Arboricultural Impact Assessment

TREEISM
Arboricultural Services

Prepared For
Ms Nada Herman
60-62 Chisholm Avenue
AVALON BEACH NSW 2107

SITE ADDRESS
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AVALON BEACH NSW 2107

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Contents

1 Introduction

1.1 Brief

1.1.1 This Arboricultural Impact Assessment (AIA) was prepared by Chantalle Hughes of Treeism Arboricultural Services. This report was commissioned by Mr Andy Lehman of Andy Lehman Design on behalf of the owners of the subject site. The Site is identified as Lot 1 and Lot 2 in DP 1104192 and is known as 60-62 Chisholm Avenue, Avalon Beach, New South Wales.

1.1.2 The purpose of this report is to identify the species of each assessed tree, assess their vigour, condition, landscape prominence and ascribe a Retention Value to each tree.

1.1.3 The Structural Root Zone (SRZ) and the Tree Protection Zone (TPZ) of each tree is established using the formula provided within the Australian Standard 4970-2009 Protection of trees on development sites (AS4970).

1.1.4 This report aims to provide guidelines for tree protection and maintenance during development.

1.2 Methodology

1.2.1 In preparation for this report, ground level, visual tree assessments* or limited VTA (e.g. where access was limited), of twenty seven (27) trees were completed by the author of this report on 9th March 2021. Inspection details of these trees are provided in Appendix 5 —Schedule of Assessed Trees.

1.2.2 The tree heights were visually estimated or measured using a Nikon ForestryPro, unless otherwise noted in Appendix 5, the trunk Diameter at Breast Height were measured at 1.4 metres above ground level (DBH) using a diameter tape unless indicated otherwise. Tree canopy spreads were stepped out with field observations written down, and photographs of the site and trees were taken using a Fujifilm XP 4K digital camera.

1.3 Limitations

1.3.1 No aerial inspections, root mapping or woody tissue testing were undertaken as part of this tree assessment.

1.3.2 This report is not intended to be a comprehensive tree risk assessment; however, the report may make recommendations, where appropriate, for further assessment, treatment or testing of trees where potential structural problems have been identified, or where below ground investigation may be required.

1.3.3 Information contained in this report only reflects the condition of the trees at the time of inspection. Trees are dynamic, living things which can be subject to change without notice in certain circumstances.

1.3.4 This AIA is not intended as an assessment of any impacts on the trees by any proposed future development of the site.

1.3.5 Care has been taken to obtain all information from reliable sources. All data has been verified as far as possible; however, I can neither guarantee nor be responsible for the accuracy of information provided by others.

* Visual Tree Assessment (VTA) is a procedure of defect analysis developed by Mattheck and Breloer (1994) that uses the growth response and form of trees to detect defects.

1.4 Document and Plan References

1.4.1 Plans and documents referenced for the preparation of this report include:

- AS4970-2009 Protection of trees on development sites, Standards Australia.
- AS4373-2007 Pruning of amenity trees, Standards Australia.
- Part B Section B4.22 Preservation of Trees or Bushland Vegetation, Pittwater 21 Development Control Plan (P21DCP).
- Design Drawings, Drawing no's. SK.00-SK.07, authored by Andy Lehman Design, dated February 2021.

1.4.2 The subject trees are shown on a marked-up excerpt of the Carparking Floor Plan. This marked-up plan is attached as Appendix 7—Tree Location Plan.

1.5 Tree Preservation and Management Guidelines

1.5.1 This AIA takes account the State Environmental Planning Policy (Vegetation in Non-Rural Areas) 2017 'Vegetation SEPP', and Part B, Section B4.22 Preservation of Trees or Bushland Vegetation, Pittwater 21 Development Control Plan (P21 DCP).

2 Observations and Discussion

2.1 Site Description

2.1.1 The site is a large block with predominantly native vegetation consisting of upper canopy of mature trees and an understorey of young trees and native ferns. Two dwellings were noted, one heritage sandstone dwelling, and another steel and timber construction residential dwelling and a pool. The site has a south-easterly aspect.

Figure 1 – Site Location. Courtesy of Nearmap 2021.

2.2 Assessed Trees

2.2.1 Twenty-seven (27) trees (prescribed and non-prescribed) were assessed or identified and are included in this report. Details of these are included in the Schedule of Assessed Trees—Appendix 5.

2.2.2 **Tree numbers** — of the twenty-seven (27) assessed trees the following is noted:

- Twenty-five (25) trees are located within the subject site—Tree 1-3, Group 3A, Tree 4-19, Tree 19A, Tree 20, Tree 21, Tree 21A, Tree 22-24.
- Two (2) trees are located on Council land outside the south-eastern boundary—Tree 4 & 5.

2.2.3 **Species origin** — Of the twenty-seven (27) trees, the following is noted:

- All twenty-seven (27) are locally native species— Tree 1-3, Group 3A, Tree 4-19, Tree 19A, Tree 20, Tree 21, Tree 21A, Tree 22-24.

2.2.4 **Retention Value (RV**) — the twenty-seven (27) prescribed trees/tree groups and their respective Retention Value (RV) are identified in Table 1, below/next page.

Note: Refer to Appendix 3 for the methodology used to assess the Retention Value of a tree.

Table 1—Tree Identification and RV, where L = Low, M = Medium, H = High. R = proposed removal.

Tree No.	*Genus & species* **Common Name**	RV	Tree No.	*Genus & species* **Common Name**	RV
1	*Angophora costata* **Sydney Red Gum**	M	14	*Angophora costata* **Sydney Red Gum**	H
2	*Eucalyptus umbra* **Broad-leaved White Mahogany**	M	15	*Angophora costata* **Sydney Red Gum**	H
3	*Banksia serrata* **Old Man Banksia**	L	16	*Cyathea cooperi* **Lacy Tree Fern**	M
3A	*Elaeocarpus reticulatas* **Blueberry Ash - group**	H	17	*Ceratopetalum gummifera* **NSW Xmas Bush**	M
4	*Corymbia gummifera* **Bloodwood**	H	18	*Corymbia gummifera* **Bloodwood**	H
5	*Angophora costata* **Sydney Red Gum**	H	19	*Eucalyptus resinifera* **Red Mahogany**	H
6	*Eucalyptus umbra* **Broad-leaved White Mahogany**	H	19A	*Elaeocarpus reticulatas* **Blueberry Ash**	H
7	*Eucalyptus umbra* **Broad-leaved White Mahogany**	H	20	*Angophora costata* **Sydney Red Gum**	L
8	*Allocasuarina littoralis* **Black She-oak**	M	21	*Corymbia gummifera* **Bloodwood**	H
9	*Corymbia gummifera* **Bloodwood**	H	21A	*Eucalyptus umbra* **Broad-leaved White Mahogany**	M
10	*Allocasuarina littoralis* **Black She-oak**	H	22	*Corymbia gummifera* **Bloodwood**	H
11	*Banksia serrata* **Old Man Banksia**	M	23	*Angophora costata* **Sydney Red Gum**	H

Tree No.	*Genus & species* **Common Name**	RV	Tree No.	*Genus & species* **Common Name**	RV
12	*Allocasuarina littoralis* **Black She-oak**	**M**	**24**	*Corymbia gummifera* **Bloodwood**	**H**
13	*Angophora costata* **Sydney Red Gum**	**M**			

2.3 Threatened Species

2.3.1 No individual species of assessed tree is subject to threatened conservation status under Australian and/or State Government legislation (i.e. NSW Biodiversity Conservation Act 2016 and the Commonwealth Environment Protection and Biodiversity Conservation Act 1999). However, three (3) species identified onsite are key species of the Pittwater and Wagstaffe Spotted Gum Forest Ecologically Endangered Community (*Corymbia gummifera* Red Bloodwood, *Eucalyptus umbra* Broad-leaved White Mahogany and *Angophora costata* Sydney Red Gum).

2.4 Soil Landscape

2.4.1 The landscape is Narrabeen Group of sediments. Mostly interbedded laminite and shale with quartz to lithic quartz sandstone. Minor red claystones occur north of the Hawkesbury River. Clay pellet sandstone occurs south of the Hawkesbury River (Herbert, 1983, cited in Espade 2021).

3 Impact of the Proposed Development

3.1 Potential Required Removal of Prescribed Trees

3.1.1 All six (6) trees will be required to be removed to allow for the proposed driveway and carport.

- **Tree 1** — ***Angophora costata*** **(Sydney Red Gum)** – this tree has been ascribed a medium retention Value (RV) and is located within the footprint of the carport, it could not be retained.
- **Tree 2** — ***Eucalyptus umbra*** (**Broad-leaved White Mahogany)** – this medium RV tree is located within the footprint of the carport and could not be retained.
- **Tree 3** — ***Banksia serrata*** **(Old Man Banksia)** – the low RV tree is located just over 1m from the proposed carport and this tree could not be safely retained.
- **Group 3A** — ***Elaeocarpus reticulatas*** **(Blueberry Ash)** – several, young self-sown Blueberry Ash are located within the footprint of the proposed carport. Some will require removal however many may be able to be retained if located outside the direct footprint.
- **Tree 6** — ***Eucalyptus umbra*** (**Broad-leaved White Mahogany)** – this high RV tree is located within the driveway footprint and could not be safely retained.
- **Tree 7** — ***Eucalyptus umbra*** (**Broad-leaved White Mahogany)** – this high RV tree is located right on the edge of the existing retaining wall. The proposed

driveway falls within the calculated Structural Root Zone and this tree could not be safely retained.

