



Arboricultural Impact Assessment and Management Plan



32 Bower Street, Manly.

Prepared For: **Eaton Molina Architects.**

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Dated: **June, 2023.**



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1.0 INTRODUCTION

1.1 Background

1.1.1 This Arboricultural Impact Assessment and Management Plan has been prepared for Eaton Molina Architects on behalf of the property owners, Rob and Deborah Gregor. This report will document the arboricultural significance of those trees located within and neighbouring the site and make recommendations for their preservation or removal, based on this and their location in relation to the proposed construction.

1.1.2 This report has been requested by Northern Beaches Council as part of an application to modify an approved DA. The approved works have seen the demolition of the previously existing residence and the partial excavation of the building footprint. This portion of the works has seen the removal of much of the site's previously existing trees.

1.1.3 In the preparation of this Report consideration has been given to the objectives of the following:

- State Environment Planning Policy Vegetation in Non-Rural Areas (2017).
- Australian Standard 4373 Pruning of Amenity Trees (2007).
- Australian Standard 4970 Protection of Trees on Development Sites (2009).
- Australian Standard 2303 Tree Stock for Landscape Use (2015).
- Safe Work Australia Guide for Managing Risks of Tree Trimming and Removal work (2016).

1.1.4 This assessment references Lot 28 DP 8075, 32 Bower Street, Manly and the following plans:

- **Eaton Molina Architect:** Site Analysis Plan- A.01.00-A. Dated: 07.03.2023
- **Eaton Molina Architect:** Site Plan General Arrangements- A.01.01-A. Dated: 07.03.2023
- **Eaton Molina Architect:** General Arrangements Levels- 1, 2 + 3. A.02.00-A. Dated: 07.03.2023
- **Eaton Molina Architect:** General Arrangements L4. Roof Plan- A.02.01-A. Dated: 07.03.2023
- **Eaton Molina Architect:** General Arrangements E + W Elevation- A.03.00-A. Dated: 07.03.2023
- **Eaton Molina Architect:** General Arrangements N + S Elevation- A.03.01-A. Dated: 07.03.2023
- **Eaton Molina Architect:** General Arrangements Plan Calculations- A.04.01-A. Dated: 07.03.2023
- **360 Landscape Design:** Tree Protection and Removal Plan. Dated: 22.02.2023
- **360 Landscape Design:** Landscape Plan- Masterplan. Dated: 22.02.2023
- **360 Landscape Design:** Landscape Plan- Level 1. Dated: 22.02.2023
- **360 Landscape Design:** Landscape Plan- Level 2. Dated: 22.02.2023
- **360 Landscape Design:** Landscape Plan- Level 3. Dated: 22.02.2023
- **360 Landscape Design:** Landscape Plan- Level 4. Dated: 22.02.2023

1.1.5 These plans show that these works will reconfigure a previously approved DA (DA2019/0916). This has been done as part of a Section 4.55 application to alter an approved development. The proposed works are again predominantly within that of the existing construction footprints. The proposed extension of the construction footprint to the east is however within the Structural Root Zone (SRZ) of the *Ficus rubiginosa*, or Port Jackson Fig tree previously documented as Tree 17 and requires its removal.



1.2 The Proposal

1.2.1 This Section 4.55 application to alter an approved DA seeks approval for the following:

- The reconfiguration of the construction footprints.
- The reconfiguration of the vehicular access and parking facilities.
- The reconfiguration of the foreshore gardens including the construction of a swimming pool.
- The reconfiguration of the pedestrian access to the foreshore boundary.

1.2.2 The existing construction footprints, as well as the construction of boundary walls will have affected the abiotic spread and development of all tree roots including those neighbouring the boundary. https://en.wikipedia.org/wiki/Abiotic_component

2.0 RESULTS

2.1 The Site

2.1.1 The site is an irregular shaped block of 1859m² that extends from the site's upper Bower Street boundary down to the lower foreshore boundary, with the site's eastern boundary, adjacent to Shelley Beach Reserve.

2.1.2 The previously existing residence had been constructed on the elevated, central portion of the block with steep vehicular access from Bower Street providing off street garaged parking and storage. The central residential construction footprint extends to the north and east with terraced gardens down to the foreshore boundary.

2.1.3 Site topography, particularly on the lower northern portion of the site is characterised by a series of large sandstone "floaters". These will have again affected the abiotic spread and development of underlying tree roots. Works are currently underway to stabilise these as part of the northern boundary wall reconstruction.

