6 The project Arborist shall conduct a final assessment of the protected trees and site to assess any adverse influences from the development and complete a final certification once works have been completed, with future recommended management strategies implemented as required.

8.7.4 GUIDANCE 3. (G3) Tree Removal and Pruning

8.7.4.1 The tree species scheduled within Table 8 and Table 9 shall not be removed or pruned to facilitate the development. The trees identified for potential transplanting are exempt from this guidance.

8.7.5 GUIDANCE 4. (G4) Tree Protection Zone (TPZ)

8.7.5.1 Tree 1,2,3,4,5 & 6 are to be retained and protected in accordance with the Tree Protection Plan shown in Figure 6.

8.7.5.2 Tree 52,53,54,55,58,59,59a,59b & 60 are to be retained and protected in accordance with the Tree Protection Plan shown in Figure 7.

8.7.5.3 Tree Protection zones shall exclude the following activities unless supervised or approved by the project Arborist:

8.7.5.4 Modification of existing soil levels.

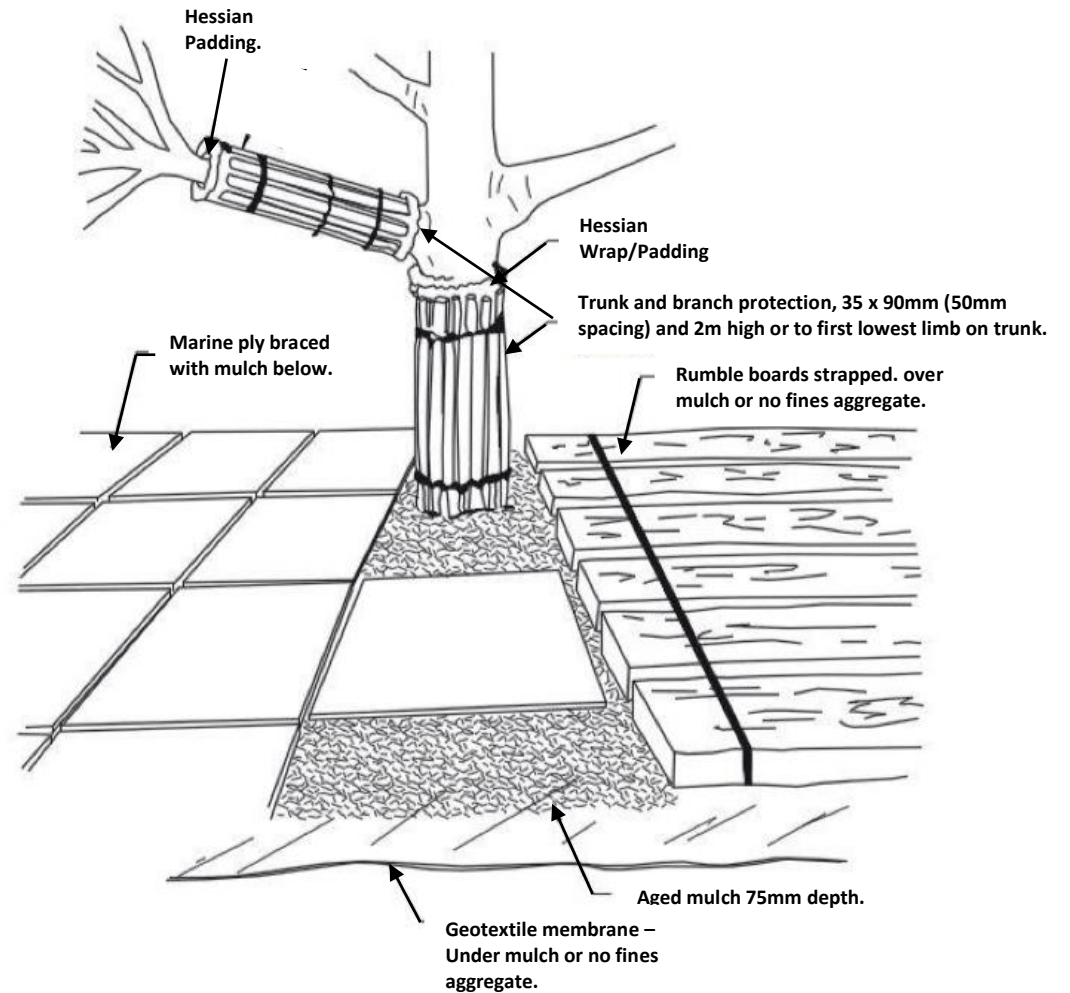
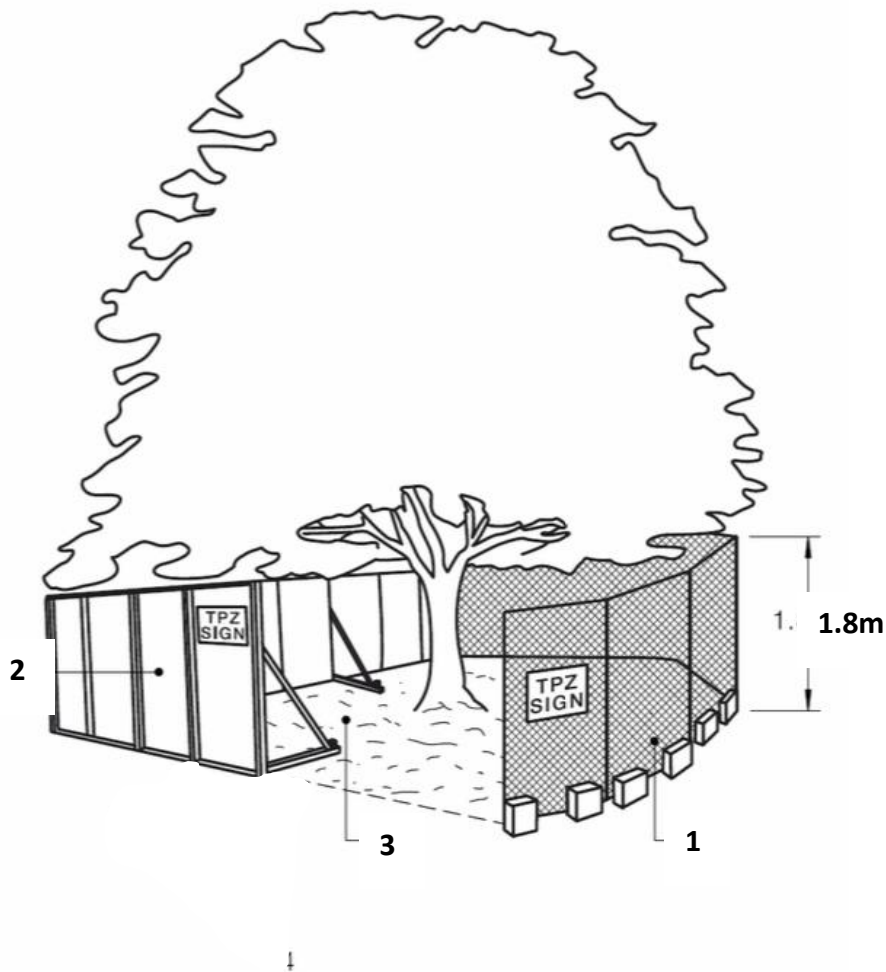
8.7.5.5 Storage of materials, plant, equipment or site sheds, Preparation of building materials, refuelling, disposal of waste and or chemicals.

8.7.5.6 Movement of pedestrians or vehicular access Any other activity that may cause damage to the tree.

8.7.5.7 Temporary or permanent location of services, or the works required for their installation.

8.7.5.8 Run on, shall be limited where practical by the installation of a boundary outside the TPZ.

8.7.5.9 All works in 'Tree Protection Zones' shall be supervised by the project Arborist or an AQF-5 Arborist. **NOTE:** If access, encroachment or incursion into the 'Tree Protection Zone' is deemed essential, prior authorisation is required by the project Arborist.



1 = Chain mesh fencing, concrete feet (Shade cloth council dependent)

2 = Hoarding/timber fencing alternative (CBD)

3 = Aged quality mulch (75mm max depth) extent of TPZ (where practical) no construction unless supervised by AQF-5 Arborist. No grade changes, no surface changes, no storage of materials permitted and no excavation to occur as part of the site establishment related to tree protection.