3.2 Potential Impacts on Trees to be Retained

3.2.1 Under the Australian Standard 4970-2009 *Protection of trees on development sites* (AS4970), encroachments less than 10% of the *Tree Protection Zone* (TPZ) are considered to be minor. No specifications are provided in AS4970 for potential impacts of 10% or greater. This 10% is interpreted as the threshold figure, and the trigger where arboricultural investigations into TPZ encroachments beyond this figure need to be considered under the consideration set out in Section 3.3.4 of AS4970.

3.2.2 Disturbance within the *Structural Root Zone* (SRZ), and extent of encroachments into the TPZ's of prescribed trees to be retained are summarised in Table 1, below.

Table 1 – Indicates whether encroachment occurs into the SRZ and/or TPZ of trees proposed for retention. Site-specific constraints will heavily influence the presence of roots in a particular location.

Tree No.	Tree Common name	Tree located on site	SRZ affected	TPZ area (m2)	TPZ encroachment (approx. m2)	TPZ encroachment (approx. %)
4	Bloodwood	✕	✕	163	5.7	3.5
5	Sydney Red Gum	✕	✕	41	0	0
8	Black She-oak	✓	✕	18	0	0
9	Bloodwood	✓	✕	191	2.7	1.4
10	Black She-oak	✓	✕	18	0	0
11	Old Man Banksia	✓	✕	92	0	0
12	Black She-oak	✓	✕	48	0	0
13	Sydney Red Gum	✓	✕	15	0	0
14	Sydney Red Gum	✓	✕	290	0	0
15	Sydney Red Gum	✓	✕	113	0	0
16	Swamp Mahogany	✓	✕	15	0	0
17	NSW Xmas Bush	✓	✕	129	0	0
18	Bloodwood	✓	✕	18	0	0
19	Red Mahogany	✓	✕	13	0	0
19A	Blueberry Ash	✓	✕	13	0	0
20	Sydney Red Gum	✓	✕	13	0	0
21	Bloodwood	✓	✓	41	12.1	*29.5
21A	Broad-leaved White Mahogany	✓	✓	13	1.5	*11.5
22	Bloodwood	✓	✓	41	9.4	*22.9
23	Sydney Red Gum	✓	✓	72	14.5	*20.1
24	Bloodwood	✓	✕	28	1.0	*3.6

* Indicates true encroachment calculations may vary from those noted within Table 1. See individual discussion on trees below for further information.

3.2.3 Tree 4 — Bloodwood – located on Council property.

- Structural Root Zone impacts:

  All proposed works are located outside the SRZ.

- Tree Protection Zone impacts:

  An encroachment of 5.7m^2 or 3.5% has been calculated for this specimen, (see Figure 1 below/next page) in relation to the proposed driveway and vehicle

turntable. Under AS4970 encroachments less than 10% are considered *minor* encroachment.

Provided recommendations within this report are followed, it is unlikely tree health or condition would be negatively impacted from this level of impact.

- Pruning impacts:

  Minor pruning may be required to ensure clear access for machinery during driveway excavation. It is foreseen this would be minor in nature and would have minor impact on tree health or condition.

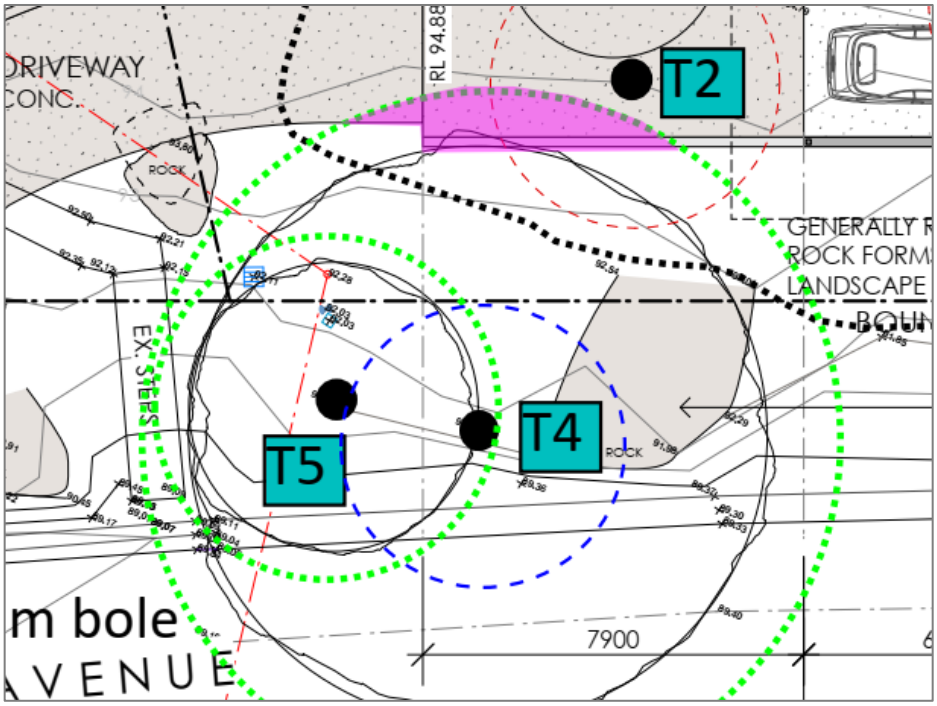

Figure 1 – Tree 4 - Estimated encroachment into TPZ denoted with pink shading. SRZ noted as blue hashed circle, green dotted circle denotes TPZ. Carparking Floor Plan, drawing no. SK-02, by Andy Lehman Design. Marked up by C Hughes.

3.2.4 Tree 5 —Sydney Red Gum – located on Council property.

- Structural Root Zone impacts:

  All proposed works are located outside the SRZ.

- Tree Protection Zone impacts:

  All proposed works are located outside the TPZ.

- Pruning impacts:

  Pruning may be required to ensure clear access for machinery during driveway excavation. It is foreseen this would be minor in nature and would likely have little impact tree health or condition.

3.2.5 Tree 8 — Black She-oak – located on subject site.

- Structural Root Zone impacts:

  All proposed works are located outside the SRZ.

- Tree Protection Zone impacts:

All proposed works are located outside the TPZ.

- Pruning impacts:

  No pruning is foreseen as hard landscape works are located outside the spread of this specimen.

3.2.6 Tree 9 — Bloodwood – located on subject site.

- Structural Root Zone impacts:

  All proposed works are located outside the SRZ.

- Tree Protection Zone impacts:

  An encroachment of 2.7m^2 or 1.4% has been calculated for this specimen (see Figure 2 below) in relation to stepping-stone placement and the proposed terrace. Under AS4970 encroachments less than 10% are considered *minor* encroachment.

  Provided recommendations within this report are followed, it is unlikely tree health or condition would be negatively impacted from this level of impact.

- Pruning impacts:

  Given this specimen is located on the retaining wall well above the proposed excavation for the driveway, it is unlikely pruning will be required.

