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142 OCEAN STREET

NARRABEEN, NSW

DEVELOPMENT PROPOSAL

ARBORICULTURAL IMPACT ASSESSMENT REPORT

Report Ref No- 8821

Prepared for
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INTRODUCTION

This report has been commissioned by TRIO Industry Pty Limited C/- PopovBass Architects to assess the remaining Useful Life Expectancy (ULE) and potential impacts that may occur to significant trees in relation to a new development proposal. The proposed development consists of constructing a new multi-level residential apartment facility within Lot 12 of SEC 47 in DP 111254 known as 142 Ocean Street, NARABEEN NSW.

Recommendations for retention or removal of trees is based on the trees condition, accorded ULE category, current design and potential impacts to trees under this development application.

Development incursions within tree protection zones (TPZ) and impacts to trees have been outlined within Note 2 of Appendix- A where incursions are described as Minor (<10%) & Major (>10%) TPZ occupancy. Within this report encroachments are discussed as low, moderate to high level impacts within the TPZ. Where site restrictions within notional root zone radiuses exist development impacts or encroachment disturbances are based on author's experience, observations of site conditions, soil type and topography.

To retain specific trees and ensure their viability development must take into consideration protection of the Tree Protection Zone (TPZ) radius as shown within the *acceptable incursion diagram* of Appendix- A. As a guide to determining impacts the Structural Root Zone (SRZ) & Tree Protection Zone (TPZ) setbacks have been provided within Appendix- C the SRZ & TPZ distance column.

Each tree assessed has been accorded a temporary identification number and is referred to by number throughout this report. For additional trees not plotted on provided documentation their location has been estimated by taking offsets from existing trees and structures. The trees, their location, development impact and design requirements may be referenced within the Tree Assessment Schedule and Tree Location Plan of Appendices C & D.

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

METHODOLOGY

1. In preparation for this report a limited site and ground level Visual Tree Assessment (VTA) was conducted on Friday 23rd April 2021 by the author of this report. The principles of VTA were primarily adopted from components of Mattheck *& Breloer* 1994 '*The Body Language of Trees*' with very basic risk values determined by criteria explained within the ISA TRAQ manual 2017. The inspection included assessment of the overall health and vigour of the trees, tree form, structure and structural condition commencing from near the lower trunk to the upper first order branch division as best as site conditions would allow. On completion of the VTA the retention value of the tree was summarised utilizing the tree assessment Checklist shown within Appendix- B.

2. The inspection was limited to visual assessment from within the subject site where the retention value, condition and diameters of neighbouring trees was estimated. No aerial (climbing) inspections, woody tissue testing or tree root investigation was undertaken as part of this tree assessment. Tree height and canopy spread was estimated and expressed in metres with trunk diameters measured at approximately 1.4 metres above ground level, rounded off to the nearest 50mm and expressed as DBH (Diameter at Breast Height). The height of palms was taken from ground level to the top of the crown shaft only, and excludes the central apical spear projection.

3. This report acknowledges and utilizes the current Australian Standards 'Protection of Trees on Development Sites' AS 4970 – 2009 as explained within Notes of Appendix- A.

4. Unless specified otherwise all distances and development offsets within this report are taken from the centre of the tree.

5. Plans and/or documentation received to assist in preparation of this assessment include:

   PopovBass Architects Job No: 0586, *specific to*:
   - Site & Site Survey Analysis Plan Dwg No: DA101, rev 1 dated 1.6.21
   - Lower Ground & Ground Floor Plan Dwg No: DA102, rev 2 dated 1.6.21
   - Elevations Dwg No: DA104, rev 2 dated 1.6.21
   - Sections Dwg No: DA105, rev 2 dated 1.6.21
   - Demolition Plan Dwg No: DA106, rev 2 dated 1.6.21

   Jane Britt Design, landscape Plans
   - Lower Ground & Ground Floor Plan Dwg No: SKL01 rev B dated 23.4.21

   C & A Surveyors NSW P/L
   - Survey Plan ref No. 16303-21 dated 20.1.2021

1. SUMMARY OF ASSESSMENT

1.1 General tree assessment

1.1.1 Thirteen (13) trees or groups of have been assessed for the purpose of this report. Of the thirteen trees one (1) tree is located within the front Council verge and the remaining twelve (12) trees or groups of are non-prescribed exempt trees noted within Northern Beaches Council Development Control Plans.

