
rain Tree consulting

Arboricultural Management

PO Box 326 AVALON NSW 2107

Mobile 0419 250 248

2 September 2020

3 CENTRAL ROAD

AVALON BEACH, NSW

RESIDENTIAL DEVELOPMENT PROPOSAL

ARBORICULTURAL IMPACT ASSESSMENT REPORT

Report Ref No- RTC-14020

Prepared for
Avalon Central Pty Limited
C/- Cottee Parker Architects Pty Limited
L4, 50 Stanley Street
EAST SYDNEY, NSW
p: 9366 1133

Prepared by
Mark A. Kokot
AQF Level 5 Consulting arborist



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INTRODUCTION

This report has been commissioned by Avalon Central Pty Limited C/- Cottee Parker 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 new development proposal consists of constructing new residential apartment block facility within Lot 27 of DP 9151 being known as 3 Central Avenue AVALON BEACH, NSW 2107.

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

Development incursions within tree protection zones and impacts to trees have been outlined within Note 2 of Appendix- A where incursions are outlined as low, moderate to high level impacts within tree protection zones. Where site restrictions within notional root zone radiuses exists development impacts or encroachment disturbances are based on author's experience, observations of site conditions, soil type and topography.

The trees assessed have been identified by their accorded tree number corresponding with tree numbers provided within Survey Plan Sheet 2 of Drawing No. 125698, and are referenced 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 and their location may be referenced within the Tree Assessment Schedule and Tree Location Plan Appendices C and 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.

DISCLAIMER & LIMITATION ON THE USE OF THIS REPORT

This report is to be utilized in its entirety only. Any written or verbal submission, report or presentation that includes statements taken from the findings, discussions, conclusions or recommendations made in this report, may only be used where the whole of the original report (or copy) is referenced in, and directly to that submission, report or presentation. Unless stated otherwise: Information contained in this report covers only the tree/s that were examined and reflects the condition of the trees at the time of inspection: and the inspection was limited to visual examination of the subject tree without dissection, excavation, probing or coring. There is no warranty or guarantee, expressed or implied, that problems or deficiencies of the subject tree/s may not arise in the future. Arborist cannot guarantee that a tree will be healthy or safe under all circumstances, or for a specific period of time. Trees are a living entity and change continuously, they can be managed but not controlled and to be associated near one involves some degree of risk.

METHODOLOGY

- i In preparation for this report an initial limited site and ground level Visual Tree Assessment (VTA) was conducted on Wednesday 6th November 2019 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 2013. 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.
- ii The inspection was limited to a visual assessment from within the subject site where the retention value, condition and diameters of neighbouring trees was estimated. 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.
- iii This report acknowledges the current Australian Standards 'Protection of Trees on Development Sites' AS4970 – 2009. As explained within Note 1 of Appendix- A. 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*. 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.
Unless specified otherwise all distances and development offsets within this report are taken from the centre of the tree.
- iv Updated & revised plans or documentation received to assist in preparation of this report include:
Cottee Parker Architects job No: 5914 *specific to*:
 - Floor Plan Basement 01 Dwg No. SK2007 issue A dated 25.11.19
 - Floor Plan Lower Ground Dwg No. SD2007 issue C dated 8.7.2020
 - Ground Floor Plan Dwg No. SD2008 issue C dated 8.7.2020
 - Floor Plan Roof Dwg No. SD2010 issue C dated 8.7.2020
 - Street Elevations Dwg No. SD3001 & 002 issue C dated 8.7.2020
 - Sections 1 Dwg No. SD3101 issue C dated 8.7.2020Intrax Consulting Group
 - Survey Plan Drawing No. 125698 Sheet 2 rev A dated 20.11.2019

1. SUMMARY OF ASSESSMENT

1.1 General tree assessment

1.1.1 Forty one (41) trees have been assessed under this development proposal with smaller shrubs at or <4m in height located within the assessment area. Of the trees assessed five (5) trees are located within neighbouring properties, thirteen (13) trees are situated within adjacent Council verges of which T19, 23 & 24 are partly located on the boundary. Four (4) contain low retention values and three (3) trees are non-prescribed exempt species.

Exempt trees are identified as trees: 5, 5a(x3) & 27. Being non-prescribed trees and exempt from protection the trees are permitted to be managed (pruned, removed or relocated) without Council consent.

Low retention value trees are identified as trees: 6, 14, 28 & 37. The trees have been assessed as containing structural faults indicating low remaining safe site usefulness. The trees are considered trees which should not restrict development applications due to their expected remaining short safe site usefulness.

Neighbouring trees are identified as trees: 1a, 2, 20, 21 & 22. Tree 20 contains Laneway vehicle impact damage to the mid trunk which may become problematic in the future. Remaining trees receive negligible TPZ occupancy by design.

Council managed trees are identified as trees: 1, 12, 13, 17, 19, 23, 24, 30, 31, 32, 33, 34 & 35. Fronting central Road the design proposes a suspended walkway and garbage minimising TPZ disturbance, with trees 12 & 13 requiring removal to construct the proposed public pathway. To retain the two trees tree sensitive design would be required to minimise pathway impacts. Remaining trees receive negligible to minor TPZ disturbance an occupancy by design.

1.1.2 The majority of trees assessed are considered viable for retention without change in existing site conditions or modification within their Tree Protection Zone (TPZ) radiuses, refer Appendix- C the SRZ & TPZ distance column.

1.2 The development proposal

1.2.1 As shown within Figure 1 the development proposal consists of constructing a new residential apartment facility with excavation for basement levels and associated infrastructure to accommodate design. The design impact to trees has been summarised within section 1.4, and outlined within the Tree Assessment Schedule of Appendix- C.