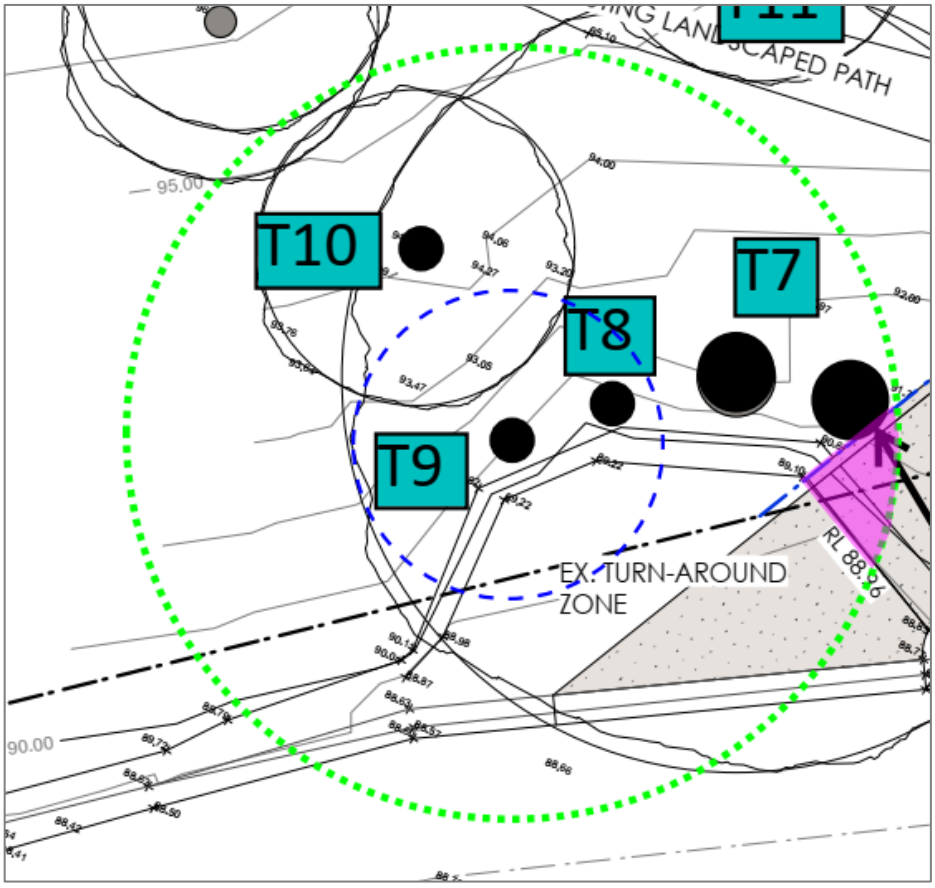

Figure 2 – Tree 9 - Estimated encroachment into TPZ denoted with pink shading. SRZ noted as blue hashed circle, green dotted circle denotes TPZ. Carparking Floor Plan, drawing no. SK-02,by Andy Lehman Design. Marked up by C Hughes.

3.2.7 Tree 10 — Black She-oak – located on subject site.

- Structural Root Zone impacts:

  All proposed works are located outside the SRZ.

- Tree Protection Zone impacts:

  All proposed works are located outside the TPZ.

- Pruning impacts:

  No pruning is foreseen as works are located outside the spread of this specimen.

3.2.8 Tree 11 — Old Man Banksia – located on subject site.

- Structural Root Zone impacts:

  All proposed works are located outside the SRZ.

- Tree Protection Zone impacts:

  All proposed works are located outside the TPZ.

- Pruning impacts:

  No pruning is foreseen as works are located outside the spread of this specimen.

3.2.9 Tree 12 — Black She-oak – located on subject site.

- Structural Root Zone impacts:

  All proposed works are located outside the SRZ.

- Tree Protection Zone impacts:

  All proposed works are located outside the TPZ.

- Pruning impacts:

  No pruning is foreseen as works are located outside the spread of this specimen.

3.2.10 Tree 13 — Sydney Red Gum – located on subject site.

- Structural Root Zone impacts:

  All proposed works are located outside the SRZ.

- Tree Protection Zone impacts:

  All proposed works are located outside the TPZ.

- Pruning impacts:

  No pruning is foreseen as works are located outside the spread of this specimen.

3.2.11 Tree 14 — Sydney Red Gum – located on subject site.

- Structural Root Zone impacts:

  All proposed works are located outside the SRZ.

- Tree Protection Zone impacts:

All proposed works are located outside the TPZ.

- Pruning impacts:

  No pruning is foreseen as works are located outside the spread of this specimen.

3.2.12 Tree 15 — Sydney Red Gum – located on subject site.

- Structural Root Zone impacts:

  All proposed works are located outside the SRZ.

- Tree Protection Zone impacts:

  All proposed works are located outside the TPZ.

- Pruning impacts:

  No pruning is foreseen as works are located outside the spread of this specimen.

3.2.13 Tree 16 — Swamp Mahogany – located on subject site.

- Structural Root Zone impacts:

  All proposed works are located outside the SRZ.

- Tree Protection Zone impacts:

  All proposed works are located outside the TPZ.

- Pruning impacts:

  No pruning is foreseen as works are located outside the spread of this specimen.

3.2.14 Tree 17 — NSW Christmas Bush – located on subject site.

- Structural Root Zone impacts:

  All proposed works are located outside the SRZ.

- Tree Protection Zone impacts:

  All proposed works are located outside the TPZ.

- Pruning impacts:

  Pruning may be required to ensure clear access for the construction and access of the inclinator. It is foreseen that this pruning would be within acceptable limits as stated within AS4373-2007.

3.2.15 Tree 18 — Bloodwood – located on subject site.

- Structural Root Zone impacts:

  All proposed works are located outside the SRZ.

- Tree Protection Zone impacts:

  All proposed works are located outside the TPZ.

- Pruning impacts:

No pruning is foreseen as works are located outside the spread of this specimen.

3.2.16 Tree 19 — Red Mahogany – located on subject site.

- Structural Root Zone impacts:

  All proposed works are located outside the SRZ.

- Tree Protection Zone impacts:

  All proposed works are located outside the TPZ.

- Pruning impacts:

  No pruning is foreseen as works are located outside the spread of this specimen.

3.2.17 Tree 19A — Blueberry Ash – located on subject site.

- Structural Root Zone impacts:

  All proposed works are located outside the SRZ.

- Tree Protection Zone impacts:

  All proposed works are located outside the TPZ.

- Pruning impacts:

  No pruning is foreseen as works are located outside the spread of this specimen.

3.2.18 Tree 20 — Sydney Red Gum – located on subject site.

- Structural Root Zone impacts:

  All proposed works are located outside the SRZ.

- Tree Protection Zone impacts:

  All proposed works are located outside the TPZ.

- Pruning impacts:

  Pruning may be required to ensure clear access for construction and use of the proposed inclinator. It is foreseen this is likely to have minor impact to the existing poor tree health and condition of this specimen.

3.2.19 Tree 21 — Bloodwood – located on subject site.

- Structural Root Zone impacts:

  The location of the proposed inclinator falls within the calculated SRZ, however this will consist of piers only. Provided pier locations are flexible to allow avoidance of woody roots, and carried out by hand-tools, this tree should only be moderately affected in the short term.

- Tree Protection Zone impacts:

  An encroachment of 12.1m^2 or 29.5% (see Figure 3 below) has been calculated for this specimen in relation to the proposed inclinator and landing deck. This is an over-estimate as only piers will be located in this area. However, this level of encroachment is considered *major* encroachment under AS4970.

Provided pier location can be flexible to avoid woody roots and works are carried out with hand tools only, long term impacts on tree health and condition should be moderate.

Pruning impacts:

Pruning is likely to be required to ensure clear access for construction and use of the proposed inclinator.

3.2.20 Tree 21A — Broad-leaved White Mahogany – located on subject site.

- Structural Root Zone impacts:

  The location of the proposed inclinator falls within the calculated SRZ, however this will consist of piers only. Provided pier locations are flexible to allow avoidance of roots, this tree should only be moderately affected in the short term.

- Tree Protection Zone impacts:

  An encroachment of 1.5m^2 or 11.5% (See Figure 3 below) has been calculated for this specimen in relation to the proposed inclinator and landing deck. This is an over-estimate as only piers will be located in this area. This level of encroachment is technically considered *major* encroachment under AS4970.

  Provided pier location can be flexible to avoid woody roots and carried out with hand tools only, long term impacts on tree health and condition should be moderate at worse in relation to work within the TPZ.

  Pruning impacts:

  Pruning is likely to be required to ensure clear access for construction and use of the proposed inclinator.

3.2.21 Tree 22 — Bloodwood – located on subject site.

- Structural Root Zone impacts:

  The location of the proposed inclinator falls within the calculated SRZ, however this will consist of piers only. Provided pier locations are flexible to allow avoidance of roots, this tree should only be moderately affected in the short term.

- Tree Protection Zone impacts:

  An encroachment of 9.4m^2 or 22.9% (see Figure 3 below) has been calculated for this specimen in relation to the proposed inclinator and landing deck. This is an over-estimate as only piers will be located in this area. However, this technically is considered *major* encroachment under AS4970.

  Provided pier location can be flexible to avoid woody roots and carried out with hand tools only, long term impacts on tree health and condition should be at most moderate in relation to this tree.

  Pruning impacts:

  Pruning is likely to be required to ensure clear access for construction and use of the proposed inclinator.

3.2.22 Tree 23 — Sydney Red Gum – located on subject site.

- Structural Root Zone impacts:

  The location of the proposed inclinator falls within the calculated SRZ, however this will consist of piers only. Provided pier locations are flexible to allow avoidance of roots, this tree should only be moderately affected in the short term.

- Tree Protection Zone impacts:

  An encroachment of 14.5m^2 or 20.1% (see Figure 3 below) has been calculated for this specimen in relation to the proposed inclinator and landing deck. This is an over-estimate as only piers will be located in this area. However, this technically is considered *major* encroachment under AS4970.

  Provided pier location can be flexible to avoid woody roots and carried out with hand tools only, long term impacts on tree health and condition should be moderate at worse.