- *Council verge tree:* T1 is unlikely to be affected by work with tree protection fencing recommended to be installed prior to construction activities. The proposed new driveway access commences near 3m from the tree being outside of the critical Structural Root Zone (SRZ) radius. It is likely that the existing brick fence foundations have restricted root access within the site mitigating impacts by design indicating the tree can be protected in accordance with Section 2.3 *General tree protection requirements* of this report.
- *Exempt non-prescribed trees:* are identified as T2, 3, 4x4, 5, 6, 7, 8, 9, 10, 11x3, 12x6 & 13.

  Being exempt non-prescribed trees the trees are permitted to be managed (pruned, removed or relocated) without Council consent. Should an exempt tree require retention further advice and protection methodology is required prior to works occurring within Tree Protection Zone (TPZ) setbacks.

1.2 The development proposal

1.2.1 The proposal consist of constructing a multi-level apartment block facility with deep excavation to accommodate lower levels within tree protection zones setbacks.

Figure 1, showing proposed design footprint

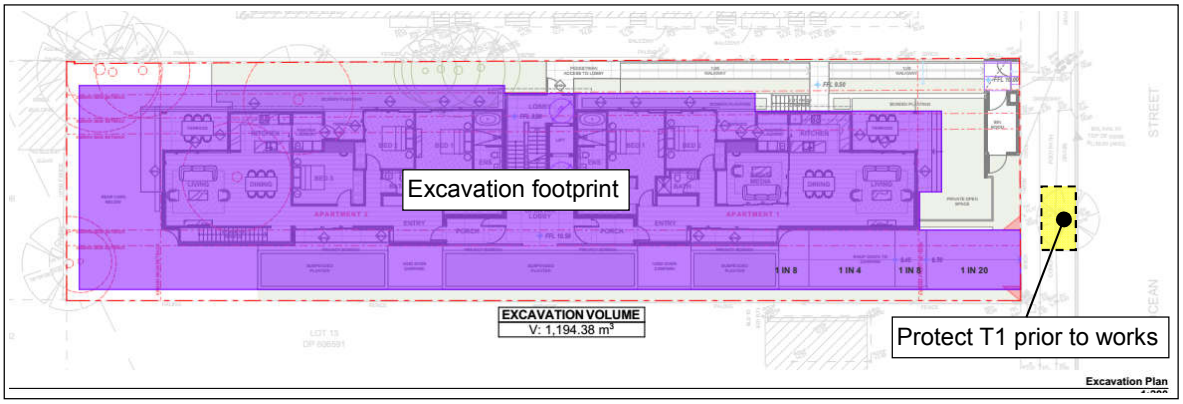
1.3 Design impact & tree removal

1.3.1 Figure 2 below identifies the proposed excavation area to accommodate lower levels with part external access areas that are located within tree protection zones. Those exempt trees that are significantly affected by the excavation footprint are trees throughout the site consisting of exempt trees:

- T2, 3, 4x4, 5, 6, 7, 8, 9, 10, 11x3, 12x6 & 13.

The trees are proposed for removal with their identified development impacts and design requirements detailed within Appendix- C.

Figure 2, showing bulk earthwork plan



1.3.1 Council verge tree T1. The existing brick fence foundations have likely restricted root access with proposed new driveway access located outside of the trees critical structural root zone. Having likely negligible root zone impact prior to works commencing the tree is to be protected with tree protection fencing as indicated within Figure 3.