1.3 Tree removal to accommodate design

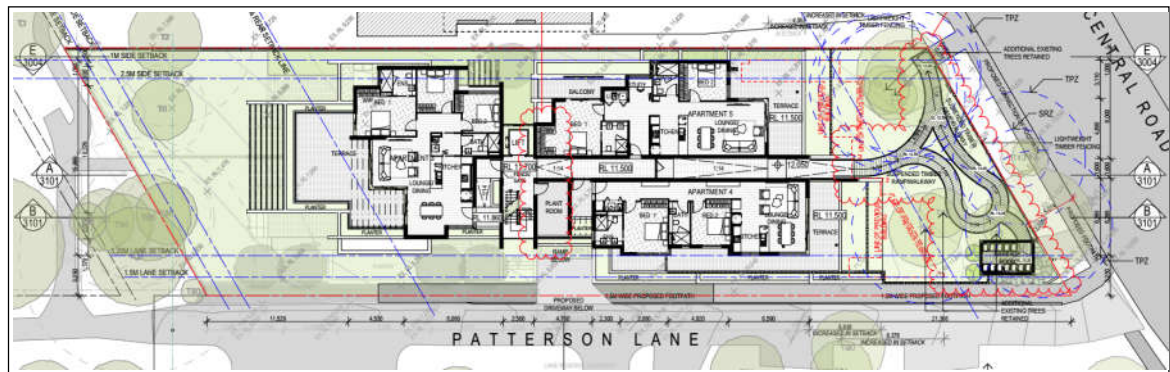
1.3.1 Sixteen (16) prescribed trees require or are recommended for removal to accommodate design. The sixteen trees are identified as trees:

- 4, 4a, 6, 7, 18, 19, 23, 24, 25, 26, 28, 28a, 29 & 37, with Council verge trees 12 & 13 likely to require removal to accommodate the proposed Central Road concrete public pathway.

Non-prescribed trees permitted to be removed without Council consent are identified as trees:

- 5, 5a & 27.

Figure 1, showing proposed development footprint



1.4 Discussions of development impacts – *prescribed trees*

1.4.1 Trees which fall within proposed building footprints or receive high level encroachments within Structural (S) & Tree Protection Zones (TPZ) areas requiring removal to accommodate design are identified as trees:

- 4, 4a, 6, 7, 18, 19, 23, 24, 25, 26, 28, 28a, 29 & 37

Of these trees T6 & 37 contain low retention values and trees 18, 19, 23, 24 & 25 are situated where their location to and within infrastructure (retaining walls & kerb) will likely become problematic in the future. Their removal is primarily required to accommodate the new Patterson Lane pathway.

1.4.2 Remaining tree discussions and encroachments by design have been summarised as follows:

- Tree 1, 1a, 2 & 3 – Negligible encroachment within TPZ setbacks. Minor excavation impact may occur for fence footing locations where fence lines are recommended to be suspended above ground level to protect underlying tree roots. Tree protection fencing for T2 shall be installed to incorporate the 4m radial protection zone of T3 with the inner area becoming a tree protection area (TPA) as shown within Appendix E01 & E02.

Basement excavation

- Trees 10, 11 & T15 specific: Tree protection fencing shall be installed at a 1m setback from the line of the proposed basement cut as shown within Plan SD2007 & Appendix- E01. There is to be no over excavation beyond the line of the proposed cut to mitigate further encroachment and impact to underlying tree roots within tree protection zones. Given the depth of cut arborist supervision is required to treat encountered roots where the face of the cut is recommended to be protected (covered) to minimise drying of the soil face and exposed roots. Tree protection fencing shall only be altered (reduced) to accommodate ground level works under the guidance and certification of an appointed site arborist. The remaining TPZ areas shall be mulched & irrigated as shown within Appendix E02. The placement of minor high visibility mesh fencing forming new tree protection areas around SRZ radiuses is recommended allowing for suspended walkway construction as is timber beam trunk protection to ensure minimal impact during works.

Suspended walkway

- Trees 8 – 17: Minor encroachment or disruption within tree protection zones occurs by excavation for footings that support the suspended walkway. Ideally there should be no excavation within SRZ radiuses for footing placement with the design spanning over the SRZ to minimise impacts on critical underlying tree roots. Prior to construction pier locations or a pier footing plan should be reviewed and endorsed by an appointed site arborist. The walkway design should also clearly detail suitable trunk clearances to allow for future growth.

Central Road pedestrian pathway

- Trees 12, 13 & 17: To retain trees 12 & 13 requires tree sensitive design, being a pathway constructed on top of ground level, suspended over the SRZ without excavation cut or compaction. Should excavation or compaction be required for pathway construction adjacent T17 tree root mapping would provide more information on the location, distribution and impact to underlying tree roots.

Neighbouring trees 20, 21 & 22

- The trees receive negligible encroachment by the design footprint with T20 recommended to have timber beam trunk protection installed to mitigate the possibility of construction vehicle impact during works.

Dunbar Park reserve tree

- To adequately retain T30 the proposed new laneway concrete path requires to be located at the extremity of the 2m TPZ.
- Trees 31 – 35; receive minor to negligible impact by design where boundary fences are recommended to be suspended above ground level, spanning over SRZ setbacks to protect underlying tree roots. Where excavation is required for fence post footings within tree protection zones works are to be supervised & certified by an appointed site arborist to ensure no critical root is damaged by works. The installation of tree protection fencing should be at the discretion of an appointed site arborist and be based on any requirement for rear site access to complete construction of the proposal. At a minimum timber beam trunk protection should be considered.

Tree 36 comprising part of Dunbar Park reserve trees

- Within the site tree protection fencing shall be installed at a 4m boundary setback as shown within Appendix E01 & E02. The minimising of fence footing impacts should occur by suspending the fence above ground level spanning over the SRZ to avoid conflict with critical underlying tree roots.

2. CONCLUSIONS & RECOMMENDATIONS

2.1 Tree Removal

2.1.1 Under the current proposal and with the consent of Council sixteen (16) trees require or are recommended for removal to accommodate design. The sixteen trees are identified as trees: 4, 4a, 6, 7, 12, 13, 18, 19, 23, 24, 25, 26, 28, 28a, 29 & 37.

Exempt non-prescribed trees 5, 5a & 27 are permitted to be managed (pruned, removed or relocated) without the consent of Council.

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

- 1) Demolition & basement excavation stage: the following recommendations are provided to minimise impacts to trees during initial works.

Demolition of existing site features

- Tree protection fencing is recommended to be installed prior to demolition activities as indicated within Appendix E01. Where minor demolition of existing site features such as driveways and property pathways is required works are to be supervised by an appointed site arborist reinstating the tree protection area (TPA) and fence at completion of works.

Basement excavation

- To mitigate further encroachment within tree protection zones no over excavation is recommended beyond the basement line as shown within construction drawings. Should over excavation be required further advice from an appointed project arborist is recommended.
- The site arborist shall certify the location of tree protection fencing being installed 1m off the proposed line of cut as indicated within Appendix E02.