2.1.4 This existing residence, as well as boundary and retaining walls all represent a significant construction footprint that will have significantly affected the abiotic development of all site and neighbouring trees. https://en.wikipedia.org/wiki/Abiotic_component

2.2 The Trees

2.2.1 This report focuses on those trees remaining on and neighbouring the site. Previously approved demolition works have included the removal of most of the trees located on site. An assessment of the remaining trees has been done using Visual Tree Assessment (VTA) criteria and notes. This is a requirement of 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 inspection was limited to a visual examination of the subject tree(s) from ground level only. Tree(s) outside the site have been



assessed from property boundaries only. No internal diagnostic or tissue testing was undertaken as part of this assessment. The site was inspected by Level 5 Arborist, George Palmer on the 26th April, 2023.

2.2.2 Tree dimensions and locations are approximate only. The locations of the subject tree(s) was determined from the supplied plans, tree(s) not shown on the supplied plans have been plotted in their approximate location only.

2.2.3 Tree Protection Zones, Tree Protection Measures and Sensitive Construction Methods for the subject trees were based on methods outlined in *Australian Standards 4970-2009 Protection of Trees on Development Sites*. The Tree Protection Zone (TPZ) is described in AS-4970 as a combination of the root area and crown area requiring protection. It is an area isolated from construction disturbance, so that the tree remains viable.

2.2.4 The Structural Root Zone (SRZ) is described in AS-4970 as the area around the base of a tree required for the tree's stability in the ground. Severance of structural roots within the SRZ is not recommended as it may lead to the destabilisation of the tree at ground level.

2.2.5 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.

2.3 Tree Data

2.3.1 Trees 1 and 2 remain on site. These are semi mature *Eucalyptus saligna*, or Sydney Blue Gums located within the neighbouring reserve. These trees remains in good health and condition and are located outside the impacts of the construction process.

2.3.2 Tree 2 is a semi mature *Melaleuca quinquenervia*, or Paperbark located adjacent to the Bower Street boundary. This tree has been pruned to provide construction clearance and has seen a number of pier holes dug to allow for the re construction of this boundary, retaining wall structure. The tree remains in good health and condition.

2.3.3 The semi mature *Glochidion ferdinadii*, or Cheese tree previously documented as Tree 4 has unfortunately been removed. The tree had been considered for retention and was mistakenly removed along with the *Pittosporum undulatum*, or Sweet Pittosporum previously documented as Tree 6 in the initial stages of site establishment.

2.3.4 The well established *Banksia integrifolia*, or Coastal Banksia previously documented as Tree 16 entered into a cycle of decline prior to site establishment and has since died and been removed.



2.3.5 The mature *Ficus rubiginosa*, or Port Jackson Fig documented as Tree 17 continues to lean to the east and over the power line infrastructure through the reserve. Decay extends from the tree's base to lower canopy. This is likely a result of historic construction. The included basal structure of the tree also continues to undermine the tree's structural integrity. The tree is considered as being a High probability of failure and should be removed.

2.3.6 The two (2) *Glochidion ferdinadii*, or Cheese trees previously documented as Trees 27 and 28 continue to decline. Both have historically been reduction pruned and do not retain well structured canopies. Both have been considered as Low Value and documented for removal to allow replacement.

2.3.7 The mature *Livistona australis*, or Cabbage Tree Palms documented as Trees 29 and 30 have been separated from the more direct impacts of the construction process with the installation of Trunk Protection as outlined in AS4970 Standards for the Protection of Trees on Development Sites. Both remain in good health and condition.

3.0 ARBORICULTURAL IMPACT ASSESSMENT

3.1 Tree Removal/Retention.

3.1.1 The proposed works require the removal of Trees 17, 27 and 28. These have not have been seen as a material constraint to the proposed and all are required for removal to allow.

3.1.2 Trees 1, 2, 29 and 30 will continue to be protected throughout the ongoing construction process. This will be done in accordance with Australian Standard 4970 for the Protection of Trees on Development Sites and Northern Beaches Conditions of Consent.

3.2 Works within TPZ Areas

3.2.1 Works adjacent to Tree 2 have included the excavation required to allow for the installation of a series of piers to allow for the approved construction. These piers were hand excavated to ensure limited impacts on the underlying tree roots and none where noted. Pruning works were required to provide construction clearance to the tree's eastern canopy. Works to date represent the bulk of the construction and will not extend beyond those detailed.

