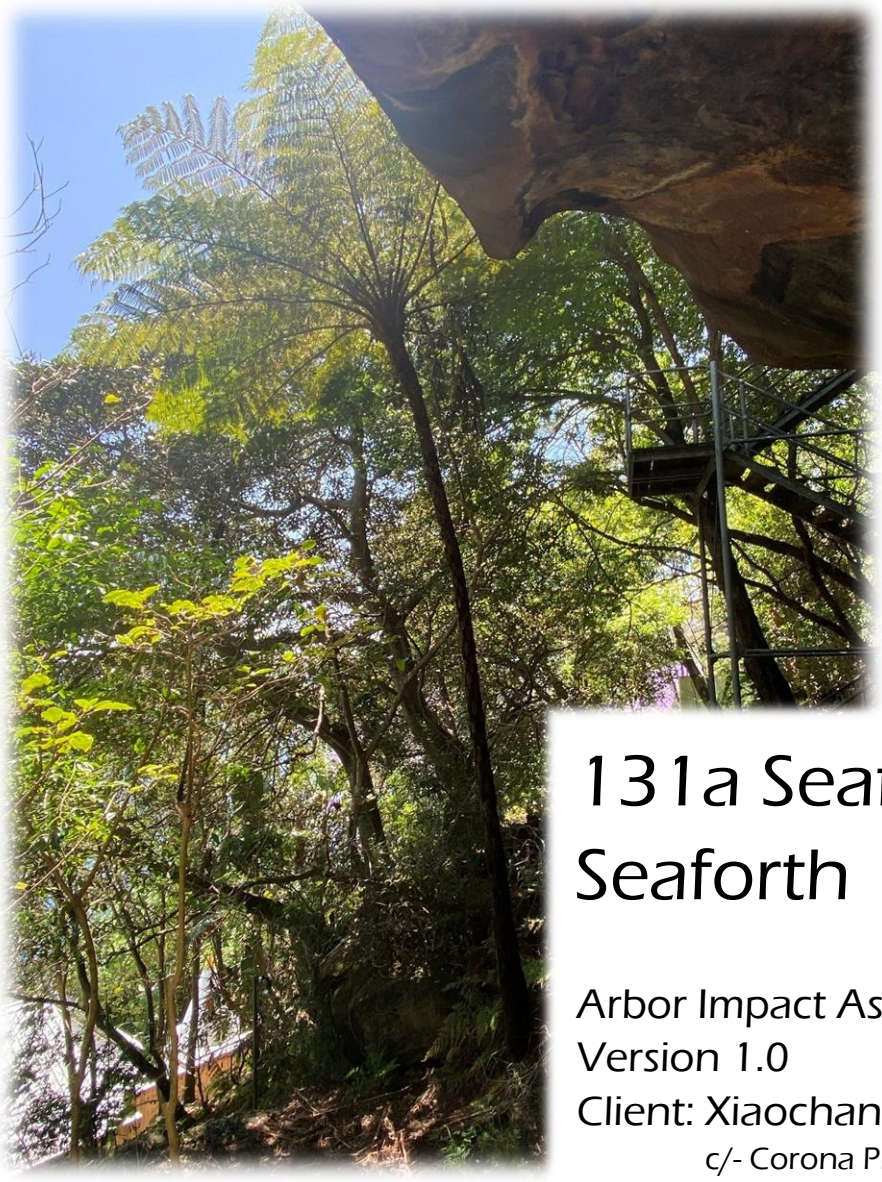
11 December 2024



131a Seaforth Crescent, Seaforth

Arbor Impact Assessment
Version 1.0
Client: Xiaochang Zhang
c/- Corona Projects Pty Ltd

Prepared By

Luke Smart
AQF V Consulting Arborist (AHC50510)

Contents

1. DISCLAIMER

The information provided within this report from Smart Arbor Professional Consulting is independently gathered by the author as an unbiased party and represents only the opinions and summations of the consulting arborist; compiled using the data gathered from the site inspection/s and any relevant information provided to the author.

All recommendations and information provided in this report relates to the time and date of the initial, and any following, site assessment/s. In the absence of historical records or information provided to the author, assumptions and findings of the consulting arborist are made based off observations at the time of inspection.

Measurements and locations noted in this report are an approximation and may be based on information found in surveys and further documentation not necessarily completed by the author. Exact locations and measurements of landscape require the assessment of a qualified surveyor.

No guarantees are implied for any findings or recommendations made within this report. Deficiencies, defects, climatic impacts, environmental changes, vandalism, mechanical impacts, or any other variable that may change the current state of the tree/s assessed are not covered in this report and may change the relevance to the opinions and findings provided.

2. EXECUTIVE SUMMARY

This report has been commissioned by Xiaochang Zhang, c/- Corona Projects Pty Ltd to provide a qualified assessment of multiple tree specimens on and adjacent to a proposed development site located at 131a Seaforth Crescent, Seaforth; a residential property located in the Northern Beaches Council LGA and subject to Local Government Tree Management policies.

The general vegetation on the site is noted to be a combination made up of mostly endemic tree specimens, with some scattered state native and exotic species towards the top of the property. The vegetation assessed were 14 x trees on the property, 10 x trees across neighbouring property boundaries and 1 x tree on the Council verge.

The proposed development that bears any impact to trees on site includes the restoration of the existing dwelling with the reconstruction of the roof slightly expanding the overall footprint to the north-west; and a new inclinator with associated landings, steps and support pillars that stretches from the top access of the property on Seaforth Crescent, down to bottom of the block, approximately 10-12m short of the water's edge. This will involve construction activities including partial demolition of existing structures and regrading site levels by post and pillar excavation, cut/fill processes, and trenching. No hydraulic or underground services plans have been submitted prior to report completion.

- **8** tree specimens (Tree No.'s 5, 6, 11, 13, 14, 17, 20 & 25) are unaffected by the proposed development.
- **8** tree specimens (Tree No.'s 1, 7, 8, 12, 15, 16, 22 & 24) are located within proximity to the proposed development, creating a negligible or low impact encroachment within the TPZ
- **3** tree specimens (Tree No.'s 9, 10 & 19) are located within proximity to the proposed development, creating a moderate impact encroachment within the TPZ.
- **2** tree specimens (Tree No.'s 2, & 23) are located within proximity to the proposed development, creating a high impact encroachment within the TPZ.
- **4** trees (Tree No.'s 3, 4, 18 & 21) are located within the proposed footprint or area of permanent operation for the development.

A summary of the recommendations in reference to the vegetation assessed and information on the proposed development provided within this report is as follows:

- Tree No.'s 5, 6, 11, 13, 14, 17, 20 & 24 are suitable for retention as no measurable impact is posed to the Tree Protection Zone (TPZ). Tree protection measures must be implemented as prescribed below and in the **DISCUSSION** section of this report (pages 15, 16 & 17).
- Tree No.'s 1, 7, 8, 12, 15, 16, 22 & 24 have a negligible or low impact and sustainable encroachment posed to the Tree Protection Zone by the proposed development and are suitable for retention. Tree sensitive construction techniques must be utilised, and protection

measures must be implemented as prescribed below and in the **DISCUSSION** section of this report (pages 17, 18, 19 & 20).

- Tree No.'s 9, 10, & 19 have a moderate, yet sustainable impact encroachment posed to the Tree Protection Zone by the proposed development and are suitable for retention. Tree sensitive construction techniques must be utilised, and protection measures must be implemented as prescribed below and in the **DISCUSSION** section of this report (pages 20 & 21).
- Tree 2 has a significant area of impact posed to the measured Tree Protection Zone, however the tree may be sustainably retained if all construction works are completed as a suspended or post/pier type construction, with tree sensitive construction techniques being utilised, and protection measures must be implemented as prescribed below and in the **DISCUSSION** section of this report (pages 21 & 22).
- Potential pruning required on Tree No.'s 12 & 16 to maintain clearance from roof restoration works must be identified during site establishment and brought to the attention of a Project Arborist with a minimum AQF5 level qualification. A pruning specification should be completed by the Project Arborist and submitted to Council prior to commencing any pruning of a retained tree.
- All pruning works should be completed by an experienced Arborist with a minimum AQF III qualification in Arboriculture who holds Public Liability and Workers Compensation insurance, and must be carried out in accordance with Australian Standard for Pruning of amenity trees (AS4373 - 2007)[a].

- Tree No.'s 3, 4, 21 & 23 are unsuitable for retention if the proposed development is to proceed due to being located within the footprint of the proposed inclinator rail or interfering with the path of travel for the mobile platform. These trees should be removed prior to site establishment.
- Tree 18 is unsuitable for retention if the proposed development is to proceed due to being located within the footprint of the proposed roof and deck extension to the premises. This tree should be removed prior to site establishment.

- A Project Arborist with a minimum AQF V qualification must be engaged for the duration of the project to manage the implemented TPZs, supervise excavation works within a measured Tree Protection Zone of retained trees, monitor retained tree health with intermittent site visits over the course of the development, and certify Tree Protection Measures.
- A fenced exclusion zone is to be implemented that extends around Tree 1 in order to protect the trunk and lower crown from potential impact from materials and equipment during construction, while not impeding construction activities (as indicated on the **TREE LOCATION & IMPACT PLAN**, page 26).
- A second fenced exclusion zone is to be implemented that extends along the northern boundary in front of Tree No.'s 7, 8, 9, 10 & 15 that delineates and excludes these trees from

incidental impact during site access and construction activities, while not impeding clear access to the site for construction activities (as indicated on the **TREE LOCATION & IMPACT PLAN**, page 26).

- Both these exclusion zones must be installed as per **10.2- TREE PROTECTION FENCING**, page 27 of this report.
- Tree No.'s 2, 11, 17, 19, 22 & 24 must have protective battening installed on the lower trunk and sections of first-order branches (as per **10.3 – OTHER TREE PROTECTION MEASURES**, page 28) that shall consist of internal cushioning and battens strapped together consistent with the Australian Standard for the Protection of Trees on Development Sites (AS 4970 - 2009), Section 4 and paragraph 4.5.2 and Figure 4. The battens shall consist of lengths of 35 x 70mm (or similar to accommodate tree structure) structural timber secured side by side that extend from ground level, up to a height of 2.5m, spaced 50-100mm apart with galvanised steel banding for the full circumference of the trunk or branch and fixed by straps without driving nails or screws into the trunk or branches. This should be installed prior to site establishment and removed after completion of the development.

Schedule of Tree Management Processes

Stage	Task	Responsible Parties	Process Timing
1	Engagement of Project Arborist to oversee tree health and management	Principal Contractor	Prior to site establishment
2	Specify and undertake pruning of Trees 12 & 16 and remove of Trees 3, 4, 18, 21 & 23	Principal Contractor Project Arborist	Prior to site establishment
3	Install Tree Protection battens on Trees 2, 11, 17, 19, 22 & 24, and implement fenced exclusion zones for Trees 1, 7, 8, 9, 10 & 15	Principal Contractor	Prior to site establishment.
4	Certification of Pruning and Tree Protection Measures	Project Arborist	Prior to site establishment.
5	Supervise all excavation works proposed within the TPZ and complete intermittent visits to assess retained tree health.	Principal Contractor Project Arborist	As required prior to the works proceeding adjacent to tree
6	Final Inspection and certification of retained tree health	Project Arborist	Following the removal of tree protection measures from Stage 3

3. PURPOSE

3.1 - PROPOSAL

This report has been commissioned by Xiaochang Zhang, c/- Corona Projects Pty Ltd to provide a qualified assessment of multiple tree specimens on and adjacent to a proposed development site located at 131a Seaforth Crescent, Seaforth; a residential property located in the Northern Beaches Council LGA and subject to Local Government Tree Management policies.

The objective of this report is to complete a Visual Tree Assessment (Mattheck and Breloer 1994 standard)[c] and take data to assess and provide advice on the impacts posed to vegetation protected by Local Government policies and provide recommendations to assist and guide management of tree species with the view of retaining and protecting suitable specimens.

Determinations and conclusions are drawn in this report by identifying key factors such as:

- Significant tree specimens
- Trees protected under the Manly Development Control Plan 2013[h] and the Manly Local Environmental Plan 2013[i]
- Trees protected under the NSW Biodiversity Conservation Act 2016 and the State Environmental Planning Policy (Vegetation in Non-Rural Areas) 2017.
- Trees suitable/unsuitable for retention
- The impacts by proposed structures to currently existing tree specimens

The data collected can be read in summarized table form in **TREE DATA COLLECTION FORM** (pages 12 & 13).

3.2 - LOCAL GOVERNMENT TREE PROTECTION

The site is located within the Northern Beaches Council LGA and is thus governed by their relevant adopted Development Control Plans and Local Environment Plans from former Councils and their current Tree Management Policies. The Manly Development Control Plan(c) requires a Vegetation Clearing Permit for:

a. Removal or cutting down of any tree over five (5) metres in height;
b. Pruning of more than ten percent (10%) of a tree canopy.
c. The removal or cutting down of vegetation in "Bushland".