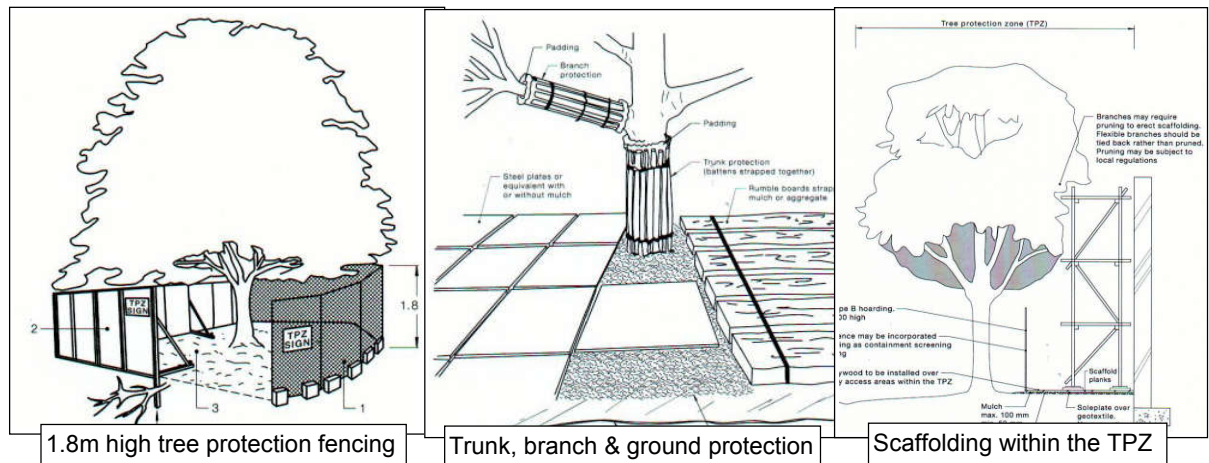
Ground level construction

- At completion of basement works tree protection fencing shall be altered to accommodate ground level works specifically adjacent trees fronting Central Road as indicated within Appendix E02. Tree protection should include timber beam trunk protection, mulching & irrigation of tree protection areas (TPA).
- Tree 17; the proposed pathway is recommended to be constructed utilizing tree sensitive design to ensure underlying tree roots within the SRZ are not disrupted. Should excavation or compaction be required tree root investigation (root mapping) is required to provide more information on the location, distribution and impact to suck roots.

2.2.2 General requirements

- 1) Prior to demolition works Tree Protection Fencing (TPF) and/or zones as identified within Figure 2 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 specified areas.
- 2) In accordance with AS4970 - 2009 (1.4.4) a Project 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 be suitably qualified having a minimum Australian Qualification Framework (AQF) Level 4 certification and be competent in methodology of protecting trees on development sites.
- 3) 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*).
- 4) 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*.

Figure 2: tree protection fencing, ground and trunk protection detail



All tree protection fencing requires appropriate signage clearly stating a *TPZ restriction area* being a designated Tree Protection Zone.

- 5) **Hold points:** Hold points specific to *no works are to commence without arborist advice, inspections & certifications:* 1) No works shall occur within the SRZ without prior arborist advice and certification. 2) No excavation shall occur within the TPZ without prior project arborist notification and/or site supervision.

It is the responsibility of the principle contractor to complete each task identified within Table 1 to ensure trees are appropriately managed in accordance with Australian Standard AS 4970 – 2009 Protection of Trees on Development Sites.

Table 1, certification requirements & hold points

1	Pre-construction	Prior to demolition works install tree protection fencing to accommodate basement excavation as specified or as directed by the site arborist, refer Appendix E01
2	During construction	At completion of basement works and prior to ground floor construction arborist to amend tree protection fencing for construction purposes as indicated within Appendix E02
		Project arborist to supervise & certify approved works including minor demolition of existing features within tree protection zones
		Arborist to conduct monthly inspections of tree protection zones
3	Post construction	Prior to handover project arborist to provide final inspection & certification of tree health & condition

- 6) 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 at or <30mm(Ø) 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 larger roots 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.
- 7) The storage of materials and fill within tree protection zones is to be avoided. Should storage be required further advice and certification from the appointed project arborist is recommended.
- 8) *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 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).

- 9) *Boundary fence and minor retaining wall construction*: to avoid disturbance to underlying tree roots boundary fences and landscape retaining walls should span across the SRZ being suspended above ground level supported by pier and beam construction within the TPZ.
 - 10) *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.
 - 11) To ensure tree(s) are appropriately protected the development site superintendent is recommended to be familiar with all tree protection requirements as outlined within this report. The superintendent is responsible for informing all subcontractors of the responsibilities and requirements of tree protection prior to their engagement.
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Should you require further liaisons in this matter please contact me direct on 0419 250 248

Yours sincerely



Mark A Kokot

AQF Level 5 consulting arborist

Diploma of Hort/Arboriculture (AQF5), Associate Diploma Parks Management (AQF4)
Certified Arborist / Tree Surgeon (AQF3), ISA Tree Risk Assessment Qualified 6/2014
Member: ISA, Arboriculture Australia & IACA, Working With Children No: WWC0144637E



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APPENDIX- A: Terminology, notes & 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.'

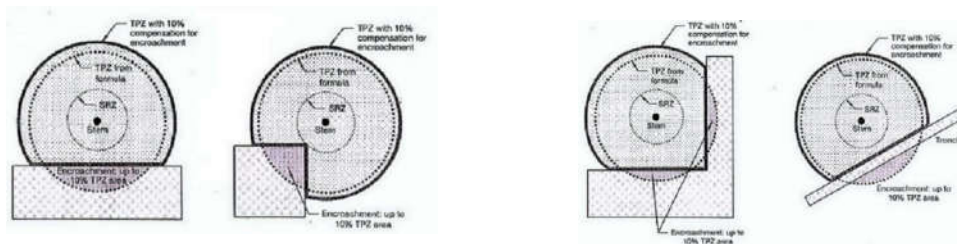
Age classes: (I) Immature refers to a well established but juvenile tree. (ESM) refers to an early semi mature tree not of juvenile appearance. (SM) Semi-mature refers to a tree at growth stages advancing into maturity and full size. (LSM) Late Semi-Mature, refers to a tree between semi-mature and close 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. (LM) Late mature refers to a tree entering into over maturity (OM) and likely first stages of senescence. **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 weak trunk / branch junctions. These are not directly connected with health and it is possible for a tree to be healthy but in poor condition. **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** = 100% within building footprint.

Showing acceptable incursion within the TPZ (AS4970)



SELECTED REFERENCES:

Barrell J. 1993, 'Preplanning Tree Surveys: Safe useful Life expectancy (SULE) is the Natural Progression', *Arboricultural Journal* 17: 1, February 1993, pp. 33-46.

