ALLIED TREE
CONSULTANCY
Level 5 and 8 Arboriculturist

Arboricultural Impact Assessment Report

For the site address

Lots 1 and 2 (DP 501837) and
lot 12 (DP 552854),
No. 10 Lagoon Street and
No. 75-77 Murray Street
MORUYA, NSW

Prepared for

Land and Housing Corporation
Department of Planning, Industry and Environment

AUTHOR

Warwick Varley and Geoff Beisler

STATUS

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1.0 Introduction

1.1 *Allied Tree Consultancy* (ATC) has been commissioned by *Land and Housing Corporation, Department of Planning, Industry and Environment* to prepare an Arboricultural Impact Assessment for the development proposal at No. 10 Lagoon Street and No. 75-77 Murray Road, Moruya. This proposal includes the construction of a multi-dwelling residential housing development. This report includes thirteen trees located on and adjacent to the lot and discusses the viability of these trees based on the proposed works.

1.2 This report will address for these trees the:

- species' identification, location, dimensions, and condition;
- SULE (Safe Useful Life Expectancy) and STARS (Significance of a Tree Assessment Rating System) rating;
- discussion and impact of the proposed works on each tree;
- tree protection zones and protection specifications for trees recommended for retention.

1.3 The subject site resides within Moruya; for this reason, Eurobodalla Shire Council is the consenting authority for any tree works recommended in this report.

2.0 Standards

2.1 Allied Tree Consultancy provides an ethical and unbiased approach to all assignments, possessing no association with private utility arboriculture or organisations that may reflect a conflict of interest.

2.2 This report must be made available to all contractors during the tendering process so that any cost associated with the required works for the protection of trees can be accommodated.

2.3 It is the responsibility of the project manager to provide the requirements outlined in this report relative to the Protection Zones, Measures (Section 7.0) and Specifications (Section 8.0) to all contractors associated with the project before the initiation of work.

2.4 All tree-related work outlined in this report is to be conducted in accordance with the:

- Australian Standard – AS4373; Pruning of Amenity Trees.
- Guide to Managing Risks of Tree Trimming and Removal Work[1].

[1] Safe Work Australia; July 2016; Guide to Managing Risks of Tree Trimming and Removal Work, Australia

- All tree works must be carried out at a tertiary level (minimum Certificate-level 3) qualified and experienced (minimum five years) arboriculturist.
- For any works in the vicinity of electrical lines, the arboriculturist must possess the ISSC26 endorsement (Interim guide for operating cranes and plant in proximity to overhead powerlines).

2.5 As a minimum requirement, all trees recommended for retention in this report must have removed all dead, diseased, and crossing limbs and branch stubs to be pruned to the branch collar. This work must comply with the local government tree policy (Eurobodalla Shire Council) and Section 2.4.

2.6 Any tree stock subject to conditions for works carried out in this report must be supplied by a registered Nursery that adheres to the AS 2303; 2015[2].

- All tree stock must be of at least 'Advanced' size (minimum 75lt) unless otherwise requested.
- All tree stock requested must be planted with adequate protection. This may include tree guards (protect stem and crown) and if planted in a lawn area, a suitable barrier (planter ring) of an area, at least, $1m^2$ to prevent grass from growing within the area adjacent to the stem.

3.0 Disclosure Statement

Trees are living organisms and, for this reason, possess natural variability. This cannot be controlled. However, risks associated with trees can be managed. An arborist cannot guarantee that a tree will be safe under all circumstances nor predict the time when a tree will fail. To live or work near a tree involves some degree of risk, and this evaluation does not preclude all the possibilities of failure.

4.0 Methodology

4.1 The following tree assessment was undertaken using criteria based on the guidelines laid down by the International Society of Arboriculture.

4.2 The format of the report is summarised below;

4.2.1 **Plan 1;** Tree Location Relative to Site: This is an unscaled plan reproduced from the Survey Plan as referenced in Section 4.4.1, depicting the area of assessment.

[2] Australian Standard; 2015, AS2303, Tree stock for landscape use, Australia

4.2.2 Table 1; This table compiles the tree species, dimensions**,** brief assessment (history, structure, pest, disease, or any other variables subject to the tree), significance, allocation of the zones of protection (i.e., Tree Protection Zone[3] ;TPZ and Structural Root Zone; SRZ) for each tree illustrated in Plan 1, Section 5.0. All measurements are in metres.

4.2.3 Discussion relating to the site assessment and proposed works regarding the trees.

4.2.4 Protection Specification; Section 8.0 details the requirements for that area designated as the Tree Protection Zone (TPZ), for those trees recommended for retention.

4.3 The opinions expressed in this report, and the material, upon which they are based were obtained from the following process and data supplied:

4.3.1 Site assessment on the 17th October 2020 using the method of the Visual Tree Assessment[4]. This has included a Level 2 risk assessment, being a *Basic Assessment*[5]. The assessment has been conducted by Geoff Beisler[6] on behalf of *Allied Tree Consultancy*. A follow-up assessment was conducted on the 18th May, 2023 by Warwick Varley[7], resulting with an amendment to Sections 6.0 and 7.0.

4.3.2 Trees included in this report are those that conform to the description of a prescribed tree by the local government policy.

4.3.3 All measurements, unless specified otherwise, are taken from the tree centre.

4.3.4 Tagging of trees with scribed aluminium tags nailed to the trees at chest level and face north. Tree No. 9 (A linear planting of 25 trees) is a neighbouring tree. Therefore, the tree tag was attached to the fence post in the southeastern corner of No. 10 Lagoon Street. Tree No. 13 is also a neighbouring tree, therefore the tree tag was installed on the post in the northeastern corner of No. 10 Lagoon Street.

[3] Australian Standard, 4970; 2009 – Protection of Trees on Development Sites, Australia
[4] Mattheck, C. Breloer, H.,1994, The Body Language of Trees – A handbook for failure analysis The Stationary Office, London
[5] Dunster J.A., 2013, Tree Risk Assessment Manual, International Society of Arboriculture, 2013, USA
[6] Consulting Arborist, Diploma of Arboriculture (level 5)
[7] Consulting Arborist, Diploma of Arboriculture (level 5 and 8)

4.3.5 Raw data from the preliminary assessment including the specimen's dimensions was compiled by the use of a diameter tape, height clinometer, angle finder, compass, steel probes, Teflon hammer, binoculars and recording instruments.

4.4 Documentation provided

The following documentation has been provided to Allied Tree Consultancy and utilised within the report.

4.4.1 Surveyor

Drawn by *TTS*
Date: 15 October 2020
Reference: 201878
Drawing No: Sheet 1 of 5
Note 1: See Section 4.5.1

4.4.2 Design

Drawn by *Kennedy Associates Architects*
Date: 16 February 2024
Reference: 2053
Drawing No: DA-000-DA601 (45 Sheets) ; revision B

4.4.3 Engineering; Stormwater

Drawn by *Xavier Knight*
Date: 16 February 2024
Reference: 221106
Drawing No: C000-C350, revision A