- Pruning impacts:

  Pruning is likely to be required to ensure clear access for construction and use of the proposed inclinator.

3.2.23 Tree 24 — Bloodwood – located on subject site.

- Structural Root Zone impacts:

  All proposed works are located outside the SRZ.

- Tree Protection Zone impacts:

  An encroachment of 1m^2 or 3.6% (see Figure 3 next page) has been calculated for this specimen in relation to the proposed inclinator and landing deck. This is an over-estimate as only piers will be located in this area. Under AS4970 encroachments less than 10% are considered *minor* encroachment.

  Provided recommendations within this report are followed, it is unlikely tree health or condition would be negatively impacted from this level of impact.

- Pruning impacts:

  Pruning is likely to be required to ensure clear access for construction and use of the proposed inclinator.

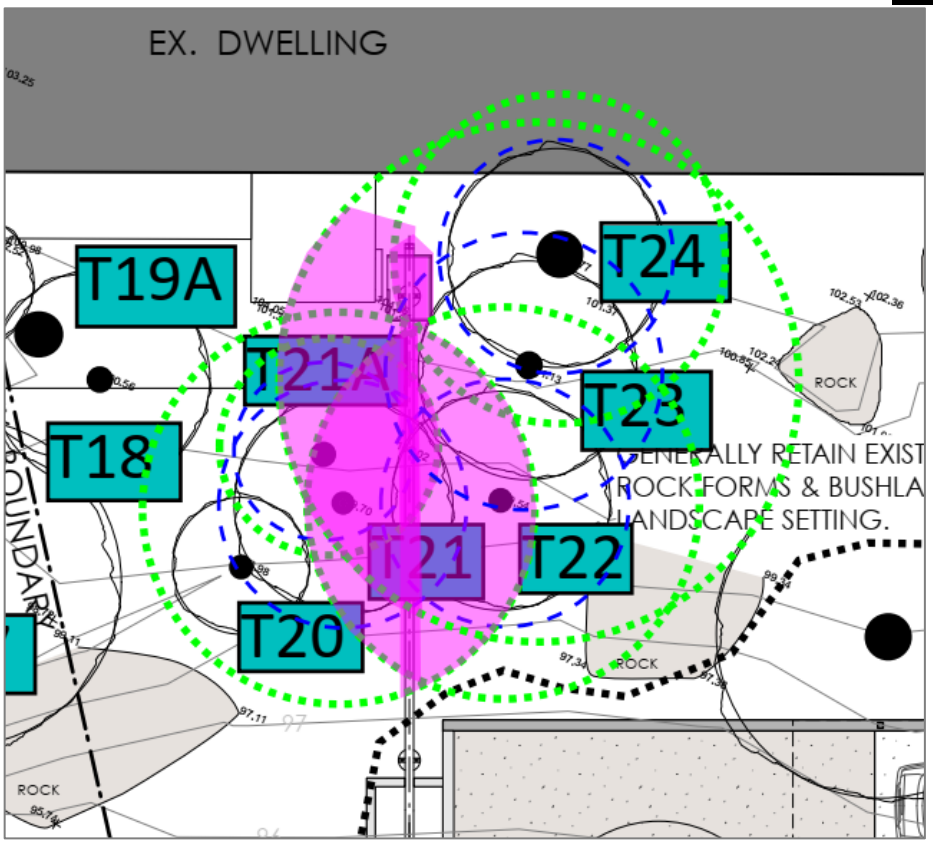

Figure 3 – Tree 21, 21A, 22, 23 & 24. - Estimated encroachment into TPZ denoted with pink shading. SRZ noted as blue hashed circle, green dotted circle denotes TPZ. Carparking Floor Plan, drawing no. SK-02,by Andy Lehman Design. Marked up by C Hughes.

4 Conclusions

4.1.1 A total of twenty-seven (27) trees are included in this Arboricultural Impact Assessment. Two (2) trees are located on Council property (Tree 4 & 5), and twenty-five are located on the subject site (Tree 1-3, Group 3A, 6-24).

4.1.2 No assessed tree has been identified as endangered or threatened under State or Federal Government legislation.

4.1.3 Six (6) trees/tree groups will require removal to allow the proposed development (Trees 1-3, part of Group 3A, Tree 6 and Tree 7).

4.1.4 Provided the recommendations of this report are adopted, adverse impacts on the vitality and condition of the trees to be retained are unlikely.

5 Recommendations

5.1 Tree Removal

5.1.1 Tree removals are to be undertaken in accordance with the NSW WorkCover Code of Practice for the Amenity Tree Industry (1998) and Safe Work Guide to Managing Risks of Tree Trimming and Removal Work 2016.

5.1.2 Tree removals shall be in accordance with the Work Health and Safety Act 2011 and the Work Health and Safety (WHS) Regulations 2017.

5.1.3 All tree removals are subject to permit from the relevant consent authority and shall comply with Section 5.5 of AS 4373-2007 Pruning of amenity trees.

5.2 Project Arboriculturist

5.2.1 A Project Arboriculturist (PA) shall be engaged prior to further works commencing on the site.

5.2.2 The PA must have a minimum Australian Qualification Framework Level 5 (AQF5) or above in Arboriculture.

5.2.3 Duties of the PA shall include, but not be limited to:

- Liaising with the Project Manager/Head Contractor/Site Manager to confirm the tree protection and other specific tree protection requirements prior to site works commencing.
- Inspection of Tree Protection Devices and supervision of works as recommended in this report or as specified in any Conditions of Consent associated with an approved development application.
- Provision of Compliance Certification if, and when required.

5.3 Minimising Impacts on Trees to be Retained

5.3.1 NOTE: Traditional tree protection fencing as stated in AS4970 will not work at this site due to the steep slope. In this instance, steel pickets and para-webbing are the most appropriate form of tree protection device. Avoidance of contact or damage with woody roots is expected and required.

5.3.2 Signage stating '*Tree Protection Zone – No Unauthorised Access'* shall be placed on the para-webbing in a clearly visible position detailing the relevant contact details of the site supervisor shall be displayed.

5.3.3 Tree 4 – Bloodwood

- Protect Tree 4 by placing tree protection devices stated in 5.3.1 and 5.3.2 and as detailed in Appendix 4.
- Any work within the calculated TPZ requires Project Arborist/Council supervision.
- Pruning is to be carried out prior to works commencing, by an AQF Level 3 Arborist, to Australian Standards AS4373-2007 (AS4373) *Pruning of amenity*

trees. A maximum 10% total live canopy and 100mm branch diameter is to be removed.

- Refer to Section 5.4 of this report for further tree protection measures.

5.3.4 Tree 5 – Sydney Red Gum

- Protect Tree 5 by placing tree protection devices stated in 5.3.1 and 5.3.2 and as detailed in Appendix 4.
- No ground level changes are to occur within the calculated TPZ. Care when planting to avoid woody roots is required.
- Pruning is to be carried out prior to works commencing, by an AQF Level 3 Arborist, to Australian Standards AS4373-2007 (AS4373) *Pruning of amenity trees*. A maximum 10% total live canopy and 100mm branch diameter is to be removed.
- Refer to Section 5.4 of this report for further tree protection measures.

5.3.5 Tree 8 – Black She-oak

- Protect Tree 8 by placing tree protection devices stated in 5.3.1 and 5.3.2 and as detailed in Appendix 4.
- No ground level changes are to occur within the calculated TPZ. Care when planting to avoid woody roots is required.
- No canopy pruning is required to facilitate the proposed works.
- Refer to Section 5.4 of this report for further tree protection measures.

5.3.6 Tree 9 & 10 – Bloodwood & Black She-oak

- Protect Tree 9 & 10 by placing tree protection devices stated in 5.3.1 and 5.3.2 and as detailed in Appendix 4.
- No ground level changes are to occur within the calculated TPZ. Care when planting to avoid woody roots is required.
- No canopy pruning is required to facilitate the proposed works.
- Refer to Section 5.4 of this report for further tree protection measures.

5.3.7 Tree 11-16 & 19A – Various locally native species

- Protect Tree 11-16 & 19A by placing tree protection devices stated in 5.3.1 and 5.3.2 and as detailed in Appendix 4.
- No ground level changes are to occur within the calculated TPZ. Care when planting to avoid woody roots is required.
- No canopy pruning is required to facilitate the proposed works.
- Refer to Section 5.4 of this report for further tree protection measures.

5.3.8 Tree 17 & 20 – NSW Xmas Bush and Sydney Red Gum

- Protect Tree 17 & 20 by placing tree protection devices stated in 5.3.1 and 5.3.2 and as detailed in Appendix 4.
- No ground level changes are to occur within the calculated TPZ. Care when planting to avoid woody roots is required.

- Pruning is to be carried out prior to works commencing, by an AQF Level 3 Arborist, to Australian Standards AS4373-2007 (AS4373) *Pruning of amenity trees*. A maximum 10% total live canopy and 100mm branch diameter to be removed.
- Refer to Section 5.4 of this report for further tree protection measures.