2. CONCLUSIONS & RECOMMENDATIONS

2.1 Tree Removal

2.1.1 Given the twelve (12) trees or palm groups assessed within the site are all exempt non-prescribed trees they are permitted to be managed (pruned, removed or relocated) without Council consent.

Based on the design proposal the twelve trees or palm groups require or are recommended for removal to accommodate design, and are again identified as:

- T2, 3, 4x4, 5, 6, 7, 8, 9, 10, 11x3, 12x6 & 13.

Should an exempt tree require retention further advice and protection methodology is required prior to works occurring within Tree Protection Zone (TPZ) setbacks.

2.2 Recommended tree management & protection principles

2.2.1 In addition to the recommendations provided within this report and Australian Standard AS4970 – 2009 Protection of Trees on Development Sites the following summary and/or additional recommendations are provided as a guide for tree protection during works:

Specific recommendations

a) Council verge tree T1: there shall be no excavation within the trees 2.1m SRZ without prior arborist advice.

Prior to works occurring the tree shall be protected with tree protection fencing or similar protection that mitigates the potential for damages during construction activities while allowing for suitable public access.

2.3 General tree protection requirements

a) Prior to demolition works Tree Protection Fencing (TPF) and/or zones as identified within Figure 3 are recommended to be located under the guidance of an appointed site arborist. Unless specified otherwise the location of tree protection fencing is to be positioned to allow for adequate work access and/or be located at the extremity of the TPZ radius, see SRZ & TPZ distance column Appendix- C.

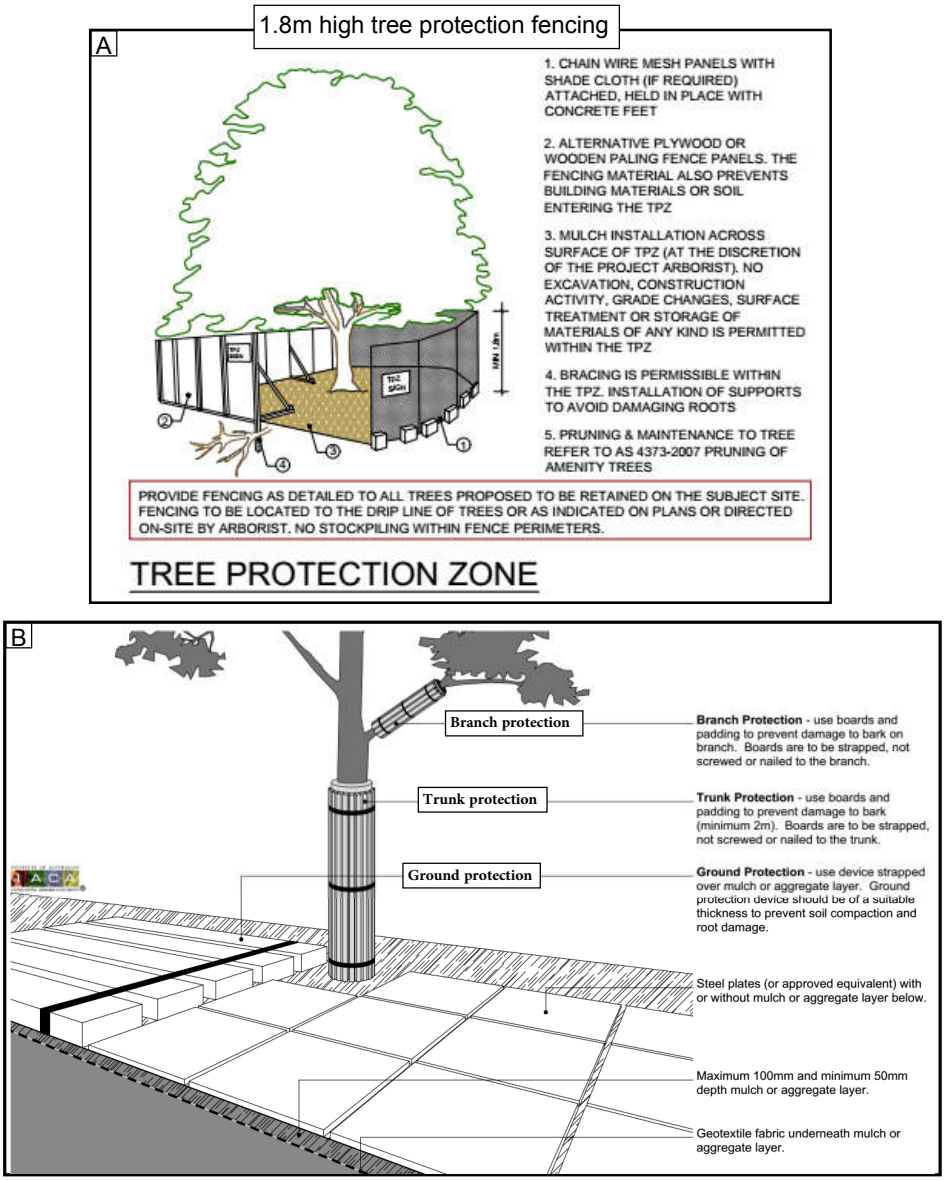
Where design & construction access may be restrictive timber beam trunk protection is recommended to be installed, with ground protection mats provided to protect underlying tree roots within tree protection zones or areas.

