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1 BEATTY STREET – BALGOWLAH, NSW
PROPOSED SWIMMING POOL
ARBORICULTURAL IMPACT ASSESSMENT REPORT
Ref No. 14021

INTRODUCTION

This report has been commissioned by Mr. Josh Locker C/- Sandberg Schoffel Architects. The purpose of this report is to assess potential impacts that may occur to a significant tree in relation to a new development proposal. The new development proposal consists of constructing a new in ground swimming pool partly within a previous pool location within Lot 21 of DP 788398 known as 1 Beatty Street BALGOWLAH NSW.

METHODOLOGY

In preparation for this report a site inspection was conducted by the author on Friday 6th August 2021. Documentation reviewed and/or works conducted to assist in the preparation of this report include:

- Undertaking a limited ground level Visual Tree Assessment adopted from components of Mattheck & Breloer 'The Body Language of Trees' 1994. On completion of the VTA the retention value of the tree was summarized utilizing the Tree Assessment Checklist provided within Appendix- C.
- Estimating tree height and measuring trunk diameter to determine the estimated Structural Root Zone (SRZ) *the area required for tree stability*, and Tree Protection Zone (TPZ) radiuses.
- Determining age and vitality of the tree to withstand works within the TPZ.
- Providing terminology & references within Appendix- B.

Documents reviewed

Sandberg Schoffel Architects

- Site Analysis & Roof Plan Dwg No: DA-01 rev - dated 16.7.2021
- Ground Floor Plan Dwg No: DA-02 rev - dated 20.8.2021
- Sections Dwg No: DA-06 rev - dated 18.3.2021

CMS Surveyors Pty Limited

- Survey Plan Dwg ref. 11589D issue 1 dated 3.5.2021

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

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SUMMARY OF ASSESSMENT

General tree assessment

- One (1) tree T1 has been assessed for the purpose of this development application. The tree is a local occurring semimature Sydney Red Gum or Angophora (*Angophora costata*). The tree displays significant decline where slow decline appears irreversible indicating the tree has a likely short or low retention value. Cause of decline is unknown where poor site conditions and past works within the tree protection zone may be contributing factors.

The development proposal

- A small inground swimming pool and associated infrastructure is proposed within notional Structural Root Zone (SRZ) & Tree Protection Zone (TPZ) radiuses. In mitigating impacts to the tree, the design proposes to retain an existing retaining wall forming a root protection barrier within the SRZ.

Discussion of development impacts

- No new works (excavation) is proposed within the trees 2.7m SRZ. Within the SRZ between the retaining wall and tree a significantly large structural root >200mm(Ø) descends towards the rear of the existing retaining wall. This structural root is critically important in maintaining anchorage. To avoid consequences resulting from root damage by development activities the large root and secondary roots within the SRZ must not be damaged or disrupted.
- Within the 6.6m TPZ the design footprint proposes a negligible to very Minor (<10%) TPZ encroachment indicating a very low level impact or minor new TPZ occupancy by design. As a guide to minimising development impacts within the tree protection zone the following guidelines are provided to appropriately manage minor incursions within the TPZ.
 - From the existing retaining wall there is to be no excavation or soil disturbance within the trees 2.7m SRZ. The SRZ behind the existing retaining wall is to be considered a development activity exclusion area. Should excavation for pool services or boundary fence be required within the critical protection zone as shown within Appendix- C Item 2, arboricultural tree root investigations are to be conducted to identify the location, distribution and impact to underlying tree roots. The management of the tree shall be based on the results of the investigation and further advice from an appointed site arborist.
 - To avoid additional root disturbances within the 6.6m TPZ no continuous strip footings or trench excavation shall occur to accommodate the proposed pool addition as shown within Item 2 of Appendix - C. The minor addition or proposed finished level at RL43.01 shall be suspended design utilizing tree sensitive construction techniques to avoid damage to underlying tree roots.

- c. Where minor excavation is required within the TPZ works are to be conducted manually (by hand) to avoid ripping of roots by excavation machinery.
- d. Given the small suspended area it is unlikely fill beneath the proposed addition will detrimentally impact tree vitality. Where fill is required beyond the existing retaining wall fill shall consist of approved free draining non-contaminated 80/20 (sand(80%) & loam (20%)) soils compliant with AS4419-2018 Soils for Landscape & Garden Use.
- e. Within the TPZ external to the SRZ no tree roots at or >30mm(Ø) are to be damaged without prior arborist advice.
- f. Prior to obtaining a Construction Certificate (CC) an appointed project arborist shall certify the location of pool hydraulics and services ensuring pool hydraulics are positioned as not to disrupt underlying tree roots.
- g. The trunk of the tree shall be protected with timber beam trunk protection as indicated within Figure 2 prior to works commencing.