4.5 Limitations of the assessment/discussion process

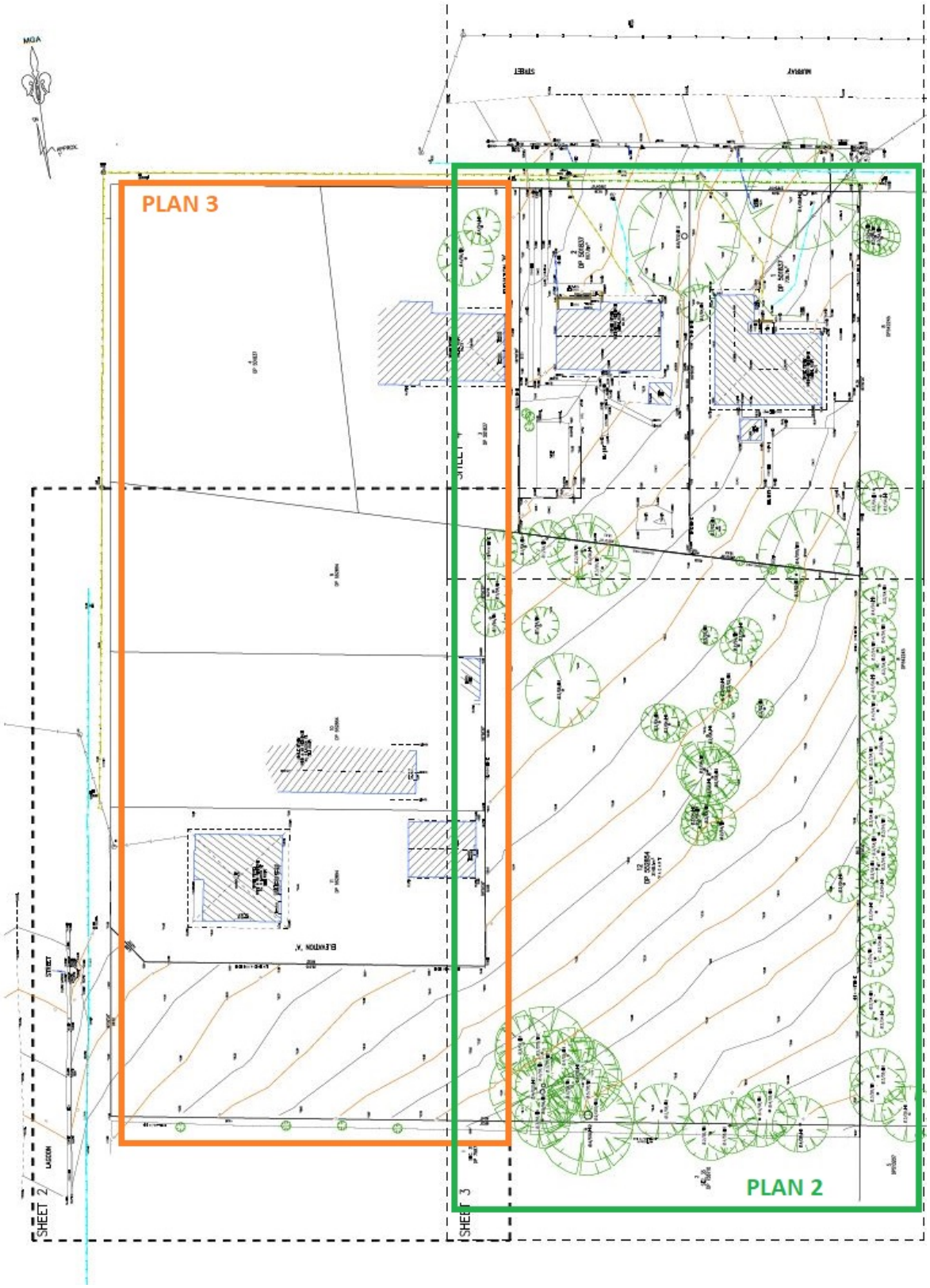
4.5.1 Tree No. 5 has been omitted from the plans provided, however, is required for inclusion because it conforms to the definition of a prescribed tree within the local government tree policy. The tree location has been plotted onto the Plan 1 by *Allied Tree Consultancy*. The tree location was established by measuring from known points and scaling onto the drawing. *Allied Tree Consultancy* is not a registered surveyor and, however, the accuracy of the survey is attempted; the true position of this tree may marginally deviate. Any such deviation provides the potential for changing the actual impact (encroachment) provided to a tree.

4.5.2 The assessment has considered only those target zones that are apparent to the author and the visually apparent tree conditions, during the time of assessment.

4.5.3 Any tree regardless of apparent defects would fail if the forces applied to exceed the strength of the tree or its parts, for example, extreme storm conditions.

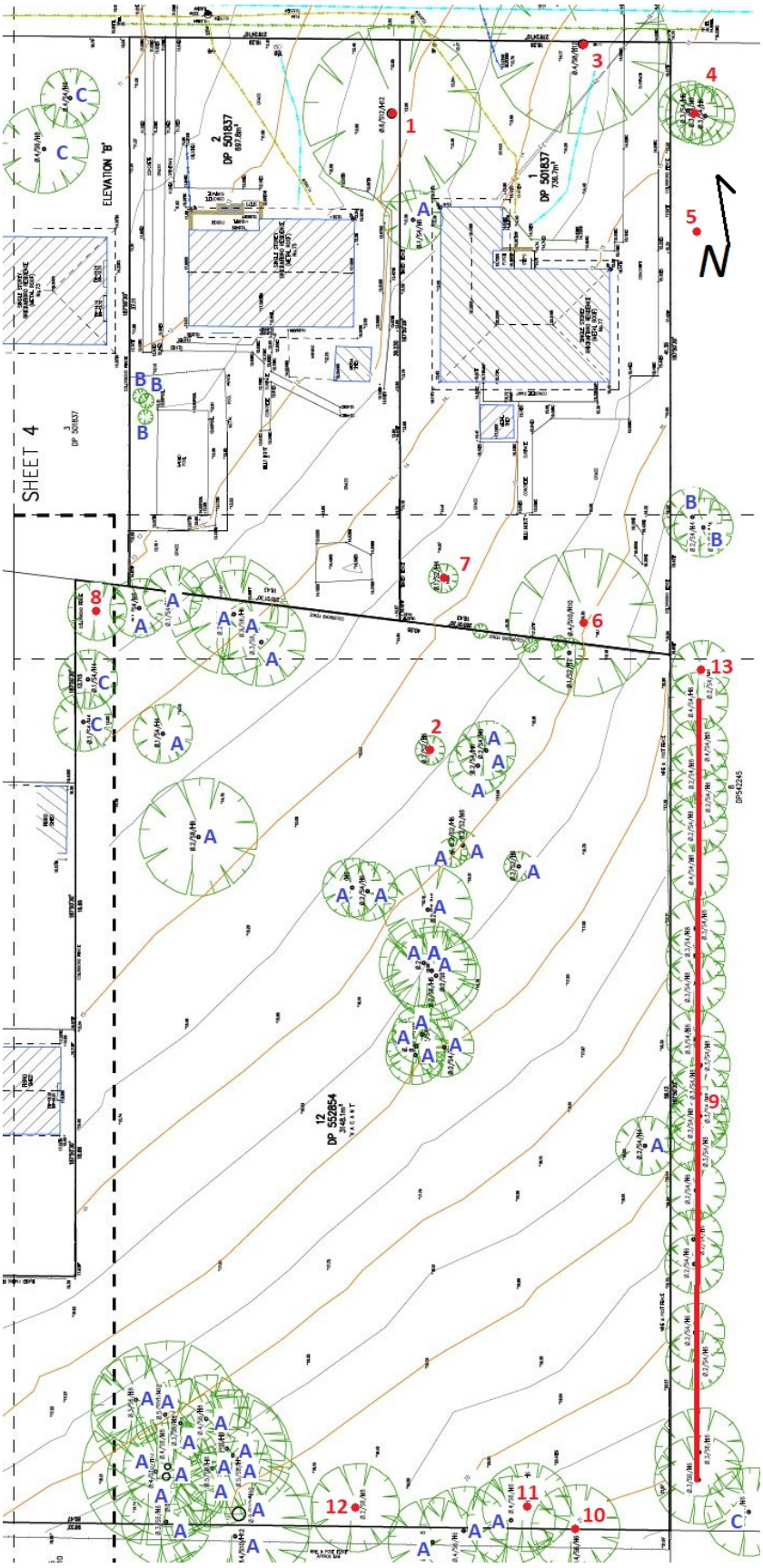
4.5.4 The assessment has been limited to that part of the tree which is visible, existing from the ground level to the crown. Root decay can exist and in some circumstances provide no symptoms of the presence. This assessment responds to all the symptoms provided by a tree, however, cannot provide a conclusive recommendation regarding any tree that may have extensive root decay that leads to windthrow without the appropriate symptoms.