The policy applies to all trees included in this report.

4. METHOD

4.1 – METHODOLOGY

A visual assessment of the trees (VTA[8] - Mattheck and Breloer 1994 standard)[(c)] was performed on both the 6th and 26th November, 2024. VTA[8] is an industry recognised and standard assessment of an individual tree from ground level to identify tree health and structural symptoms. VTA[8] is limited to view at ground level, and does not observe symptoms below ground level, or up in the canopy not viewable from ground.

In order to view tree conditions below ground level, excavation around the root base would be required. For viewing areas of the canopy not viewable from ground, an aerial inspection would be required. Neither of these methods were completed at the time of assessment.

4.2 - INSPECTION DATA

- Genus and species
- Height (Estimation),
- Canopy Spread (Estimation)
- DBH (Diameter at Breast Height) and DRB (Diameter at Root Base) with Diameter Tape
- Age
  (**J**uvenile, **S**emi-**M**ature, **M**ature, **L**ate-**M**aturity, **S**enescent)
- Vigor
  (**G**ood, **AV**erage, **F**air, **P**oor, **D**ead, **DO**rmant)
- Growth Habit
  (**U**pright, **S**preading, **L**eaning, **O**ver-**E**xtended, **D**ominant, **C**o-**D**ominant leaders, **M**ulti-**S**temmed)
- Crown[1] Form
  (**S**ymmetrical, **AS**ymmetrical, **DE**nse, **SP**arse)
- IACA STARS© Significance value
  (**H**igh, **M**edium, **L**ow)
- Defects
- General Comments

Data collected is then subject to the SULE (© Jeremey Barrell 2001)[(d)] methodology of assessment, which influences any conclusions drawn and recommendations made.

4.3 - TREE DATA DEFINITIONS

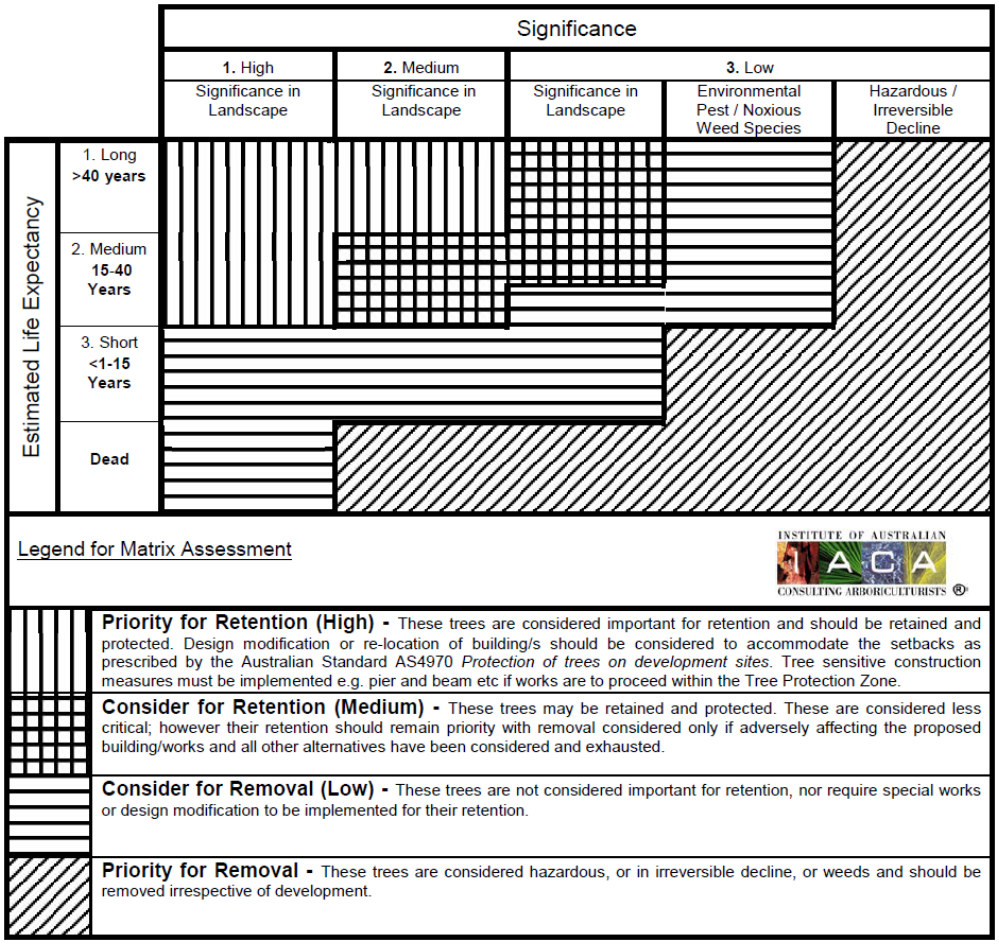
- **Age:** The definitions for tree age refer to the stage of life and maturity the tree is currently in that is relevant to tree species. Juvenile (J) is where the tree is in a small or sapling form and

has not yet reached a stage where it is producing fruit. This category can often refer to a tree specimen that is under Local Government minimum requirements for classification of a tree but is not necessarily defined by this parameter. A juvenile specimen can grow at an accelerated rate in comparison to the other categories depending on competing species. Semi-Mature (**SM**) is an age of the tree where it may have reached fruiting ability, however the size and habit does not reflect what would be classified as a fully mature example of its species. This category is governed by tree species and their growth habits. Mature (**M**) is the category where the tree has reached fruiting ability and the size and habit reflect what is expected from a fully mature specimen. A mature tree will continue to have steady annual growth. Late Maturity (**LM**) is a mature tree that has considerably slowed its growth rate and has neared its useful life expectancy. Senescent (**S**) is a stage where the tree is still alive, but no longer capable of putting on new growth. This is the final live stage of a tree.

- **Vigor:** The definitions for vigor correlate with how well the tree is performing in its environment and inclusive of canopy growth, branch growth and habit, and expression of general shape from the species in question. Good (**G**) is signs of new growth both in leaf/canopy and branches. 'Flushing'[4] is a general good indicator. Average (**AV**) is little to no signs of 'Flushing'[4], however growth is stabilizing and there is no significant loss of canopy growth, nor is there excessive presence of deadwood. Fair (**F**) has an increased presence of deadwood, or moderate signs of decline and dieback to branch extremities. The tree's significance value is usually decreased when in this state, however it is generally reversible with appropriate management. Poor (**P**) is when the tree shows heavier signs of decline, usually with excessive amounts of deadwood or epicormic[3] growth, along with less canopy leaf presence and little to no progress in branch and trunk growth. Dead (**D**) means no signs of growth, and the tree is irreversible of its condition. Dormant (**DO**) describes the canopy as being non-existent, i.e. no leaves, however this is not necessarily a sign of death or poor vigor as the tree may be deciduous and in its dormancy stage.
- **Growth Habit:** The definitions for growth habit apply to condition and habit of the tree and the form features that impact its shape and other factors. Upright (**U**) means the tree is generally growing straight up and reaching skyward with little deviation of direction from the point of the root base. Leaning (**L**) means the tree has deviated from the point of the root base and is favoring a direction that is leaning away. Over-extended (**OE**) means the tree has an excessive lean that could over-balance the tree, and extreme weather conditions may pose a threat of uprooting the tree. Co-Dominant (**CD**) means the main leader of the tree has split into two or more main leaders that have started growing their own primary and secondary laterals. Multi-Stemmed (**MS**) means the tree has begun growth of multiple leaders from the root base that have started their own scaffold of primary and secondary branches.
- **Crown Form:** The definitions for crown form describe the shape and habit of the canopy, or crown, and touch upon the vigor or leaf growth habit of the crown also. Symmetrical (**S**) describes the canopy as being generally even and balanced in all directions, without favoring a direction. Asymmetrical (**AS**) could refer to a lean or unbalanced canopy, generally seen in species inhibited by other species or unevenly pruned. Dense (**DE**)

describes the canopy as generally full for its species, with decent or 'Flushing'[4] growth. Sparse (**SP**) describes the canopy as having less decent growth, or open gaps in the canopy.

- **Significance Value:** The definitions for significance value are determined using the IACA Significance of a Tree, Assessment Rating System (STARS)©[(e)]. This rating system assists with tree management in the planning processes for a proposed development that impacts trees protected under Local Government Tree Management Policies. The system defines three categories of significance as **H**igh, **M**edium and **L**ow within the landscape. Once assessment criteria define the significance of the tree in the landscape, a retention value can then be determined utilising the below Priority Matrix:



Other variations on values defined and attributed to the significance value of a tree is at the discretion of the author utilizing experience and professional opinion. All such results are discussed in a report's recommendations.

5. SITE OBSERVATIONS

5.1 - SITE DESCRIPTION

The trees are located on a battle-axe residential block with a steep westerly aspect that includes a narrow right-of-passage easement commencing from Seaforth Cresent that descends to a cliff edge drop-off. The lower ground level at the foot of the cliff is currently only accessed via three flights of timber stairs supported on a steel post frame. This leads to a secondary steep gradient where the block expands and houses a vacated and unmaintained two-storey timber residence with associated stone paths and footways, and tiered unmaintained gardens with stone retaining walls supporting the steep slope of the block. A secondary isolated shed structure is located on the lower gradient of the block. The majority of the block is naturally vegetated, and the approximate location of each assessed tree specimen can be identified on the **TREE LOCATION & IMPACT PLAN** (page 26).

The proposed development that bears any impact to trees on site includes the restoration of the existing dwelling with the reconstruction of the roof slightly expanding the overall footprint to the north-west; and a new inclinator with associated landings, steps and support pillars that stretches from the top access of the property on Seaforth Crescent, down to bottom of the block, approximately 10-12m short of the water's edge. This will involve construction activities including partial demolition of existing structures and regrading site levels by post and pillar excavation, cut/fill processes, and trenching. No hydraulic or underground services plans have been submitted prior to report completion.

5.2 - VEGETATION COMMUNITY

The mapped vegetation communities found surrounding this site are plant communities associated with the vegetation class known as Sydney Coastal Dry Sclerophyll Forests, which are open sclerophyll forest and woodland with prominent and diverse sclerophyll shrub understorey and open groundcover of sclerophyll sedges.

The dominant tree species across the topography of this ecological community includes *Angophora costata* (Sydney red gum) and *Corymbia gummifera* (Red Bloodwood), with locally prevalent specimens including *Eucalyptus botryoides* (Bangalay). In gullies *Eucalyptus piperita* (Sydney Peppermint) is frequent, while ridges house canopy species consisting of *Eucalyptus capitellata* (Brown Stringybark), *Eucalyptus haemastoma* (Broad-leaved Scribbly Gum), Eucalyptus oblonga, Eucalyptus racemosa (Narrow-leaved Scribbly Gum) and Eucalyptus sieberi (Silvertop Ash). Banksia serrata (Old Man Banksia) and *Ficus rubiginosa* (Port Jackson Fig) make up a mid-stratum canopy layer. *Ceratopetalum gummiferum* (NSW Christmas Bush), *Pittosporum undulatum* (Native Daphne), *Glochidion ferdinandi* (Cheese Tree) and *Elaeocarpus reticulatus* (Blueberry Ash) are the most regular combination of hardy mesic small trees found in these communities.

The majority of tree specimens addressed in this report are either representative species of these communities, or commonly occurring species found within other associated communities within the Northern Beaches Council LGA. Only Tree No.'s 3 & 4 are exotic species to Australian vegetation.