Figure 1, Showing retaining wall acting as a root protection barrier

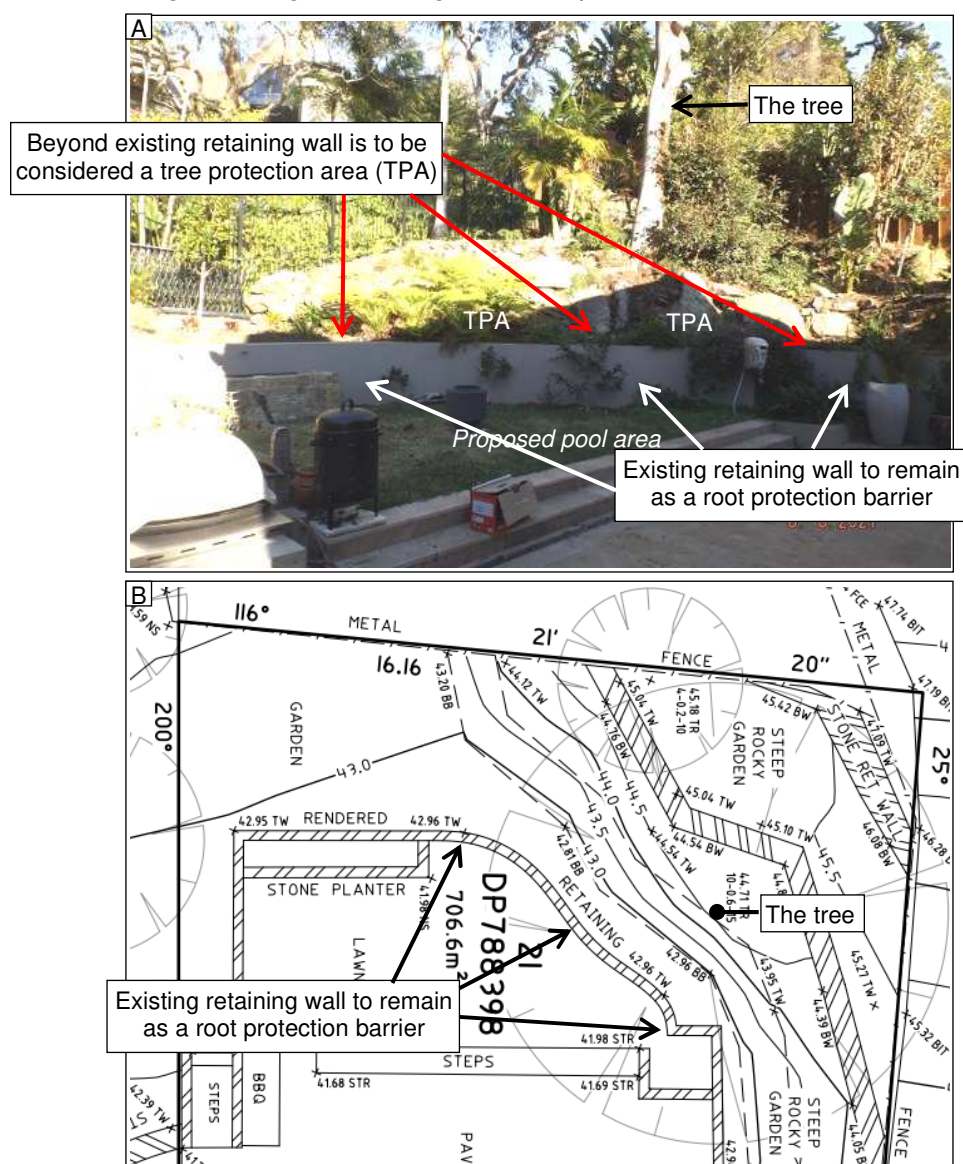
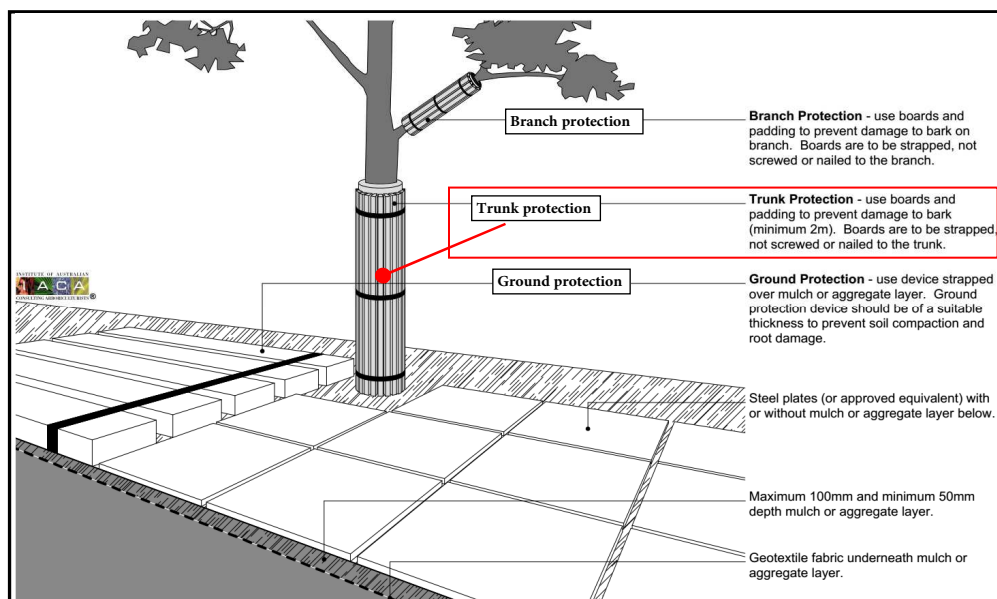