5.0 Plan 1; Area of assessment



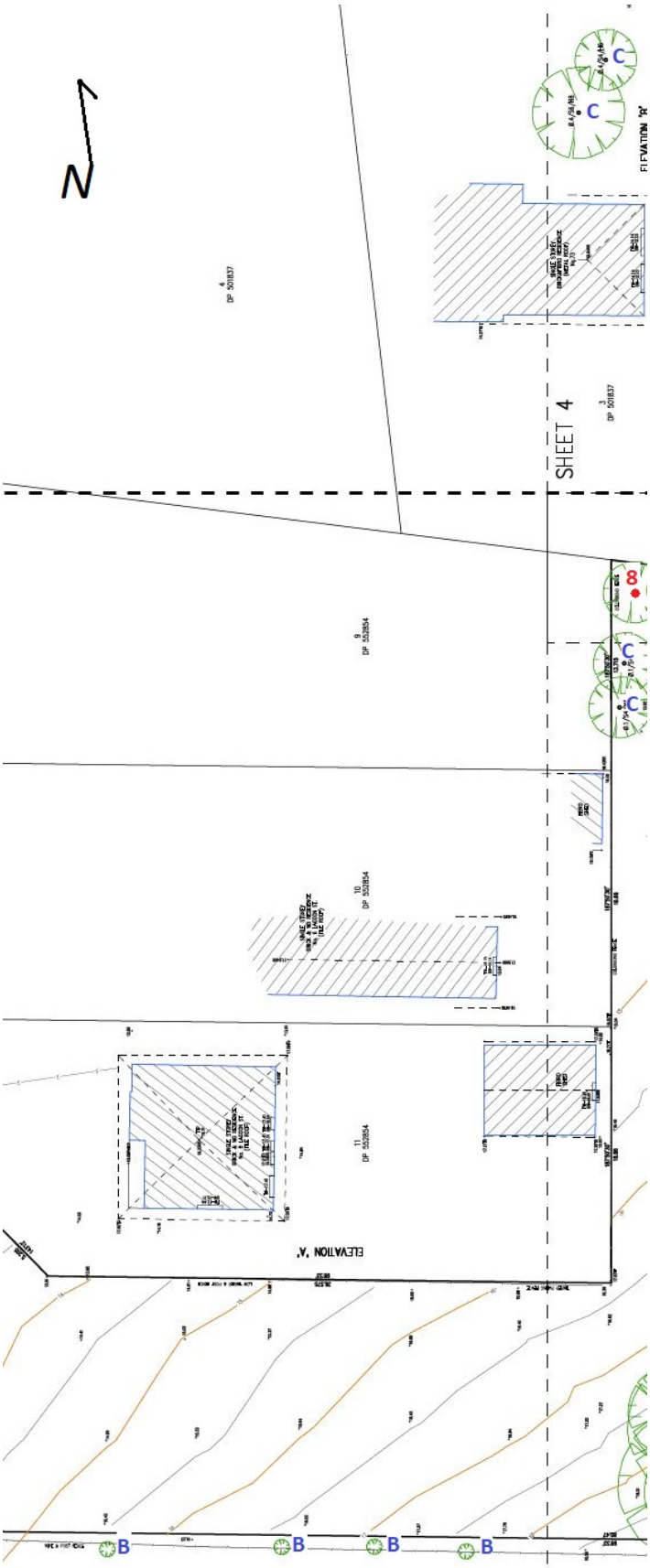
Not to scale
Source: Adapted from *TTS,* see Section 4.4.1

5.1 Plan 2; Area of assessment illustrating tree location



Not to scale
Trees labelled A, B and C are exempt species, see Section 7.0.
Source: Adapted from *TTS,* see Section 4.4.1

5.2 Plan 3; Area of assessment illustrating tree location



Not to scale
Trees labelled A, B and C are exempt species, see Section 7.0.
Source: Adapted from *TTS,* see Section 4.4.1

6.0 Table 1 – Tree Species Data

Terminology/references provided in Appendix A.

Tree No.	Botanical Name Common Name	Height (m)	DBH (m)	Crown Spread (m)	Age	Crown Class	Crown Aspect	Vitality	SULE Rating	STARS Rating	TPZ	SRZ
1	*Eucalyptus globulus* Tasmanian Blue Gum	14	0.61	12 x 13	M	D	Sym.	B-C	**A3**	**LOW**	**7.32**	**2.70**
Assessment This tree presents as typical for the species, however since the previous assessment (2 years, 6 months) the tree has declined further. No obvious reason exists, although the species is susceptible to pathogenic decay-type fungi and in particular *Phellinus*, although no signs exist, such infection can still exist. A quantitative variable for determining tree vitality is the DBH growth increments. The average incremental growth rate across the site trees (not neighbours which are estimated) has been 30mm. Tree No. 6 for which this tree is most closely related (based on species and age) provided a growth increase of 30mm. However, the increase of this tree is 10mm, which is significantly less than the average, and based on the vitality typically displayed by the species, is a significant difference. That is, this tree is displaying consistent decline, and data supports this. Based on this, and taking into account the substantial growth offered by trees throughout the urban environment from increased rainfall over the past 18 months, provides a dubious life expectancy and reduced ratings for this tree. **Proposed works**; See Section 7.1.2												
2	*Acacia irrorata* [A] Green Wattle	8	0.26	8 x 8	M	D	Sym.	A	**A3**	**LOW**	**3.12**	**1.88**
Assessment This tree presents as typical for the species, although the limited life span associated with the species has limited the rating. **Proposed works**; See Section 7.1.2												
3	*Ulmus parvifolia* Chinese Elm	13	0.64[B]	12 x 13	M	D	Sym.	A	**D2**[E]	**MEDIUM**	**7.32**	**2.69**
Assessment This tree presents as typical for the species. Codominant at 1m, large wounds are located on the stem, north and south side. The southern wound has a vertical crack in the wound face (probe enters approximately 110mm) that corresponds with the codominant union above it. The crack appears static based on the past assessment, although still presents a potential weak point where half or the entire tree can fail. Although no decay appears to be present, a level 3 assessment (internal diagnostics, See Appendix A), could determine this and respective risk. Based on the outcome of a Level 3 assessment, and viability of this tree, bracing (See Appendix A) of the crotch would be considered mandatory. **Proposed works**; See Section 7.1.2												