5.3 - REFERENCE MATERIAL

- Plan Showing Details& Level Survey Over Lot 2 in DP 562588 by **Altitude Surveys**; 22.05.24
- Design Of Proposed Inclinator Within Lot 2 in DP 562588 by **P.R. King & Sons Pty Ltd** 16.06.17
- Proposed Floor Plans & Elevations by **Corona Projects Pty Ltd**; June 2024
- NSW Government; **Trees Near Me NSW**; ©2024[g]

ADDRESS: 131a Seaforth Crescent, Seaforth INSPECTION: 6 & 26/11/24

NO#	Genus	Species	Common Name	Age	Vigor	Growth Habit	Crown Form	Height (m)	Canopy Spread (m)	DBH 1 (mm)	DBH 2 (mm)	DBH 3 (mm)	DBH 4 (mm)	Avg DBH (mm)	DRB (mm)	SRZ (mm)	TPZ (mm)	STARS© Rating	Defects & Attributes	General Comments	Encroachment
1	*Pittosporum*	*undulatum*	Native Daphne	M	G	CD, U	As	6	3.5	220				220	270	1910	2640	L		Located on Council verge in front of property. Tree not on survey	Located 600mm from proposed inclinator rail installation and 670mm from proposed landing posing a 12% discontinuous cut encroachment within the TPZ
2	*Eucalyptus*	*racemosa*	Narrow-leaved Scribbly Gum	M	G	CD, skew	As	12	14	590				590	720	2883	7080	M-H	Codominant from 1.7m with decayed stub in fork. N stem overhanging property and skewing back to S @6m. S stem skewing to W.	Tree not on survey	Located 900mm from proposed inclinator rail installation and directly beside proposed landing and stirs rdirection posing an approximate 40% discontinuous cut encroachment within the TPZ and SRZ
3	*Melia*	*azederach*	White Cedar	M	Av	U	As, Su	8	3.5	160				160	190	1647	1920	L	Overhanging neighbouring structure.	Tree not on survey	Located within contact of proposed inclinator mobile platform
4	*Jacaranda*	*mimosifolia*	Jacaranda	M	F-Av	MS, L	As, Skew	8.5	9	240	240			340	470	2410	4080	L-M	Codominant stems leaning and skewing to N-NW. Only moderate presence of flower. E side of crown with moderate dieback.		Located within footprint of proposed inclinator rail.
5	*Pittosporum*	*undulatum*	Native Daphne	M	Av	CD, U	As, Su	7.5	3	180	110			211	300	1996	2532	L	Upright growth habit, suppressed upper crown from T4 overhanging canopy.	Located in neighbouring property to N.	No measurable encroachment
6	*Melaleuca*	*hypericifolia*	Hillock Bush	M	G	MS, Shrub	As	3	5	60	70	60	50	121	140	1449	1452	L	Spreading shrub	Located in neighbouring property to N.	No measurable encroachment
7	*Glochidion*	*ferdinandi*	Cheese Tree	M	G	U, Skew	As	11	6	300				300	370	2180	3600	M	Upright forest specimen directly below cliff edge.	Located in neighbouring property to N. Tree not on survey.	Negligible encroachment from inclinator rail installation.
8	*Pittosporum*	*undulatum*	Native Daphne	M	Av	L, Photo	As, Emergent	9	7.5 (NW)	250	140	160		329	430	2322	3948	M	Basal sweep to W then leaning phototropic growth habit.	Located in neighbouring property to N.	Negligible encroachment from inclinator rail installation.
9	*Glochidion*	*ferdinandi*	Cheese Tree	M	G	CD, U	As	12	7	420				420	510	2494	5040	M	Most dominant crown in surrounds	Located in neighbouring property to N. Tree not on survey.	Located 1.9m from proposed inclinator rail installation posing a 21% discontinuous cut encroachment within the TPZ
10	*Ficus*	*rubiginosa*	Port Jackson Fig	M	G	MS, Sp	As	10	17	550				550	860	3106	6600	M	Spreading and dividing root buttress across rocky outcrop above neighbouring property. Suppression of crown to E from T9.	Located in neighbouring property to N. Tree not on survey.	Located 2.8m from proposed inclinator rail installation posing a 20% discontinuous cut encroachment within the TPZ
11	*Cyathea*	*cooperi*	Lacy Tree Fern	M	G	Pole	S	7.5	3.5	170				170	N/A	N/A	2750	M	Slight skew to W		No measurable encroachment
12	*Glochidion*	*ferdinandi*	Cheese Tree	M	G	MS, L	As, Sp	8.5	8	260	210	200		390	630	2726	4680	M	L to W		Located 2.2m from proposed roof restoration posing a 5% encroachment within the tree's crown
13	*Glochidion*	*ferdinandi*	Cheese Tree	SM	G	CD, L	As, Sweep	4	5	130	100			165	170	1572	1980	L	Basal sweep and lean to W over rooftop.		No measurable encroachment
14	*Pittosporum / Glochidion*	*undulatum / ferdinandi*	Native Daphne / Cheese Tree	M	Av-G	MS, L	As	6.5	6	340				340	450	2366	4080	M	Intertwined specimens sharing root base. L to N.	DBH and DRB taken from Cheese Tree	No measurable encroachment
15	*Glochidion*	*ferdinandi*	Cheese Tree	M	G	L	As, Photo	5	5	200				200	270	1910	2400	L	Phototropic lean to W, suppressed by T10.		Located 1.6m from proposed inclinator rail installation posing a 9% discontinuous cut encroachment within the TPZ
16	*Glochidion*	*ferdinandi*	Cheese Tree	M	G	U	As	7.5	5	230				230	310	2024	2760	L-M	Lower laterals coming into contact with awning roof.		Located 2.8m from proposed roof restoration posing a 10% encroachment within the tree's crown

17	*Pittosporum*	*undulatum*	Native Daphne	M	Av	U	As	7	5.5	190	190	250	1849	2280	L	Lower laterals coming into contact with premises roof.		No measurable encroachment
18	*Cyathea*	*cooperi*	Lacy Tree Fern	M	G	Pole	S	6	3.5	180	180	N/A	N/A	2750	M	Fronds coming my into contact with premises roof		Located within footprint of proposed roof extension.
19	*Glochidion*	*ferdinandi*	Cheese Tree	M	G	L	As, Sp	7.5	8	360	360	460	2388	4320	M	Lean to W.	Located in neighbouring property to N.	Located 1.7m from proposed inclinator rail installation posing a 23% discontinuous cut encroachment within the TPZ
20	*Ceratopetalum*	*gummiferum*	NSW Christmas Bush	M	G	U	S	6	3	190	190	210	1718	2280	L-M			No measurable encroachment
21	*Glochidion*	*ferdinandi*	Cheese Tree	M	F-Av	U	As, Sp	7	3.5	250	250	360	2155	3000	L			Located 340mm from proposed inclinator rail installation and directly adjacent to minimum inclinator platform travel clearance posing a 39% discontinuous cut encroachment within the TPZ and a potential impact from moving platform
22	*Banksia*	*integrifolia*	Coastal Banksia	M	Av	L	As	7.5	4	260	260	350	2129	3120	M			Located 2.2m from proposed inclinator rail installation posing an 8% discontinuous cut encroachment within the TPZ
23	*Casuarina*	*glauca*	Swamp She-Oak	M	G	L, Correct	As	17	5	370	370	520	2515	4440	M	Slight lean to W from base, correcting @ 5m.		Located 410mm from proposed inclinator rail installation and directly adjacent to minimum inclinator platform travel clearance posing a 41% discontinuous cut encroachment within the TPZ and a potential impact from moving platform
24	*Eucalyptus*	*botryoides*	Bangalay	M	Av	U, B	S	19	13	560	560	770	2965	6720	H	Located on rocky outcrop.		Located 4m from proposed inclinator rail installation posing a 12% discontinuous cut encroachment within the TPZ
25	*Pittosporum*	*undulatum*	Native Daphne	M	G	U, Lopped	S	5	4	280	280	300	1996	3360	L	Located near waters edge. Tree previously lopped to 3m.		No measurable encroachment

7. DISCUSSION

Assumptions have been made for the purpose of this report in regard to the construction of the proposed inclinator such as:

- The rail will be installed with the use of multiple cranes.
- The rail will be attached to the ground with infrequent intermittent pillars installed with a pier footing no wider than 400mm.
- All landings and stairs associated with inclinator access will be suspended platforms installed with the use of piers or posts.
- The minimum area of clearance needed for inclinator platform mobility is a travel width of 800mm or more.

The extent of impacts to trees on development sites can be broadly rated using the following scale of impact to the tree's health and structure (as utilised by Guy Paroissien – Landscape Matrix Pty Ltd):

0% of encroachment into the Tree Protection Zone –	No Impact
0 to 10% of encroachment into the Tree Protection Zone –	Low Impact
10 to 15% of encroachment into the Tree Protection Zone –	Low to Moderate Impact
15 to 20% of encroachment into the Tree Protection Zone –	Moderate Impact
20 to 25% of encroachment into the Tree Protection Zone –	Moderate to High impact
25 to 35% of encroachment into the Tree Protection Zone –	High Impact
>35% of encroachment into the Tree Protection Zone –	Significant Impact

The area percentage of encroachment applies to a continuous line of cut or fill across the measured Tree Protection Zone (TPZ). In the instance that a structure poses a discontinuous line of excavation to the TPZ (such as pier or post holes), the quoted percentage is only indicative of the overall potential area affected, and the estimated actual impact is generally significantly less than the percentage quoted.

7.1 – Trees with No Measurable Impact (0%)

- Tree No.'s 5 & 6 are a Native Daphne (*Pittosporum undulatum*) and a Hillock Bush (*Melaleuca hypericifolia*) located in a neighbouring property to the north (No. 133) beside the upper section of the property along the right-of-passage easement, and outside the development area. There is no measurable impact on these trees from construction. These trees are considered as having a Low STARS© Significance rating, however they must be retained as neighbouring tree assets.

  While no impact is posed to these trees, care should be taken when accessing the site with construction materials. No specifically installed protection measures are necessary, but access to

the site should avoid excessive compaction of soft soil areas within their measured TPZ to prevent any impact to root matter extending into the property.

- Tree 11 is a Lacy Tree Fern (*Cyathea cooperi*) located in a neighbouring property on the south side of the right-of-passage easement (No. 131) below the cliff edge, and outside the development area. There is no measurable impact on this tree from construction. This tree is considered as having a Medium STARS© Significance rating, and must be retained and protected as a neighbouring tree asset.

  While there is no measurable impact to the this tree from the development footprint, care should be taken when accessing the site in and around this tree .The tree should have protective battening installed on the lower trunk and sections of first-order branches (as per **10.3 – OTHER TREE PROTECTION MEASURES**, page 28) that shall consist of internal cushioning and battens strapped together consistent with the Australian Standard for the Protection of Trees on Development Sites (AS 4970 - 2009), Section 4 and paragraph 4.5.2 and Figure 4. The battens shall consist of lengths of 35 x 70mm (or similar to accommodate tree structure) structural timber secured side by side that extend from ground level, up to a height of 2.5m, spaced 50-100mm apart with galvanised steel banding for the full circumference of the trunk or branch and fixed by straps without driving nails or screws into the trunk or branches. This should be installed prior to site establishment and removed after completion of the development.

- Tree No.'s 13 & 14 are a Cheese Tree (*Glochidion ferdinandi*) and a second Cheese Tree intertwined and sharing a buttress area with a Native Daphne (*Pittosporum undulatum*). These trees are located on the upper gradient above the existing residence to the south-east, and outside the development area. There is no measurable impact on these trees from construction. These trees are considered as having a Low & Medium STARS© Significance rating and are suitable for retention.

  While no impact is posed to these trees, care should be taken when accessing the site. No specifically installed protection measures are necessary, but access to the site should avoid excessive compaction of soft soil areas within their measured TPZs to prevent any impact to root matter in this zone.

- Tree 17 is a Native Daphne (*Pittosporum undulatum*) located in a retained garden bed beside the south corner of the existing residence, and due to the raised gradient, is outside the development area. There is no measurable impact on the tree from construction. This tree is considered as having a Low STARS© Significance rating and should not be viewed as a constraint on development.

  While there is no measurable impact to the this tree from the development footprint, if it is intended for retention then care should be taken when accessing the site in and around this tree .The tree should have protective battening installed on the lower trunk and sections of first-order branches (as per **10.3 – OTHER TREE PROTECTION MEASURES**, page 28) to the same

dimensions and standards as Tree 11. This should be installed prior to site establishment and removed after completion of the development.

- Tree 20 is a New South Wales Christmas Bush (*Ceratopetalum gummiferum*) located on the sloping land behind the residence, and outside the development area. There is no measurable impact on the tree from construction. This tree is considered as having a Low-Medium STARS© Significance rating and should not be viewed as a constraint on development.

  While no impact is posed to this tree, care should be taken when accessing the site. No specifically installed protection measures are necessary, but access to the site should avoid excessive compaction of soft soil areas within the measured TPZ to prevent any impact to root matter within this zone.

- Tree 25 is a Native Daphne (*Pittosporum undulatum*) located near the water's edge, and outside the development area. There is no measurable impact on the tree from construction. This tree is considered as having a Low STARS© Significance rating and should not be viewed as a constraint on development.

  While no impact is posed to this tree, care should be taken when accessing the site from the waterside. No specifically installed protection measures are necessary, but access to the site should avoid excessive compaction of soft soil areas within the measured TPZ to prevent any impact to root matter within this zone.

7.2 – Trees with a Low Impact (<10%)

- Tree 1 is a Native Daphne (*Pittosporum undulatum*) located at the property frontage on the Council verge and is 600mm from the proposed inclinator rail, and 670mm from a proposed landing for access to the inclinator providing a 12% area of discontinuous cut encroachment within the Tree Protection Zone. This tree is considered as having a Low STARS© Significance rating but must be retained and protected as a Council street tree asset.

  The excavation required for installation of the inclinator and the associated landing poses an impact to the tree's root system that would be deemed as sustainable, pending confirmation of a post or pier construction. If post hole excavation is undertaken under the supervision of a Project Arborist with a minimum AQF5 level qualification, then they should advise whether any roots greater than 30mm diameter identified must be retained, or they should be clean cut with a pruning saw or chainsaw under their direction. The tree is displaying good signs of vigor and recovery from the impact is highly likely.