3.3 Existing Construction

3.4.1 The existing construction footprints including boundary and retaining walls will have significantly affected the abiotic spread and development of all documented tree roots. It is not anticipated that any significant roots will be directly affected by the works. https://en.wikipedia.org/wiki/Abiotic_component



4.0 SUMMARY + CONCLUSIONS

4.1 The bulk of the approved demolition and excavation works has seen the removal of many of the site's previously existing trees. Those that remain are adjacent to the site boundaries and will have been affected by historic construction.

4.2 Trees 1, 2, 29 and 30 all remain in good health and condition and continue to be separated from the more direct impacts of the construction process.

4.3 The mature *Ficus rubiginosa*, or Port Jackson Fig documented as Tree 17 continue to represent a High hazard. The tree has developed with a lean over power line infrastructure with a co dominant and included basal structure. This is compounded by decay from the tree's base that further undermines the structural integrity of the tree from ground level.

5.0 RECOMMENDATIONS

5.1 It will be recommended that Trees 17, 27 and 28 be removed to allow the proposed reconfiguration of the proposed construction footprints as detailed. These removals should be done in accordance with current industry standards following formal Norther Beaches Council Approval.

5.2 The remainder of the trees on site have been documented for preservation. Construction impacts must be limited to those detailed. All works will need to be completed from within the existing or proposed construction footprints.

5.3 All permeable soil surface areas should be treated as being part of a Tree Protection Zone (TPZ) and allocated appropriate protection. Access will need to follow existing and remain within the current construction footprint wherever practical. All construction on site will require consideration for the preservation of topography outside the construction footprint.

5.4 All construction will require the preservation of larger diameter (30mm +) roots associated with preserved trees. All roots within the SRZ of a preserved tree will require preservation where possible. A pier and beam based construction method will limit the direct impacts of the construction to those detailed.

5.5 The remainder of the indirect construction impacts should be mitigated with the implementation of the following requirements to meet the Australian Standard AS4970 for the Protection of Trees on Development Sites. **Appendix 1.**



APPENDIX 1- PROTECTION of TREES on DEVELOPMENT SITES.

6.1 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.

6.2 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.

6.3 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.

6.4 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.

6.5 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.

6.6 Signage

Tree Protection Signage shall be attached to the TPZ 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.

6.7 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.

6.8 Site Arborist

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

6.9 Site Management

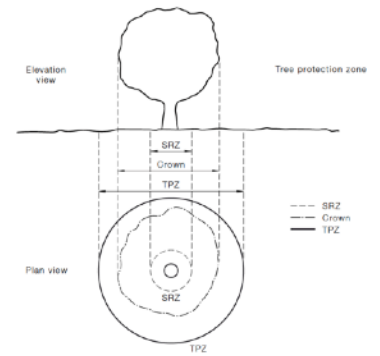
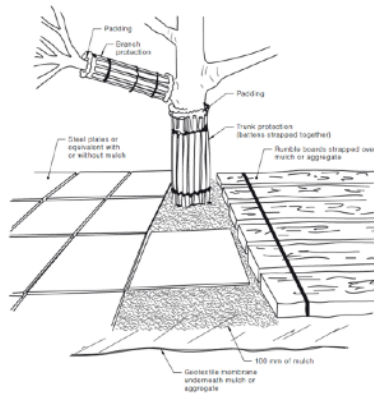
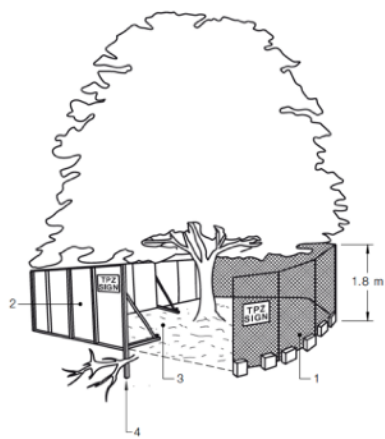
Materials and waste storage, site sheds and temporary services shall not be located within the TPZ unless specified. Storage points shall be covered when not in use and be no greater than 2m in height.

6.10 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.

6.11 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.



Australian Standards: AS4970 for the Protection of Trees on Development Sites.