Tree No.	Botanical Name Common Name	Height (m)	DBH (m)	Crown Spread (m)	Age	Crown Class	Crown Aspect	Vitality	SULE Rating	STARS Rating	TPZ	SRZ
4	*Banksia integrifolia* Coast Banksia	3	0.41 [BC]	3 x 3	M	I	E	A	**A2**	**MEDIUM**	**4.92**	**2.28**
Assessment This neighbouring tree had presented as typical for the species, however, has since been topped (lopped) over two-thirds of the tree, from 8m to 3m. This illicit pruning practice has significantly limited the useful life expectancy. **Proposed works**; See Section 7.1.3												
5	*Melaleuca quinquenervia* Broad Leaved Paperbark	3	0.50 [BC]	6 x 7	M	D	Sym.	A	**A2**	**HIGH**	**6.00**	**2.47**
Assessment This neighbouring tree had presented as typical for the species, however, has since been topped (lopped) over two-thirds of the tree, from 11m to 3m. This illicit pruning practice has significantly limited the useful life expectancy. **Proposed works**; See Section 7.1.3												
6	*Angophora costata* Smooth Barked Apple	11	0.58	11 x 12	M	D	Sym.	A	**B1**	**HIGH**	**6.60**	**2.57**
Assessment This tree presents as typical for the species. Several small rubbing branches are located in the mid-crown. **Proposed works**; See Section 7.1.3												
7	*Syzygium paniculata* Magenta Lilly Pilly	5	0.16	3 x 3	M	D	Sym.	A	**D3**	**MEDIUM**	**2.0**	**1.5**
Assessment This tree presents as typical for the species, although recent demolition works has resulted with machine damage to the base of the tree that has extensively wounded causing a structural crack through the base of the stem. This practice has significantly limited the useful life expectancy. **Proposed works**; See Section 7.1.2												
8	*Acacia irrorata* [A] Green Wattle	8	0.18 [C]	5 x 5	O	D	N	C	**A4**	**LOW**	**2.16**	**1.61**
Assessment This tree is senescing. **Proposed works**; See Section 7.1.2												
9	*Casuarina cunninghamiana* River Sheoak	17 (Average)	0.33 (Average)	6 x 8 (Average)	M	C	Sym.	A-B (Average)	**A2** (Average)	**HIGH** (Average)	**3.96**	**2.08**

Tree No.	Botanical Name Common Name	Height (m)	DBH (m)	Crown Spread (m)	Age	Crown Class	Crown Aspect	Vitality	SULE Rating	STARS Rating	TPZ	SRZ
Assessment This is a linear planting of 25 neighbouring trees, all located approximately 1800mm from the fence line separating the lots. Three trees in the southern portion of the linear stand present significant decline. **Proposed works**; See Section 7.1.1												
10	*Photinia spp.* [A] Photinia	6	0.30 [BC]	6 x 6	M	C	Sym.	A	**A2**	**MEDIUM**	**3.60**	**2.00**
Assessment This tree presents as typical for the species. **Proposed works**; See Section 7.1.4												
11	*Photinia spp.* [A] Photinia	6	0.35 [BC]	6 x 6	M	C	Sym.	A	**A2**	**MEDIUM**	**4.20**	**2.13**
Assessment This tree presents as typical for the species. **Proposed works**; See Section 7.1.4												
12	*Melia azedarach* White Cedar	9	0.28	7 x 5	Y	C	N	A	**A2**	**MEDIUM**	**2.76**	**1.79**
Assessment This tree presents as typical for the species. **Proposed works**; See Section 7.1.4												
13	*Syzygium spp.* [A] Lilly Pilly	8	0.24 [BC]	5 x 6	M	S	NW	A	**B1**	**MEDIUM**	**2.88**	**1.82**
Assessment This neighbouring tree presents as typical or the species. **Proposed works**; See Section 7.1.1												

A. Incomplete identification of species due to insufficiently available plant material
B. Diameter taken below 1.4m due to low stem bifurcation
C. Estimate due to the overgrown area and/or limited access
D. Deciduous species, void of foliage at the time of assessment
E. Level 3 assessment required to determine the accurate rating

7.0 Site Assessment

The area of assessment comprises three adjacent suburban lots. Therefore the site assessment/s shall be divided into the individual lots;

No. 10 Lagoon Street: this is a large, vacant, 'L' shaped lot, consisting entirely of unmaintained grass and weedstock. The lot has a consistent slight-medium gradient, north-westerly aspect. Numerous trees are exempt species- this includes large trees. A linear planting of neighbouring trees is located to the east. The southern boundary is densely overgrown- this has limited the assessment of the few trees requiring inclusion. It is feasible that trees (desirable species) less than 3m in height are located within the dense vegetation; however, brush clearing activities would have to be undertaken to ascertain this.

No. 75-77 Murray Road: This trapezoid suburban lot has a consistent medium gradient, westerly aspect. The lot has been recently demolished and is currently cleared with slashed weed stock as ground cover.

The trees labeled as A, B and C, that have been included on the survey drawing (Plan 1) however, excluded from this report because of the failure to conform to the description of a prescribed tree based on the Eurobodalla Shire Councils Development Control Plan.

Tree A: trees that occur on the lot proposed for development and are exempt species[8].

Tree B: trees below 3m in height or less than 100mm in diameter

Tree C: trees that are removed from the works/ outside the scope of works.

7.1 Proposed development

The proposed development consists of the demolition of existing site structures and construction of a multi-dwelling residential housing development, drive access, and drainage infrastructure.

Neighbours trees; Trees No. 4, 5, 9 (a linear planting of multiple trees) and 13 are located in the neighbours lots, therefore constituting ownership by a second party. Any proposed works within the zones of protection for these trees must not adversely impact these zones, and the trees shall be retained and protected from any site works unless permission for removal is granted by the tree owner and Eurobodalla Shire Council.

The calculations included in the following discussion have not been considered;

- subsurface utilities that have not been included in the design,
- Work methods related to subsurface utilities, for example, concrete encasing or replacement of existing lines

[8] https://www.esc.nsw.gov.au/__data/assets/pdf_file/0019/138511/Tree-Preservation-CoP-Aug-2019.pdf

- or work methods related to construction (stockpiling, site sheds, scaffolding) unless otherwise specified.

These may also increase the encroachment and tree impact and, therefore, the opportunity for tree retention.

Assumption 1, Retaining wall: The excavation required for the retaining walls will need to be further from the outside edge of the proposed wall to allow for construction of the wall, waterproofing, and drainage; therefore, the actual cut has been assumed within this report to be up to 300mm from the line indicating the location of the retaining wall. All calculations for the encroachment of any zone of protection (TPZ, SRZ) has been based on this assumption.

This report discusses the impact of the proposed design on the trees. Thirteen (13) trees have been listed within this report based upon the vicinity of the proposed works. This has included any tree where any part of the zones of protection; Tree Protection Zone (TPZ) and Structural Root Zone (SRZ), encroach into the area proposed for work. Recommendations based on the tree significance and condition, together with the impact on these trees regarding the proposed development (based on the documents contained in Section 4.4) and mitigation where available, follow.

7.1.1 Trees and zones of protection (TPZ/SRZ) outside of the proposed design

Tree No. 9 and 13

None of the proposed works conflict with the location of these trees or respective zones of protection. These trees can be retained without impact by the proposed design.

7.1.2 Trees directly conflicting with the design

Trees No. 1-3, 7 and 8

These trees are located in the footprint of the proposed design and would require removal based on this premise alone. The conflict is summarised as follows;

Tree No. 1; within the footprint of the proposed footpath and entry steps to unit 03.

Note: Although this tree has been initially requested for retention, the follow-up assessment has provided sufficient reason to avoid design measures for retention. Based on the assessment of this tree, measures for limiting the encroachment are likely ineffective. That is, the tree is displaying decline, which has increased since, and accounting for the species' susceptibility to pathogens, limited significance (i.e., not indigenous to the area), and estimated life span as less than a decade, the measures for designing around this tree are not deemed warranted. That is, based on the current assessment, the natural life expectancy assigned to this tree should not dictate design measures for retention. Alternatively, the removal of this tree and a design that is not hampered by the zones of protection is

recommended. However, to preserve the amenity value of the streetscape, compensatory planting will be necessary. This is referred to in Section 7.1.5.

Tree No. 2 and 7; within the footprint of the proposed communal driveway/parking bays.

Tree No. 3; within the footprint of the footpath servicing the proposed unit 02.

Tree No. 8; within the footprint of the proposed stormwater.