  A small, fenced exclusion zone should be implemented around the tree in order to protect the trunk from incidental impact during construction, while not impeding access for construction activities (as indicated in the **TREE LOCATION & IMPACT PLAN**, page 26).

- Tree No.'s 7 & 8 are a Cheese Tree (*Glochidion ferdinandi*) and a Native Daphne (*Pittosporum undulatum*) located at in the neighbouring property to the north (No. 133a) at the foot of the cliff, and are both 3.2m from the proposed inclinator rail providing a negligible area of discontinuous cut encroachment within the Tree Protection Zone. These trees are considered as having a Medium STARS© Significance rating and must be retained and protected as neighbouring tree assets.

  The excavation required for installation of the inclinator poses a negligible impact to these trees' root system, pending confirmation of a post or pier construction. However, care should be taken during the construction phase of the development. A fenced exclusion zone should be implemented that delineates and excludes these trees from incidental impact during site access and construction activities (as indicated in the **TREE LOCATION & IMPACT PLAN**, page 26).

- Tree 12 is a Cheese Tree (*Glochidion ferdinandi*) located on the upper gradient above the existing residence to the east and is 2.2m from the proposed roof restoration on the eastern side of the residence, posing the need for pruning of lower laterals up to 5% of the live crown ratio to provide clearance for construction activities. This tree is considered as having a Medium STARS© Significance rating and is suitable for protection and retention.

  The reconstruction of the roof over the existing residence will pose some encroachment into the western side of the canopy of this tree; however, it is unclear from the plans as to what height of pruning is required to provide adequate clearance. Any clearance requirements must be identified during site establishment and brought to the attention of a Project Arborist with a minimum AQF5 level qualification. A pruning specification should be completed by the Project Arborist and submitted to Council prior to commencing any pruning of a retained tree. Pruning works should be completed by an experienced Arborist with a minimum AQF III qualification in Arboriculture who holds Public Liability and Workers Compensation insurance.

  While no impact is posed to the measured TPZ of this tree, care should be taken when accessing the site. No specifically installed protection measures are necessary, but access to the site should avoid excessive compaction of soft soil areas within the TPZ to prevent any impact to root matter in this zone.

- Tree 15 is a Cheese Tree (*Glochidion ferdinandi*) located at in the neighbouring property to the north (No. 133a) and is 1.6m from the proposed inclinator rail providing a 9% area of discontinuous cut encroachment within the Tree Protection Zone. This tree is considered as having a Low STARS© Significance rating but must be retained and protected as a neighbouring tree asset.

  The excavation required for installation of the inclinator poses an impact to the tree's root system that would be deemed as sustainable, pending confirmation of a post or pier construction. If post hole excavation is undertaken under the supervision of a Project Arborist with a minimum AQF5 level qualification, then they should advise whether any roots greater than 30mm diameter identified must be retained, or they should be clean cut with a pruning

saw or chainsaw under their direction. The tree is displaying good signs of vigor and recovery from the impact is highly likely.

The fenced exclusion zone recommended for Tree No.'s 7 & 8 should be extended to delineate and exclude this tree from incidental impact during site access and construction activities (as indicated in the **TREE LOCATION & IMPACT PLAN**, page 26).

- Tree 16 is a Cheese Tree (*Glochidion ferdinandi*) located on the upper gradient above the existing residence to the south-east and is 2.8m from the proposed roof restoration on the eastern side of the residence, with lower laterals coming into contact with the existing roof posing the need for pruning of lower laterals up to 10% of the live crown ratio to provide clearance for construction activities. This tree is considered as having a Low-Medium STARS© Significance rating and is suitable for protection and retention.

  The reconstruction of the roof over the existing residence will pose some encroachment into the north-western side of the canopy of this tree; however, it is unclear from the plans as to what height of pruning is required to provide adequate clearance. Any clearance requirements must be identified during site establishment and brought to the attention of a Project Arborist with a minimum AQF5 level qualification. A pruning specification should be completed by the Project Arborist and submitted to Council prior to commencing any pruning of a retained tree. Pruning works should be completed by an experienced Arborist with a minimum AQF III qualification in Arboriculture who holds Public Liability and Workers Compensation insurance.

  While no impact is posed to the measured TPZ of this tree, care should be taken when accessing the site. No specifically installed protection measures are necessary, but access to the site should avoid excessive compaction of soft soil areas within the TPZ to prevent any impact to root matter in this zone.

- Tree 22 is a Coastal Banksia (*Banksia integrifolia*) located on the sloping land behind the residence and is 2.2m from the proposed inclinator rail providing an 8% area of discontinuous cut encroachment within the Tree Protection Zone. This tree is considered as having a Medium STARS© Significance rating and is suitable for retention and protection.

  The excavation required for installation of the inclinator poses an impact to the tree's root system that would be deemed as sustainable, pending confirmation of a post or pier construction. If post hole excavation is undertaken under the supervision of a Project Arborist with a minimum AQF5 level qualification, then they should advise whether any roots greater than 30mm diameter identified must be retained, or they should be clean cut with a pruning saw or chainsaw under their direction. The tree is displaying good signs of vigor and recovery from the impact is highly likely.

  An efficient fenced exclusion zone for this tree would be difficult to install on the steep gradient of the slope where it is located. As an alternative measure, the tree should have protective battening installed on the lower trunk and sections of first-order branches (as per **10.3 – OTHER TREE PROTECTION MEASURES,** page 28) to the same dimensions and standards as

Tree No.'s 11 & 17. This should be installed prior to site establishment and removed after completion of the development.

- Tree 24 is a Bangalay (*Eucalyptus botryoides*) located further down the sloping land behind the residence and is 4m from the proposed inclinator rail providing a 12% area of discontinuous cut encroachment within the Tree Protection Zone. This tree is considered as having a High STARS© Significance rating and must be retained and protected.

  The excavation required for installation of the inclinator poses an impact to the tree's root system that would be deemed as sustainable, pending confirmation of a post or pier construction. If post hole excavation is undertaken under the supervision of a Project Arborist with a minimum AQF5 level qualification, then they should advise whether any roots greater than 30mm diameter identified must be retained, or they should be clean cut with a pruning saw or chainsaw under their direction. The tree is displaying good signs of vigor and recovery from the impact is highly likely.

  While this tree is at a much greater offset from the rail than Tree 22, access on the slope is limited and potential impact may still occur to the trunk of the tree during site access and traversal of equipment or materials. Therefore, the tree should have protective battening installed on the lower trunk and sections of first-order branches (as per **10.3 – OTHER TREE PROTECTION MEASURES,** page 28) to the same dimensions and standards as Tree No.'s 11, 17 & 22. This should be installed prior to site establishment and removed after completion of the development.

7.3 - Moderately Impacted Trees (>10%; <20%)

- Tree No.'s 9 & 10 are a Cheese Tree (*Glochidion ferdinandi*) and a Port Jackson Fig (*Ficus rubiginosa*) located at in the neighbouring property to the north (No. 133a) at the foot of the cliff and are 1.9m and 2.8m respectively from the proposed inclinator rail, providing a 20-21% discontinuous cut encroachment within the Tree Protection Zone. These trees are considered as having a Medium STARS© Significance rating and must be retained and protected as neighbouring tree assets.

  The excavation required for installation of the inclinator poses a moderate impact to each tree's root zone from a discontinuous cut encroachment. However, this may be deemed as sustainable if exploratory excavation to a depth of the first 600mm of proposed post/pier locations within the measured TPZ is completed under the supervision of a Project Arborist with a minimum AQF5 level qualification. If roots greater than 30mm diameter are identified, the Project Arborist at their discretion should advise whether the root must be retained and the post/pier relocated, or they should be clean cut with a pruning saw or chainsaw under their direction.

The fenced exclusion zone recommended for Tree No.'s 7, 8 & 15 will also extend in front of these trees to delineate and exclude them from incidental impact during site access and construction activities (as indicated in the **TREE LOCATION & IMPACT PLAN**, page 26).

- Tree 19 is a Cheese Tree (*Glochidion ferdinandi*) located in the neighbouring property to the north (No. 133a) nearby their residence and is 1.7m from the proposed inclinator rail providing a 23% area of discontinuous cut encroachment within the Tree Protection Zone. This tree is considered as having a Medium STARS© Significance rating and must be retained and protected as a neighbouring tree asset.

  The excavation required for installation of the inclinator poses a moderate impact to the tree's root zone from a discontinuous cut encroachment. However, this may be deemed as sustainable if exploratory excavation to a depth of the first 600mm of proposed post/pier locations within the measured TPZ is completed under the supervision of a Project Arborist with a minimum AQF5 level qualification. If roots greater than 30mm diameter are identified, the Project Arborist at their discretion should advise whether the root must be retained and the post/pier relocated, or they should be clean cut with a pruning saw or chainsaw under their direction.

  The tree should have protective battening installed on the lower trunk and sections of first-order branches (as per **10.3 – OTHER TREE PROTECTION MEASURES,** page 28) to the same dimensions and standards as Tree No.'s 11, 17, 22 & 24. This should be installed prior to site establishment and removed after completion of the development.

7.4 - Highly Impacted Trees (>20%; <35%)

- Tree 2 is a Narrow-leaved Scribbly Gum (*Eucalyptus racemosa*) located at the property frontage where the right-of passage easement meets with Seaforth Crescent, and is 0.9m from the proposed inclinator rail, and directly beside a proposed landing and redirected set of stairs that wraps around the trunk of the tree, providing an approximate area of 40% (translating to an actual impact of less than 35%) discontinuous cut encroachment within the Tree Protection Zone that also requires excavation within the Structural Root Zone (SRZ) of the tree. This tree is considered as having a Medium-High STARS© Significance rating and should be retained and protected.

  While the proposed new stairs sit directly next to the tree's trunk within the SRZ, the design has been implemented in order to retain the tree as a design feature. In order to retain this tree, the new stairs must be installed as a suspended or post frame type construction so as to minimise the required excavation for support of the structure. The landing, stairs and associated frame should provide a minimum 100mm clearance to allow for secondary thickening of the trunk. The design should also take into consideration the ease of expansion of clearance zone over time as the tree continues to mature.

Tree sensitive construction measures must be implemented if works are to proceed within the TPZ and SRZ (as prescribed by the Australian Standard AS4970-2009 Protection of trees on development sites[b]). Specifically, excavation for these post holes should be completed using appropriate hand-controlled tools under the supervision of a Project Arborist with a minimum AQF5 level qualification. If woody structural roots are identified during excavation that require severance, the relocation of the pier/s or footings should be considered unless advised otherwise by the Project Arborist.

The tree must have protective battening installed on the lower trunk and sections of first-order branches (as per **10.3 – OTHER TREE PROTECTION MEASURES,** page 28) to the same dimensions and standards as Tree No.'s 11, 17, 19, 22 & 24. This should be installed prior to site establishment and removed after completion of the development.

7.5 - Trees within the development footprint

- Tree 3 is a White Cedar (Melia azedarach) located near the property frontage where the right-of-passage easement meets with Seaforth Crescent and is within the path of travel for the mobile inclinator platform. This tree is considered as having a Low STARS© Significance rating and should not be viewed as a constraint on the development.

  Relocation of the inclinator rail and associated platform path is limited to the narrow corridor the tree is located in, and the tree would continue to pose an impediment to travel clearance. This tree cannot be retained if the development is approved in its current form.

- Tree 4 is a Jacaranda (*Jacaranda mimosifolia*) located along the right-of-passage easement and is within the footprint of the proposed inclinator rail. This tree is considered as having a Low-Medium STARS© Significance rating and should not be viewed as a constraint on the development.

  As discussed with Tree 3, relocation of the inclinator rail and associated platform path is limited to the narrow corridor the tree is located in. This tree cannot be retained if the development is approved in its current form.

- Tree 18 is a Lacy Tree Fern (*Cyathea cooperi*) located near the northern corner of the existing residence and is within the proposed footprint for a roof and deck extension to the premises. This tree is considered as having a Medium STARS© Significance rating and would be suitable for retention in its current environment.

  Extensive redesign would be required in order to accommodate this tree, and construction materials including scaffolding would still pose a significant level of impact to the root system from compaction. The tree cannot be retained if the development is approved in its current form.

- Tree 21 is a Cheese Tree (*Glochidion ferdinandi*) located on the sloping land behind the residence near the dividing boundary between No. 131a and 133a and is within the path of travel for the mobile inclinator platform. This tree is considered as having a Low STARS© Significance rating and should not be viewed as a constraint on the development.

  Extensive redesign would be required in order to relocate the inclinator rail and associated platform path, which may need to be defined in a straight line for stable travel of the machine. This tree cannot be retained if the development is approved in its current form.