8.7.7 GUIDANCE 6. (G6) Trunk Protection

8.7.7.1 Trunk protection shall be installed to tree 1,2,3,4,5 & 6 in accordance with Guidance 5 Trunk Protection.

8.7.8 GUIDANCE 7. (G7) Tree Protection Fencing

8.7.8.1 Tree protection fencing shall be installed in accordance with the Tree Protection Plan and as follows:

8.7.8.1.1 Shall be installed to tree 1,2,3,4,5 & 6 in accordance with Guidance 5 Protection Fencing at locations shown in Figure 6.

8.7.8.1.2 Shall be installed to tree 52,53,54,55,58,59,59a,59b & 60 in accordance with Guidance 5 Protection Fencing at locations shown in Figure 7

8.7.8.1.3 Shall be covered with green shade cloth to reduce particulate matter entering the TPZ.

8.7.9 GUIDANCE 8. (G8) Ground Protection

8.7.9.1 N/A

8.7.10 GUIDANCE 9. (G9) Tree Protection Signage

8.7.10.1 Shall be installed to all tree protection fencing (Sample Attached) throughout the site and approaches to the site perimeter.

8.7.10.2 Shall be laminated (weatherproof) and fixed to fencing with wire or zip ties.

8.7.11 GUIDANCE 10. (G10) TPZ Mulching

8.7.11.1 Mulch shall be installed only where directed by the project Arborist.

8.7.12 GUIDANCE 11. (G11) Tree Health Care

8.7.12.1 Nutri-Tech Solutions 'Black Gold' shall be amended to the tree root zones of tree **9,10,16,21,23** and **24** to aid in increasing plant health and reducing the potential stress of transplanting. These shall be conducted fortnightly for 2 months prior to transplanting as per the manufacturer's guidance and attached in section 8.17

8.7.13 GUIDANCE 12. (G12) Cyclical Watering Schedule

8.7.13.1 Under direction from the project Arborist only.

8.7.14 GUIDANCE 13. (G13) Grade Changes in TPZ's

8.7.14.1 No grade changes shall occur within any retained and protected TPZ's

8.7.15 GUIDANCE 14. (G14) Tree Pit Aeration and Irrigation

8.7.15.1 N/A

8.7.16 GUIDANCE 15. (G15) 90 diameter UPVC agricultural drain

8.7.16.1 The project Arborist shall supervise the works within the TPZ of tree 3 & 4.

8.7.16.1.1 The trench shall be hand dug through non-destructive means.

8.7.16.1.2 Where tree roots greater than 50mm diameter are exposed these shall be covered with hessian, kept moist and protected.

8.7.16.1.3 The agricultural UPVC shall then be installed below the exposed roots and back filled.

8.7.17 GUIDANCE 16. (G16) Tree Root Exposure

8.7.17.1 Where tree roots are exposed or excavated these shall be inspected by the project Arborist and protected.

8.7.17.2 Roots shall be covered with hessian and kept moist.

8.7.17.3 Where tree roots are to be cut by the project Arborist these shall be cleanly cut at the trench face or nearest internal lateral limb.

8.7.18 GUIDANCE 17. (G16) Landscaping

8.7.18.1 The installation of tree species or vegetation within TPZ's shall be conducted by hand with no heavy machinery allowed within the TPZ.