7.1.3 Trees subject to a minor encroachment

Trees No. 4-6

These trees are not directly located in the footprint of the proposed design, however, are subject to a *minor encroachment*. That is, the proportion (<10%) of encroachment provided by design will not adversely impact on the tree. These trees could be retained relative to the design.

7.1.4 Trees subject to a major encroachment

Tree No. 10-12

These trees are not directly located in the footprint of the proposed design, however, are located close and adjacent to the design footprint and subject to a *major encroachment*, that is, in excess of 10% of the TPZ. The extent and type of encroachment for each tree are discussed and the relative implications.

Tree No. 10-12: Encroachment: 15%-20%; based on drawing A-0101 (P2), revision A. The encroachment consists of the installation of the (apparent) retaining wall adjacent the proposed units 7-9. This will present excessive root removal (TPZ and SRZ) that could not sustain the tree, and also require excessive crown reduction. The existing design will not accommodate these trees.

Note; these trees do not present sufficient significance to retain and amend the design.

7.1.5 Compensatory Planting

Compensatory planting is recommended to be included as part of the streetscape. The following requirements are nominated for this planting.

- The tree species chosen must produce a mature height of at least 15m.
- At least five trees are required to be included in the landscape drawing at the front of the site, within a design that offers screening.
- Although, this provides a potential hindrance to solar access for the units, a deciduous species is nominated, which offers screening during Summer without loss of solar access, and limited hindrance during winter by allowing the light through the front of the units.

- The stock must be a minimum of 'Advanced' size (minimum 300 lt) and supplied by a registered Nursery that adheres to the Australian Standard 2303[9].
- Trees must be planted with adequate protection. This may include tree guards (protect stem and crown) and based on the local government street tree planting policy where available. Relative to the surrounding environment, measures to manage the root system, for example deflectors, root vaults may be required and should be subject to further investigation and planning during construction and before planting.

7.2 Sub-surface utilities

No drawings have been provided for the proposed route of sub-surface utilities, other than stormwater. Any trenching, other than what has been allowed for should be avoided within the area of the TPZ's for any tree nominated for retention. Any proposed route shall be re-routed outside of the TPZ. Under boring may be required if a limitation for the route of a service is restricted to an area that falls within the TPZ from any tree. Any excavation in the area of a TPZ must be authorised and conditioned by the project arborist.

7.3 Protection measures

Tree protection measures will be required during the demolition and construction stage. However, the design of these will be pending the work methodology and final design. The project arborist shall be contracted after the completion/confirmation of design work for the instruction of the protection measures implementation that is the Arboricultural Method Statement. Examples of the protection measures are contained in Appendix B.

7.4 Protection measures

The following protection measures are required to be implemented for the trees nominated for retention and before initiation of site works (including demolition/excavation) and retained until the landscaping works are required unless otherwise specified.

7.4.1 Protective fence

A protective fence is required to be installed to protect the TPZ from all site-related work and are recommended to be located in accordance with the requirements of the AS 4970, listed in Appendix C. The fence is required to be secured to the ground with pegs to avoid movement during construction. This must be installed prior to the commencement of any demolition, excavation or construction works and shall be maintained throughout the entire construction phase of the development, and until landscaping works and installation of the drive/cross-overs is required.

[9] Standards Australia, AS 2303: 2018, Tree stock for landscape use, Australia

7.4.2 Conditions of demolition

The following conditions are required during the demolition stages for the zones of protection.

1. The demolition process must remove all other site structures before removal of the concrete surfaces (including the portion of the drive) that are within the TPZ (9.8m radius). These will be the final structures removed from the site.
2. Machinery can be used for part of this removal, however, must always be retained to a hard surface (drive or slab). No machine should on any occasion work on a soil/lawn based surface within the area of the TPZ.
3. That part of the concrete surface that falls within the area of 4m radius from the girth of the tree must be removed via hand tools, e.g., Jackhammers, etc. removal of the remaining concrete must disturb as little area beneath the drive surface as possible. That is, the removal of this area should not carry any soil with it.
4. If machinery is required to enter the TPZ where no hard surface exists, then ground protection methods are required to be employed. Any machinery used within this process must provide for a minimum height of 2500mm, and that sufficient clearance is offered beneath the branch structure and machine to avoid injury. No pruning can occur for access to machinery.
5. After removal of the concrete surface, a soil conditioner is required to be applied immediately over the TPZ previously covered by the slab.
   Soil Conditioner: A non-synthetic type is recommended such as 'Seasol,' 'Tri-Kelp' and applied as a diluted root drench via a hose applicator, appropriate to the manufacturer's recommendations. In addition to the soil drench, a surfactant (wetting agent) and carbohydrate treatment, will aid with the wetting and movement of water in the ground. The carbohydrate treatment includes the addition of 25-50 gms of caster sugar per litre of water. These three ingredients can be combined and applied via a single application.

7.4.3 Conditions for compliance

The following conditions are required before any works proceed on site.

Site induction; All workers related to the construction process and before entering the site must be briefed about the requirements/conditions outlined in this report relative to the zone of protection, measures, and specifications before the initiation of work. This is required as part of the site induction process.

Project Arborist; A project arborist who conforms to the requirements of the AS 4970 is required to be nominated immediately after a *Notice of*

Determination is issued, and they are to be provided with all related site documents.

7.5 Compliance Documentation

The following stages will require assessment and documentation (report, letter, certification) by the project arborist or person responsible for the specific work type, and the related documentation is to be issued to the principal certifying agent.

7.5.1 Table 2; Assessment/Certification stages

Hold Points	Work type	Document required
Pre-demolition	Installation of the protection measures, Section 7.4	Certificate
During construction	Any <u>further works</u> required within the area of the TPZ, or decline related to the trees that have not been covered by this report.	Report Brief
During construction	Any crown modification including pruning or root disturbance.	Report Brief

Construction refers to the time between the initiation of demolition and until an occupation certificate is issued.

Project Arborist person nominated as responsible for the provision of the tree assessment, arborist report, consultation with stakeholders, and certification for the development project. This person will be adequately experienced and qualified with a minimum of a level 5 (AQF); Diploma in Horticulture (Arboriculture)[10].

8.0 Protection Specification

The retention and protection of tree trees requires the remaining Tree Protection Zone (TPZ) not subject to encroachment to conform to the conditions outlined below. These conditions provide the limitations of work permitted within the area of the Tree Protection Zone (TPZ) and must be adhered to unless otherwise stated.

1. <u>Soil levels within the TPZ must remain the same</u>. Any excavation within the TPZ must have been previously specified and allowed for by the project arborist:

   a) So it does not alter the drainage to the tree.

   b) Under specified circumstances,

   - Added fill soil does not exceed 100mm in depth over the natural grade. Construction methodologies exist that can allow grade increases in

[10] Based upon the definition of a 'consulting arborist' from the AS 4970; Protection of trees on development sites; 2009, Section 1.4.4, p 6.

excess of 100mm, via the use of an impervious cover, an approved permeable material or permanent aeration system or other approved methods.

- Excavation cannot exceed a depth of more than 50mm within the area of the TPZ, not including the SRZ. The grade within the SRZ cannot be reduced without the consent from a project arborist.

2. No form of material or structure, solid or liquid, is to be stored or disposed of within the TPZ.

3. No lighting of fires is permitted within the TPZ.

4. All drainage runoff, sediment, concrete, mortar slurry, paints, washings, toilet effluent, petroleum products, and any other toxic wastes must be prevented from entering the TPZ.

5. No activity that will cause excessive soil compaction is permitted within the TPZ. That is, machinery, excavators, etc. must refrain from entering the area of the TPZ unless measures have been taken, and with consultation with the project, arborist to protect the root zone.