- Tree 23 is a Swamp She-Oak (*Casuarina glauca*) located on the sloping land behind the residence and is in close proximity to the path of travel for the mobile inclinator platform. This tree is considered as having a Medium STARS© Significance rating and would be suitable for retention in its current environment.

  Extensive redesign would be required in order to relocate the inclinator rail and associated platform path, which may need to be defined in a straight line for stable travel of the machine. While there is the possibility of retention of this tree as it currently stands (only prequalified by the inclinator platform being no greater than 800mm wide), the tree would have no opportunity for secondary expansion of the trunk and would inevitably pose an impediment to travel clearance. This tree cannot be retained long term if the development is approved in its current form.

7.6 - Other Vegetation Not Assessed and General Notes

- Additional canopies included on the survey by Altitude Surveys across the property and neighbouring properties indicated either vegetation that did not minimum prescribed criteria as per the Manly DCP, or a prescribed tree that did not have any potential impact posed to their estimated Tree Protection Zone. However, care should be taken when transporting equipment along the limited pathways around the property to avoid unnecessary damage to retained shrubs and trees, or compaction to soil adjacent to this vegetation.

- Underground service plans including hydraulic engineering and installation of gas, electric or telecommunications have not been supplied at the time of report completion. In order to mitigate impact to trees proposed for retention, service planning should take into consideration a design that avoids unnecessary trenching or excavation within the measured Tree Protection Zone of these trees.

  If this cannot be achieved, assessment of proposed excavation within these zones should be reevaluated by a qualified Consulting Arborist or Council Tree Management Officer including the level of impact this may pose to retained trees on site.

8. RECOMMENDATIONS

8.1 - TREES SUITABLE FOR RETENTION

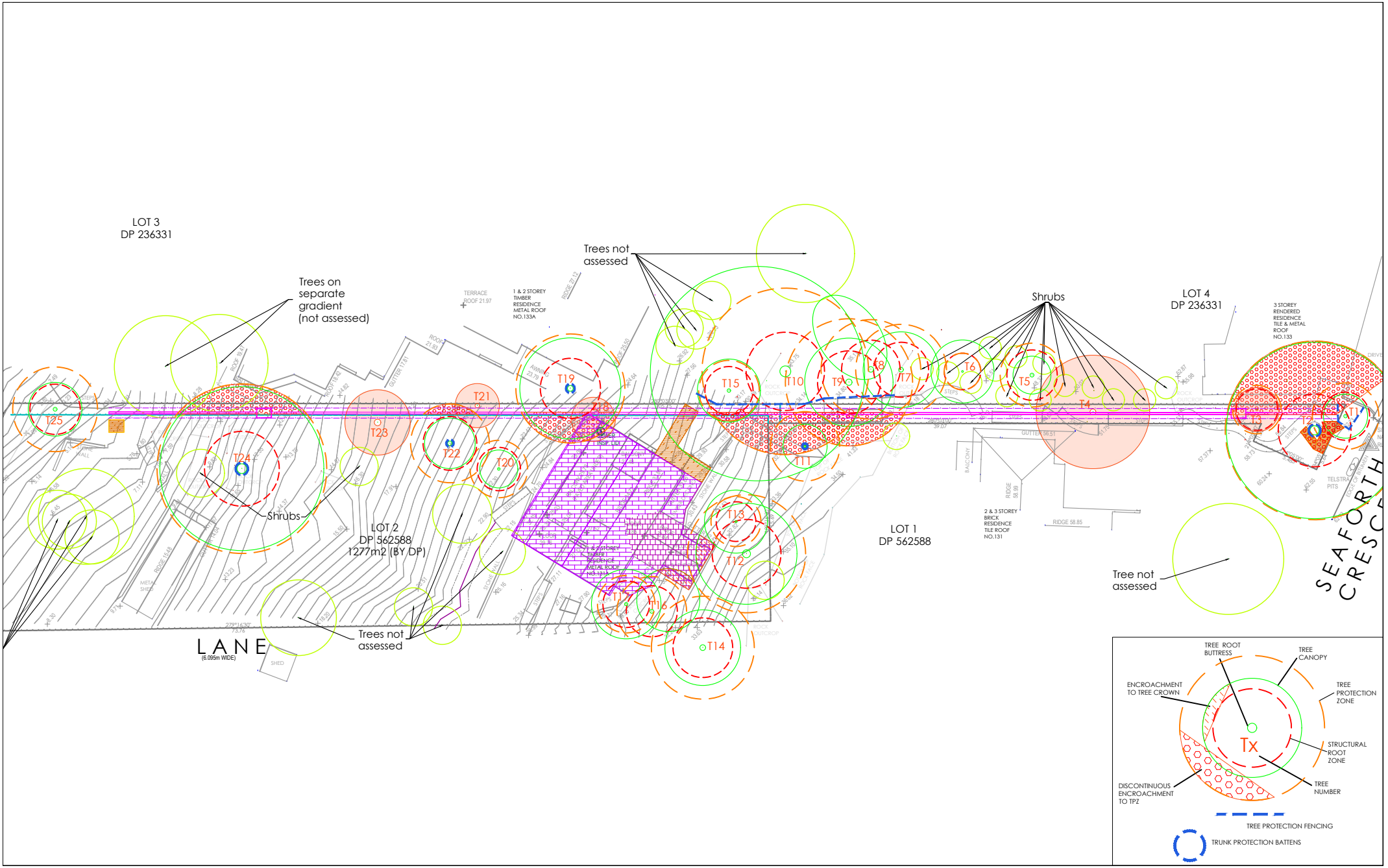
- Tree No.'s 5, 6, 11, 13, 14, 17, 20 & 24 are suitable for retention as no measurable impact is posed to the Tree Protection Zone (TPZ). Tree protection measures must be implemented as prescribed below and in the **DISCUSSION** section of this report (pages 15, 16 & 17).
- Tree No.'s 1, 7, 8, 12, 15, 16, 22 & 24 have a negligible or low impact and sustainable encroachment posed to the Tree Protection Zone by the proposed development and are suitable for retention. Tree sensitive construction techniques must be utilised, and protection measures must be implemented as prescribed below and in the **DISCUSSION** section of this report (pages 17, 18, 19 & 20).
- Tree No.'s 9, 10, & 19 have a moderate, yet sustainable impact encroachment posed to the Tree Protection Zone by the proposed development and are suitable for retention. Tree sensitive construction techniques must be utilised, and protection measures must be implemented as prescribed below and in the **DISCUSSION** section of this report (pages 20 & 21).
- Tree 2 has a significant area of impact posed to the measured Tree Protection Zone, however the tree may be sustainably retained if all construction works are completed as a suspended or post/pier type construction, with tree sensitive construction techniques being utilised, and protection measures must be implemented as prescribed below and in the **DISCUSSION** section of this report (pages 21 & 22).
- Potential pruning required on Tree No.'s 12 & 16 to maintain clearance from roof restoration works must be identified during site establishment and brought to the attention of a Project Arborist with a minimum AQF5 level qualification. A pruning specification should be completed by the Project Arborist and submitted to Council prior to commencing any pruning of a retained tree.
- All pruning works should be completed by an experienced Arborist with a minimum AQF III qualification in Arboriculture who holds Public Liability and Workers Compensation insurance, and must be carried out in accordance with Australian Standard for Pruning of amenity trees (AS4373 - 2007)[a].

8.2 - TREES UNSUITABLE FOR RETENTION

- Tree No.'s 3, 4, 21 & 23 are unsuitable for retention if the proposed development is to proceed due to being located within the footprint of the proposed inclinator rail or interfering with the path of travel for the mobile platform. These trees should be removed prior to site establishment.
- Tree 18 is unsuitable for retention if the proposed development is to proceed due to being located within the footprint of the proposed roof and deck extension to the premises. This tree should be removed prior to site establishment.

8.3 – SITE SPECIFIC TREE PROTECTION MEASURES

- A Project Arborist with a minimum AQF V qualification must be engaged for the duration of the project to manage the implemented TPZs, supervise excavation works within a measured Tree Protection Zone of retained trees, monitor retained tree health with intermittent site visits over the course of the development, and certify Tree Protection Measures.
- A fenced exclusion zone is to be implemented that extends around Tree 1 in order to protect the trunk and lower crown from potential impact from materials and equipment during construction, while not impeding construction activities (as indicated on the **TREE LOCATION & IMPACT PLAN**, page 26).
- A second fenced exclusion zone is to be implemented that extends along the northern boundary in front of Tree No.'s 7, 8, 9, 10 & 15 that delineates and excludes these trees from incidental impact during site access and construction activities, while not impeding clear access to the site for construction activities (as indicated on the **TREE LOCATION & IMPACT PLAN**, page 26).
- Both these exclusion zones must be installed as per **10.2- TREE PROTECTION FENCING**, page 27 of this report.
- Tree No.'s 2, 11, 17, 19, 22 & 24 must have protective battening installed on the lower trunk and sections of first-order branches (as per **10.3 – OTHER TREE PROTECTION MEASURES**, page 28) that shall consist of internal cushioning and battens strapped together consistent with the Australian Standard for the Protection of Trees on Development Sites (AS 4970 - 2009), Section 4 and paragraph 4.5.2 and Figure 4. The battens shall consist of lengths of 35 x 70mm (or similar to accommodate tree structure) structural timber secured side by side that extend from ground level, up to a height of 2.5m, spaced 50-100mm apart with galvanised steel banding for the full circumference of the trunk or branch and fixed by straps without driving nails or screws into the trunk or branches. This should be installed prior to site establishment and removed after completion of the development.



REV.	TITLE	BY	DATE
A	TREE LOCATION & IMPACT PLAN	LS	11.12.24

smart arbor professional CONSULTING
Ph: 0439 727 266
Email: luke@smartarbor.com.au
Web: www.smartarbor.com.au
Member of Arboriculture Australia
Registered User of QTRA

ADDRESS
131A SEAFORTH CRESCENT, SEAFORTH

CLIENT
XIAOCHANG ZHANG

PROJECT	ALTERATIONS, ADDITIONS & NEW INCLINATOR		
DRAWING	TREE LOCATION & IMPACT PLAN		
SCALE	NTS @ A4	REPORT ISSUE V1.0	DRAWN BY LS
SHEET NUMBER	TLP-S1	DATE 11.12.24	REVISION A

NORTH

10. TREE PROTECTION PLANNING

10.1 – Engagement of A Project Arborist

The engagement of a Project Arborist is required to oversee and certify tree protection measures implemented prior to any site establishment works and maintained for the duration of the construction process. The Project Arborist is to perform additional site inspections as required at each stage of the development that may impact tree health including supervision of construction works with a tree's measure TPZ, pruning of trees away from construction activities, etc. The Project Arborist should also be notified in the event the protected trees are damaged or are showing signs of decline which may require further management recommendations.

10.2 - Tree Protection Fencing

When required as part of an approved Development Application, tree protection fencing shall be installed prior to site establishment to establish the TPZ for trees to be retained. Tree protection fencing shall be maintained for the duration of the development schedule. The Tree Protection Fencing should enclose as much of the TPZ as can reasonably be fenced off, allowing for pedestrian access and a reasonable offset around the construction footprint and scaffolding. The fencing should be made up of steel with a chain mesh or fence palings with plywood panels that is lockable and a minimum 1.8m in height. All Tree Protection Fencing should be sign posted with a 'no access' instruction and contact details for the Project Manager and Project Arborist. This should all be certified by the Project Arborist.

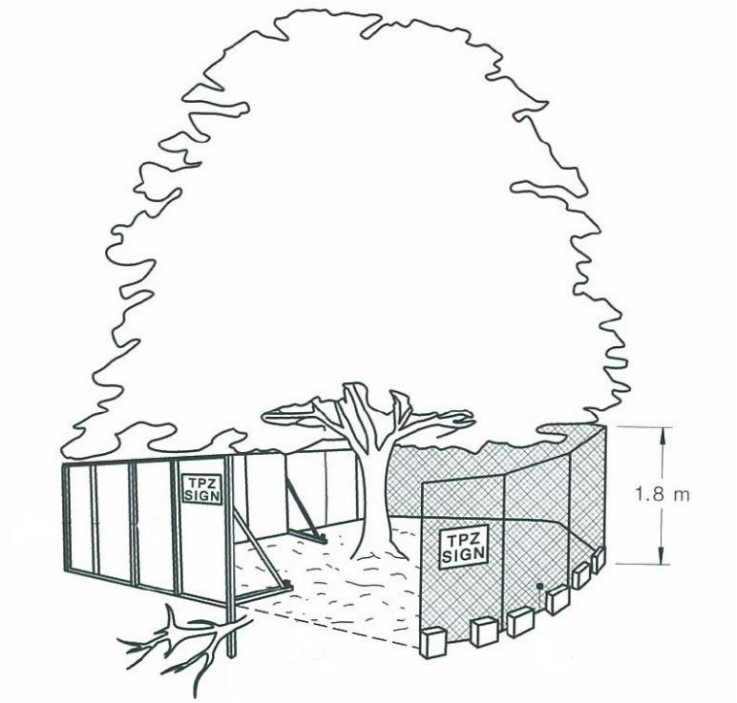


Image from AS 4970 'Protection of Trees on Development Sites'; Standards Australia, 2009

10.3 - Other Tree Protection Measures

Other measures that can assist with the protection of the canopy, trunk, branches, or roots from the risk of damage can include:

- A 100mm layer of approved mulch to be installed to the TPZ.
- A temporary drip irrigation system to be installed to the TPZ.
- Ground protection matting for staff, equipment and machinery access over tree roots.
- Trunk and branch battens and/or wrapping.