8.7.19 SCHEDULE OF WORKS AND RESPONSIBILITIES

ARBORICULTURAL ACTION	PROGRAMMING	EXTENT OF ARBORICULTURAL INPUT	SIGNED OFF (Project Arborist)
<i>Pre-start meeting with Project Manager and Demolition contractor team to discuss any emerging issues and tree protection establishment.</i>	<i>Before any activities start onsite.</i>	<ul style="list-style-type: none"> ▪ Meeting with relevant members of the project managers team to explain the extent of tree constraints, i.e., Architect, Site Manager, engineer, landscape architect, Contractor, etc. ▪ Review working space requirements to consider fencing and ground protection adjustments to improve site functionality. ▪ Review post consent layout changes that may affect trees. ▪ Confirm tree protection measures will be acceptable. 	
<i>Installation of tree protection measures as per this site specification for agreement with the consent authority.</i>	<i>Prior to any works being started onsite.</i>	<ul style="list-style-type: none"> ▪ Site fencing can be installed by the contractor as per this specification. 	
HOLD POINT 1			
<i>Tree protection certification.</i>	<i>Before hand over to contractor and site occupation.</i>	<ul style="list-style-type: none"> ▪ Project Arborist to inspect all tree protection measures. ▪ Conduct a VTA of all surveyed trees to assess and record Health, Vigour and Condition. ▪ Produce a certification document outlining observations and compliance. 	
HOLD POINT 2			
<i>Pre-demolition and construction meeting with contractor.</i>	<i>Before hand over to contractor and site occupation.</i>	<ul style="list-style-type: none"> ▪ Meeting with project managers team i.e., Architect, Site Manager, engineer, landscape architect, etc. and Contractor to explain the extent of tree constraints. ▪ Review site setup i.e., site office, equipment storage, plant, cranes. ▪ Review if any works are proposed in TPZ's. ▪ Review post consent layout changes that may affect trees. 	
<i>Site Inspections</i>	<i>During the demolition or construction phases</i>	<ul style="list-style-type: none"> ▪ Project Arborist shall conduct inspections of the site to conduct compliance checks as specified only by the consent authority. 	
<i>Tree Protection Measures removed</i>	<i>Post works onsite and prior to handing over the project completed and or occupation certificate.</i>	<ul style="list-style-type: none"> ▪ Removal of tree protection to be approved by the Project Arborist. ▪ Ground protection removal for tree 10 and 11 to be supervised by the project arborist. 	
HOLD POINT 3		<ul style="list-style-type: none"> ▪ 	
<i>Final Certification</i>		<ul style="list-style-type: none"> ▪ Project Arborist to conduct a final certification ▪ Conduct a VTA of all surveyed trees to assess and record Health, Vigour and Condition. ▪ Produce a certification document outlining observations and any recommendations. 	

8.7.20 Tree Schedule

REPTILE & AMPHIBIAN CONSERVATION CENTRE TREE SCHEULE																				
Tree No.	ArborPlan No.	Heritage No.	Genus Species (Common Name)	Height (m)	Canopy Spread				1st Branch Height (m)	Diameter (m)		SRZ	TPZ	Age Class (STARS)	Health (VTA)	Vigour (STARS)	Condition (STARS)	E.L.E (STARS)	Significance (STARS)	Development Outcome
					N	E	S	W		@1.4m	Base									
1	250	163L	Waterhousia floribunda (Weeping Lily Pily)	12.3	6	9.7	7.1	5.9	3.3	0.815	0.97	3.3	9.8	MATURE	GOOD	GOOD	FAIR	15>40	HIGH	Retain & Protect
2	251	163L	Waterhousia floribunda (Weeping Lily Pily)	11	8.5	8.6	5.5	6.4	4.7	0.82	0.99	3.3	9.8	MATURE	GOOD	LOW	FAIR	15>40	HIGH	Retain & Protect
3	253	163L	Waterhousia floribunda (Weeping Lily Pily)	13.2	10.2	6.6	7	7.4	1.9	0.78	0.93	3.2	9.4	MATURE	GOOD	GOOD	GOOD	15>40	HIGH	Retain & Protect
4	254	163L	Waterhousia floribunda (Weeping Lily Pily)	12.1	7.1	7.8	5	7.1	0.8	0.84	0.82	3.0	10.1	MATURE	FAIR	LOW	FAIR	15>40	HIGH	Retain & Protect
5		202L	Livistona australis (Cabbage Tree Palm)	12.5	2	2	2	2	N/A	0.35	0.5	2.5	4.2	MATURE	GOOD	GOOD	GOOD	15>40	HIGH	Retain & Protect
6		202L	Livistona australis (Cabbage Tree Palm)	12.6	2	2	2	2	N/A	0.35	0.5	2.5	4.2	MATURE	GOOD	GOOD	GOOD	15>40	HIGH	Retain & Protect
9			Ficus craterostoma (Blunt-Leaved Forest Fig)	7	4.5	5	5	2	0.5	0.35	0.35	2.1	4.2	MATURE	GOOD	GOOD	GOOD	>40	HIGH	Retain & Relocate
10			Ficus craterostoma (Blunt-Leaved Forest Fig)	7	4	2	5	5	1	0.3	0.3	2.0	3.6	MATURE	GOOD	GOOD	GOOD	>40	HIGH	Retain & Relocate
11			Polyscias elegans (Black Pencil Cedar)	8.4	3	3	1	1.5	4.3	0.4	0.4	2.3	4.8	MATURE	GOOD	GOOD	FAIR	15>40	LOW	Retain & Protect
12			Polyscias elegans (Black Pencil Cedar)	6.9	1	1	2	1	3	0.2	0.2	1.7	2.4	MATURE	GOOD	GOOD	FAIR	15>40	LOW	Retain & Protect
16			Howeia forsteriana (Kentia palm)	6.3	3	3	3	3	N/A	0.2	0.2	1.7	2.4	MATURE	GOOD	GOOD	GOOD	15>40	HIGH	Retain & Relocate
21			Livistona australis (Cabbage Tree Palm)	8	3	3	3	3	N/A	0.4	0.4	2.3	4.8	MATURE	GOOD	GOOD	GOOD	15>40	HIGH	Retain & Relocate
23			Livistona australis (Cabbage Tree Palm)	8	3	3	3	3	N/A	0.4	0.4	2.3	4.8	MATURE	GOOD	GOOD	GOOD	15>40	HIGH	Retain & Relocate
24			Livistona australis (Cabbage Tree Palm)	13	3	3	3	3	N/A	0.5	0.6	2.7	6.0	MATURE	GOOD	GOOD	GOOD	15>40	HIGH	Retain & Relocate
52			Acacia decurrens (Green/Black Wattle)	6	4	4	4	6	1	0.2	0.2	1.7	2.4	MATURE	GOOD	GOOD	GOOD	<1-15	LOW	Retain & Protect
53			Banksia integrifolia (Coast Banksia)	5	2	2	1	0.5	0.8	0.2	0.2	1.7	2.4	MATURE	GOOD	GOOD	GOOD	15>40	LOW	Retain & Protect
54			Banksia integrifolia (Coast Banksia)	6	3	2	2	3	1	0.2	0.2	1.7	2.4	MATURE	GOOD	GOOD	GOOD	15>40	LOW	Retain & Protect
55			Acacia implexa (Hickory Wattle)	8	3	3	4	1	0.5	0.2	0.2	1.7	2.4	MATURE	FAIR	GOOD	FAIR	<1-15	LOW	Retain & Protect