International Society of Arboriculture (ISA) 2013, *Tree Risk Assessment Manual*, Martin Graphics, Champaign Illinois U.S.

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.html

Standards Australia 2009, *Australian Standards 4970 Protection of Trees on Development Sites* - Standards Australia, Sydney, Australia.

APPENDIX- B: Tree Retention Value Checklist @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, are based after IACA Sustainable Retention Index Value (SRVI) which offer a visual understanding of the relative importance of the tree to the environment. The Landscape Significance for this assessment 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
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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 where risk mitigation or rectification works may likely compromise tree, trees may be contained within a vault having restricted root development / anchorage
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 of 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 free 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
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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 to 15 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 Order (TPO)					
Tree No	Botanical Name COMMON NAME	Height x spread (m)	DBH (mm)	SRZ	Age	Health	Condition	Significance	VTA	RV	U. L.E.	Comments CV = Council verge tree NT= Neighbouring tree
				TPZ								
1 CV	<i>Melaleuca quinquenervia</i> Paperbark	15 x 12	800	3m 9.6	M	Good	Fair	3	2C/3	2	2?	Open cavity & wound on lower trunk N side benefit from further investigations, with minor stem inclusion development throughout
<i>Action & TPZ occupancy</i>		<i>Retain; negligible TPZ occupancy, no tree protection fencing required due to location, works (fencing excavation) within TPZ requires arborist supervision</i>										
1a NT	<i>Phoenix canariensis</i> Phoenix Palm	8 x 6	600	- 4	EM	Good	Good	4	7	1	2	Restricted VTA, above ground visual parts appear in good order
<i>Action & TPZ occupancy</i>		<i>Retain; neighbouring non-prescribed palm. Low level TPZ disturbance, works (fencing excavation) within TPZ requires arborist supervision</i>										
2 NT	<i>Eucalyptus robusta</i> Swamp Mahogany	17 x 14	600	2.7 7.2	M	Fair / Good	Fair / Good	3	4/7	2	3	Environmentally stressed minor decline in canopy, epicormic shoots throughout upper branch scaffolds, minor wounds evident on lower branch scaffolds with no significant branch overhang
<i>Action & TPZ occupancy</i>		<i>Retain; negligible TPZ occupancy, tree protection fencing recommended to combine with T3 TPZ with arborist supervision for excavation within TPZ</i>										
3	<i>Angophora floribunda</i> Rough Barked Apple	12 x 6	300	2.1 3.6	ESM	Fair / Good	Fair / Good	3	4	2	2	Environmentally stressed minor decline in canopy with minor fine tip decline
<i>Action & TPZ occupancy</i>		<i>Retain; negligible TPZ occupancy, tree protection fencing recommended at 4m radius with arborist supervision for excavation within TPZ</i>										
4	<i>Glochidion ferdinandi</i> Cheese Tree	6 x 5	150, 100	2.1 4.2	ESM	Good	Good	4/3	6	1	1	Skewed bowing trunk at ground level with no significant defects noted
<i>Action & TPZ occupancy</i>		<i>Remove; located within terrace and garden bed footprint</i>										
4a	<i>Glochidion ferdinandi</i> Cheese Tree	7 x 8	300at base	2 3.6	ESM	Good	Fair / Good	4/3	2C/B	2	3	Twin stems at 0.4m with minor stem inclusion development = likely to become problematic in the future, contains past reduction pruning cuts E side to 2.4m
<i>Action & TPZ occupancy</i>		<i>Remove; Moderate to high level impact & TPZ occupancy, located adjacent landscape terrace court yard</i>										
*5	<i>Citharexylum spinosum</i> Fiddlewood	11 x 9	750at base	2.8 9	ESM	Fair / Poor	Fair	5	0/2C	2	3	Exempt tree species, appears stressed with lower epicormic shoots throughout and minor junction faults
<i>Action & TPZ occupancy</i>		<i>Remove; Exempt tree species</i>										

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 Order (TPO)					
Tree No	Botanical Name COMMON NAME	Height x spread (m)	DBH (mm)	SRZ	Age	Health	Condition	Significance	VTA	RV	U. L.E.	Comments CV = Council verge tree NT= Neighbouring tree
				TPZ								
*5a x3	<i>Nerium oleander</i> Oleander	av 6 x 6	av 500at base	2.5 6	SM	Good	Fair / Good	5	0/6	2	3	Exempt tree species, multi stemmed at base
<i>Action & TPZ occupancy</i>		<i>Remove; Exempt tree species</i>										
6	<i>Corymbia gummifera</i> Bloodwood	9 x 2	250	2 3	ESM	Fair	Poor	4	2D/4	3	<3	Past significant pruning modifying form with significant decline in canopy = low retention value
<i>Action & TPZ occupancy</i>		<i>Remove; High level impact & TPZ occupancy by basement cut</i>										
7	<i>Acmena smithii</i> Lilly Pilly	4 x 4	200	1.8 2.4	ESM	Good	Fair	4/3	2C	2	2	Extensive epicormic growth shoots at base, low broad form with past pruning cuts evident
<i>Action & TPZ occupancy</i>		<i>Remove; high level impact, located within footprint of proposed basement cut</i>										
8	<i>Angophora costata</i> Angophora	15 x 14	550	2.7 6.6	ESM	Good	Good	3	6	1	1	Suppressed canopy form biomass & slight lean NW, with no significant defects noted
<i>Action & TPZ occupancy</i>		<i>Retain; Minor TPZ disturbance & occupancy by proposed suspended walkway. Requires arborist supervision for excavation within TPZ & tree protection fencing</i>										
9	<i>Angophora costata</i> Angophora	14 x 13	500	2.6 6	ESM	Good	Good	3	6	1	1	Suppressed canopy form biomass & slight lean N, with no significant defects noted
<i>Action & TPZ occupancy</i>		<i>Retain; Minor TPZ disturbance & occupancy by proposed suspended walkway. Requires arborist supervision for excavation within TPZ & tree protection fencing</i>										
10 x3	<i>Angophora costata</i> Angophora	9 x 7	250	2 3	ESM	Good	Good	3	6	1	1	Three (3) trees in group averaging 250(Ø) trunks, with no significant defects noted
<i>Action & TPZ occupancy</i>		<i>Retain; Minor TPZ disturbance & occupancy by proposed suspended walkway. Requires arborist supervision for excavation within TPZ & tree protection fencing</i>										
11	<i>Angophora costata</i> Angophora	7 x 5	250	2 3	ESM	Good	Good	3	6	1	1	Suppressed canopy form biomass E, with no significant defects noted
<i>Action & TPZ occupancy</i>		<i>Retain; Minor TPZ disturbance & occupancy by proposed suspended walkway. Requires arborist supervision for excavation within TPZ & tree protection fencing</i>										
12 CV	<i>Corymbia gummifera</i> Bloodwood	8 x 5	250, 200	2.4 5.4	ESM	Fair / Good	Good	3	4/6	1	2	Suppressed canopy form biomass SW, very slight decline in canopy – appears slightly environmentally stressed
<i>Action & TPZ occupancy</i>		<i>Remove; likely high level impact within SRZ by proposed concrete public pathway, requires tree sensitive design to retain</i>										