5.3.9 Tree 21, 21A, 22-24 – Various locally native species

- Protect Tree 21, 21A and 22-24 by placing tree protection devices stated in 5.3.1 and 5.3.2 and as detailed in Appendix 4.
- All work within the calculated TPZ requires direct Project Arborist/Council supervision and hand tool use only. No vehicles/machinery are permitted within the calculated TPZ of these specimens.
- Pruning is to be carried out prior to works commencing, by an AQF Level 3 Arborist, to Australian Standards AS4373-2007 (AS4373) *Pruning of amenity trees*. A maximum 10% total live canopy and 100mm branch diameter to be removed. String line placement of proposed inclinator location and knowledge of cart dimensions will be required for clearances.
- Refer to Section 5.4 of this report for further tree protection measures.

5.4 Arboricultural advice

5.4.1 Tree and Root Pruning

- Any pruning required is to be assessed and approved by the PA, prior to undertaking any of this type of work.
- Pruning shall not be undertaken by unqualified site personnel at any time.
- Pruning of branches must be undertaken by a minimum AQF Level 3 arborist in accordance with the Australian Standard AS4373-2007 *Pruning of amenity trees*,
- Unless otherwise approved by the Conditions of Development Consent, or by separate application and approval by the consent authority, pruning is to be limited to cutting of limbs less than 80mm diameters, and no more than 10% total live material removed.

5.4.2 Stockpiling and location of site sheds

- The project arboriculturist must be consulted prior to placing any items within a tree's TPZ.
- Where stockpiling must be located within the TPZ offset of trees to be retained, the existing/undisturbed natural ground must be covered with thick, coarse mulch to a minimum 75-100mm thickness.
- Large, or bulky materials (non-contaminating) can be stacked on wooden pallets or boards placed over the mulch.
- Tarpaulins (or similar) placed on boards or pallets on top of mulch shall be used to prevent loose or potentially contaminating materials from moving into the soil profile within the TPZ of trees or within 10m upslope of trees.

- Where site sheds must be located within the TPZ offset of a tree/s, the shed must be fully elevated on all sides with a minimum 300m between existing ground and the floor/floor bearers. Isolated pad footings must be carefully dug by hand and not damage or sever any roots greater than 20mm diameters.
- Any conflict between footing locations and larger roots (i.e. 20mm Ø plus) must be brought to the attention of the project arboriculturist who is to provide practical alternatives that do not include unnecessary tree root removal.

5.4.3 Fill Material

- Placement of fill material within the TPZ of trees to be retained should be avoided where possible. Where placement of fill cannot be avoided, the material should be a coarse, gap graded material such as 20 — 50mm crushed basalt or equivalent to provide some aeration to the root zone. Note that roadbase or crushed sandstone or other material containing a high percentage of fines is unacceptable for this purpose.
- The fill material should be consolidated with a non-vibrating roller to minimise compaction of the underlying soil.
- Permeable geotextile may be used beneath the sub-base to prevent migration of the stone into the sub-grade. No fill material shall be placed in direct contact with the trunk.

5.4.4 Pavements

- Pavements should be avoided within the TPZ of trees to be retained where possible.
- Proposed paved areas within the TPZ of trees to be retained is to be placed above grade to minimise excavations within the root zone, avoiding root severance and damage.

5.4.5 Fencing and walls within the SRZ and TPZ of retained trees.

- Where fencing and/or masonry walls are to be constructed along site boundaries, they must provide for the presence of any living woody tree roots greater than 50mm diameter.
- Hand digging must occur within the SRZ of trees to be retained.
- For masonry walls/fences it may be acceptable to delete continuous concrete strip footings and replace with suspended in-fill panels (e.g. steel or timber pickets, lattice etc) fixed to pillars.

5.4.6 Landscaping within tree root zones.

- The level of introduced planting media into any proposed landscaped areas within the TPZ is not to be greater than 75mm depth, and be of a coarse, sandy material to avoid development of soil layers that may impede water infiltration.

- Appropriate container size of proposed plants within the SRZ of trees should be determined prior to purchase of plants. Otherwise, any proposed landscaping within the SRZ must consist of tubestock only. This is required to ensure that damage to tree roots is avoided.
- Mattocks and similar digging instruments must not be used within the TPZ of the trees. Planting holes should be dug carefully by hand with a garden trowel, or similar small tool.
- Where possible, do not plant canopy trees beneath, or within 6 - 8m of overhead lines.

5.4.7 Other

- No washing or rinsing of tools or other equipment, preparation of any mortars, cement mixing, or brick cutting is to occur within 8m upslope of any palms or trees to be retained.
- Regular monitoring of the trees during development works for unforeseen changes or decline will help maintain the trees in a healthy state.

6 References

Barrell, J (1995) Pre-development Tree Assessment from Trees and Building Sites, Eds. Watson & Neely, International Society of Arboriculture, Illinois.

Hadlington, P. & Johnston, J. (1988) Australian Trees: Their Care & Repair. University of NSW Press, Kensington.

Mattheck, C. & Breloer, H. (1994) The Body Language of Trees: A handbook for failure analysis. Research for Amenity Trees No. 4, The Stationery Office, London.

Standards Australia AS4373-2007: Pruning of Amenity Trees, Standards Australia, Sydney.

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https://www.treetec.net.au/tpz_srz_dbh_calculator/ - Accessed 22/3/2021.

7 Acknowledgements

Credit to Catriona Mackenzie of Urban Forestry Australia Pty Ltd for areas of text and general layout.

Report prepared by Chantalle Hughes –

March 2021

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8 Appendices

Appendix 1 – Terms and Definitions

Age classes

Y Young refers to an established but juvenile tree.
SM Semi-mature refers to a tree at growth stages between immaturity and full size.
EM Early-mature refers to a tree close to full sized still actively growing.
M Mature refers to a full sized tree with some capacity for further growth.
LM Late-Mature refers to a full sized tree with little capacity for growth that is not yet about to enter decline.
OM Over-Mature refers to a full sized tree with little capacity for growth that is entering or has entered decline.

Bole: refers to the stem/trunk of a tree, in this instance no branches remain.

Co-dominant: refers to stems or branches equal in size and relative importance.

Condition/Structure: refers to the tree's form and growth habit, as modified by its environment (aspect, suppression by other trees, soils) and the state of the scaffold (i.e. trunk and major branches), including structural defects such as cavities, crooked trunks or weak trunk/branch junctions. These are not directly connected with health and it is possible for a tree to be healthy but in poor condition/structure.

Deadwood: refers to any whole limb that no longer contains living tissues (e.g. live leaves and/or bark). Some dead wood is common in a number of tree species.

Diameter at Breast Height (DBH): Refers to the tree trunk diameter at breast height (1.4 metres above ground level).

Hazard: refers to anything with the potential to harm health, life or property.

Health: Refers to the tree's vigour as exhibited by the crown density, leaf colour, presence of epicormic shoots, ability to withstand disease invasion, and the degree of dieback.

Secondary Stem: refers to stems or branches with one of unequal size and relative importance.

SRZ: refers to the Structural Root Zone of the tree, this is the area required for tree stability.

TPZ: refers to the Tree Protection Zone of the tree, this is the primary method of protecting trees, it is a combination of the root area and the canopy and the SRZ is located within it.

Visual Tree Assessment (VTA): a procedure of defect analysis developed by Mattheck and Breloer (1994) that uses the growth response and form of trees to detect defects.

Appendix 2 – ULE Guide

ULE categories (after Barrell 1996, Updated 01/04/01)

The five categories and their sub-groups are as follows:

1. Long ULE - tree appeared retainable at the time of assessment for over 40 years with an acceptable degree of risk, assuming reasonable maintenance:
    a) Structurally sound trees located in positions that can accommodate future growth
    b) Trees which could be made suitable for long term retention by remedial care
    c) Trees of special significance which would warrant extraordinary efforts to secure their long term retention

2. Medium ULE - tree appeared to be retainable at the time of assessment for 15 to 40 years with an acceptable degree of risk, assuming reasonable maintenance:
    a) Trees which may only live from 15 to 40 years
    b) Trees which may live for more than 40 years but would be removed for safety or nuisance reasons
    c) Trees which may live for more than 15 years but would be removed to prevent interference with more suitable individuals or to provide space for new planting
    d) Trees which could be made suitable for retention in the medium term by remedial care

3. Short ULE - tree appeared to be retainable at the time of assessment for 5 to 15 years with an acceptable degree of risk, assuming reasonable maintenance:
    a) Trees which may only live from 5 to 15 years
    b) Trees which may live for more than 15 years but would be removed for safety or nuisance reasons
    c) Trees which may live for more than 15 years but would be removed to prevent interference with more suitable individuals or to provide space for new planting
    d) Trees which require substantial remediation and are only suitable for retention in the short term.