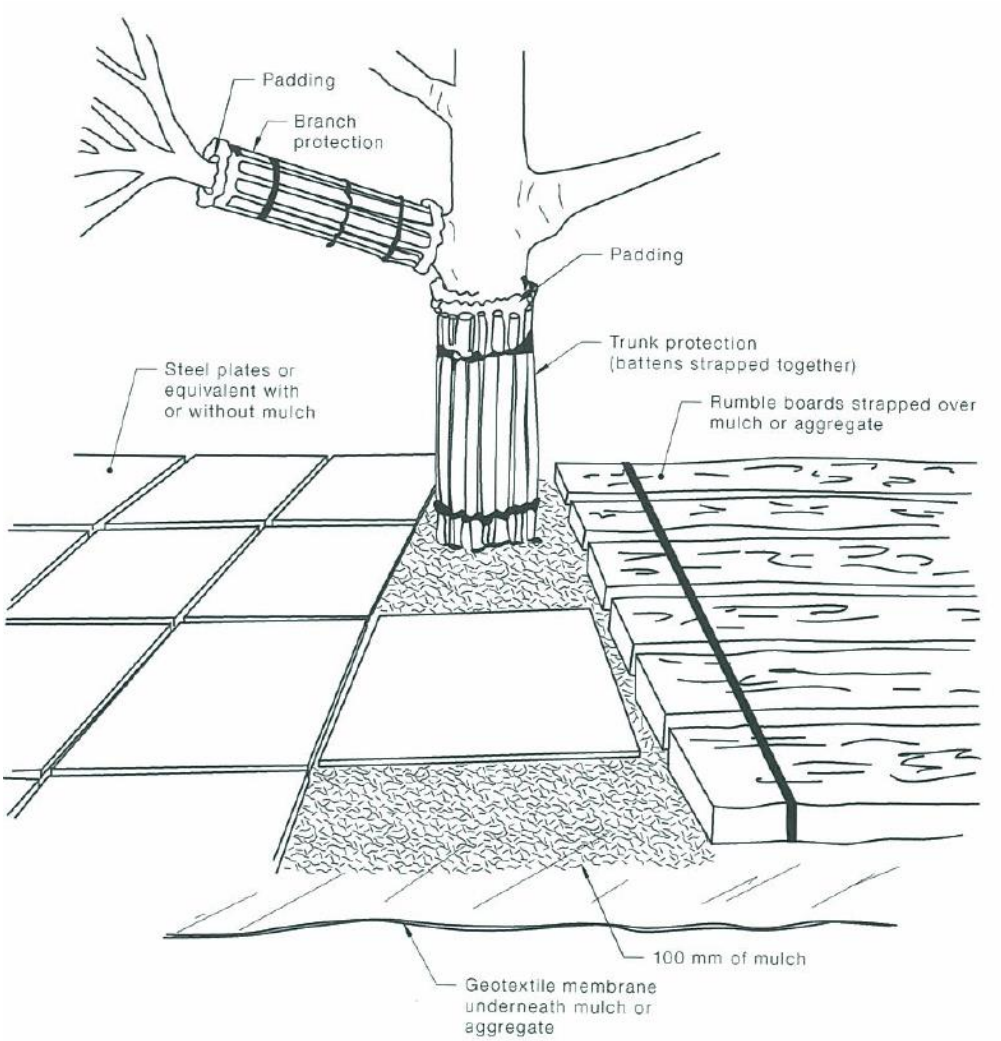


Image from AS 4970 'Protection of Trees on Development Sites'; Standards Australia; 2009

10.4 - Excavation within the TPZ

Excavation within the TPZ should be avoided, however this is not always realistically the case during a development. All efforts to preserve tree root systems should be taken including:

- Supervision from the Project Arborist during excavation.
- Excavation to be completed by hand when reasonable to avoid damage to roots.
- Root mapping may be required prior to excavation and should be completed with the use of either ground penetrating radar, air spade, water laser or by hand excavation; and should be certified by the Project Arborist.
- Where roots >50mm diameter are encountered, alternative construction methods should be considered to ensure roots are not damaged. Allowance should also be made for future root growth.
- Under-boring for services proposed below the root ball of the tree should be considered and certified by the Project Arborist.

10.5 - Fill

All fill material to be placed within the TPZ should be approved prior by the Project Arborist and be interfaced with a large diameter gravel or pebble to provide aeration and percolation to the root zone.

10.6 - Paving

Proposed paved areas within the TPZ That are to be installed on or above grade should ensure to minimise excavation and avoid surface root severance and/or damage. If proposed pavement materials are not permeable or porous, consideration should be given to forms of irrigation to the soil area below where tree roots have been retained.

10.7 - Pruning

All recommended pruning works (including root pruning) should be in accordance with Australian Standard for Pruning of amenity trees (AS4373 - 2007)[a]. If required, roots should be severed with clean sharp implement flush with the face of the excavation and maintained in a moist condition. Root pruning shall be performed under the supervision of the Project Arborist.

10.8 - Tree Removal

Tree removal work shall be carried out by an experienced Arborist in accordance with the NSW Work Cover Code of Practice for the Amenity Tree Industry (1998) and holds Public Liability and Workers Compensation insurance. Care shall be taken to avoid damage to trees during the felling operation. Stumps shall be grinded using a mechanical stump grinder to a minimum depth of 300mm without damage to other retained root systems.

10.9 - Tree Damage

In the event of damage to a tree or the TPZ of a tree to be retained, the Project Arborist should be advised in order to provide advice on remedial action. This should be implemented as soon as practicable and certified by the Project Arborist.

10.10 - Post Construction Tree Management

Tree protection fencing with additional trunk and root protection shall be removed following completion of the development schedule. Any mulch layer installed for root protection should be reduced to a 75mm layer and retained on site. In the event of any tree deteriorating in health after the development schedule is complete, the Project Arborist should be engaged to provide advice on any remedial action.

11. GLOSSARY OF INDUSTRY TERMS

1. Crown: The canopy of the tree from the starting point of the tree's first primary lateral.
2. Deadwood: Leaves and branches that have died back and are of an irreversible condition.
3. Epicormic: The growth that occurs at the point of the epicormic bud that become active shoots when reacting to damage or stress in the tree.
4. Flushing: Fast green leaf growth occurring in reaction to ideal or high nutrient conditions for the tree.
5. Tree Protection Zone (TPZ): The area calculated (DBH x 12) as a protective buffer to isolate a tree from construction and excavation disturbance so the tree may remain viable.
6. Structural Root Zone (SRZ): The area calculated ($(DRB \times 50)^{0.42} \times 0.64$) that estimates root growth requiring to be retained for stability of the tree.
7. Encroachment: An activity or disturbance that takes place within proximity to the tree and inside the Tree Protection Zone that has potential for impact to tree health and structure.
8. Visual Tree Assessment (VTA): a non-invasive biomechanically based system of Tree Assessment developed by Claus Mattheck and Helge Breloer, examining the health and structural condition of individual trees.
9. Canker: A symptom of an infectious fungal pathogen that has entered between the bark cambium and heartwood that can display as a discolouration, a depression in the bark, or a wound that continues to attempt to heal but is continuously expanding.
10. Stem taper: The rate of decrease in stem diameter with increasing height from ground level to the highest point of a singular stem canopy point. Symptoms of good stem taper is an obvious, but not disproportionate decrease in stem diameter from root buttress to a height of 1.4m that continues evenly up the stem. Symptoms outside these proportions can be considered as poor taper.

12. REFERENCES

a) Standards Australia; **AS 4373 Pruning of amenity trees;** 2007

b) Standards Australia; **AS 4970 Protection of trees on development sites;** 2009

c) Claus Mattheck; Helge Breloer; **The body language of trees: a handbook for failure analysis;** 1994

d) Jeremy Barrell; **SULE: Its use and status into the New Millennium;** modified paper, 2001

e) Institute of Australian Consulting Arboriculturalists; **IACA Significance of a Tree, Assessment Rating System (STARS)©;** 2010

f) Richard W. Harris; James R. Clark; Nelda P. Matheny; **Arboriculture: Integrated Management of Landscape Trees, Shrubs, and Vines**; 4th Edition 2004

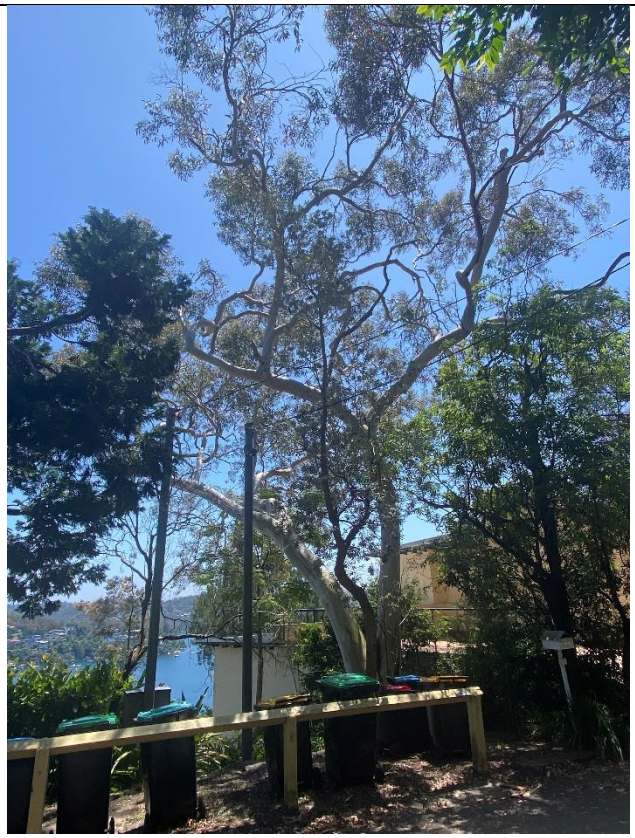
g) NSW Government; **Trees Near Me NSW;** ©2024

h) Manly Council (adopted by Northern Beaches Council); Manly Development Control Plan; 2013

i) Manly Council (adopted by Northern Beaches Council); Manly Local Environmental Plan; 2013