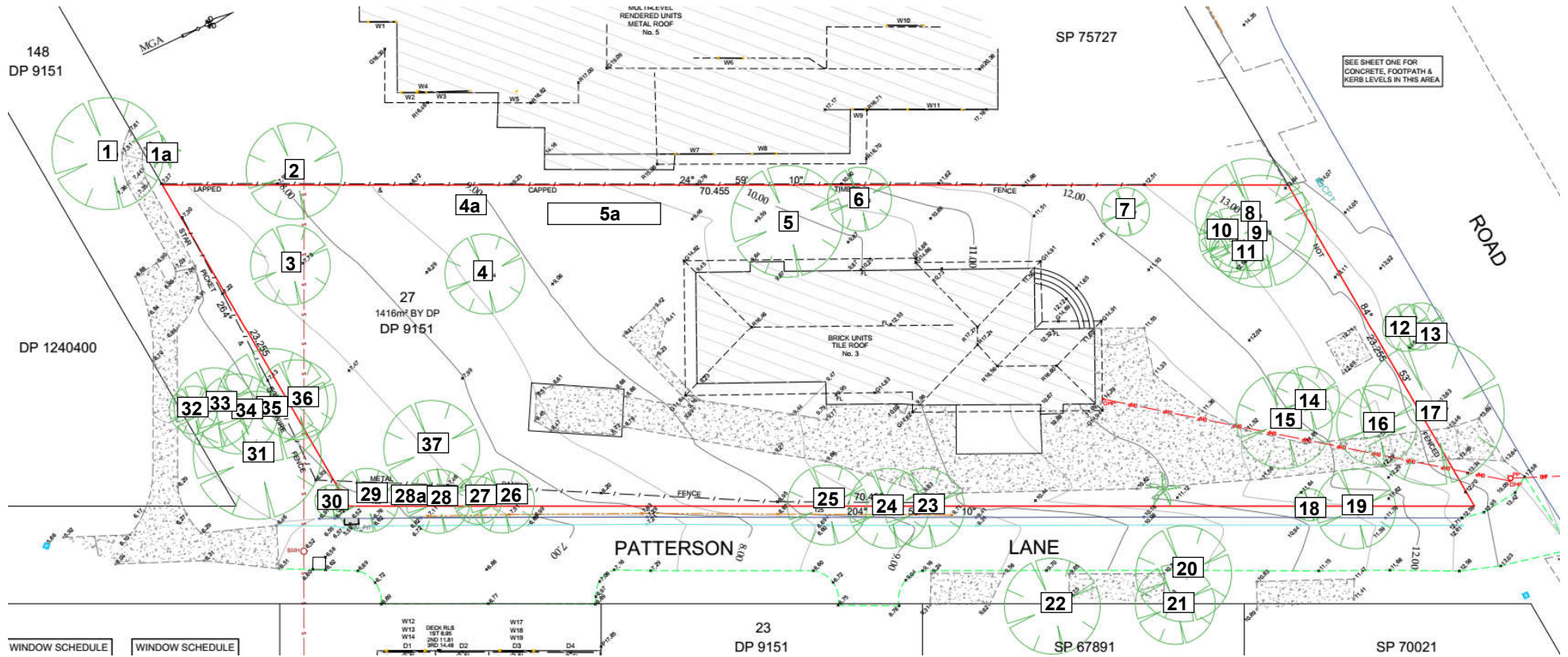
Trees requiring removal due to hazardous or dead condition - subject to Local Government Authority notification							Trees with low retention values: senescence, developing defects or being *exempt trees from the LGA Tree Preservation Order (TPO)					
Tree No	Botanical Name COMMON NAME	Height x spread (m)	DBH (mm)	SRZ	Age	Health	Condition	Significance	VTA	RV	U. L.E.	Comments CV = Council verge tree NT= Neighbouring tree
				TPZ								
13 CV	<i>Eucalyptus acmenoides</i> White mahogany	6 x 5	250	2 3	ESM	Good	Fair / Good	3	6	1	2	Suppressed canopy form biomass NNW with no significant defects noted
<i>Action & TPZ occupancy</i>		<i>Remove; high level impact with tree located within footprint of proposed concrete public pathway</i>										
14	<i>Corymbia gummifera</i> Bloodwood	8 x 5	200	1.8 2.4	ESM	Fair	Fair / Poor	4	4	3	<3	Environmentally stressed, significant decline in canopy, W stem dead, suppressed canopy form = low retention value
<i>Action & TPZ occupancy</i>		<i>Retain; Minor TPZ disturbance & occupancy by proposed suspended walkway. Requires arborist supervision for excavation within TPZ & tree protection fencing</i>										
15	<i>Angophora costata</i> Angophora	12 x 14	500	2.6 6	ESM	Good	Good	3	6	1	1	Suppressed canopy form biomass S, low broad canopy 8m S, with no significant defects noted
<i>Action & TPZ occupancy</i>		<i>Retain; Moderate to low level TPZ occupancy. Disturbance of near 3m deep excavation cut within TPZ at near 5.6m from tree. No over excavation beyond basement line as shown within Plan SD2007 to occur. All excavation activities (pathway, fence & walkway) to be supervised by arborist with soil profile protection of cut face. Tree protection fencing to be installed at 5m towards basement cut, no soil level change within remaining TPZ radius with minor work excavation (fencing & walkway) to be supervised by arborist.</i>										
16	<i>Eucalyptus robusta</i> Swamp Mahogany	9 x 6	300	2.1 3.6	ESM	Good	Fair / Good	3	2E	2	2	Skewed trunk, base at existing driveway with suppressed canopy form
<i>Action & TPZ occupancy</i>		<i>Retain; Minor TPZ disturbance & occupancy by proposed suspended walkway. Requires arborist supervision for excavation within TPZ & tree protection fencing</i>										
17	<i>Eucalyptus piperita</i> Sydney Peppermint	11 x 11	550, 600	3.5 13.8	EM	Fair / Good	Fair / Good	3	4/2C	2	2	Twin stems at ground level, moderate lean & suppressed canopy form biomass N, slightly environmentally stressed with slight decline in canopy, past termite activity noted at pruned stub end cuts
<i>Action & TPZ occupancy</i>		<i>Retain; Moderate TPZ disturbance by construction occupancy of suspended structures, boundary fence lines and proposed public pathway located within the SRZ. Pathway requires tree sensitive design and/or root investigation to determine impact to critical underlying tree roots (SRZ). No soil level change recommended within TPZ with arborist supervision to protect tree roots >30mm(Ø) for pier footing & fence post excavation within TPZ.</i>										
18	<i>Glochidion ferdinandi</i> Cheese Tree	5 x 3	150at base	1.5 2	I	Good	Good	4	6	1	2/5	Twin stems at ground level with no significant defects noted
<i>Action & TPZ occupancy</i>		<i>Remove; located within proposed public footpath</i>										
19 CV	<i>Corymbia citriodora</i> Lemon Scented Gum	14 x 10	300	2.1 3.6	ESM	Good	Good	4	2E	2	2	Majority of tree base on Council verge. Tree location to infrastructure likely to become problematic in the future with no significant defects noted
<i>Action & TPZ occupancy</i>		<i>Remove; located within proposed public footpath</i>										

