Construction Impact Assessment and Management Plan

32 Bower Street, Manly

Prepared for: Campbell Architecture.
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Dated: January, 2019.

Annexed: November, 2019.

Contents

1.0 INTRODUCTION

1.1 Background

1.1.1 This Construction Impact Assessment and Management Plan has been prepared for, and in consultation with Campbell Architecture on behalf of the property owners. This documentation has been requested to detail the arboricultural impacts associated with the demolition of the exiting residence and the construction of that proposed.

1.1.2 The purpose of this report is to identify all existing trees, assess both health and condition, determine landscape significance and life expectancy. A determination for preservation, removal or transplantation will be made based on sustainability and suitability within the setting. For the purpose of this report *Botanics* has assessed the likely impact that the proposed development will have on the subject trees. This report will then provide recommendations in relation to the management of these in accordance with Australian Standard *AS4970 for the Protection of Trees on Development Sites.* Pruning and removal works will be based on *AS4373 for the Pruning of Amenity trees* where applicable.

1.1.3 A total of thirty nine (39) trees have been assessed for the purpose of this report. These range in significance from a possibly remnant Port Jackson Fig tree and Coastal Banksia (High significance) to Cocos palms (Remove irrespective) and an assortment of both native and exotic palm and tree species of varying value. The majority of the plantings will have occurred following the original residential construction and have established to maturity, in most cases.

1.1.4 The impacts of the proposed works have been assessed based on the following supplied plans:

- Campbell Architecture Plan_level 1.
- Campbell Architecture Plan_Level 2.
- Campbell Architecture Plan_Level 3.
- Campbell Architecture Plan_Level 4.
- Campbell Architecture Plan_site.

1.1.5 The site is part of the Coastal Tea-tree Banksia Scrub. https://www.northernbeaches.nsw.gov.au/environment/native-flora/coastal-tea-tree-banksia-scrub, although most of this will have been cleared as part of the original development.

1.1.6 The arboricultural significance of the Port Jackson Fig tree on the eastern boundary has been undermined by extensive decay and poor branch structure. The spread of this tree's structural roots will have been affected by the original construction and decay has spread throughout its base. The proposed construction footprint has

however been set back to allow for its retention. The adjacent Coastal Banksia has developed with a significant easterly lean and remains in good health with a recommendation for its retention.

1.1.7 The remainder of the trees on site will have been planted following the construction of the existing residence. These are of varying and broadly limited significance for a range of reasons and should not be considered as a material constraint to this, or any significant development proposal.

1.2 The Proposal

1.2.1 The supplied plans show that the works will require;

- The demolition of the existing residence,
- The excavation of the construction footprint for both underground parking and accommodation. **Figure 2**.
- The regrading and configuration of both front and rear gardens, including the construction of both swimming, and lap pools.
- The construction of spit level residential accomodation.

1.2.2 The proposed design recognises the arboricultural significance of the site's most important trees based on health, structure and species. The most significant of these have been recommend for retention. Additional retention recommendations have been made for all *Howea forsteriana,* or Kentia Palms, via transplantation due to arboricultural suitability for the location and relative ease of relocation.

2.0 RESULTS

2.1 The Site

2.1.1 The site is a large residential block on the northern side of Bower Street, Manly. Both vehicular and pedestrian access is made via a driveway from Bower Street, as detailed. This driveway approximately follows existing and natural site contours.

2.1.2 The construction footprint for both the residence and garage, as well as gardens has seen the removal of all previously existing vegetation.

Figure 1 Shows the location of the site in relation to Shelly Beach and Gulley Reserve.

2.2 The Trees

2.2.1 It will be assumed that established plantings will have been planted as part of the original works. These include Kentia and Bangalow palms, as well as a well structured *Camellia sasanqua,* among a range of additional species. See Attached **Tree Table** for details.

2.2.2 A total of thirty nine (39) trees have been assessed using Visual Tree Assessment (VTA) criteria and notes. As required under Clause 2.3.2 of the Australian Standard 4970 (2009) for the *Protection of Trees on Development Sites,* each tree has been allocated a Retention Value based on the tree's Useful Life Expectancy and Landscape Significance with consideration to its health, structure, condition and site suitability. The Retention Value does not take into account any proposed development. All trees have been allocated 1 of 4 Retention Values;

- High Value - Priority for Retention.
- Moderate Value - Consider for Retention.
- Low Value - Consider for Removal.
- Remove - Recommended for Removal Irrespective of works.

Refer to Tree Table and Tree Assessment Schedule for details and specific recommendations.

2.2.3 Tree 1 is a semi mature *Eucalyptus saligna,* or Sydney Blue Gum. This tree will have been planted as part of more recent works and has unfortunately been planted under the overhead power lines, with little consideration of its habit or biological potential.

2.2.4 Tree 2 is a well established *Melaleuca quinquenervia,* or Paperbark. This will again have been planted here, with little consideration of its habit or biological potential. The tree has been planted directly adjacent to the properties western boundary in a raised garden bed. This provides limited access to soil moisture and nutrients and has resulted in a relatively sparse canopy.

2.2.5 Tree 3 is a *Cupressus torulosa,* or Himalayan cypress. This tree has adapted well to the local environmental conditions and remains in good health. The species is however out of context in this predominantly native setting.

2.2.6 Trees 4 and 10 are both *Glochidion ferdinadii,* or Cheese trees. These are part of the remnant plant community and should be considered for retention.

2.2.7 Trees 5 and 15 are both semi mature *Dracaena draco,* or Dragon Trees that will have been planted as part of the early landscape works. The tree should be considered for relocation via transplantation as part of the landscape works, although it should not be considered as significant due to exotic nature and its context within the surrounding environment.

2.2.8 Tree 6 is a semi mature *Pittosporum undulatum,* or Sweet Pittosporum. This is a common native tree species that readily colonises exposed soil profiles. Should be considered as a Low Value tree.