b) In accordance with AS4970 - 2009 (1.4.4) a Project or Site Arborist is to be engaged to monitor, supervise excavation within TPZ setbacks, advise and provide certification of protection works conducted. The project arborist is recommended to hold a minimum Australian Qualification Framework (AQF) Level 4 certification and be competent in methodology of protecting trees on development sites.

c) The project arborist is to be familiar with protection measures specific to Australian Standard AS4970 'Protection of Trees on Development Sites' – 2009 requirements with any modification in Tree Protection Fencing (TPF) or Zones (Z) to be compliant with AS4970 Section 4.5 *Other Tree Protection Measures.*

d) The project arborist is to provide final certification outlining tree protection measures with photographic evidence of ongoing works retained for certification purposes (AS4970 S/5.5.2 *Final certification*).

Figure 3: tree protection fencing, ground and trunk protection detail



e) Unless specified otherwise during approved excavation within TPZ setbacks excavation is to be conducted manually (by hand) under the supervision of an appointed project arborist.

Where approved by the arborist the pruning of roots is to be conducted in accordance with AS4970 – 2009 Section 4.5.4 *Root protection during works within the TPZ*, such that tree roots are not damaged or ripped beyond the point of excavation by site machinery. Where large woody roots >30mm(Ø) have been encountered they are to be referred to an independent Level 5 arborist for further advice.

For deep excavations exposed roots at the excavated cut face are to be protected with jute mesh, geotextile fabric or similar being secured in place to avoid drying of roots and the exposed soil profile.

f) *Canopy pruning / tree removal:* where required tree removal and canopy reductions are to be approved by the Local Government Authority. Works are to be conducted by a suitably qualified AQF Level 3 certified arborist in accordance with AS4373 Pruning Standards, and specifically be conducted in accordance with Safe Work Australia – Guide to managing risks of tree trimming and removal works 2016 (www.swa.gov.au).

g) *Additional inground services* which may include landscape works, sewer, stormwater, water and electrical services, final design and impact to trees shall be reviewed and endorsed by the project arborist prior to their installment. Where landscaping (excavation) is required within the SRZ further advice from an appointed project arborist is recommended.

h) *Tree sensitive construction measures* such as pier and beam bridging over critical roots, suspended slabs, cantilevered building sections, screw piles and contiguous piling can minimise the impact of encroachment (AS4970).

i) To ensure tree(s) are appropriately protected the development site superintendent is recommended to be familiar with all tree protection and ongoing certification requirements. The superintendent is responsible for informing all subcontractors of the responsibilities and requirements of tree protection prior to their engagement.

j) *Hold points*: specific to no works are to commence without arborist advice, inspections & certifications:
   1) No works shall commence without appropriate tree protection fencing or designated tree protection areas (TPA's) being installed and certified by an appointed site arborist.
   2) No works (including landscaping) shall occur within the SRZ of any tree without prior arborist advice and certification. Where excavation may be required prior exploratory tree root investigation are to identify the location, distribution and impact to underlying tree roots.
   3) No tree protection fencing modification or excavation shall occur within TPZ setbacks without prior project arborist notification and/or site supervision.