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 Order (TPO)					
Tree No	Botanical Name COMMON NAME	Height x spread (m)	DBH (mm)	SRZ	Age	Health	Condition	Significance	VTA	RV	U. L.E.	Comments CV = Council verge tree NT= Neighbouring tree
				TPZ								
20 NT	<i>Angophora costata</i> Angophora	9 x 12	500	2.6 6	ESM	Good	Fair / Good	3	2C	2	2	Vehicle impact wound at 3m, low canopy form extending into site by 2m at 3m above ground level
<i>Action & TPZ occupancy</i>		<i>Retain; negligible TPZ occupancy given tree location, tree would benefit from timber beam trunk protection during works</i>										
21 NT	<i>Angophora costata</i> Angophora	9 x 8	350	2.3 4.2	ESM	Good	Fair / Good	3	2C	2	2	Skewed lower narrow trunk with no significant defects noted
<i>Action & TPZ occupancy</i>		<i>Retain; negligible TPZ occupancy given tree location</i>										
22 NT	<i>Glochidion ferdinandi</i> Cheese Tree	8 x 9	250, 250, 300	3 9.6	ESM	Good	Fair / Good	3	2B	2	2	Main stems dividing at 1m with very minor stem inclusion development with low broad form
<i>Action & TPZ occupancy</i>		<i>Retain; negligible TPZ occupancy given tree location</i>										
23 CV	<i>Callistemon viminalis</i> Bottle Brush	6 x 5	350at base	2.1 4.2	SM	Fair / Good	Fair / Poor	4	2A/4	3	3	Majority of tree base on Council verge. Three (3) stems at base, N side stem inclusion development at ground level – likely to become problematic in the future, upper branch scaffolds with minor damage = low retention value
<i>Action & TPZ occupancy</i>		<i>Remove; located within proposed public pathway</i>										
24 CV	<i>Leptospermum petersonii</i> Lemon Scented Tea Tree	5 x 5	250at base	1.8 3	ESM	Fair / Good	Fair	4	2B	2	3/5	Majority of tree base on Council verge. Low bowing lean W, twin stems at 1.2m with minor stem inclusion development - likely to become problematic in the future
<i>Action & TPZ occupancy</i>		<i>Remove; located within proposed public pathway & driveway access</i>										
25	<i>Leptospermum petersonii</i> Lemon Scented Tea Tree	6 x 7	250, 350	2.7 7.2	ESM	Fair / Good	Fair	4/3	2A/B	2	3	Majority of tree base within site. Significant low bowing lean 6m W at 3m above ground level. Twin stems at ground level with stem inclusion development + minor stem inclusion development on lower branch scaffolds
<i>Action & TPZ occupancy</i>		<i>Remove; located within proposed public pathway & driveway access</i>										
26	<i>Callistemon viminalis</i> Bottle Brush	7 x 5	250at base	1.8 3	SM	Fair / Good	Fair	4	4/2B	2	3	Environmentally stressed with low foliage volume, twin stems at 1m with stem inclusion development
<i>Action & TPZ occupancy</i>		<i>Remove; located within proposed public pathway</i>										

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 Order (TPO)					
Tree No	Botanical Name COMMON NAME	Height x spread (m)	DBH (mm)	SRZ	Age	Health	Condition	Significance	VTA	RV	U. L.E.	Comments CV = Council verge tree NT= Neighbouring tree
				TPZ								
*27	<i>Callistemon Harkness</i> Bottle Brush	2.5 x 2	100at base	1.5 2	SM	Good	Fair / Good	5	0/7/2 B	2	3/5	Exempt species height class. Restricted VTA vine covered, appears environmentally stressed
<i>Action & TPZ occupancy</i>		<i>Remove; Exempt tree species located within proposed public pathway</i>										
28	<i>Callistemon viminalis</i> Bottle Brush	7 x 4	250at base	1.8 3	SM	Fair / Good	Fair	5	7/2A	3	<3	Suppressed canopy form biomass NNW, lower base abnormalities with vine covered canopy = low retention value
<i>Action & TPZ occupancy</i>		<i>Remove; located within proposed public pathway</i>										
28a	<i>Leptospermum petersonii</i> Lemon Scented Tea Tree	5 x 3	250at base	1.8 3	SM	Good	Fair	5	2C	2	3	Suppressed canopy form + moderate lean NE, with past stub end pruning cuts at 1.2m E side
<i>Action & TPZ occupancy</i>		<i>Remove; located within proposed public pathway</i>										
29	<i>Leptospermum petersonii</i> Lemon Scented Tea Tree	8 x 6	350at base	2.1 4.2	M	Good	Fair	5	2B/A	2	3	One sided canopy biomass E, twin stems at ground level with stem inclusion development, + minor stem inclusion development at 0.6m W side
<i>Action & TPZ occupancy</i>		<i>Remove; located within proposed public pathway</i>										
30 CV	<i>Leptospermum petersonii</i> Lemon Scented Tea Tree	5 x 5	100	1.5 2	ESM	Good	Good	5	6	1	2	Suppressed canopy form with low broad canopy
<i>Action & TPZ occupancy</i>		<i>Retain; Medium level impact by proposed adjacent public pathway, retention requires no disturbance within 2m TPZ</i>										
31 CV	<i>Melaleuca quinquenervia</i> Paperbark	14 x 12	800	3 9.6	EM	Good	Fair / Good	3	2B	2	2	Lower branch scaffolds with minor stem inclusion development throughout, canopy suppressed on W side with biomass extending NNE - E
<i>Action & TPZ occupancy</i>		<i>Retain; negligible TPZ occupancy, trunk protection recommended due to location, works (fencing excavation) within TPZ requires arborist supervision</i>										
32 CV	<i>Eucalyptus acmenoides</i> White mahogany	9 x 4	200	1.8 2.4	ESM	Fair / Poor	Fair	4	4/2C	2	3	Environmentally stressed significant decline in canopy with epicormic shoots throughout & minor wound at base W
<i>Action & TPZ occupancy</i>		<i>Retain; negligible TPZ occupancy, trunk protection recommended due to location, works (fencing excavation) within TPZ requires arborist supervision</i>										
33 CV	<i>Eucalyptus acmenoides</i> White mahogany	16 x 7	350	2.3 4.2	ESM	Fair / Good	Good	3	4	1	2	Slightly environmentally stressed, tall forest form with low live crown ratio, minor skewed lower trunk with no significant defects noted
<i>Action & TPZ occupancy</i>		<i>Retain; negligible TPZ occupancy, trunk protection recommended due to location, works (fencing excavation) within TPZ requires arborist supervision</i>										