2.2.9 Tree 7 is a well established *Melaleuca quinquenervia,* or Paperbark located centrally within the rear garden. The tree has grown to a height of over 12m and is supported on a trunk of over 90cm. The tree will have been planted here as part of earlier landscape works and although significant it is not part of the locally native plant community.

2.2.10 Trees 8 and 9 are both *Syagrus romanzoffiana,* or Cocos palms. These are a well recognised environmental weed species https://weeds.dpi.nsw.gov.au/Weeds/Details/295 and should be removed irrespective of the proposed development.

2.2.11 Trees 11 and 12 form part of a small grove of *Howea forsteriana,* or Kentia Palms that have been planted adjacent to the site's eastern boundary within a small raised garden bed. This has affected the spread and development of their root systems, and along with the fact that they are monocotyledons https://en.wikipedia.org/wiki/Monocotyledon. will allow them to be relatively easily transplanted to alternative locations.

2.2.12 Trees 13 and 14 are both *Cordyline australis,* or Cabbage trees. These are not part of the remnant plant community - despite their name, and are likely to have been planted here as part of the more recent plantings. These are both located within a small garden bed adjacent to the exisiting building footprint. Both have been considered as Low Value.

2.2.13 Tree 16 is mature *Banksia integrifolia,* or Coastal Banksia located adjacent to the site's eastern boundary. The tree has developed with a pronounced lean to the east and over the neighbouring public open space. The lean may have occurred following the original construction, or as a result of it. The tree is part of the remnant plant community and has been seen as a High Value arboricultural asset.

2.2.14 Tree 17 is a mature *Ficus rubiginosa,* or Port Jackson Fig tree. This is another locally native tree species that should be seen as High Value based on its age and species. The tree has however developed a large section of visible surface decay and supports a canopy on poorly structured forks. The mature age of the tree has reduced its vigour and limited its viability for long term retention. The tree has for these reasons been given a Moderate value and should be considered for retention as opposed to being seen as a material constraint to the proposed development.

2.2.15 Tree 18 is a mature *Phoenix roebelenii,* or Dwarf Date Palm located adjacent to the northern edge of the existing building footprint. It is relatively rare to see such a well established example of this species and consideration should be given to its transplantation and relocation to maintain amenity, although it should not be considered as a material constraint due to its exotic nature and environmental context.

2.2.16 Trees 19, 21, 22, 23 and 24 are all part of a grove of similar well established *Howea forsteriana,* or Kentia palms located throughout the foreshore garden. All provide a positive arboricultural amenity and should be considered for transplantation.

2.2.17 Tree 20 is a *Livistona chinensis,* or Chinese Cabbage Palm. This will again have been planted as part of the earlier plantings and although similar in nature to our *Livistona austral,* this Palm is out of context here.

2.2.18 Tree 25 is a well established *Camellia sasanqua,* or Camellia. This is a well structured and mature example of the species and although an exotic tree species, has been seen as a High Value tree and documented for preservation.

2.2.19 Tree 26 is a semi mature Macadamia tree. This will have been planted here and although native, it is not part of this plant community and has been recommended for removal for a number of environmental reasons.

2.2.20 Trees 27 and 28 are both *Glochidion ferdinadii,* or Cheese trees. These are again part of the locally native plant community, although both remain semi mature examples of their species located adjacent to the site's north western boundary.

2.2.21 Tree 29 and 30 are both *Livistona austral,* or Cabbage trees located on the foreshore verge. These are an important locally native tree species that are likely to have been planted here.

2.2.22 Tree 31 is another well established *Ficus rubiginosa,* or Port Jackson Fig tree located adjacent to the site's north eastern boundary. This is another High Value and important native tree species recommended for retention.

2.2.23 The final tree documented on site -Tree 32 is a self seeded Port Jackson Fig tree that has established within the stump of a recently diseased Eucalyptus tree. This is of limited amenity and of Low value.

2.2.24 Trees 33 - 36 comprise a stand of Kentia palms located on the adjacent Crown lands. All are well established examples of this species providing a High Value amenity contribution.

2.2.25 The neighbouring *Melia* or Chinaberry has been documented as Tree 37. This is an exotic weed species that should be removed for a broad range of reasons. The tree is however located on the neighbouring Crown lands and has been documented for retention until approval has been granted for its removal.

2.2.26 Tree 38 is a well established *Ficus elastics,* or Rubber Tree. These are another well recognised environmental weed species and should again be removed for these reasons. The tree is however located on the neighbouring Crown Lands and has been documented for retention.

2.2.27 Tree 39 is another *Ficus rubiginosa,* or Port Jackson fig tree of High Value. This tree is located well outside the construction impact zone of the proposed and will be retained.

3.0 ARBORICULTURAL IMPACT ASSESSMENT

3.1 The proposed works will see the demolition of all the existing residences and the construction of that detailed. This is a significant residential development that better meets the domestic requirements of the owners and site.

3.2 The proposed building footprint directly affects Trees 5, 6, 8 and 9 and will require their removal.

3.3 The mature Port Jackson Fig (Tree 17) is a mature to over mature example of this species. The tree has significant decay throughout its trunk, and supports its upper canopy on extensively included limbs. https://en.wikipedia.org/wiki/Tree_fork. These are prone to failure, and although the target area is infrequently accessed, the tree's long term viability is undermined by these factors. As such, the tree has been recommend for removal to allow alternative planting options to be considered.

3.7 The adjacent Coastal Banksia (Tree 16) is a mature and significant example of this locally native tree species and will be preserved throughout the construction process with the implementation of the following Tree Management Plan. This will implement a construction set back of over 5m from the tree's base. As noted, the tree retains a significant lean to the east. This will result in the development of support roots to the tree's west. The removal of any roots over 35mm in diameter should be avoided without due consideration.