Yours sincerely

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Diploma of Hort/Arboriculture (AQF5), Associate Diploma Parks Management (AQF4)
Certified Arborist / Tree Surgeon (AQF3), ISA Tree Risk Assessment Qualified 6/2024

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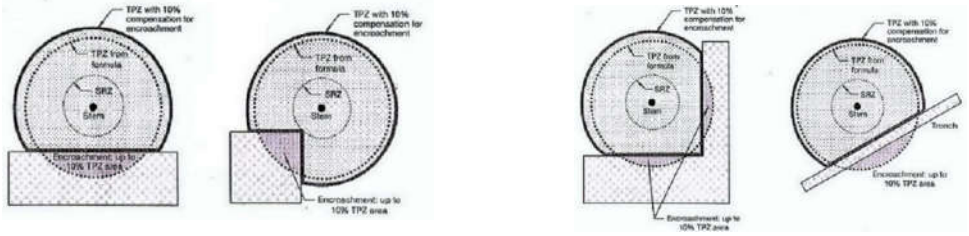
APPENDIX- A: Terminology & references

Acceptable Risk: Exposure to or reject risk of varying degrees. The acceptable risk is defined as '*The person who accepts some degree of risk in return for a benefit being exposed to some risk of varying degree*. **Age classes:** (I) Immature refers to a well established but juvenile tree. (ESM) refers to an early semi mature tree not of juvenile appearance. (SM) Semi-mature refers to a tree at growth stages advancing into maturity and full size. (LSM) Late Semi-Mature, refers to a tree between semi-mature and close to mature. (EM) refers to a tree at the first stages of maturity. (M) Mature refers to a full size tree with some capacity for future growth. **Health:** Refers to a trees vigor exhibited by the crown density, leaf colour, presence of epicormic shoots, ability to withstand disease invasion and the degree of dieback. **Condition:** Refers to the tree's form and growth habit, as modified by its environment (aspect, suppression by other trees, soils) and the state of the scaffold (i.e. Trunk and major branches), including structural defects such as cavities, crooked trunks or week trunk / branch junctions. These are not directly connected with health and it is possible for a tree to be healthy but in poor condition. **Decay:** (*N*) – an area of wood that is undergoing decomposition. (*V*) – decomposition of an area of wood by fungi or bacteria. **Decline:** Is the response of a tree to a reduction of energy levels resulting from stress. Recovery from decline is difficult and slow; is usually irreversible. **Defect:** A identifiable fault in a tree. **Epicormic Shoots**: Shoots that arise from latent or adventitious buds that occur on stems and branches and on suckers produced from the base of the tree. A symptom / result of stress related factors. **Footprint:** The area occupied by site structures, including the dwelling driveways and hard surfaces. **Included Bark**: (Inclusion) a genetic weak fault, pattern of development at branch junctions where the bark is turned inwards rather than pushed out, can pose a potential hazard. **Order of branches:** First order being those that are the first to extend from the main trunk or codominant limbs, second order branches extend from the first order and third order branches extend from the second order. **Probability:** The likelihood of some event happening. **Risk:** Is the probability of something adverse happening. **Suppression:** Restrained growth pattern from competition of other trees or structures. **Wound:** Damage inflicted upon a tree through injury to its living cells, may continue to develop further weakening of the structure compromising structural integrity.
NOTE 1: This report acknowledges the current **Australian Standards 'Protection of Trees on Development Sites'** AS 4970 – 2009 with reference to the Tree Protection Zone (TPZ): being a combination of the root and crown area requiring protection. The TPZ takes into consideration the Structural Root Zone (SRZ): The area required for tree stability. Determined by AS4970 - 2009 Figure 1, Table of determining the SRZ, section 3.3.5 of the standards. The standard states where a greater than 10% encroachment occurs the arborist is to take into consideration the schedule of determining impacts as set within AS4970 s. 3.3.4. Encroachments are referred to within this report as major or minor encroachments (AS4970 s. 3.3.2 & 3.3.3). Below is the terminology used for estimated percentage of development incursion used within this report. To retain specific trees and ensure their viability development must take into consideration protection of the TPZ radius.