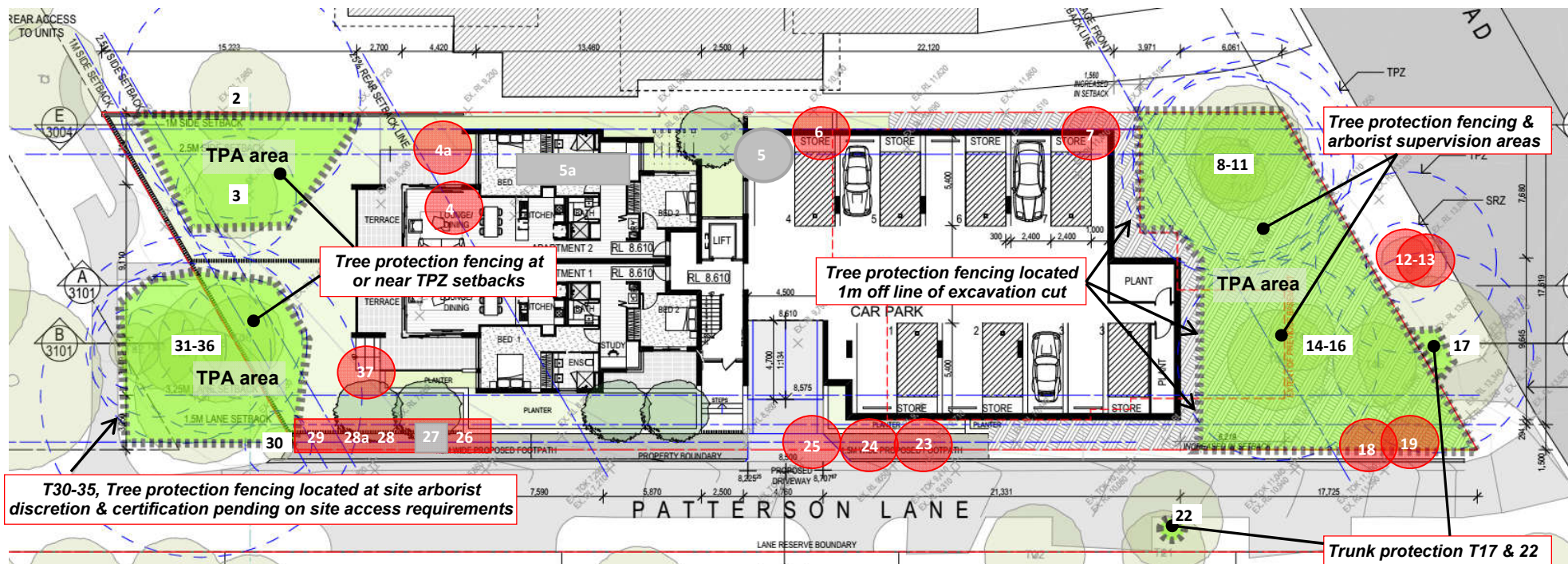
Trees requiring removal due to hazardous or dead condition - subject to Local Government Authority notification							Trees with low retention values: senescence, developing defects or being *exempt trees from the LGA Tree Preservation Order (TPO)					
Tree No	Botanical Name COMMON NAME	Height x spread (m)	DBH (mm)	SRZ	Age	Health	Condition	Significance	VTA	RV	U. L.E.	Comments CV = Council verge tree NT= Neighbouring tree
				TPZ								
34 CV	<i>Glochidion ferdinandi</i> Cheese Tree	9 x 10	250, 200	2.4 5.4	ESM	Good	Good	3	2C	2	1	Minor wound at 0.4m NE, with no significant defects noted
<i>Action & TPZ occupancy</i>		<i>Retain; negligible TPZ occupancy, trunk protection recommended due to location, works (fencing excavation) within TPZ requires arborist supervision</i>										
35 CV	<i>Eucalyptus acmenoides</i> White mahogany	16 x 10	450	2.5 5.4	ESM	Good	Good	3	6	1	1	minor wound at base W side, Suppressed canopy form biomass NNW, canopy low 7m within site at near 6m above ground level
<i>Action & TPZ occupancy</i>		<i>Retain; negligible to minor TPZ disturbance by fence proposal, trunk protection recommended due to location, works (fencing excavation) within TPZ requires arborist supervision</i>										
36	<i>Glochidion ferdinandi</i> Cheese Tree	7 x 8	300	2.1 3.6	ESM	Good	Fair / Good	3	2C/6	1	1	Suppressed canopy form, low bowing canopy N to 5m at 2.5m above ground level, past pruning cuts evident at 1.8m N side (drip line TPA)
<i>Action & TPZ occupancy</i>		<i>Retain; negligible to minor TPZ disturbance by fence proposal, trunk protection recommended due to location, works (fencing excavation) within TPZ requires arborist supervision</i>										
37	<i>Eucalyptus robusta</i> Swamp Mahogany	12 x 12	450	2.5 5.4	ESM	Poor	Fair / Poor	4/3	4	3	<3	Environmentally stressed significant decline in canopy throughout upper branch scaffolds = low retention value
<i>Action & TPZ occupancy</i>		<i>Remove, low retention value tree with structural faults, located within terrace & landscaped (planter bed) area</i>										