3.8 The *Howea forsteriana,* or Kentia Palms documented as 11, 12, 19, 21, 22, 23 and 24 should be relocated to the north western boundary and planted to form a palm grove. The transplantation of these trees should be done in accordance with current industry standards https://www.dpti.sa.gov.au/__data/assets/pdf_file/0004/478021/Part_L18_Palm_Transplanting_and_Relocating_Dec_2017.pdf.

3.9 Additional transplantation recommendations have been made for the *Dracaena draco* documented as Tree 5, as well as the *Phoenix roebelenii,* or Dwarf Date palm documented as Tree 18. These are well structured and mature trees that should be considered for relocation due to their mature age and suitability. https://en.wikipedia.org/wiki/Monocotyledon.

Retention Value 1 High- Essential		**Retention Value 2 Moderate**		**Retention Value 3 Low**		**Retention Value 4 Remove**	
Retain	**Remove**	**Retain**	**Remove**	**Retain**	**Remove**	**Retain**	**Remove**
16, 29, 30, 31, 39		1, 2, 5, 11, 12,16, 18, 19,21, 22,23 24,25, 27, 28,33,34,35 ,36.	3, 7, 10, 17, 20	4,37,38	6, 13, 14, 15, 26		8, 9, 32
Total: 5	**Total: 0**	**Total: 19**	**Total: 5**	**Total: 3**	**Total: 5**	**Total: 0**	**Total: 3**

3.8 The proposed works will see the retention of the site's most important arboricultural assets, including Trees 16, 29, 30 and 31. This along with the remainder of those trees documented for preservation will be retained with the implementation of the following Tree Protection measures as outlined within *AS4970 Standards for the Protection of Trees on Development Sites.*

4.0 DISCUSSION

4.1 The existing residence no longer meets the domestic living requirements of the current owners. The proposed design addresses these residential shortcomings and will greatly improve both the functionality and aesthetic appeal of the residence. The design maximises the use of the site topography and has been contoured to fit into the surrounding landscape.

4.2 The proposed landscape plantings and works are in keeping with the surrounding Coastal Sandstone Heath and Foreshore Forest Communities https://www.northernbeaches.nsw.gov.au/environment/native-flora/vegetation-communities. and will improve both horticultural and arboricultural amenity outcomes in the medium and long terms.

5.0 RECOMMENDATIONS

5.1 It will be recommended that trees 3, 6, 7, 8, 9, 10, 13, 14, 15, 20, 26 and 32 be removed to allow both the proposed construction to occur and alternative plantings installed.

5.2 It will be recommended that Trees 1, 2, 16, 17, 25, 27, 28, 30 and 31 be retained in their existing locations with the implementation of the following recommendations.

5.2.1 Tree Protection Fencing should be installed adjacent to the drip line of all protected trees where applicable.

5.2.2 All transplantation works should be done following the demolition of the existing residence to allow clear access to the site. The use of heavy machinery will aid in both the excavation of the root ball and soil profile as well as the lifting and relation process. This should be done by, or in consultation with both the site arborist and landscape team to ensure that industry standards are met, and that final planting levels follow that of the proposed.

5.3 Any remaining tree roots affected by the proposed works should be cut cleanly adjacent to the edge of the construction to limit the affect of exposure and decay. These should be covered between excavation and construction to again limit the affects of decay.

5.4 The remainder of the indirect construction impacts should be mitigated with the implementation of the following.

5.5 Appointment of Site Arborist

A site arborist shall be appointed prior to the commencement of work on site. The Site Arborist shall clearly mark out all trees to be removed and ensure that all trees documented for retention are preserved with the implementation of the following tree protection measures. The Site Arborist shall have a minimum qualification equivalent to a NSW TAFE Certificate Level 5 or above in Arboriculture.

5.6 Inspection Points

Give 5 working days notice to allow inspections to be undertaken at the following stages;

Inspection Point	Inspection Personnel
Installation of Tree Protection Zones including Tree Protection Fencing, Silt Fencing and Signage	Site Arborist
Modification of the Tree Protection Zone	Site Arborist
Works within the Tree Protection Zone	Site Arborist
Completion of Construction Works	Site Arborist Site Supervisor.

5.7 Education

Contractors and site workers shall receive a copy of these specifications prior to the commencement of work. Contractors and site workers undertaking any works within a TPZ shall sign the site log to confirm that they have read and understand these specifications prior to their undertaking.

5.8 Tree Protection Zones

Where applicable, all trees to be retained through the construction process shall be protected from mechanical damage and the indirect impacts of the construction process with the installation of Tree Protection Zones. Unless otherwise stated, the following activities must not be carried out within a TPZ;

- modification of existing soil levels
- excavation or trenching
- cultivation of soil
- mechanical removal of vegetation
- movement of natural rock
- storage of materials, plant or equipment
- erection of site sheds
- affixing signage or hoarding to trees
- disposal of chemical waste or construction material
- any activity that may directly or indirectly affect the health of these or surrounding trees.

Note: If access to a TPZ is required as part of the approved development, prior authorisation is required by the Site Arborist.

5.9 Tree Protection Fencing

Tree Protection Fencing shall be installed at the perimeter of the TPZ. As a minimum the Tree Protection Fencing shall be 1.8 meters high temporary chain supported by steel stakes. This shall be fastened and supported to prevent sideways movement. The trees woody roots shall not be damaged during the installation of this Tree Protection Fencing.

This Tree Protection Fencing shall be erected prior to the commencement of works on site and shall be maintained for the duration of the construction process.

5.10 Signage

Tree Protection Signage shall be attached the the PTZ and displayed in a prominent location. These signs shall be repeated in 10m intervals or closer where the fence changes direction. These shall be a minimum of a 72 font size and each sign at-least 600 x 500mm.