6. No site sheds, amenities or similar site structures are permitted to be located or extend into the area of the TPZ unless the project arborist provides prior consent.

7. No form of construction work or related activity such as the mixing of concrete, cutting, grinding, generator storage or cleaning of tools is permitted within the TPZ.

8. No part of any tree may be used as an anchorage point, nor should any noticeboard, telephone cable, rope, guy, framework, etc. be attached to any part of a tree.

9. (a) All excavation work within the TPZ will utilise methods to preserve root systems intact and undamaged. Examples of methods permitted are by hand tools, hydraulic, or pneumatic air excavation technology.

   (b) Any root unearthed which is less than 50mm in diameter must be cleanly cut and dusted with a fungicide, and not allowed to dry out, with minimum exposure to the air as possible.

   (c) Any root unearthed which is greater than 50mm in diameter must be located regarding their directional spread and potential impact. A project arborist will be required to assess the situation and determine future action regarding retaining the tree in a healthy state.

9.0 Summary of tree impact by design

Based on the design supplied, the following summary provides the impacts imposed on the trees included in this report.

9.1 Tree retention

Trees No. 4, 5, 6, 9, and 13

These trees are not adversely impacted by the design, that is, they conform to an acceptable encroachment relative to the nominated zones of protection (TPZ, SRZ) based on the requirements of the Protection Specification, Section 8.0. The proposed design does not adversely affect these trees.

9.1.1

9.2 Tree removal

Trees No. 1, 2, 3, 7, 8 and 10-12

The proposed design will impact adversely on these trees and are unable to be retained based on the design.

9.3 Compensatory Planting

Compensatory planting is recommended to be included as part of the streetscape. The following requirements are nominated for this planting.

- The tree species chosen must produce a mature height of at least 15m.
- At least five trees are required to be included in the landscape drawing at the front of the site, within a design that offers screening.
- Although, this provides a potential hindrance to solar access for the units, a deciduous species is nominated, which offers screening during Summer without loss of solar access, and limited hindrance during winter by allowing the light through the front of the units.
- The stock must be a minimum of 'Advanced' size (minimum 300 lt) and supplied by a registered Nursery that adheres to the Australian Standard 2303[11].
- Trees must be planted with adequate protection. This may include tree guards (protect stem and crown) and based on the local government street tree planting policy where available. Relative to the surrounding environment, measures to manage the root system, for example deflectors, root vaults may be required and should be subject to further investigation and planning during construction and before planting.

9.4 Sub-surface utilities

No drawings have been provided for the proposed route of sub-surface utilities other than stormwater. Any trenching other than what has been allowed for should be avoided within the area of the TPZ's for any tree nominated for retention. Any proposed route shall be re-routed outside of the

[11] Standards Australia, AS 2303: 2018, Tree stock for landscape use, Australia

TPZ. Under boring may be required if a limitation for the route of a service is restricted to an area that falls within the TPZ from any tree. Any excavation in the area of a TPZ must be authorised and conditioned by the project arborist.

9.5 Protection measures

Protection measures (outlined in Section 7.3 and 7.4) are required to be implemented for the trees nominated for retention (referenced in Section 9.1) and installed before initiation of site works (including demolition/excavation) and retained until the landscaping works are required unless otherwise specified.

All workers related to the construction process and before entering the site must be briefed about the requirements/conditions outlined in this report relative to the zone of protection, measures, and specifications before the initiation of work.

A project arborist is required to be nominated, and the stages and related certification or similar documentation is to be issued to the principal certifying agent.

The opinions expressed in this report by the author have been provided within the capacity of a Consulting Arborist. Any further explanation or details can be provided by contacting the author.

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10.0 Appendix A- Terminology Defined

Height

Is a measure of the vertical distance from the average ground level around the root crown to the top surface of the crown, and on palms - to the apical growth point.

DBH

Diameter at Breast Height – being the stem diameter in meters, measured at 1.4m from ground level, including the thickness of the bark.; Mult. refers to multiple stems, that is in excess of 4 stems.

Crown Spread

A two-dimension linear measurement (in metres) of the crown plan. The first figure is the north-south span, the second being the east-west measurement.

Age

Is the estimate of the specimen's age based upon the expected lifespan of the species. This is divided into three stages.

Young (Y)	Trees less than 20% of life expectancy.
Mature (M)	Trees aged between 20% to 80% life expectancy.
Over-mature (O)	Trees aged over 80% of life expectancy with probable symptoms of senescence.

Crown Aspect

In relation to the root crown, this refers to the aspect the majority of the crown resides in. This will be either termed Symmetrical (Sym.) where the centre of the crown resides over the root crown or the cardinal direction the centre of the crown is biased towards, being either North (N), South (S), East (E) or West (W).

Vitality Rating

Is a rating of the health of the tree, irrespective and independent of the structural integrity, and defined by the 'ability for a tree to sustain its life processes' ((Draper, Richards, 2009). This is divided between three variables, and based on the assessment of symptoms including, but not limited to; leaf size, colour, crown density, woundwood development, adaptive growth formation, and epicormic growth.

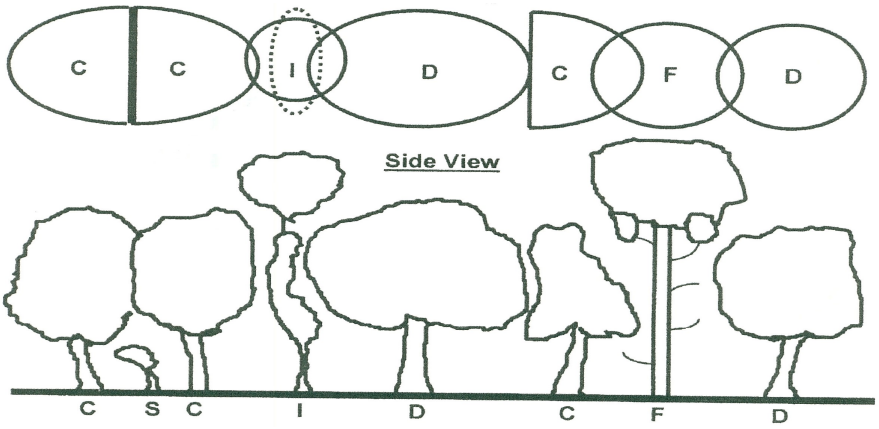
A: Normal vitality, typical for the species
B: Below average vitality, possibly temporary loss of health, partial symptoms.
C: Poor vitality; obvious decline, potentially irreversible

Crown Class

Is the differing crown habits as influenced by the external variables within the surrounding environment. They are:

D	– *Dominant*	Crown is receiving uninterrupted light from above and sides, also known as emergent.
C	– *Codominant*	Crown is receiving light from above and one side of the crown.
I	– *Intermediate*	Crown is receiving light from above but not the sides of the crown.
S	– *Suppressed*	Crown has been shadowed by the surrounding elements and receives no light from above or sides.
F	– *Forest*	Characterised by an erect, straight stem (usually excurrent) with little stem taper and virtually no branching over the majority of the stem except for the top of the tree which has a small concentrated branch structure making up the crown.

Top View



D C, I & S, and side view, after (Matheny, N. & Clark, J. R. 1998, Trees Development, Published by International Society of Arboriculture, P.O. Box 3129, Champaign IL 61826-3129 USA, p.20, adapted from the Hazard Tree Assessment Program, Recreation and Park Department, City of San Francisco, California).

Levels of assessment

Level 1: Limited visual: a visual tree assessment to manage large populations of trees within a limited period and in order to identify obvious faults which would be considered imminent.

Level 2: Basic assessment: a standard performed assessment providing for a detailed visual assessment including all parts of the tree and surrounding environment and via the use of simple tools.