4. Removal - trees which should be removed within the next 5 years:
    a) Dead, dying, suppressed or declining trees because of disease or inhospitable conditions
    b) dangerous trees through instability or recent loss of adjacent trees
    c) Dangerous trees because of structural defects including cavities, decay, included bark, wounds or poor form
    d) Damaged trees that are clearly not safe to retain
    e) Trees which may live for more than 5 years but would be removed to prevent interference with more suitable individuals or to provide space for new planting
    f) Trees which are damaging or may cause damage to existing structures within the next 5 years
    g) Trees that will become dangerous after removal of other trees for the reasons given in (a) to (f)
    h) Trees in categories (a) to (g) that have a high wildlife habitat value and, with appropriate treatment, could be retained subject to regular review

5. Small, young or regularly pruned - Trees that can be reliably moved or replaced:
    a) small trees less than 5m in height
    b) young trees less than 15 years old but over 5m in height
    c) formal hedges and trees intended for regular pruning to artificially control growth

Appendix 3 – STARS – Significance of a Tree Assessment Rating System (IACA 2010)©

The landscape significance of a tree is an essential criterion for establishing 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.
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 and *Useful Life Expectancy* of an individual tree has been defined, the retention value can be determined.

Tree Significance - Assessment Criteria

1. High Significance in landscape.

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

2. Medium Significance in landscape.

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

3. Low Significance in landscape.

- The tree is in fair-poor condition and good or low vigour;
- The tree has form atypical of the species;
- The tree is not visible or is partly visible from surrounding properties as obstructed by other vegetation or buildings;
- The tree provides a minor contribution or has a negative impact on the visual character and amenity of the local area;
- The tree is a young specimen which may or may not have reached dimension to be protected by local Tree Preservation orders or similar protection mechanisms and can easily be replaced with a suitable specimen;
- The tree's growth is severely restricted by above or below ground influences, unlikely to reach dimensions typical for the taxa *in situ* - tree is inappropriate to the site conditions;
- The tree is listed as exempt under the provisions of the local Council Tree Preservation Order or similar protection mechanisms;
- The tree has a wound or defect that has potential to become structurally unsound.

Appendix 3 – STARS – Significance of a Tree Assessment Rating System (IACA 2010)©

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.

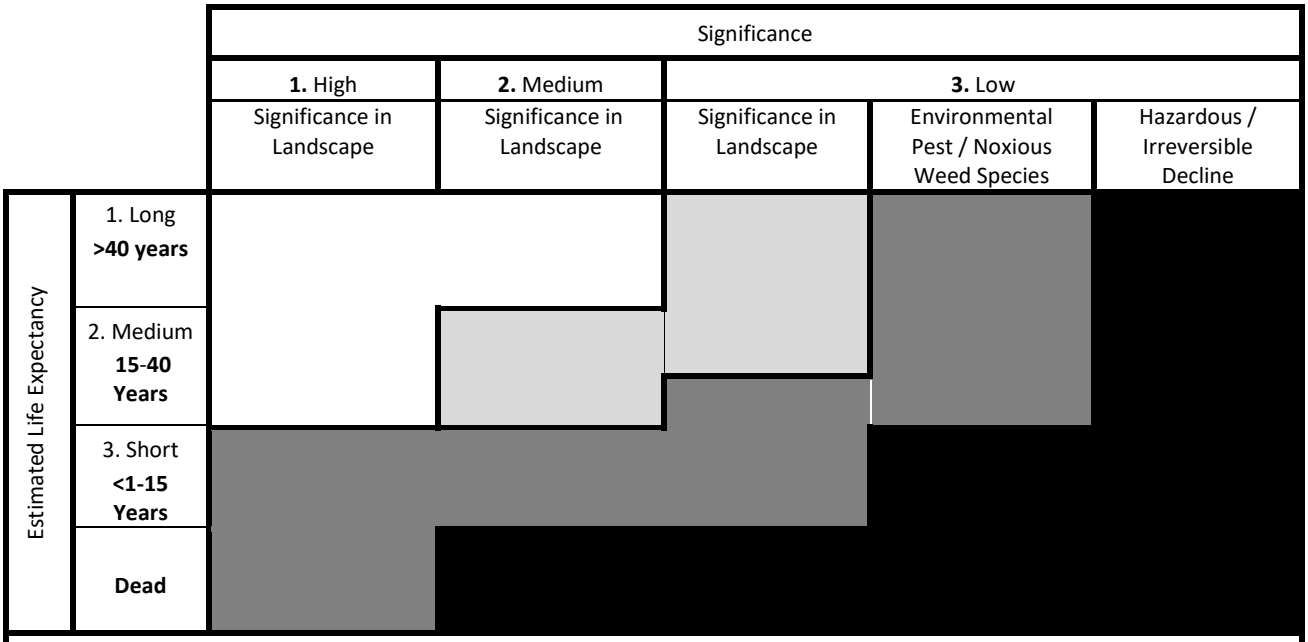
Hazardous/Irreversible Decline:

- 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 designed for individual trees only but can be applied to a monocultural stand in its entirety e.g. hedge.

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 and Andrew Morton in June 2001.



Legend for Matrix Assessment

	Priority for Retention (High) -These trees are considered important for retention and should be retained and protected. Design modification or re-location of building/s should be considered to accommodate the setbacks as prescribed by the Australian Standard AS4970 *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.

Table 1 - Tree Retention Value - Priority Matrix.

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

Appendix 4 – Tree Protection Plan

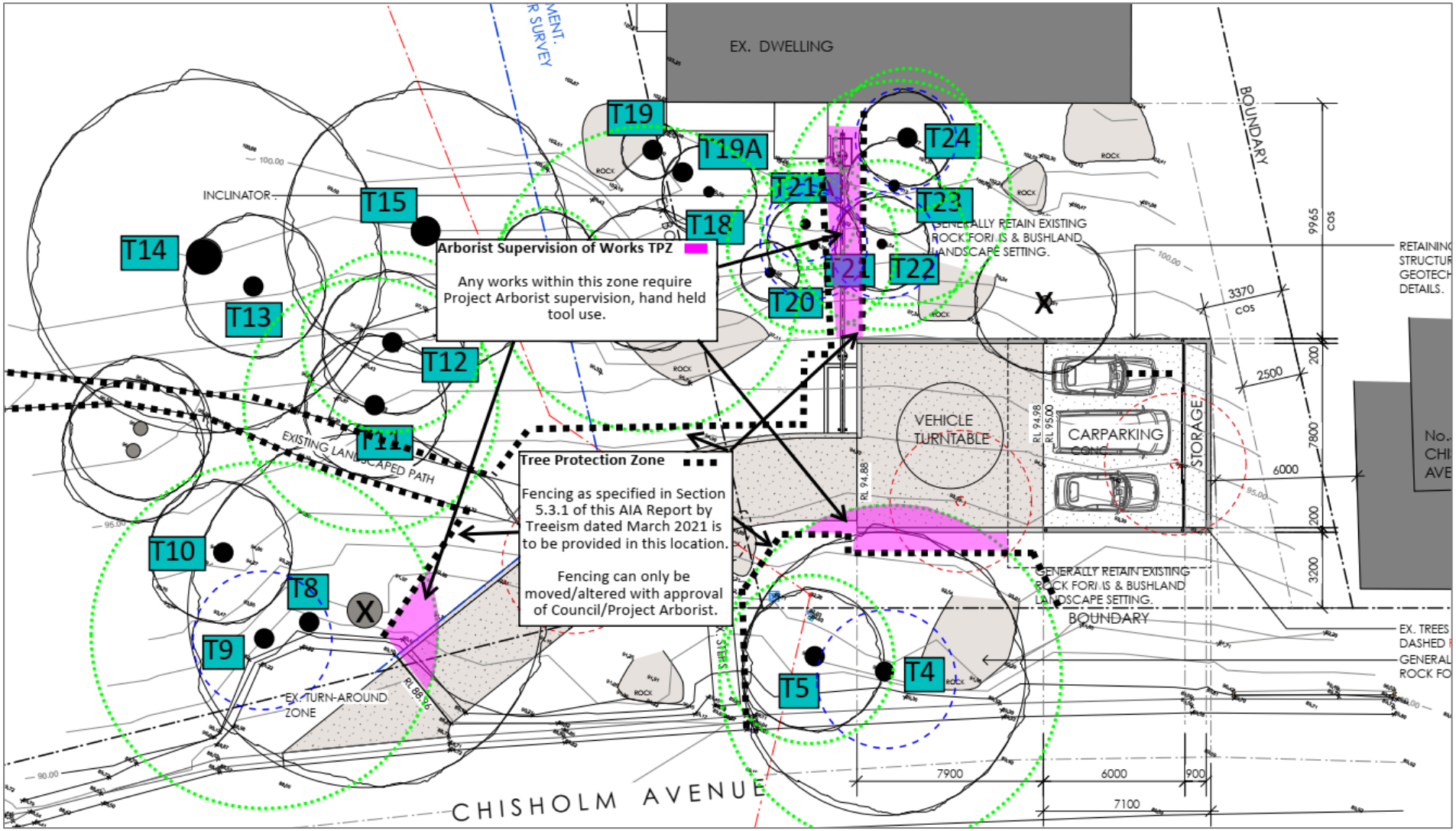


Figure 1 – Excerpt of Carparking Floor Plan, Drawing no. SK-02, dated February 2021, authored by Andy Lehman Design. Marked up by C Hughes 29/3/21 (NOT TO SCALE).