5.11 Mulching

The area within the TPZ shall be mulched and maintained with 80mm of leaf litter mulch for the duration of the construction process. This mulch shall be spread by hand to limit the impact on underlying roots and shall be installed prior to the commencement of works on site.

5.12 The Site Arborist shall inspect and approve the TPZ including mulching. signage, Tree ProtectionFencing, Silt fencing and Signage prior to the commencement of works on site.

5.13 Site Management

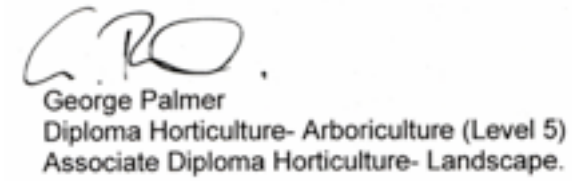
Materials and waste storage, site sheds and temporary services shall not be located within the TPZ unless specified. Storage points shall be covered when not in use and be no greater than 2m in height.

5.14 Works within the TPZ

The TPZ may need to be modified during the works to allow access between the protected tree and the proposed construction. The TPZ shall remain as specified and only those works detailed in the proposed construction undertaken.

5.15 Completion of Works within specified TPZ

Upon the completion of works within a TPZ the protective fencing shall be reinstated as specified. Where the construction of new structures does not allow for the reinstallation of fencing the TPZ shall be modified by the Site Arborist.



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Disclaimer
All care has been taken to assess potential hazards, but trees are inherently dangerous. This assessment was carried out from the ground, and covers what was reasonable to be assessed at the time of inspection. No aerial or underground inspections were carried suability is accepted for damage or injury caused by trees and no responsibility is accept if the recommendations in this report are not adhered to. Limitations on the use of this reportThis report is to be utilised in its entirety only. Any written or verbal submission that includes statements taken from this report may only be used where the whole report is referenced.AssumptionsCare has been taken to obtain accurate information from reliable sources. Botanics can neither guarantee nor be responsible for the accuracy of information provided by others.

6.0 BIBLIOGRAPHY & REFERENCES

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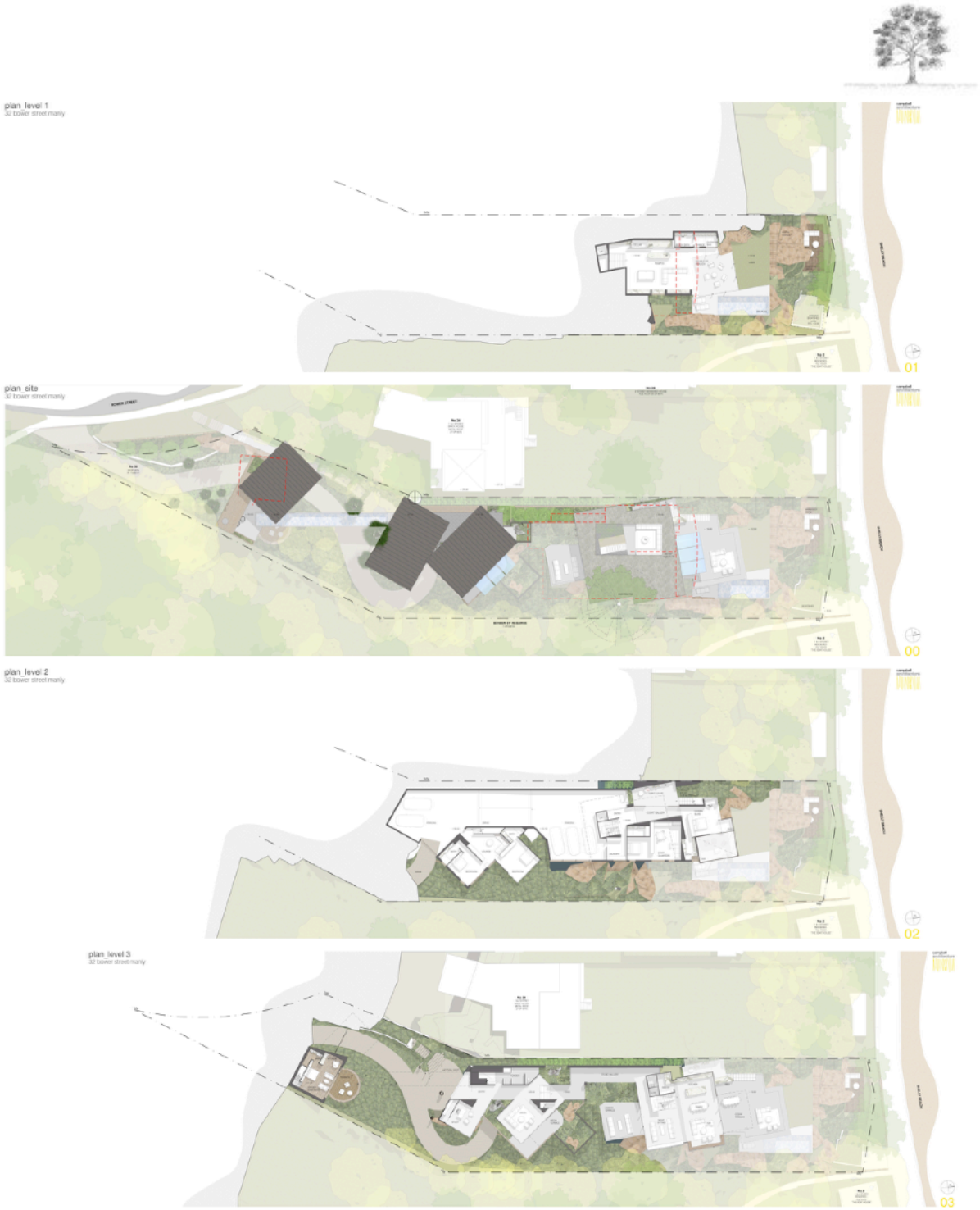

Figures 2 Show the various levels and the impacts of the proposed construction on the surrounding trees and landscape.