NOTE 2: The extent of inclusion within the TPZ radius has been categorised as follows:
No impact (0%) incursion, Low to negligible impact (<10%) of minor consequence, 10 - <15% incursion of moderate to low impact, 15 - <20% Medium to moderate level of impact and incursion where the project arborist is to demonstrate the tree/s remain viable by tree sensitive construction techniques, 20 - <25% incursion of Medium to high level of impact, 25 – <35% of High level impact to significant >35% incursion where moderate to high level impacts may require design changes or further information to manage tree vitality. **WBF** = located within the building footprint where design necessitates tree removal.
Showing acceptable incursion within the TPZ (AS4970)



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Barrell J. 1993, 'Preplanning Tree Surveys: Safe useful Life expectancy (SULE) is the Natural Progression", Arboricultural Journal 17: 1, February 1993, pp. 33-46.
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Mattheck, C. & Breloer, H.(1994) *The Body Language of Trees.* Research for Amenity Trees No.4 the Stationary Office, London.
Matheny N. & Clark J. 1998, Trees & Development *'A Technical Guide to Preservation of Trees During Land Development'* International Society of Arboriculture, Champaign USA.
ProSafe: TPZ encroachment calculator https://proofsafe.com.au/tpz_incursion_calculator.htmlStandards Australia 2009, *Australian Standards 4970 Protection of Trees on Development Sites* - Standards Australia, Sydney, Australia.
Standards Australia 2007, *Australian Standards 4373 Pruning of Amenity Trees* - Standards Australia, Sydney, Australia.
Northern Beaches Council DCP https://www.northernbeaches.nsw.gov.au/planning-and-development/building-and-renovations/planning-controls

APPENDIX- B: Tree Retention Value *Check list* ©rainTree consulting

VTA i) Landscape Significance (LS): The significance of a tree in the landscape is a combination of its amenity, environmental and heritage values.

Values may be subjective however, offer a visual understanding of the relative importance of the tree to the environment. The Landscape Significance of a tree is described in seven categories to assist in determining the retention value of trees.

1	Significant	2	Very High	3	High	4	Moderate	5	Low	6	Very Low	7	Insignificant

ii) Visual Tree Assessment (VTA)