13. PHOTO REFERENCE

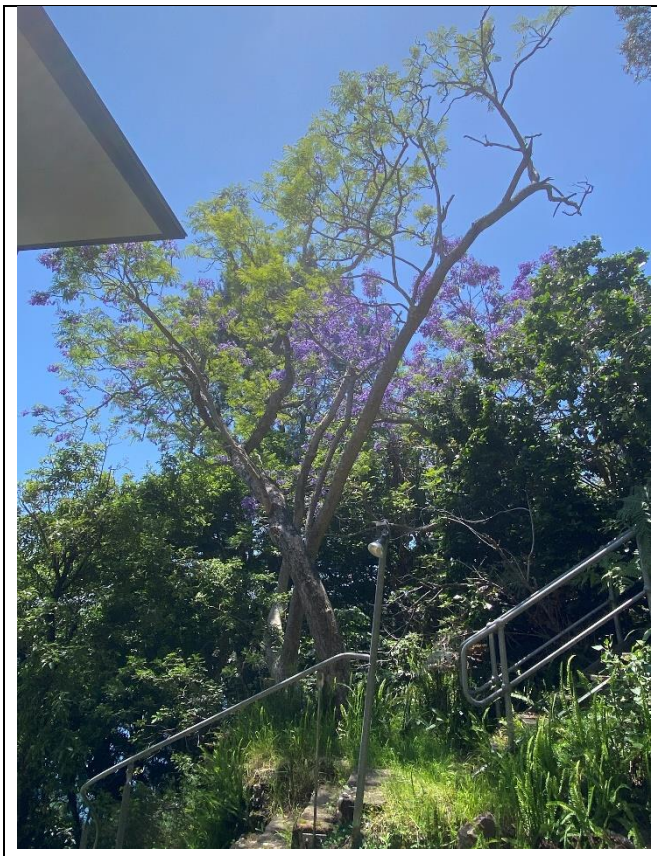
Tree 1



Tree 2

Base of Tree 2

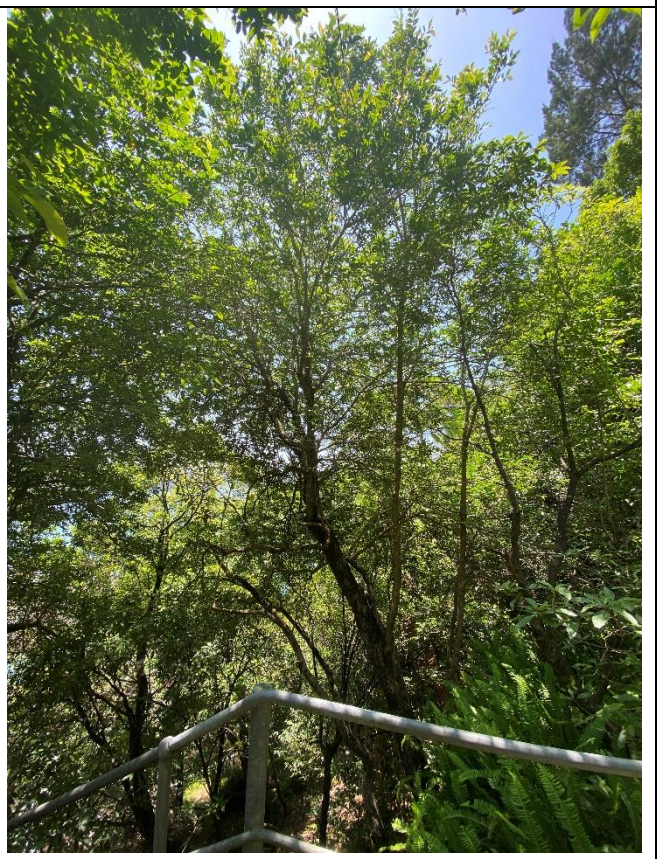
Tree 3



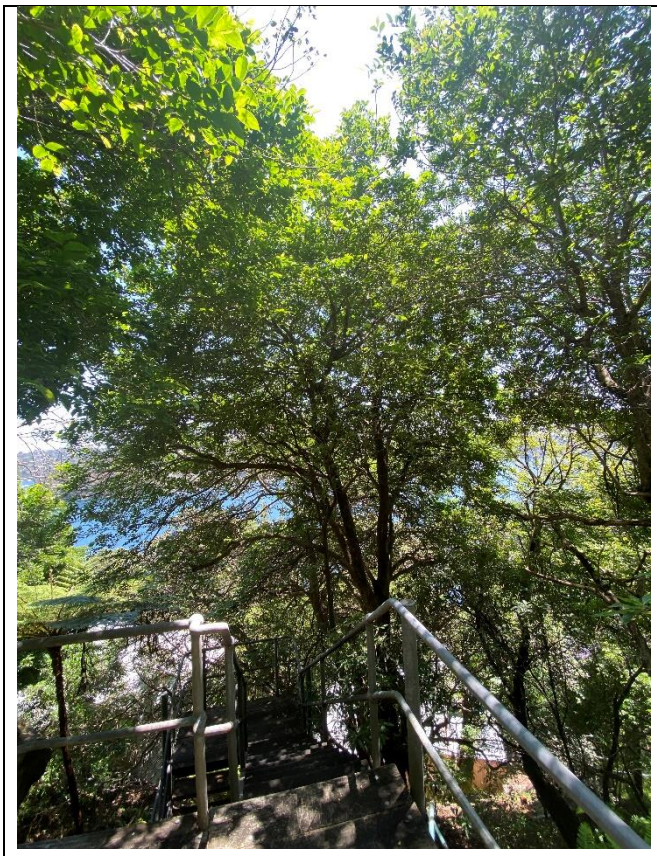
Tree 4

Tree 5

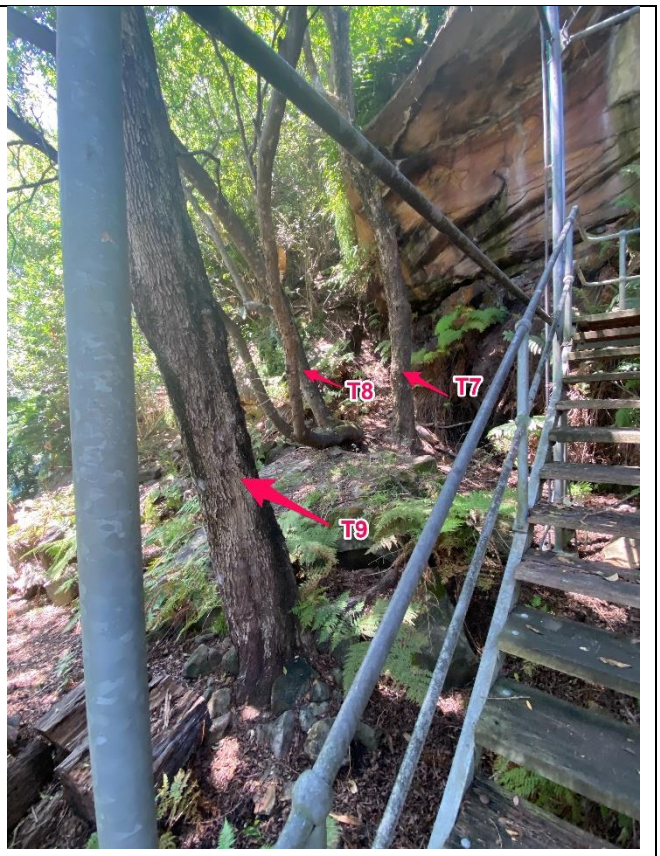
Tree 6



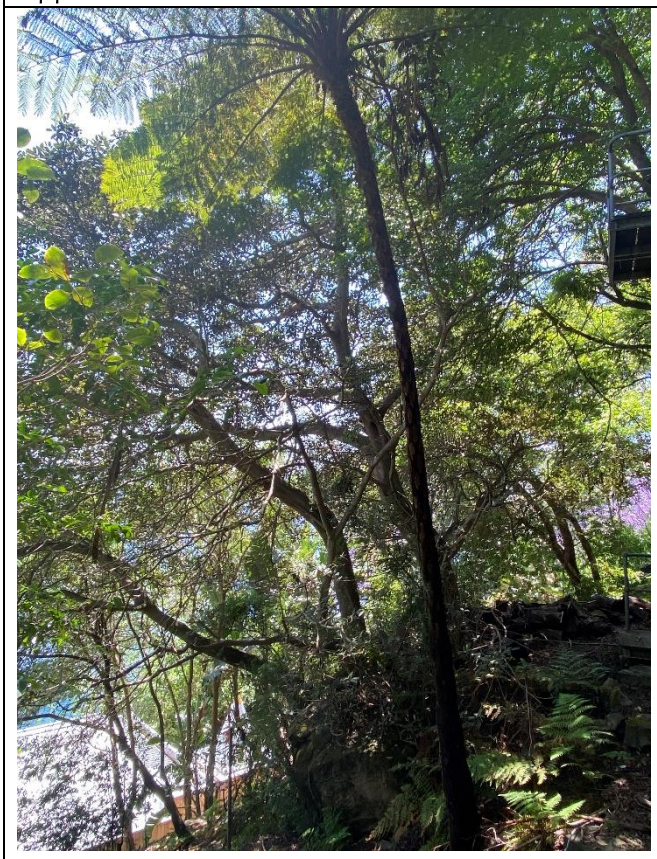
Upper crown of Tree 7



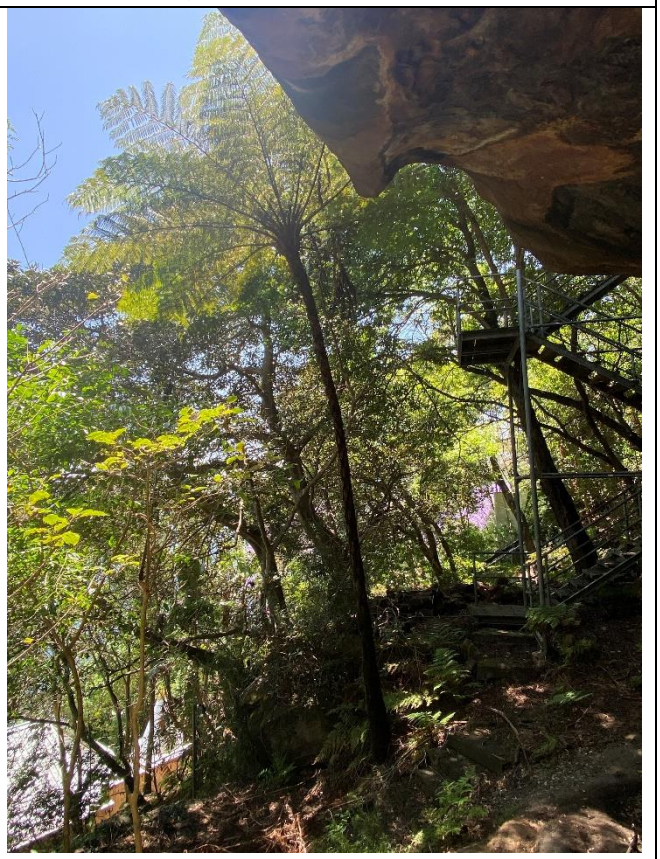
Upper crown of Tree 9



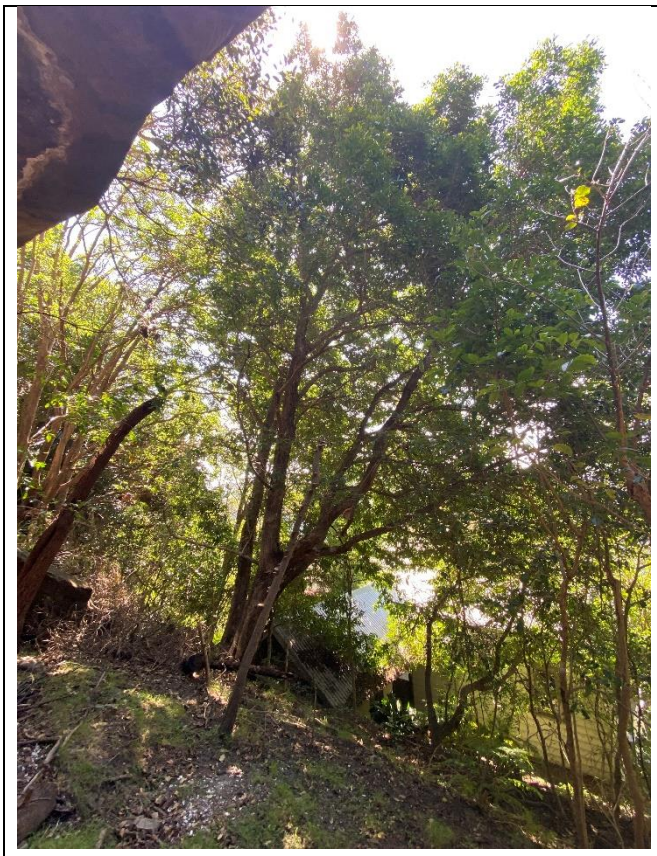
Base of Trees 7, 8 & 9



Tree 10

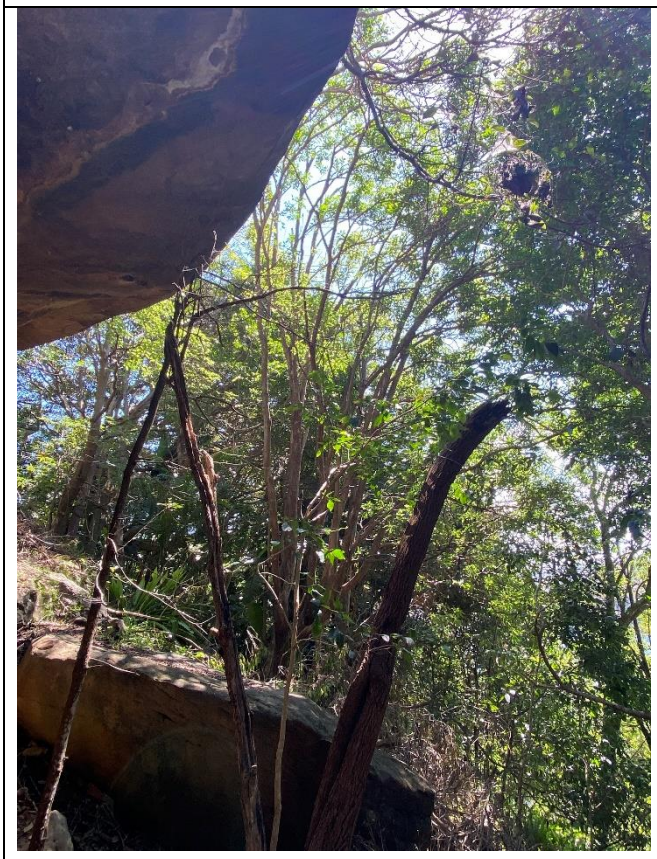