Figure 2, showing tree trunk protection detail



General requirements

5. Unless specified otherwise within this report 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 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* (i.e. timber beam trunk & ground mat protection).

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

6. There shall be no excavation (including landscape works) within SRZ setbacks without prior arborist advice and certification, see SRZ & TPZ distance column Appendix- C. Where works are proposed within the SRZ prior tree root investigations or root mapping is required to identify the impact to critical underlying and anchoring tree roots.
7. Unless specified otherwise in accordance with AS4970-2009 Section 4.2 *Activities restricted within the TPZ* being site specific are:
 - Machine trenching
 - Storage of materials
 - Cleaning of equipment &
 - Placement of fill & soil level change

Given minor works within the tree protection zone minor fill beyond the retaining wall will unlikely disrupt tree vitality.

8. The placement of fill within the TPZ shall be clearly shown within construction drawings with fill being non-contaminated, free draining 80/20 sandy soils being certified by an appointed site arborist prior to delivery within the site.

9. Hold points:

Hold points specific to *no works are to commence without prior arborist advice, inspections & certifications*:

1) No works (ie; landscaping, excavation, and fencing) shall occur within the SRZ without prior arborist advice and certification.

2) No excavation shall occur within the 6.6m TPZ or beyond the existing retaining wall as shown within Figure 1 and Item 2 of Appendix- C without prior project arborist notification, advice and/or site supervision.

10. 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 and be responsible for obtaining appropriate certifications.
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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)
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APPENDIX- A: Terminology, notes & references

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. **Vitality** – the state of being strong & active, capacity for survival or for the continuation of a meaningful or purposeful existence which includes **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:** referring 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. **Footprint:** The area occupied by site structures, including the dwelling driveways and hard surfaces. **Hazard:** When a tree failure hazard is present when a tree has potential to cause harm to people or property. (A source of potential harm). **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. **Wound:** Damage inflicted upon a tree through injury to its living cells, may continue to develop further weakening of the structure compromising structural integrity.

NOTES: 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). Given the existing site conditions both the SRZ & TPZ cannot be accurately determined

Development encroachments are referred to as No impact (0%) incursion, Low impact (<10%) of minor consequence, Medium impact (<20%) incursion where the project arborist is to demonstrate the tree/s remain viable by tree sensitive construction techniques, and High level impact (>20%) where design changes or further information is required to manage tree vitality.

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.

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.

Matheny N. & Clark J. 1998, *Trees & Development 'A Technical Guide to Preservation of Trees During Land Development'* International Society of Arboriculture, Champaign USA.

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

Standards Australia 2007, *Australian Standards 4373 Pruning of Amenities Trees* - Standards Australia, Sydney, Australia.

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.

APPENDIX- B: Visual Tree Inspection Checklist

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 - * <i>exempt</i> 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 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 pathogen activity, cavities or symptoms indicating internal decay of 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 by minor pruning or storm damaged 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 resulting in sudden exposure or poor form which may reduce retention values, - or tree extensively pruned for power line clearance modifying form increasing risk of limb bending stress by exposure	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): [1] Low risk - tree free of visual defects & viable for retention, [2] Medium – low risk - viable for retention with minor faults which may reduce ULE, [3] Medium risk - trees which containing issues or faults that are likely to become problematic in the near future, [4] M/High risk - trees to be considered for removal due to poor 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. The five categories of U.L.E. are as follows:

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 schedule, location plan & design footprint area

Tree Assessment Schedule

Refer VTA Checklist Appendix- B

Tree No:	Species	Height x Span	DBH mm	SRZ TPZ	Age	Tree vitality	Significance	VTA	RV	ULE	Comments
1	Angophora costata Angophora	16 x 13	550	2.7m 6.6	SM	Poor / declining	3- High	4	3	3	Environmentally stressed, in considerable decline with large diameter deadwood, decline in central canopy and lower branch scaffolds N & W sides, located at edge of embankment

Development area & tree location plan