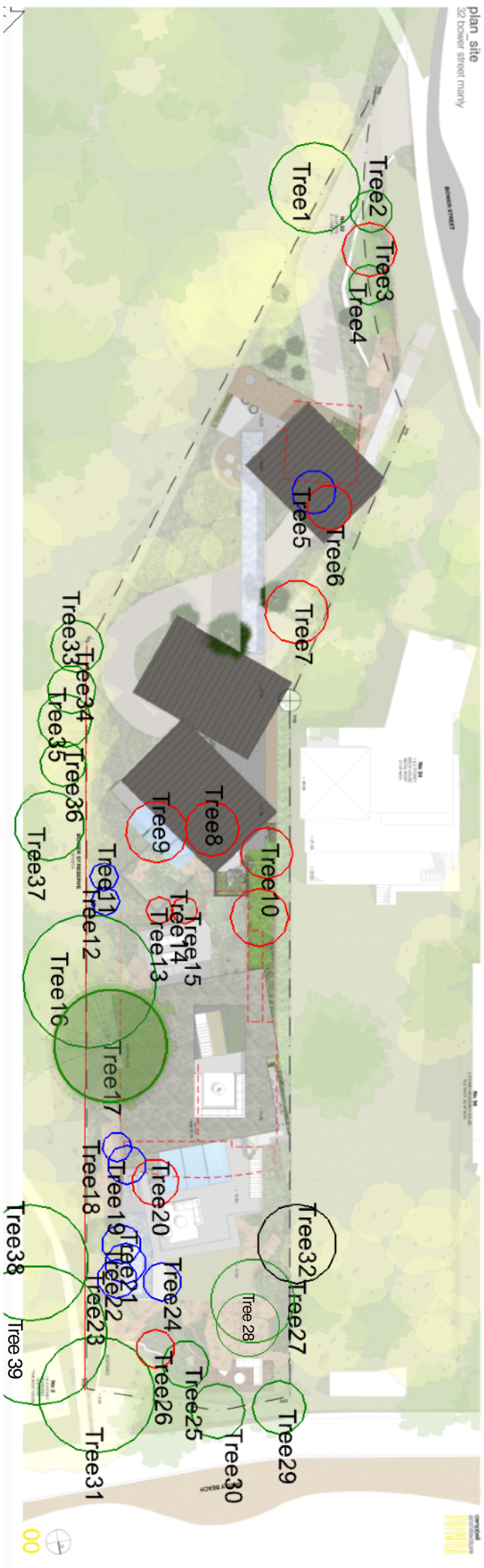

Figure 3 Shows the locations and numbers of the documented trees in relation to the proposed development. Tree 17 has subsequently been proposed for retention.

7. Annexe

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This Annex has been requested to detail the retention requirement for Tree 17. As detailed, this is a mature and significant *Ficus rubiginosa*, or Port Jackson Fig tree located adjacent to the site's eastern boundary. The tree was originally considered as a High value tree required for retention.

As such, the original proposed construction footprint had been set back to allow for this trees preservation. Further assessment of the tree located extensive decay and poor structure, undermining its significance and leading to a Removal recommendations.

Council has however since assessed the proposed development and seen the tree as High value and required for retention. The retention of the tree will not affect the currently proposed construction footprint, or development application.

As noted, the tree has been affected by decay that has developed throughout its lower canopy and trunk base. The tree's mature age and limited vigour has meant that this decay has been able to spread. This has, and will continue to impact on structural integrity.

The area affected by any potential failure is however an infrequently used portion of the site and low target.

Arboricultural management of this tree will require the removal of all dead wood from throughout the tree's canopy, removal of selected crossed branches and the reduction of end weights on limbs considered to have a higher potential for failure. This may require the reduction of canopy mass by as much as 20%.

Tree health and vigour will also need to be improved to allow the tree to produce the reaction wood to compartmentalise current decay points as well as the proposed pruning wounds. This will require the removal of horticultural competition and the importation of an organic layer of mulch among other fertilisers to improve mycoryzal fungal associations and root growth.

The tree will also require ongoing monitoring to assess health. The tree's mature age, structure and limited vigour will mean that the process of decay may well have set a course that cannot be reversed and the tree will inevitably decline further.

Tree Table for 32 Bower Street, Manly.

T#	Species	Remnant Native, Exotic.	Age Class	Canopy Height and Spread.	Trunk Diameter DBH	Basal Diameter DGL	Significance	Amenity value	Ecological Value	Defects	SRZ	TPZ	Implications
T1	Eucalyptus saligna (Sydney Blue Gum)	N	SM	14 x 6	52cm	58cm	High	High	Moderate		2.5m	5m	A well suited native tree species .
T2	Melaleuca quinquenervia (Paperbark)	N	SM	12 x 9	59cm	65cm	High	Moderate	Moderate		3m	6m	A well established example of the species located directly adjacent to the sites wester boundary.
T3	Cupressus torulosa (Bhutan cypress)	E	SM	12 x 7	28 + 22 + 12cm	40cm	Moderate	Moderate	Moderate	I.	3m	6m	A well established example of the species located directly adjacent to the sites wester boundary.
T4	Glochidion ferdinadii (Cheese tree)	N	SM	9 x 7	20cm	25cm	Moderate	Moderate	Moderate		2.5m	5m	Part of the locally native plant community that will have established here naturally.
T5	Dracaena marginata (Dragon Tree)	E	M	7 x 5	30cm	30cm	Moderate	Low	Low		2m	4m	An exotic tree species that could be considered for relocation.
T6	Pittosporum undulatum (Sweet Pittosporum)	N	SM	7 x 4	20cm	25cm	Low	Low	Low		2m	4m	A semi mature example of the species of limited horticultural significance. .
T7	Melaleuca quinquenervia (Paperbark)	N	M	18 x 9	83cm	90cm	High	High	High		3.2	10m	A well established example of the species located directly adjacent to the sites wester boundary.
T8 T9	Syagrus romanzoffiana (Cocos palm)	E	M	8 x 4	30cm	30cm	Low	Low	Moderate	W	NA	NA	A pair of poorly considered palms that are unsuitable for retention irrespective of the proposed development.