0	If appropriate to VTA - **exempt* trees from Local Government Authority (LGA) Tree Management or Preservation Orders (TPO)	2E	Trees location likely to be affected by infrastructure restricting root growth potential, or tree has potential to cause infrastructure damage &/or risk mitigation or rectification works may compromise tree anchorage. Tree(s) may be contained within a vault have restricted anchoring root potential
0A	Noxious or invasive species located within heritage conservation area		
1	Trees that are dead, significantly declining >75% volume or obviously hazardous	3	This rating incorporates trees that may require further investigation of defects such as cavities or symptoms indicating internal decay to an extent that cannot be quantified under visual examination. Further inspections may be in the way of arborist climbing inspection within the canopy, root crown investigation and/or drill penetrating or Picus Sonic Tomograph ultrasound testing procedures to determine percentage of internal decay.
2	Trees that are structurally damaged. Have poor structure or weak & detrimental large stem inclusions capable or failure opposed to 2B. Tree also may be affected by extensive borer damage, fungal pathogens (wood rot) or viruses. Some symptoms may be reversible, remediated or controlled give appropriate management.		
2A	Tree damage specific to basal and/or root plate damage, very shallow soils or steep topography resulting in poor anchorage where condition may become problematic in near future / may include trees with included bark splits to ground level	4	Trees which appear specifically environmentally stressed by drought, poor soil or site conditions. Symptoms may be reversible given appropriate management
2B	Defect specific to stem inclusions development (weak branch attachments) where the condition may not be immediately detrimental however, require annual to biannual monitoring with control to prevent stem failure by installing slings, cable or bracing. Tree may also contain multi stems or codominant twin stems	5	Trees that would benefit from crown maintenance pruning as identified within the Australian Standards AS 4373 – 2007 Pruning of Amenity Trees
		5A	Trees that require little or no maintenance at time of inspection other than close monitoring
2C	Tree may contain minor wounds, pest or minor pathogen activity, altered from storm damaged to an extent that is not considered immediately detrimental - may also display average form. Likely to require close annual monitoring or minor corrective pruning	6	Trees may be typical for species type, of good form and visual condition for age class May have suppressed one sided canopies or are low risk trees
2D	Trees significantly altered by recent storm or over pruning events which may reduce retention values due to average form- or tree extensively pruned for power line clearance	7	VTA restricted by canopy or plant material vine or ivy covering tree parts, or site conditions which do not allow access- fences to neighbouring sites

iii) Retention Value (RV): Determined by [1] tree fee of visual defects and viable for retention, [2] viable for retention with minor faults which may reduce ULE, [3] trees which should not restrict development applications containing faults that are likely to become problematic in the short term, [4] trees to be considered for removal due to average condition.

1	High retention	2	Medium retention	3	Low retention	4	Consider removal

iv) U.L.E. categories Useful Life Expectancy (after *Barrell* 1996, modified by the author). A trees U.L.E. category is the life expectancy of the tree modified first by its age, health, condition, safety and location. U.L.E. assessments are not static but may be modified as dictated by changes in trees health and environment.

1. Long U.L.E. - Appear retainable at the time of assessment for over 40 years with an acceptable degree of risk assuming reasonable maintenance.
2. Medium U.L.E. - Appear to be retainable at the time of assessment for 15 to 40 years with an acceptable degree of risk assuming reasonable maintenance.
3. Short U.L.E. - Trees appear to be retainable at the time of assessment for 5 to15 years with an acceptable degree of risk assuming reasonable maintenance.
4. Very short - Removal- Trees which should be scheduled for removal within the very short term or as specified within this report.
5. Small, young or regularly pruned – Trees under 5m in height that can be easily moved or replaced, includes screen plantings or hedge lines.

APPENDIX- C: Tree Assessment Schedule

	Trees requiring removal due to hazardous or dead condition - subject to Local Government Authority notification		Trees with low retention values: senescence, developing defects or being *exempt trees from the LGA Tree Preservation Orders (TPO)