Level 3: Advanced assessment: specific type assessments conducted by either arborist who specialise with specific areas of assessment or via the use of specialised equipment. For example, aerial assessment by use of an EWP or rope/harness, or decay detection equipment.

TPZ; Tree Protection Zone

Is an area of protection required for maintaining the trees vitality and long-term viability. Measured in meters as a radius from the trees centre. The requirements of this zone are outlined within the Protection Specification, Section 8.0, and are to be adhered to unless otherwise stated.

The size of the Tree Protection Zone (TPZ) has been calculated from the *Australian Standard, 4970; 2009* – Protection of Trees on Development Sites

The TPZ does not provide the limit of root extension, however, offers an area of the root zone that requires predominate protection from development works. The allocated TPZ can be modified by some circumstances; however will require compensation equivalent to the area loss, elsewhere and adjacent to the TPZ.

SRZ; Structural Root Zone

Is the area around the tree containing the woody roots necessary for stability. Measured in meters as a radius from the trees centre. The requirements of this zone are outlined within the Protection Specification, Section 8.0, and are to be adhered to unless otherwise stated.

Protection Measures

These are required for the protection of trees during demolition/construction activities.
Protective barriers are required to be installed before the initiation of demolition and/or construction and are to be maintained up to the time of landscaping. Samples of the recommended protection measures are illustrated in Appendix C.

All other definitions are referenced from;

Draper D.B., Richards P.A., 2009, Dictionary for Managing Trees in Urban Environments
CSIRO Pub., Australia

Significance Rating, Significance of a Tree Assessment Rating System (S.T.A.R.S), IACA, 2010[12]

Tree Significance – Assessment Criteria

1. High Significance in landscape

- The tree is in good condition and good vitality;
- The tree has a form typical for the species;
- The tree is a remnant or is a planted locally indigenous specimen and/or is rare or uncommon in the local area or of botanical interest or of substantial age;
- The tree is listed as a Heritage Item, Threatened Species or part of an Endangered ecological community or listed on Councils significant Tree Register;
- The tree is visually prominent and visible from a considerable distance when viewed from most directions within the landscape due to its size and scale and makes a positive contribution to the local amenity;
- The tree supports social and cultural sentiments or spiritual associations, reflected by the broader population or community group or has commemorative values;
- The tree's growth is unrestricted by above and below ground influences, supporting its ability to reach dimensions typical for the taxa in situ – tree is appropriate to the site conditions.

2. Medium Significance in landscape

- The tree is in fair-good condition and good or low vitality;
- The tree has form typical or atypical of the species;
- The tree is a planted locally indigenous or a common species with its taxa commonly planted in the local area
- The tree is visible from surrounding properties, although not visually prominent as partially obstructed by other vegetation or buildings when viewed from the street,
- The tree provides a fair contribution to the visual character and amenity of the local area,
- The tree's growth is moderately restricted by above or below ground influences, reducing its ability to reach dimensions typical for the taxa in situ.

3. Low Significance in landscape

- The tree is in fair-poor condition and good or low vitality;
- The tree has form atypical of the species;
- The tree is not visible or is partly visible from surrounding properties as obstructed by other vegetation or buildings,
- The tree provides a minor contribution or has a negative impact on the visual character and amenity of the local area,
- The tree is a young specimen which may or may not have reached dimension to be protected by local Tree Preservation orders or similar protection mechanisms and can easily be replaced with a suitable specimen,

[12] IACA, 2010, IACA Significance of a Tree, Assessment Rating System (STARS), Institute of Australian Consulting Arboriculturists, Australia, www.iaca.org.au

- The tree's growth is severely restricted by above or below ground influences, unlikely to reach dimensions typical for the taxa in situ – tree is inappropriate to the site conditions,
- The tree is listed as exempt under the provisions of the local Council Tree Preservation Order or similar protection mechanisms,
- The tree has a wound or defect that has potential to become structurally unsound.

Environmental Pest / Noxious Weed Species

- The tree is an Environmental Pest Species due to its invasiveness or poisonous/ allergenic properties,
- The tree is a declared noxious weed by legislation.

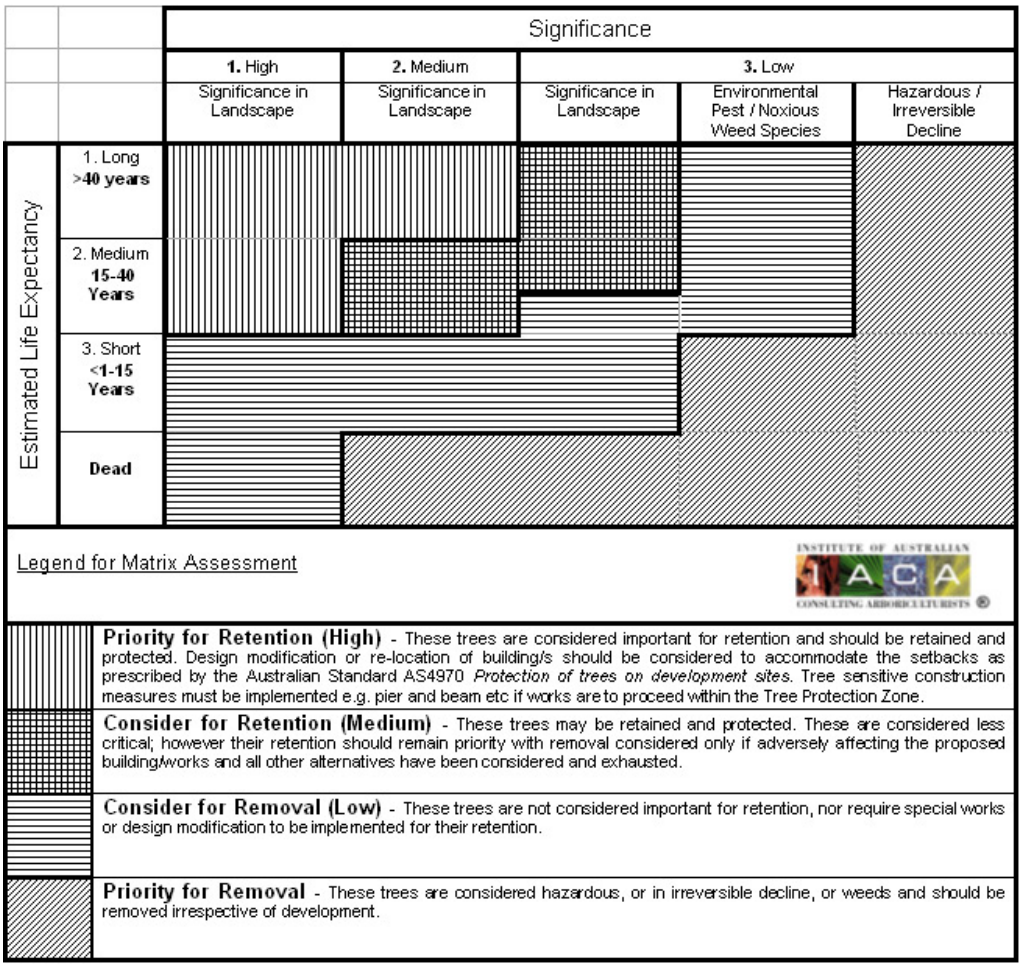
Hazardous/Irreversible Decline

- The tree is structurally unsound and/or unstable and is considered potentially dangerous, - The tree is dead, or is in irreversible decline, or has the potential to fail or collapse in full or part in the immediate to short-term.

The tree is to have a minimum of three (3) criteria in a category to be classified in that group.

Note: The assessment criteria are for individual trees only, however, can be applied to a monocultural stand in its entirety e.g.

Table 3; Tree Retention Value – Priority Matrix.