Tree Table for 32 Bower Street, Manly.

T#	Species	Remnant Native, Exotic.	Age Class	Canopy Height and Spread.	Trunk Diameter DBH	Basal Diameter DGL	Significance	Amenity value	Ecological Value	Defects	SRZ	TPZ	Implications
T10	Glochidion ferdinadii (Cheese tree)	N	SM	5 x 4	20cm	25cm	Low	Low	Low		2.5m	5m	A small locally native example of the species required for removal.
T11 -12	Howea forsteriana (Kentia palm)	N	M	9 x 4	20cm	25cm	Moderate	Moderate	Moderate		2.5m	5m	Part of a small stand of similar trees located adjacent to the sites eastern boundary. Consider for relocation.
T13 -14	Cordyline australia (Cabbage tree)	N	SM	6 x 5	30cm	35cm	Low	Low	Low		2m	4m	A pair of feature trees adjacent to the front entrance.
T15	Dracaena marginata (Dragon Tree)	E	M	7 x 4	30cm	40cm	Low	Low	Low		2.5m	5m	A well established example of the species located directly adjacent to entrance.
T16	Banksia integrifolia (Coastal Banksia)	N	M	14 x 8	52cm	60cm	High	High	High		3.5m	8m	A well established locally native tree species located adjacent to the sites eastern boundary.
T17	Ficus rubiginosa (Port Jackson Fig)	N	M	14 x 12	92cm	1m	High	High	High	D	4m	12m	A well established locally native tree species located adjacent to the sites eastern boundary. Large section of visible surface decay and included bark. Recommended for retention.

Tree Table for 32 Bower Street, Manly.

T#	Species	Remnant Native, Exotic.	Age Class	Canopy Height and Spread.	Trunk Diameter DBH	Basal Diameter DGL	Significance	Amenity value	Ecological Value	Defects	SRZ	TPZ	Implications
T18	Phoenix roebelenii (Dwarf Date)	E	M	6 x 3	20cm	20cm	Moderate	Moderate	Low		2.5m	4m	A mature example of this somewhat unusual palm species. Relocate.
T19	Howea forsteriana (Kentia palm)	N	M	12 x 4	25cm	30cm	High	High	Moderate		2.5m	4m	A well established locally native tree species located within the foreshore garden. Will have been planted as part of the earlier landscape works.
T20	Livistona chinensis (Chinese Cabbage Palm)	E	M	9 x 6	30cm	42cm	Moderate	Moderate	Moderate		2.5	6m	A well established locally native tree species located within the foreshore garden. Will have been planted as part of the earlier landscape works.
T21 T22 T23	Howea forsteriana (Kentia palm)	N	M	8 x 4	30cm	30cm	Moderate	Moderate	Moderate		2m	4m	Part of a well established stand of Kentia palms that will have been planted as part of the early landscape installation.
T24	Howea forsteriana (Kentia palm)	N	M	10 x 4	30cm	30cm	Moderate	Moderate	Moderate		2m	4m	Another well established example of this native palm species that will have been planted as part of the early landscape works.
T25	Camellia sasanqua (Camellia)	E	M	8 x 7	35cm	40cm	High	High	Moderate		2.5m	6m	A well established example of this exotic tree species that has established well in this location.

Tree Table for 32 Bower Street, Manly.

T#	Species	Remnant Native, Exotic.	Age Class	Canopy Height and Spread.	Trunk Diameter DBH	Basal Diameter DGL	Significance	Amenity value	Ecological Value	Defects	SRZ	TPZ	Implications
T26	Macadamia (Macadamia)	N	SM	8 x 5	42cm	40cm	Moderate	Moderate	Moderate		3m	8m	A semi mature example of the species of limited horticultural significance and recommend for removal.
T27 T28	Glochidion ferdinadii (Cheese tree)	N	SM	7 x 5	30cm	30cm	Low	Moderate	Moderate		2.5m	5m	1 of 2 semi mature examples of this native tree species.
T29 T30	Livistona australis (Cabbage tree palm)	N	M	7 x 5	40cm	40cm	High	High	High		2.5m	6m	Part of a planted stand of these slow growing native palms
T31	Ficus rubiginosa (Port Jackson Fig)	N	M	16 x 14m	80cm	90cm	High	High	High		3m	10m	Part of the locally native plant community that will have established here naturally.
T32	Ficus rubiginosa (Port Jackson Fig)	N	J	3 x 3	20cm	20cm	Low	Low	Low		NA	NA	A dead stump that has had this Ficus establish.
T33 - T36	Howea forsteriana (Kentia palm)	N	M	8 x 3	20cm	20cm	High	High	High		2.5m	3m	Part of a stand of similar trees located within the adjacent Crown Lands. Retain.
T37	Melia azadarach (Chinaberry)	E	J	8 x 6	25cm	30cm	Low	Low	Low		2.5m	4m	A poor tree species for a range of reasons. Recommend for removal with approval.

Tree Table for 32 Bower Street, Manly.

T#	Species	Remnant Native, Exotic.	Age Class	Canopy Height and Spread.	Trunk Diameter DBH	Basal Diameter DGL	Significance	Amenity value	Ecological Value	Defects	SRZ	TPZ	Implications
T38	Ficus elastica (Rubber tree)	E	M	20 x 18	80cm	90cm	Low	Moderate	Low	W	3m	8m	A poor tree species for a range of reasons. Recommend for removal with approval.
T39	Ficus rubiginosa (Port Jackson Fig)	N	M	20 x 18	90cm	1m	High	High	High		3.5m	10m	Part of the locally native plant community that will have established here naturally. Retain.