Appendix 5 – Schedule of Assessed Trees – Site inspection 9/3/2021 - 60-62 Chisholm Avenue, Avalon Beach.

Tree No.	*Genus & species* **Common Name**	Ht (m)	Sp (m)	DBH (mm)	Age	V	C	Comments	ULE	TSR	RV	SRZ (m)	TPZ (m)	TPZ (area)
1	*Angophora costata* **Sydney Red Gum**	12	8	225	M	G	G-F	Locally native species. Canopy mainly orientated to the north. Several branch failure sites noted (suspect from storm events). Epicormic growth and deadwood to 40mm in diameter noted.	2A	M	M	1.9	2.7	23
2	*Eucalyptus umbra* **Broad-leaved White Mahogany**	11	6	200	EM	G	F	Locally native species. Epicormic growth, high percentage of deadwood noted. Suppressed specimen – canopy orientated to the west.	2A	M	M	1.8	2.4	18
3	*Banksia serrata* **Old Man Banksia**	12	12	@ 1m AGL 225 / 400 (675)	M	G	F-P	Locally native species. Suspect decay into main stem. Main leader and secondary stem failed in upper canopy. Only one scaffold to south-west remains.	3A	L	L	2.9	8.1	206
3A	*Elaeocarpus reticulatas* **Blueberry Ash** **Large group through area**	Max 6	2-4	50-100	Y-EM	G	G	Locally native species. Group of self-sown specimens.	1A	M	H	1.6	2.0	13
4	*Corymbia gummifera* **Bloodwood**	16	14	600	LM	G-F	F-P	Locally native species. Located on Council land. Fruiting body noted at old branch failure location at 1.2m AGL. Large dead section noted, termite activity noted (may be old). Broken branches through canopy, suspect storm damage.	2A	H	H	2.8	7.2	163
5	*Angophora costata* **Sydney Red Gum**	11	18	300	EM-M	G	G	Locally native species. Located on Council land. Suppressed specimen.	2A	H	H	2.2	3.6	41
6	*Eucalyptus umbra* **Broad-leaved White Mahogany**	10	6	175	EM	G	G	Locally native species. No special problems noted at time of assessment.	2A	H	H	1.7	2.2	15

Tree No.	*Genus & species* **Common Name**	Ht (m)	Sp (m)	DBH (mm)	Age	V	C	Comments	ULE	TSR	RV	SRZ (m)	TPZ (m)	TPZ (area)
7	*Eucalyptus umbra* **Broad-leaved White Mahogany**	10	20	*800	M	G	G-F?	Locally native species. Strong lean (phototropic) to the south (over roadway). Moderate deadwood and epicormic growth noted. Located right on edge of existing retaining wall.	2A	H	H	3.2	9.6	290
8	*Allocasuarina littoralis* **Black She-oak**	6.5	4	*200	M	G	F	Locally native species.	2A	M	M	1.8	2.4	18
9	*Corymbia gummifera* **Bloodwood**	14	16	*650	M	G	F?	Locally native species. Twiggy deadwood noted, Heavily pruned specimen.	2A	H	H	2.9	7.8	191
10	*Allocasuarina littoralis* **Black She-oak**	8	8	200	M	G	G	Locally native species. No special problems noted at time of assessment.	2A	H	H	1.8	2.4	18
11	*Banksia serrata* **Old Man Banksia**	9	12	450	M-LM	G	G	Locally native species. Large dead branches noted. Heavily orientated to the south-east.	2A	M	M	2.5	5.4	92
12	*Allocasuarina littoralis* **Black She-oak**	12	20	250/ 200 (325)	M	G	G-F	Locally native species. High percentage of deadwood. Poor form and branches failures noted.	2A	M	M	2.2	3.9	48
13	*Angophora costata* **Sydney Red Gum**	10	12	175	EM	G	G	Locally native species. Twiggy deadwood noted, suppressed specimen.	2A	M	M	1.7	2.2	15
14	*Angophora costata* **Sydney Red Gum**	16	20	800	M	G	F	Locally native species. Large branch failures noted, fruiting body noted on stem.	2A	H	H	3.2	9.6	290
15	*Angophora costata* **Sydney Red Gum**	14	16	500	M	G	G	Locally native species. No special problems noted at time of assessment.	2A	H	H	2.7	6.0	113
16	*Eucalyptus robusta* **Swamp Mahogany**	10	8	175	EM	G	G	Locally native species. No special problems noted at time of assessment.	2A	M	M	1.7	2.2	15
17	*Ceratopetalum gummifera* **NSW Xmas Bush**	12	24	225 x2 200 x3 (525)	LM	G	F	Locally native species. Tree has five (5) stems from ground level. Canopy thin, appears to have recently picked up in vigour.	2A	M	M	2.7	6.4	129

Tree No.	*Genus & species* **Common Name**	Ht (m)	Sp (m)	DBH (mm)	Age	V	C	Comments	ULE	TSR	RV	SRZ (m)	TPZ (m)	TPZ (area)
18	*Corymbia gummifera* **Bloodwood**	12-14	8	200	EM	G	G	Locally native species. Twiggy deadwood noted.	2A	M	H	1.8	2.4	18
19	*Eucalyptus resinifera* **Red Mahogany**	11	6	150	EM	G	G	Locally native species. Located very close to exposed rock outcrop. Twiggy deadwood noted.	2A	M	H	1.6	2.0	13
19A	*Elaeocarpus reticulatas* **Blueberry Ash**	6.5	4	75	Y	G	G	Locally native species. No special problems noted at time of assessment.	1A	M	H	1.6	2.0	13
20	*Angophora costata* **Sydney Red Gum**	10	6	100	EM	P	P	Locally native species. Almost dead, a few epicormic branches remain only.	4A	L	L	1.6	2.0	13
21	*Corymbia gummifera* **Bloodwood**	12	8	300	M	G	F	Locally native species. High percentage of epicormic growth. Rubbing wound noted on section of scaffold branch.	2A	H	H	2.2	3.6	41
21A	*Eucalyptus umbra* **Broad-leaved White Mahogany**	10	10	125	EM	G	G	Locally native species. Located directly behind T21. Pruned for house clearance.	2A	M	M	1.6	2.0	13
22	*Corymbia gummifera* **Bloodwood**	12	8	300	M	G	G-F	Locally native species. Deadwood to 125mm in diameter. Epicormic growth noted.	2A	H	H	2.2	3.6	41
23	*Angophora costata* **Sydney Red Gum**	13	12	400	M	G	F	Locally native species. Poorly pruned stub to south-west. Poor form.	2A	H	H	2.5	4.8	72
24	*Corymbia gummifera* **Bloodwood**	12	10	250	EM-M	G	G	Locally native species. Twiggy deadwood, epicormic growth noted.	2A	H	H	2.1	3.0	28

KEY

Trees to be retained.

Dead/non-prescribed tree or palm on site that may be removed or retained without Development Consent or Tree Management Permit.

Trees proposed to be removed.

L	Low Retention Value-These trees are not considered important for retention.	M	Medium Retention Value-These trees may be retained & protected.	H	High Retention Value -These trees are considered important for retention and should be retained and protected.

* DBH is visually estimated (usually adjoining trees or those that are hard to access). AB – above *buttress roots*. AGL - above ground level.

Figures in brackets indicates the determined DBH and TPZ for a multi-stemmed tree based on the formula shown in Appendix A of AS4970-2009.

NOTE: According to AS4970, the TPZ of palms, other monocots, cycads, and tree ferns should not be less than 1m outside the crown projection. The AS4970 formula for calculating the SRZ of a tree does not apply to palms, other monocots, cycads, and tree ferns.

H refers to the approximate height of a tree in metres, from base of stem to top of tree crown.

Sp refers to the approximate and average spread in metres of branches/canopy (the 'crown') of a tree.

DBH refers to the approximate diameter of tree stem at breast height i.e. 1.4 metres above ground (unless otherwise noted) and expressed in millimetres. Figures in brackets indicate the minimum TPZ allowable as per Section 3.2 Determining the TPZ with AS4970-2009.

Age refer to Appendix 1 -Terms and Definitions for more detail.

V refers to the tree's vigour (health) Refer to Appendix 1 -Terms and Definitions for more detail.

C refers to the tree's structural condition. Refer to Appendix 1 -Terms and Definitions for more detail.