Table 9

REPTILE & AMPHIBIAN CONSERVATION CENTRE TREE SCHEULE

Tree No.	ArborPlan No.	Heritage No.	Genus Species (Common Name)	Height (m)	Canopy Spread				1st Branch Height (m)	Diameter (m)		SRZ	TPZ	Age Class (STARS)	Health (VTA)	Vigour (STARS)	Condition (STARS)	E.L.E (STARS)	Significance (STARS)	Development Outcome
					N	E	S	W		@1.4m	Base									
58			Acacia implexa (Hickory Wattle)	9	6	1	0	3	0.25	0.45	0.5	2.5	5.4	MATURE	GOOD	GOOD	POOR	<1-15	LOW	Retain & Protect
59			Banksia integrifolia (Coast Banksia)	6	1	5	4	1	0.5	0.2	0.2	1.7	2.4	MATURE	GOOD	GOOD	GOOD	15>40	LOW	Retain & Protect
59a			Banksia integrifolia (Coast Banksia)	6	2	4	0.5	1	1	0.1	0.1	1.3	1.2	SEMI MATURE	GOOD	GOOD	GOOD	15>40	LOW	Retain & Protect
59b			Banksia integrifolia (Coast Banksia)	6	1	1	1	1	0.5	0.15	0.15	1.5	1.8	SEMI MATURE	GOOD	GOOD	GOOD	15>40	LOW	Retain & Protect
60			Eucalyptus saligna (Sydney Blue Gum)	6	1	1	1	1	2	0.1	0.1	1.3	1.2	YOUNG	GOOD	GOOD	GOOD	>40	LOW	Retain & Protect