Genus, Species, and Common name
The botanical and common name of each tree is identified and recorded. Occasionally the exact species name is unknown; sp. Is recorded to indicate this.

Height, Spread, Trunk Diameter, DBH and DRB
The Trees height and spread are recorded in meters.
The tree DBH is recorded in millimeters. DBH is an abbreviation of diameter (of the trunk) measured at breast height (or 1.4 meters from the base of the trunk). If more than one trunk is present the DBH is calculated in accordance with AS4970-2009 Protection of Trees on Development Sites.
If the tree has multiple trunks each trunk DBH will be recorded individually.
The tree DRB is recorded in millimeters. DRB is an abbreviation of Diameter (of the trunk) measured above the root buttress. It is required to calculate the SRZ in accordance with AS4970-2009 Protection of Trees on Development Sites when there is major encroachment within the TPZ, i.e. greater than 10% is encroached upon or if there is an encroachment within the SRZ.

Age
The age class of each tree is estimated as either:
J- Juvenile, a young sapling, easily replaced from nursery stock
SM- Semi mature, a tree that has not grown to mature size
M- Mature, a tree that has reached mature size and will slowly increase in size over time.
OM- Over mature, a tree that has been mature for a long period and is beginning to display signs of decline, e.g. large dead branches
S- Senescent, an over mature tree that is now in decline

Health
The Tree's health is recorded as a measurement of:
G- Good, the does not appear stressed with no excessive dieback, insect infestation, decay, deadwood or epicormic shoots
Avg- Average health, the tree appears stressed and has some crown dieback, and/or areas or few epicormic shoots, and/0r some deadwood in the crown and some new growth at the branch tips. These trees may benefit from remediation of the growing environment to reduce stress and return it to good health.
F- Fair, the tree may have areas of crown die back, and/or many epicormic shoots, and/or reduced new growth at branch tips. These trees have been stressed fort a short period of time; remediation of the growing environment may improve the trees health.
P- Poor, the tree may have large areas of crown die back, and/or many epicormic shoots, and/or reduced new growth at branch tips. These trees have been stressed for a long time, remediation of the growing environment would not return the tree to good health.

Tree Table for 32 Bower Street, Manly.

Crown Condition

The crown condition of each tree is assessed and recorded as either:

G- Good Condition: the tree appears to have no visible indication of inherent structural effects.

Avg- Average Condition: the tree has minor structural defects which may be corrected with remedial works or pruning, allowing the tree to return to Good Condition.

F- Fair Condition: the tree has visible structural defects such as (but not limited to) dead branches, and/or an unbalanced crown, and/or leaning trunk and/or signs of decay. These trees do not demonstrate the typical form of their species, of have been damaged or have begun to deteriorate. Remedial works or pruning may return the tree to Average Condition.

P- Poor Condition: the tree has significant structural defects such as (but not limited to) very large dead branches, and/or extremely unbalanced crown, and/or subsiding trunk, and/or large areas of decay. These trees do not demonstrate the typical form of their species, or have been severely damaged or have deteriorated significantly. Remedial pruning would not return the tree to fair condition.

Significance

The landscape significance of a tree is an essential criterion to establish the importance that a particular tree may have on a site. When determining a trees significance within the landscape context, the following questions are asked. Significance is measured as high, medium, or low. High being a affirmative answer for 4 or more questions, Medium being 3 affirmative answers, and Low being 2 or less affirmative answers.

- Is the tree a local native remnant; an endangered species, a part of an endangered species community; or does the tree provide critical habitat.

RATING	HERITAGE VALUE	ECOLOGICAL VALUE	AMENITY VALUE
1. SIGNIFICANT	The subject tree is listed as a Heritage Item under the Local Environment Plan (LEP) with a local, state or national level of significance or is listed on Council's Significant Tree Register	The subject tree is scheduled as a Threatened Species as defined under the Threatened Species Conservation Act 1995 (NSW) or the Environmental Protection and Biodiversity Conservation Act 1999	The subject tree has a very large live crown size exceeding 300m² with normal to dense foliage cover, is located in a visually prominent position in the landscape, exhibits very good form and habit typical of the species
	The subject tree forms part of the curtilage of a Heritage Item (building /structure /artefact as defined under the LEP) and has a known or documented association with that item	The tree is a locally indigenous species, representative of the original vegetation of the area and is known as an important food, shelter or nesting tree for endangered or threatened fauna species	The subject tree makes a significant contribution to the amenity and visual character of the area by creating a sense of place or creating a sense of identity
	The subject tree is a Commemorative Planting having been planted by an important historical person (s) or to commemorate an important historical event	The subject tree is a Remnant Tree, being a tree in existence prior to development of the area	The tree is visually prominent in view from surrounding areas, being a landmark or visible from a considerable distance.
2. VERY HIGH	The tree has a strong historical association with a heritage item (building/structure/artefact/garden etc) within or adjacent the property and/or exemplifies a particular era or style of landscape design associated with the original development of the site.	The tree is a locally-indigenous species, representative of the original vegetation of the area and is a dominant or associated canopy species of an Endangered Ecological Community (EEC) formerly occurring in the area occupied by the site.	The subject tree has a very large live crown size exceeding 200m²; a crown density exceeding 70% (normal-dense), is a very good representative of the species in terms of its form and branching habit or is aesthetically distinctive and makes a positive contribution to the visual character and the amenity of the area
3. HIGH	The tree has a suspected historical association with a heritage item or landscape supported by anecdotal or visual evidence	The tree is a locally-indigenous species and representative of the original vegetation of the area and the tree is located within a defined Vegetation Link / Wildlife Corridor or has known wildlife habitat value	The subject tree has a large live crown size exceeding 100m²; The tree is a good representative of the species in terms of its form and branching habit with minor deviations from normal (e.g. crown distortion/suppression) with a crown density of at least 70% (normal); The subject tree is visible from the street and surrounding properties and makes a positive contribution to the visual character and the amenity of the area
4. MODERATE	The tree has no known or suspected historical association, but does not detract or diminish the value of the item and is sympathetic to the original era of planting.	The subject tree is a non-local native or exotic species that is protected under the provisions of this DCP.	The subject tree has a medium live crown size exceeding 40m²;The tree is a fair representative of the species, exhibiting moderate deviations from typical form (distortion/suppression etc) with a crown density of more than 50% (thinning to normal); and
			The tree is visible from surrounding properties, but is not visually prominent – view may be partially obscured by other vegetation or built forms. The tree makes a fair contribution to the visual character and amenity of the area.
5. LOW	The subject tree detracts from heritage values or diminishes the value of a heritage item	The subject tree is scheduled as exempt (not protected) under the provisions of this DCP due to its species, nuisance or position relative to buildings or other structures.	The subject tree has a small live crown size of less than 40m² and can be replaced within the short term (5-10 years) with new tree planting
6. VERY LOW	The subject tree is causing significant damage to a heritage Item.	The subject tree is listed as an Environment Weed Species in the Leichhardt Local Government Area, being invasive, or is a known nuisance species.	The subject tree is not visible from surrounding properties (visibility obscured) and makes a negligible contribution or has a negative impact on the amenity and visual character of the area. The tree is a poor representative of the species, showing significant deviations from the typical form and branching habit with a crown density of less than 50% (sparse).
7. INSIGNIFICANT	The tree is completely dead and has no visible habitat value	The tree is a declared Noxious Weed under the Noxious Weeds Act (NSW) 1993 within the relevant Local Government Area.	The tree is completely dead and represents a potential hazard.