Safe Useful Life Expectancy – S.U.L.E (Barell 1995)

	1. Long	2. Medium	3. Short	4. Removal	5. Moved or Replaced
	Trees that appeared to be retainable at the time of assessment for more than 40 years with an acceptable level of risk.	Trees that appeared to be retainable at the time of assessment for 15 – 40 years with an acceptable level of risk.	Trees that appeared to be retainable at the time of assessment for 5 – 15 years with an acceptable level of risk.	Trees that should be removed within the next 5 years.	Trees which can be reliably moved or replaced.
A	Structurally sound trees located in positions that can accommodate future growth.	Trees that may only live between 15 and 40 years.	Trees that may only live between 5 and 15 more years.	Dead, dying, suppressed or declining trees through disease or inhospitable conditions.	Small trees less than 5m in height.
B	Trees that could be made suitable for retention in the long term by remedial tree care.	Trees that may live for more than 40 years but would be removed for safety or nuisance reasons.	Trees that may live for more than 15 years but would be removed for safety or nuisance reasons.	Dangerous trees through instability on recent loss of adjacent trees.	Young trees less than 15 years old but over 5m in heights
C	Trees of special significance for historical, commemorative or rarity reasons that would warrant extraordinary efforts to secure their long term retention.	Trees that may live for more than 40 years but would be removed to prevent interference with more suitable individuals or to provide space for new planting.	Trees that may live for more than 15 years but should be removed to prevent interference with more suitable individuals or to provide space for new planting.	Damaged trees through structural defects including cavities, decay, included bark, wounds or poor form.	Trees that have been pruned to artificially control growth.
D		Trees that could be made suitable for retention in the medium term by remedial tree care.	Trees that require substantial remedial tree care and are only suitable for retention in the short term.	Damaged trees that are clearly not safe to retain.	
E				Trees that may live for more than 5 years but should be removed to prevent interference with more suitable individuals or to provide space for new plantings.	
F				Trees that are damaging or may cause damage to existing structures within 5 years.	
G				Trees that will become dangerous after removal of other trees for reasons given in (A) to (F).	

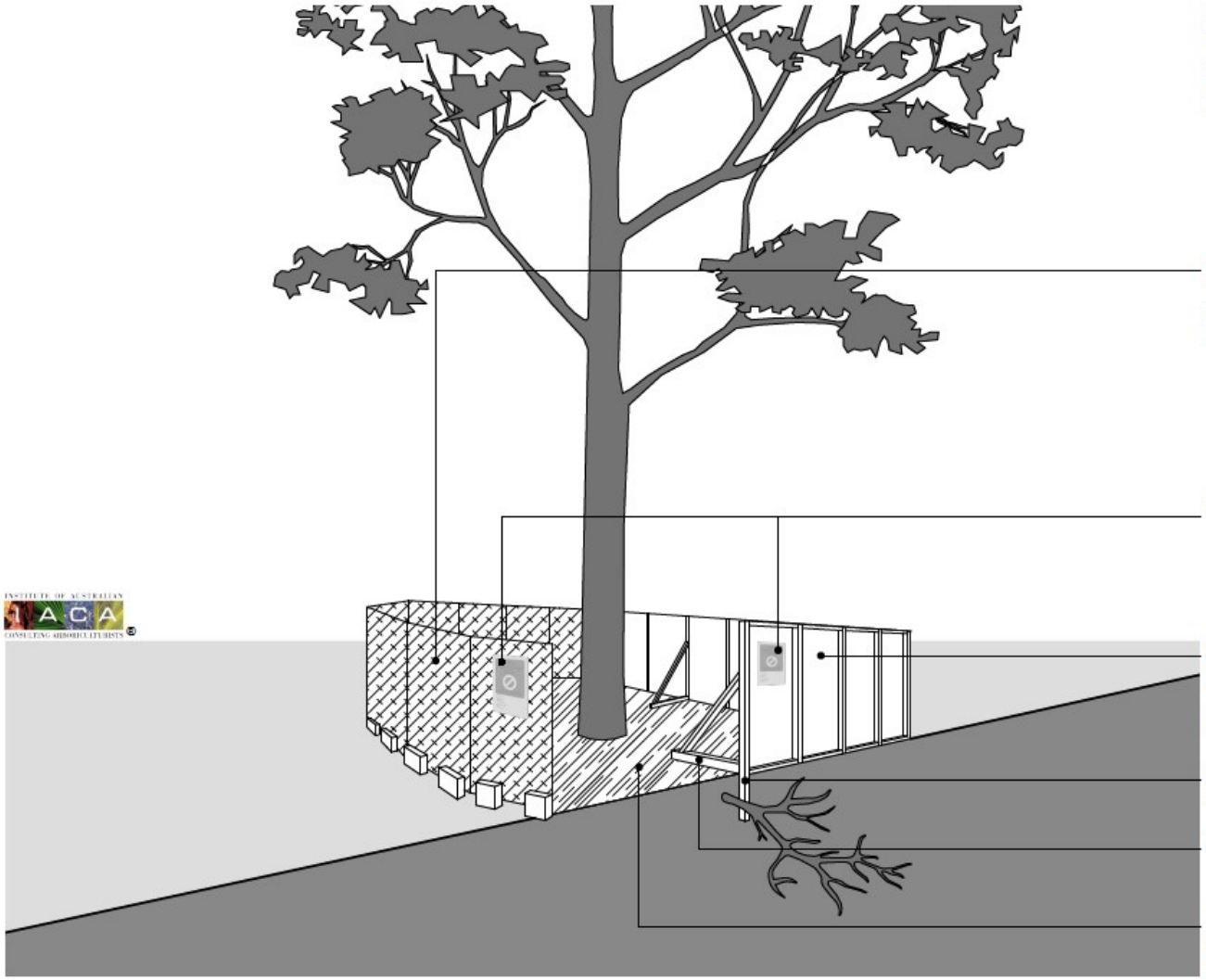
Internal Diagnostic Testing

Cavities and loss of supporting wood by decay can compromise the stability of a tree, and the risk for failure will be based on the extent of the wood loss. This often cannot be assessed without specialty equipment for diagnosing the internal structure of a tree. Methodologies exist for determining the extent of wood loss (be it from decay or termites), and based on industry standards, the risk of failure can be determined. This methodology is a specialised area of arboriculture and limited to consulting arborists who are equipped with the technology (internal diagnostic devices) to assess this area. The two most common forms of internal diagnostic testing consist of the 'Resistograph,' and 'Sonic Tomography.' This technology is not recommended for all trees; however, only those trees that are considered to present significant specimens. This is based on the size, species, amenity value, and use by native wildlife. Within most situations, the cost of tree removal far outweighs the cost related to the specialty assessment.

Bracing: Tree Support System

Tree support systems are a method of reducing risk by the provision of supplementary support with the use of cables, slings, braces, and guys. This limits the movement on areas that can offer reduced structural integrity and therefore in some situations allows the tree to occlude. This method of support is often provided to significant parts of a tree where pruning would not be viable and include, leaders, individual branches, and/or entire trees. The three types of systems are the Dynamic, Static, and Brace systems and their use is related to the specific support required. The supplemental support system will reduce the risk and offer an opportunity for retaining a tree often at a cost less than tree removal. Tree support systems are utilised internationally for the best practice management for tree care. However, should be installed by a suitably qualified arborist (minimum Level 3) who is experienced with the installation of support systems. The systems must be installed based on the Industry Standards, including the MIS310, Tree Supports Systems, Arboriculture Australia, (2020) and/or the document; ANSI A300 Part 3 (2006) Supplementary Support Systems and Best Management Practices; Tree Support Systems, International Society of Arboriculture.

Appendix B- Protection measures;
Protective fence



Stem and Ground protection