APPENDIX 2- GLOSSARY

COMMON NAME/GENUS SPECIES CULTIVAR – Common names can vary with selected texts. Where species is unknown, “sp.” indicated after genus. Where cultivar is unknown “cv” indicated after species. The number in brackets e.g. (x9) after the species indicates the number of trees in this tree group.

DBH – Diameter at Breast Height. Tree trunk diameter measured at breast height (1.4 metres above ground level). Fabric diameter tape is used which assumes a circular cross section. Multiple measurements indicate multiple trunks. More than three trunks are indicated as “multi”. Where DBH measurement cannot be taken at 1.4m the height at which it has been taken is indicated in the Comments column.

CANOPY SPREAD RADIUS – Average canopy radius (widest + narrowest 2). Circular canopy depictions on Tree Plan/Survey are indicative only. Where canopy spread was significantly skewed, all four cardinal point measurements were recorded.

AGE CLASS – Immature (IM), Semi-mature (SM), Mature (M), Over-mature (OM). Assessment of the tree’s current Age. A Mature (M) tree has reached a near stable size (biomass) above and below ground. Trees can have a Mature age class for >90% of life span. Over-mature (OM) trees show symptoms of irreversible decline and decreasing biomass.

VIGOUR–Good(G),Fair(F)orPoor(P). The general appearance of the canopy/foilage of the tree at the time of inspection. Vigour can vary with the season and rainfall frequency. A tree can have Good vigour but be hazardous due to Poor condition. A tree in Good vigour has the ability to sustain its life processes. Vigour is synonymous with health.

CONDITION – Good (G), Fair (F) or Poor (P). The general form and structure of the trunk/s and branching. Trunk lean, trunk/branch structural defects, canopy skewness or other hazard features are considered.

SRZ RADIUS – Structural Root Zone. The area around a tree required for tree stability. Earthworks should be prohibited within the SRZ.. The area is calculated from the formula and graph at Figure 1 of AS4970-2009. The SRZ graph has been adapted from the work of Claus Mattheck (1994). DBH has been used instead of stem diameter above root buttress in the calculation of SRZ. 0.1m has been added to SRZ to allow for minor increases in stem diameter.

TPZ RADIUS – Tree Protection Zone. Radial offset (m) of twelve times (12X) trunk DBH measured from centre of trunk (for trees less than 0.3 metre DBH minimum TPZ is 2.0 metres). To satisfactorily retain the tree construction activity (both soil cut and fill) must be restricted within this offset. TPZ offsets are rounded to the nearest 0.1 metre. Existing constraints to root spread can vary TPZ. Generally an area equivalent to the TPZ should be available to the tree post development. Encroachment occupying up to 10% of the TPZ area is acceptable without detailed root zone assessment. Encroachments greater than 10% require specific arboricultural assessment.

SULE – Safe Useful Life Expectancy. A systematic pre-development tree assessment procedure developed by Jeremy Barrell, Hampshire, England. The SULE method used in this assessment has been adapted for simplified use within the field. It gives a length of time that the Arborist feels a particular tree can be retained with an acceptable level of risk based on the information available at the time of the inspection. SULE ratings are Long (retainable for 40 years or more with an acceptable level of risk), Medium (retainable for 16-39 years), Short (retainable for 5-15 years) and Removal (tree requiring immediate removal due to imminent hazard or absolute unsuitability).

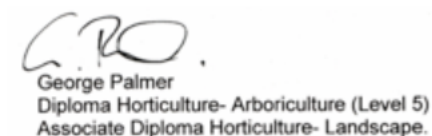
RECOMMENDATIONS – Retain (R), Retain Plus (R+), Transplant (T) or Remove (Rm).

COMMENTS – Comments relating to the location, surroundings and hazard potential of the trees at the time of inspection and where applicable the reason for removal.



APPENDIX 3- BIBLIOGRAPHY

- BARRELL J (1993), 'Pre-planning tree surveys: Safe Useful Life Expectancy (SULE) , *Arboricultural Journal*.
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- Standards Australia (2009), *Protection of Trees on Development Sites AS-4970.*



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 out. Liability is accepted for damage or injury caused by trees and no responsibility is accepted if the recommendations in this report are not adhered to. Limitations on the use of this report: This 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. Assumptions: Care 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.



Figure 1 Shows the piers within the TPZ of Tree 2.



Figure 2 Shows the basal decay and inclusions at the base of Tree 17.





Figure 3 Shows the sites eastern boundary with the neighbouring reserve and Tree 1.