APPENDIX- D: Tree Location Plan



APPENDIX- E01: Demolition stage Tree Removal & Protection Plan, not to scale

TPA = Tree Protection Area, no works or access to occur without prior arborist advice

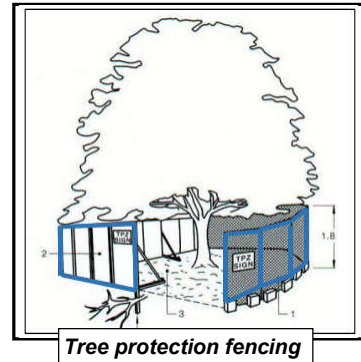
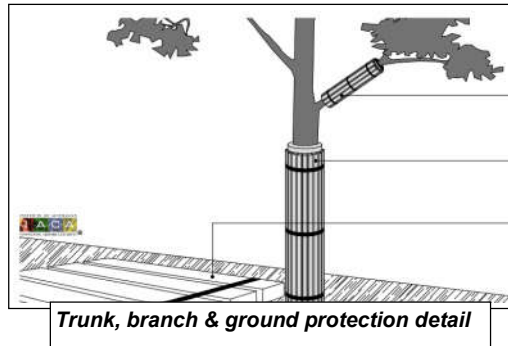


T30-35, Tree protection fencing located at site arborist discretion & certification pending on site access requirements

- = Prescribed tree removal: T4, 4a, 6, 7, 12, 13, 18, 19, 23, 24, 25, 26, 28, 28(a), 29 & 37
- = Exempt tree removal: T5, 5a, & 27

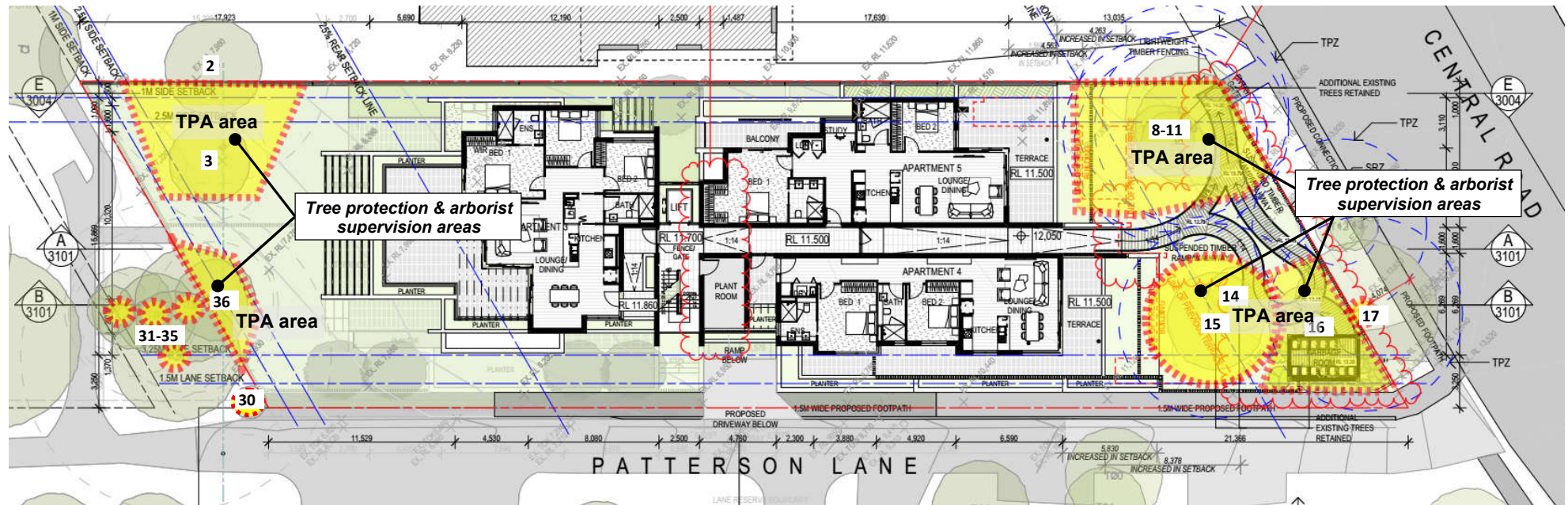
NOTES

1. Tree protection fencing to be installed prior to demolition & basement cut
- 1a. Installed around T2, 3, 8-11, 14-16 & 30-36 (Park Reserve trees)
2. For park reserve trees timber beam trunk protection would suffice
- 2a. Trunk protection installed against T17 & 20
3. All tree protection to be certified by site arborist

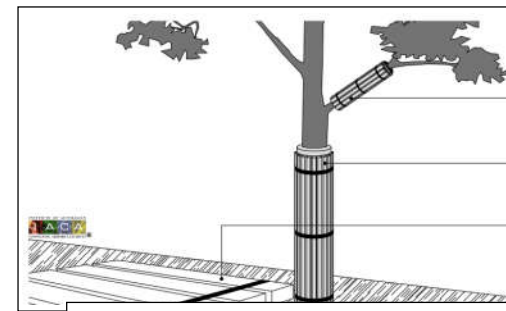


APPENDIX- E02: Construction stage Tree Protection Plan, not to scale

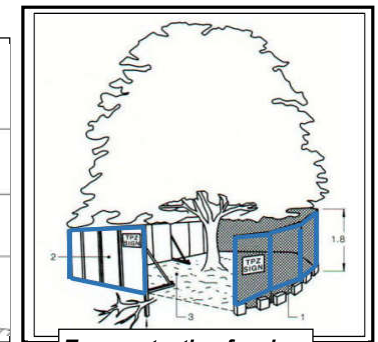
TPA = Tree Protection Area, no works or access to occur without prior arborist advice



4. At completion of basement works fencing to be reduced for ground level construction activities
- 4a. Fence reduction should occur under the guidance & certification of the arborist
- 4b. The TPA of T8-11 & 14-17 shall be mulched & irrigated
5. For park reserve trees 30-35 timber beam trunk protection should suffice
- 5a. Tree protection fencing shall remain as proposed for T2, 3 & 36
6. Trunk protection shall remain against T17 & 20 until completion of works
7. No works shall occur within the TPA or TPZ without arborist advice & supervision



Trunk, branch & ground protection detail



Tree protection fencing