Tree 11

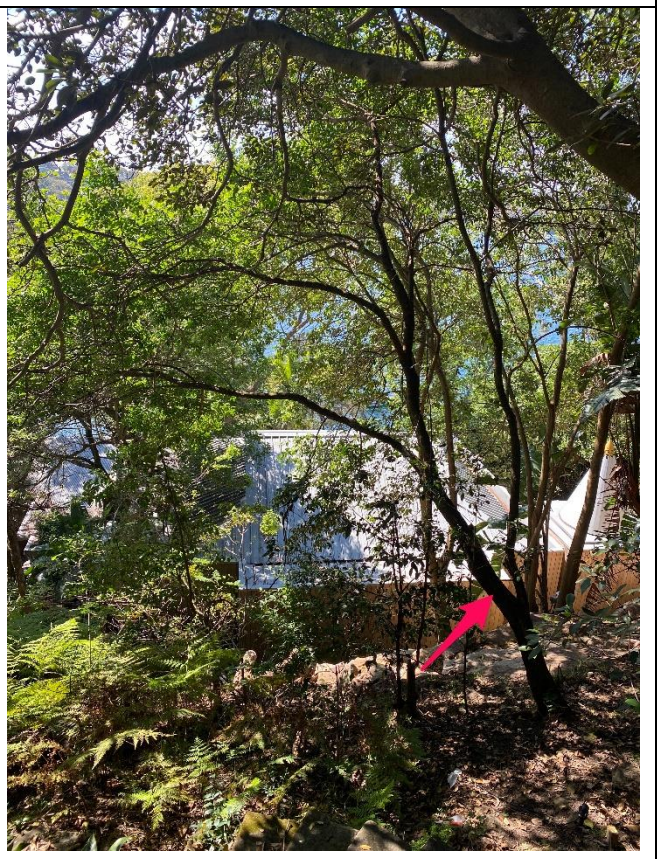


Tree 12

Tree 13



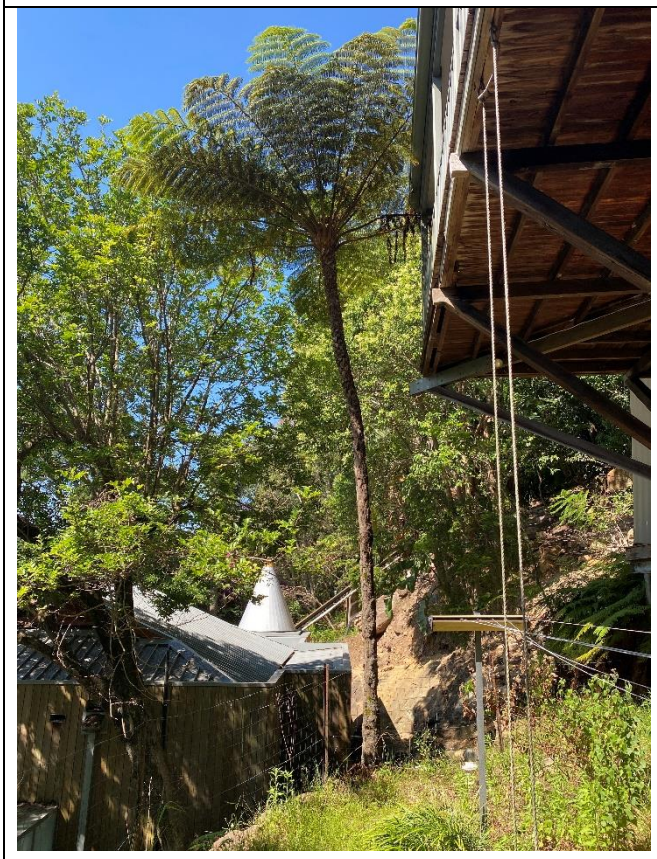
Tree 14



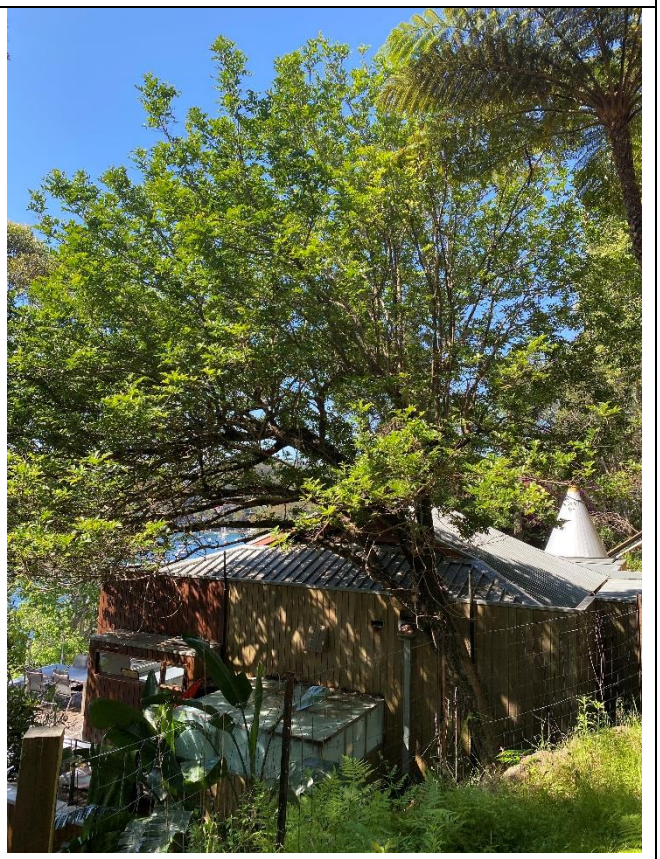
Tree 15

Trees 16 & 17

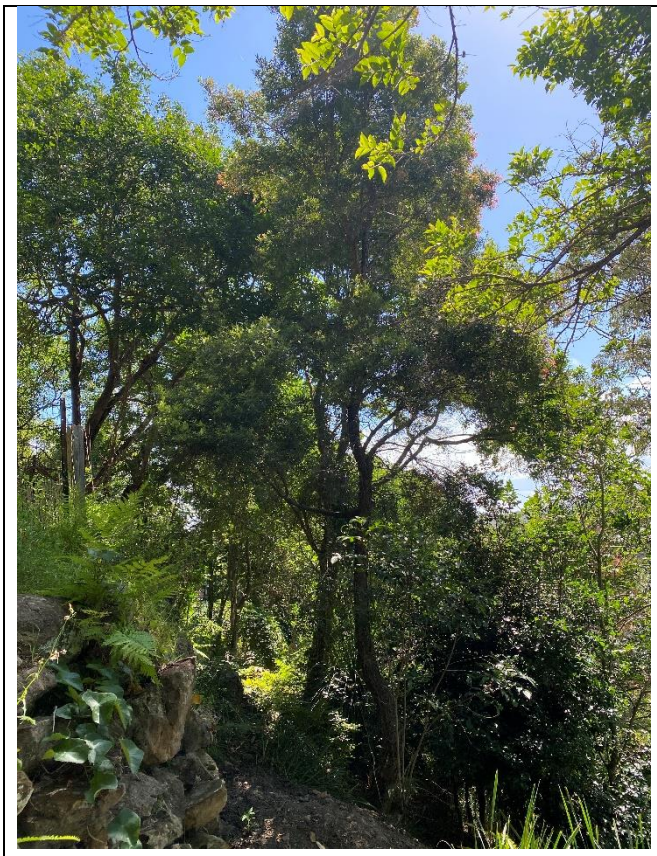
Branches from Tree 16 on roof



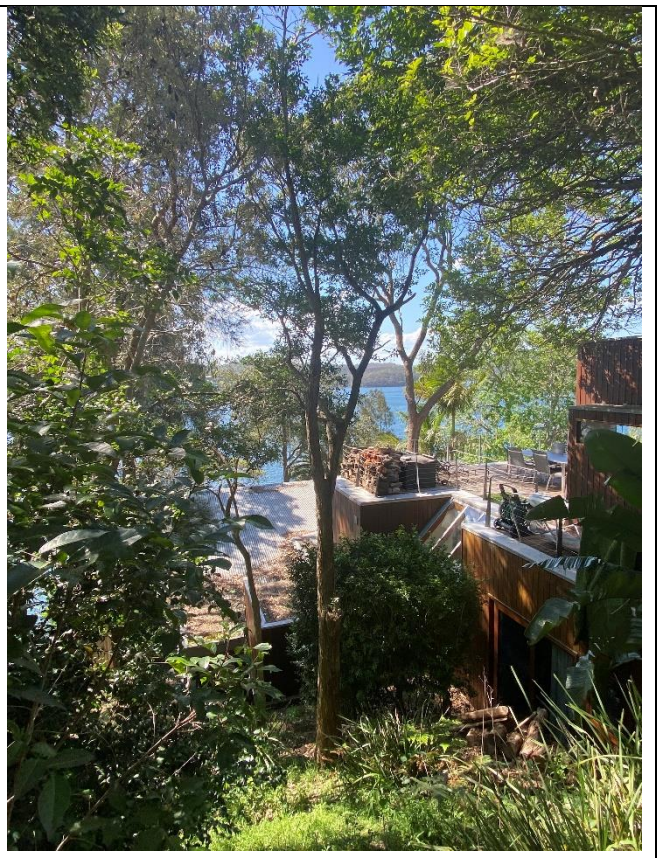
Tree 18



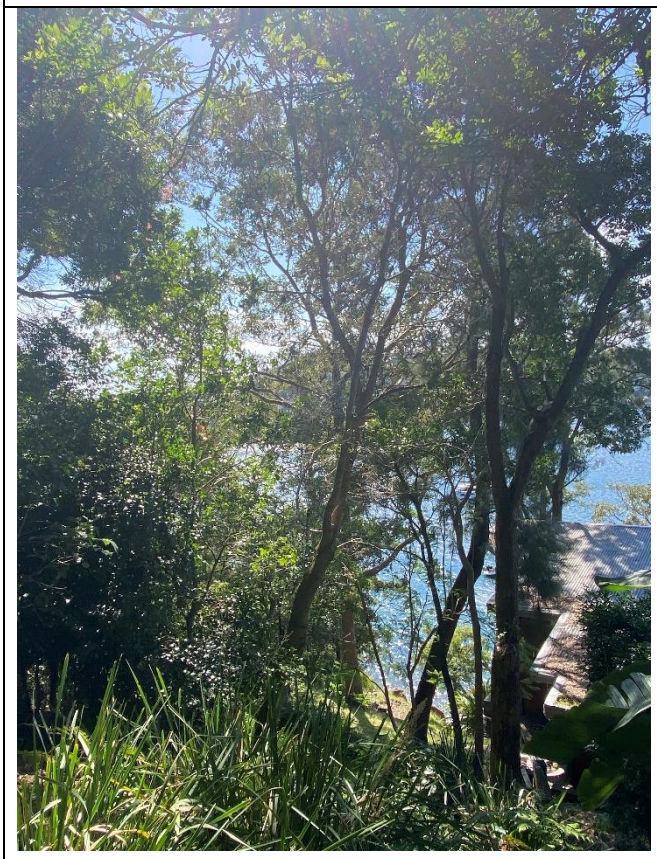
Tree 19



Tree 20



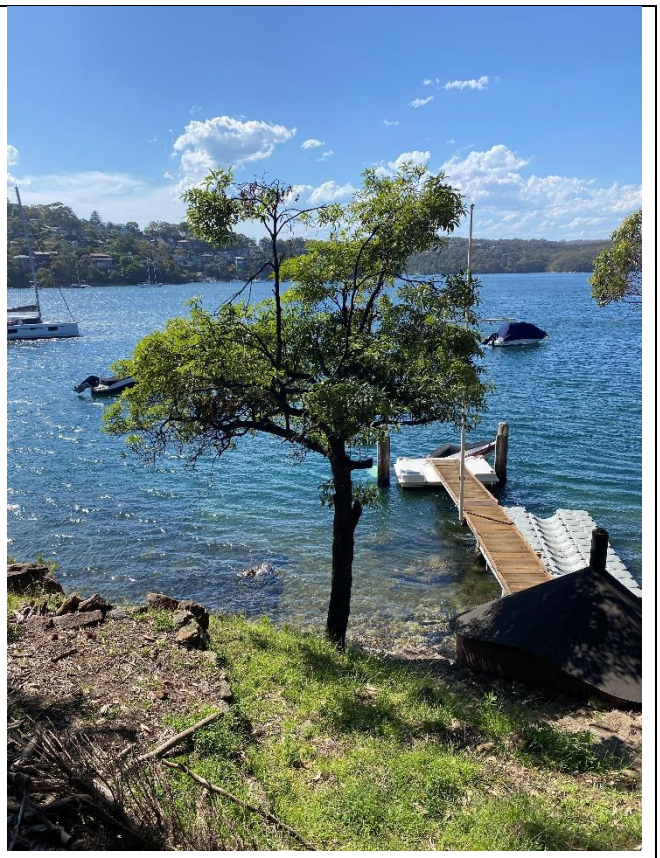
Tree 21



Tree 22

Tree 23

Tree 24



Tree 25