Tree No	*Botanical Name* COMMON NAME	Height x spread (m)	DBH (mm)	SRZ / TPZ	Age	Vigour	Condition	Signifi-cance	VTA	RV	U. L.E.	Comments CV = Council verge tree NT= Neighbouring tree
1 CV	*Lagunaria patersonii* Norfolk Island Hibiscus	5 x 3	350	2.1m / 4.2	M	Good	Fair	4	2C	2	2	Minor pruning cuts throughout modifying tree form
Design & impact summary	*Retain & protect with tree protection fencing. Likely negligible impact with root zone likely restricted by existing brick fence foundations. Alterations for proposed driveway access to ensure no excavation occurs within SRZ.*											
*2	*Strelitzia reginae* Giant Bird of Paradise	av 2.5 x 2	av 150	- / 2	ESM	Good	Good	5	0	1	1	Non-prescribed (exempt) palm like species
Design & impact summary	*Remove to accommodate new design*											
*3	*Strelitzia reginae* Giant Bird of Paradise	av 2.5 x 2	av 150	- / 2	ESM	Good	Good	5	0	1	1	Non-prescribed (exempt) palm like species
Design & impact summary	*Remove to accommodate proposed walkway*											
*4x4	*Syagrus romanzoffiana* Cocos Palm	av 8 x 4	av 250	- / 3	M	Good	Good	4	0	1	1	Exempt palm species with exempt Bangalo palm(s) within group
Design & impact summary	*Proposed removal; high level root zone conflicts by excavation see Section A-A, B-B & C-C and Excavation Plan [DA106]. Impact suggest root anchorage may become compromised*											
*5	*Strelitzia reginae* Giant Bird of Paradise	av 4 x 3	av 150	- / 2.5	ESM	Good	Good	4	0	1	1	Non-prescribed (exempt) palm like species spanning boundary line
Design & impact summary	*Proposed removal; high level root zone conflicts by excavation with narrow garden bed unable to successfully sustain palms without impact. Recommend remove to make space for new plantings*											
*6	*Strelitzia reginae* Giant Bird of Paradise	av 6 x 4	av 150	- / 3	ESM	Good	Good	4	0	1	1	Non-prescribed (exempt) palm like species, large clump in garden bed
Design & impact summary	*Remove; WBF within building or excavation footprint*											
*7	*Nerium oleander* Oleander	2.5 x 6	400at base	2.3 / 4.8	SM	Good	Fair / Good	4	0/2B	2	2	Non-prescribed (exempt) tree, multi stemmed at base
Design & impact summary	*Remove; WBF within building or excavation footprint*											
*8	*Schinus areira* Peppercorn	4 x 5	400, 250	2.7 / 7.8	M	Fair	Fair / Poor	4	0/4	3	3	Exempt tree species height class, lower trunk pruning cuts with minor decay sections, with significant decline in canopy
Design & impact summary	*Remove; WBF within building or excavation footprint*											

	Trees requiring removal due to hazardous or dead condition - subject to Local Government Authority notification		Trees with low retention values: senescence, developing defects or being *exempt trees from the LGA Tree Preservation Orders (TPO)

Tree No	*Botanical Name* COMMON NAME	Height x spread (m)	DBH (mm)	SRZ / TPZ	Age	Vigour	Condition	Signifi-cance	VTA	RV	U. L.E.	Comments CV = Council verge tree NT= Neighbouring tree
*9	*Persea americana* Avocado	6 x 4	100, 100	1.6 / 2.4	ESM	Good	Fair	4	0/2A	3	3	Non-prescribed (exempt) tree, twin stems at ground level with minor junction damage
Design & impact summary		*Remove; tree in garden bed, likely high level SRZ conflict by proposed basement excavation*										
*10	*Plumeria sp* Frangipani	3 x 3	200at base	1.6 / 2.4	ESM	Good	Good	4	0	1	1/5	Exempt tree species height class, suppressed canopy form & lean W, SW, located in garden bed
Design & impact summary		*Remove; located within proposed hydraulic footprint area*										
*11x3	*Syagrus romanzoffiana* Cocos Palm	av 6 x 5	av 300	- / 3.5	ESM	Good	Good	4	0	2E	2	Exempt palm species located in raised garden bed
Design & impact summary		*Remove; located within proposed hydraulic footprint area*										
*12x6	*Syagrus romanzoffiana* Cocos Palm	av 5 x 3	av 200	- / 2.5	ESM	Good	Good	4	0	2E	2	Exempt palm species, stand of palms consisting of additional Bangalo & Stelitzia mix in raised garden bed
Design & impact summary		*Remove; part stand located within proposed hydraulic & swimming pool footprint areas*										
*13	*Morus sp* Mulberry	2.5 x 4	200at base	1.6 / 2.4	ESM	Good	Fair / Good	4	0/2C	2	2	Exempt tree species, multi stemmed at base, with decaying stub end evident
Design & impact summary		*Remove; part stand located within proposed hydraulic & swimming pool footprint areas*										

APPENDIX- D: Tree Location Plan