Table 10

8.7.22 Tree protection plan tree 52,53,54,55,58,59,59a,59b & 60.

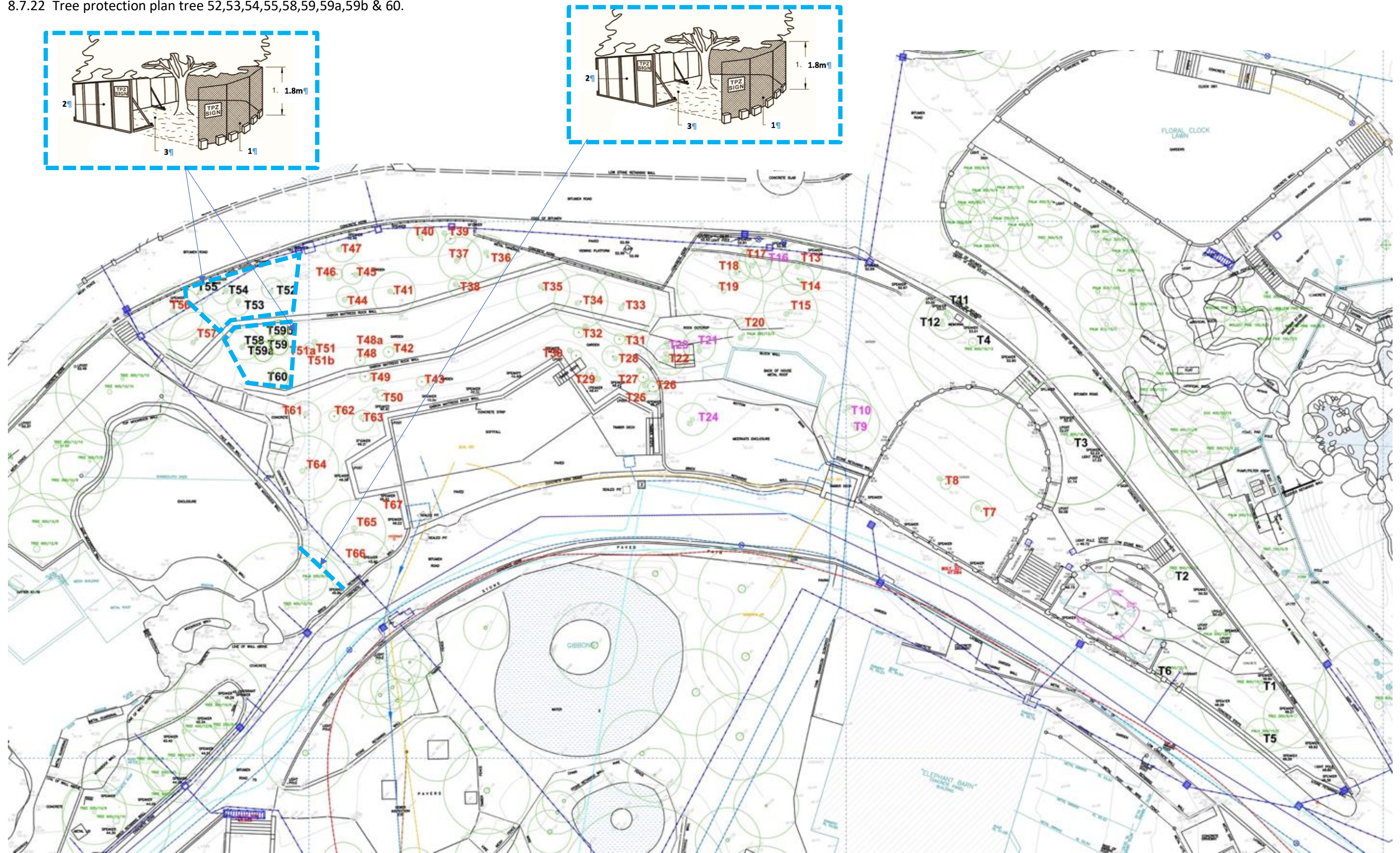


Figure 7

TREE PROTECTION ZONE



**NO ACCESS
NO EXCAVATION
NO TRENCHING
NO STORAGE OF
MATERIALS**

www.sydneyarbor.com.au

Project Manager:

Project Arborist:





Nutri-Tech Black Gold®



A plant growth promoter that includes kelp, fish, humates and other natural "goodies".