Tree Table for 32 Bower Street, Manly.

Amenity value
Amenity value is a subjective measurement based on the tree's contribution to the landscape, it may be based on the tree's visual form, however it also includes non visual attributes such as provision of shade for a seat, screening of poor views or for privacy, or if it has historical significance. The amenity value is recorded as:

H- High, the trees form is an excellent example of its species and it makes a great specimen and/or it has other attributes such as screening, or its historical significance. These trees are visually prominent and valuable to the community or public domain.

M- Medium, the tree may have an altered form and/or it has attributes that provide amenity to local residents only.

L-Low, the tree is not a good specimen and it does not provide substantial benefit to local residents or the community.

Ecological value
Ecological value is a measurement of the trees contribution to the environment. It is determined by the trees area of origin, its potential to provide habitat to native fauna and its potential to become an environmental pest. The ecological value is recorded as:

H- High, the tree is locally native or reminant and/or it has habitat for native fauna

M- Medium, the tree is native but not locally native

L- Low, the tree is not native and/or it may be a listed nuisance or weed species.

Ha- Habitat, is the tree valued by fauna for food (i.e. foliage, fruit, or sap) or shelter (i.e. nesting, roosting, dray, or hollow).

Form
The form, structure or shape of each tree is assessed and recorded as either one or a combination of several of the below terms may be used to describe the trees form; (U) Upright, (B) Broad, (C) Conical, (Sh) Shrub, (CS) Crown Shy (also referenced is the adjacent dominant tree canopy i.e. T4), (V) Vase, (D) Dome, (P) Palm, (S) Spreading, (L) Leaning or (BM) Basal Multi Trunked.
Crown form may also be assessed in accordance with the relationship with the neighbouring tree and recorded as either: S- Suppressed, the crown is located beneath another larger crown and is leaning away (Crown Shy); C- Codmoninant, the crown is adjacent to another crown of similar size, their crown areas may appear joined; D- Dominant, the crown is above the lower crowns; E- Emergent, the crown emerges from a lower canopy formed by the other dominant or codominant crowns.

Defects
The presence of one or a combination of several defects is recorded (W) Wound, (D) Decay, (F) Fungus, (B) Bulge, (FB) Fibre Buckling, (C) Cracks, (S) Split, (H) Hollow, (DB) Die back, (Epicormic Shoots, (DW) Dead wood, (I) Inclusion, (CA) Cavities, (PF) Previous Failure, (R) Root Damage, (P) Pruning wound, (PD) Pests and Diseases, (ST) Storm Damage.

Structural Root Zone (SRZ
The SRZ is a radial area extending outwards from the center of the trunk. This area contains the majority of the structural woody roots. This area is primarily responsible for stability. Root damage or root loss within this zone greatly increases the opportunity for decay fungi to ingress in to the heartwood, causing internal decay in addition to destabilizing the trees structural integrity. The SRZ is calculated as follows (This calculation is derived from the Australian Standard $4970-2009 Protection of Trees on Development Sites):

$$\textbf{SRZ (Radius)} = (D \times 50)^{0.42} \times 0.6$$

Tree protection Zone (TPZ)
The TPZ is a circular area with a radius measured by multiplying the DBH by twelve, or a circular area the size of the trees drip line, whichever is greater. This area contains the majority of the essential structural and feeder roots responsible for stability, gaseous exchange and water and nutrient uptake. Excavation, back filling, compaction or other disturbance should not occur in this area. The TPZ is used to identify the minimum area required for the safe retention of a given tree. This calculation is derived from the Australian Standard 4970-2009 Protection of Trees on Development Sites. An incursion to 10% within the TPZ is potentially acceptable if no other option is available. A major encroachment (in excess of 10%) is required to be clearly justified by the project Arborist and compensated for elsewhere. Justification methodology mat vary depending on site or individual trees health, vigor and ability to withstand disturbance may require root investigation.