ULE refers to the estimated *Useful Life Expectancy* of a tree. Refer to Appendix 2 for details.

TSR The *Tree Significance Rating* considers the importance of the tree because of its prominence in the landscape and its amenity value, from the point of view of public benefit. Refer to Appendix 3 – Significance of a Tree Assessment Rating for more detail.

RV Refers to the retention value of a tree, based on the tree's ULE *and* Tree Significance. Refer to Appendix 3 – Significance of a Tree Assessment Rating for more detail.

SRZ Structural Root Zone (SRZ) refers to the critical area required to maintain stability of the tree. Refer to Appendix 1 -Terms and Definitions for more detail. This is not calculated/does not apply for palms, cycads, tree ferns or monocot species.

TPZ Tree Protection Zone (TPZ) refers to the *tree protection zones* for trees to be retained. Refer to Appendix 1 -Terms and Definitions for more detail. For palms, cycads, tree ferns or monocot species it is calculated to be no less than 1m outside the crown projection.

Appendix 6 – Photographs

Plate 1 – Tree 1 (noted with arrow) – This tree requires removal to accommodate the proposal.

Plate 2 – Tree 5 & 6 – Arrows note subject trees, Tree 5 to the left and Tree 6 to the right) located on Council property will require retention and protection during works.

Plate 3 – Tree 6 (noted with arrow) – This tree requires removal to accommodate the proposal.

Plate 4 – Tree 7 & dead stump (noted with arrow) – This tree and large dead stump require removal to accommodate the proposal.

Plate 5 – Group 3A – This site is dense in sections with self-sown Blueberry Ash trees.

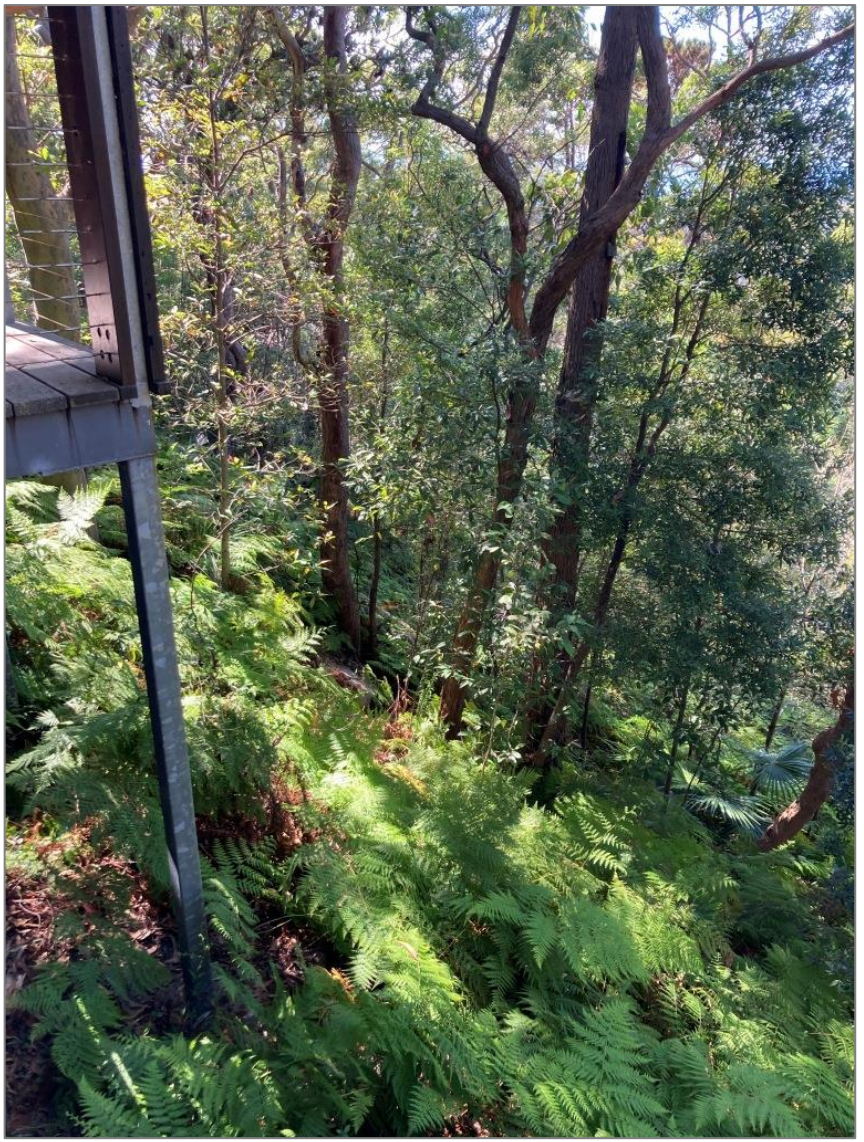


Plate 6 – Tree 20, 21, 21A & 22 are noted.

Appendix 7 – Tree Location Plan

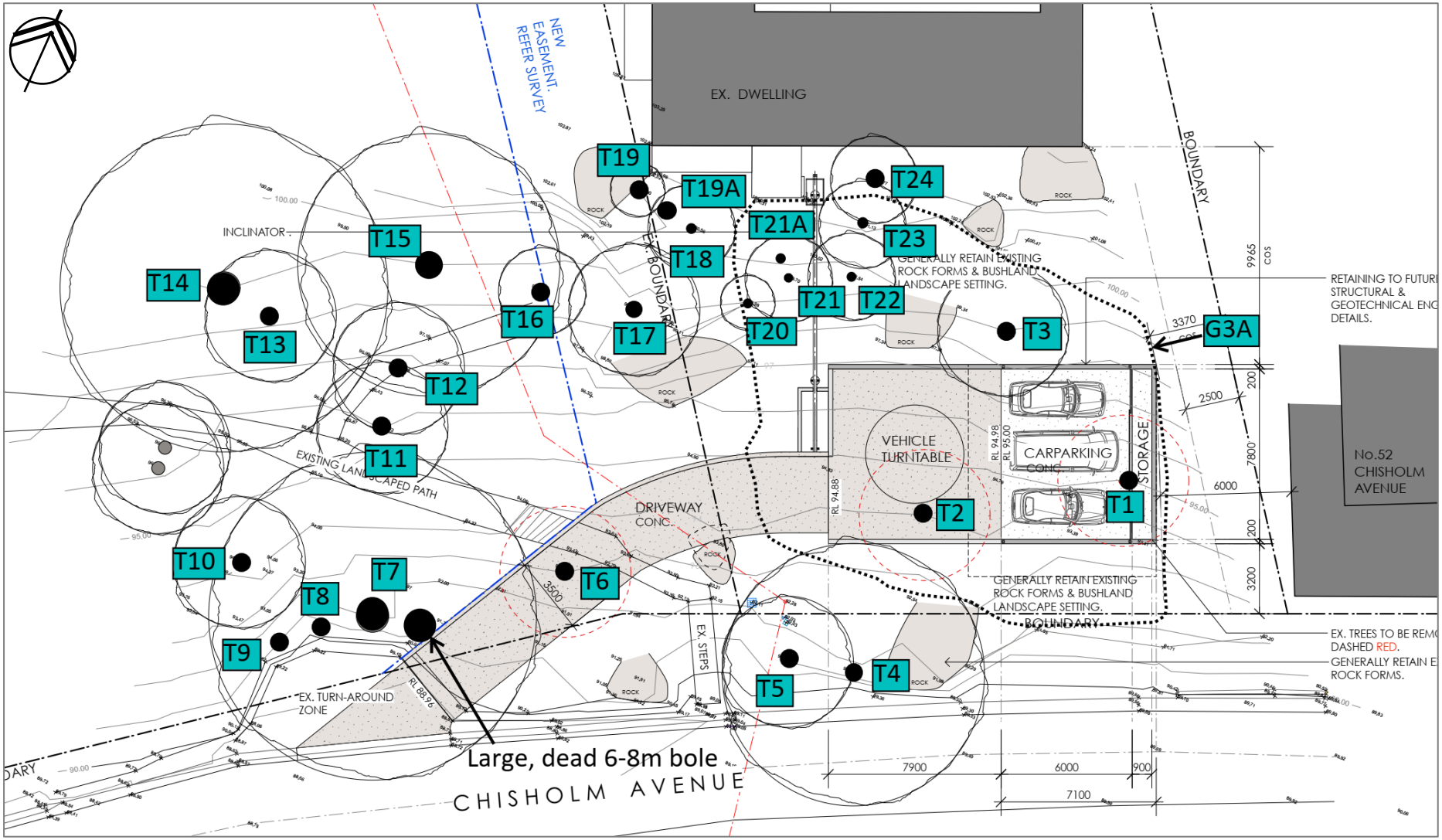


Figure 2 – Excerpt of Carparking Floor Plan, Drawing no. SK-02, dated February 2021, authored by Andy Lehman Design. Marked up by C Hughes 19/3/21 (NOT TO SCALE).