**NATURAL
SOIL-LIFE
AND PLANT
GROWTH
PROMOTERS**

A blend of fish protein, high-analysis kelp, polysaccharides, natural chelating agents, humic acid, fulvic acid and beneficial plant extracts. Nutri-Tech Black Gold® can be used for both foliar and fertigation applications and helps to build brix levels, increase stress resistance and frost resistance, chelates minerals and promotes soil life.

BENEFITS

- Excellent all-rounder for broad-spectrum nutrition and plant growth promotion.
- Can be used frequently as it is not overloaded with N-P-K.
- Ideal as a rescue remedy following periods of stress, i.e. transplants, heat, frost, storm damage.

PACKAGING:

1 L, 5 L, 20 L,
200 L, 1000 L
Product Code:
NTBG



**Nutrition
Farming®**

Nutri-Tech Black Gold[®]

APPLICATION RATES

Foliar Spray:

Vegetables

1 L per 100 L water up to 5 L/ha equivalent
Apply weekly or as required

Orchards & Vineyards

1 L per 100 L water up to 7 L/ha equivalent
Apply every 3 – 4 weeks or as required

Ornamentals

1 L per 100 L water up to 5 L/ha equivalent
Apply every 3 – 4 weeks or as required

Turf

1 L per 100 L water up to 5 L/ha equivalent
Apply every 2 – 4 weeks or as required

Spot-Spraying

50 mL per 10 L water, apply as required

Fertigation:

Vegetables

10 – 15 L/ha, apply weekly or as required

Orchards & Vineyards

10 – 20 L/ha, apply every 3 – 4 weeks or as required

Ornamentals

10 – 15 L/ha, apply every 3 – 4 weeks or as required

Turf

5 – 10 L/ha, apply every 2 – 4 weeks or as required

Home Garden Application:

Dilute 45 mL per 9 L watering can and apply the diluted mix at a rate of 1 litre per square metre
Apply fortnightly or as required

IMPORTANT

- Avoid spraying close to harvest if produce is susceptible to staining.
- **Note:** Product in 1000 L tanks may weigh over 1 tonne. Forklift with 2 tonne lifting capacity is recommended.

TYPICAL ANALYSIS W/W

Total Nitrogen (N) (as organic).....	3.07%
Total Phosphorus (P) (water soluble).....	0.39%
Total Potassium (K) (as organic).....	1.67%
Sulfur (S).....	1.05%
Calcium (Ca).....	0.14%
Iron (Fe).....	0.11%
Magnesium (Mg).....	791 mg/L
SG.....	1.1
pH.....	4.8 – 5.8
Conductivity.....	30 – 50 mS/cm
Appearance.....	Black liquid with a slight fish odour

INSTRUCTIONS

Shake or stir well before use. Where higher water rates are required for good foliar coverage, do not exceed maximum product rate per hectare. Sensitive foliage or plants should be test sprayed prior to full scale application. Frequencies are a guideline only and can be adjusted according to farm practices and/or in conjunction with crop monitoring. Ensure suitable spray conditions (e.g. temperature, humidity, wind-speed), prior to foliar application. Compatibility and/or performance cannot be guaranteed when combined with other products. Jar test for compatibility and spray test on small area before wide-spread use.

STORAGE & HANDLING

- Store in a cool dry area out of direct sunlight. This product has been tested to store safely down to 5°C. Crystallisation or sedimentation may occur below 5°C. Do not pre-mix or store in diluted form. Seal lid/cap immediately after use.

Disclaimer: Any recommendations provided by Nutri-Tech Solutions Pty Ltd (NTS) or its Distributors are advice only. As no control can be exercised over storage, handling, mixing, application or use, or weather, plant or soil conditions before, during or after application (all of which may affect the performance of our program), no responsibility for, or liability for any failure in performance, losses, damages, or injuries (consequential or otherwise), arising from such storage, mixing, application, or use will be accepted under any circumstances whatsoever. NTS recommend you contact an Agronomist prior to product application. The Buyer assumes all responsibility for the use of any NTS products.

YOUR LOCAL NTS DISTRIBUTOR:

Nutri-Tech Solutions P/L (NTS)
7 Harvest Road, Yandina, Queensland 4561, Australia
Phone +61. 7. 5472 9900 Fax +61. 7. 5472 9999
info@nutri-tech.com.au www.nutri-tech.com.au

20.06.17