Tree Report – 21- 23 Victoria Ave, Castle Hill Park

Prepared for Masters Home Improvement

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Abbreviations

ABBREVIATION	DESCRIPTION
SULE	Safe Useful Life Expectancy
TPZ	Tree Protection Zone
SRZ	Structural Root Zone
AS	Australian Standard
DBH	Diameter at Breast Height
VTA	Visual Tree Assessment

Executive Summary

To assist the proposed development and to identify trees that are candidates for retention at the subject site, 21 - 23 Victoria Road, Castle Hill, a tree survey was undertaken. This report outlines the findings of the survey and retention value for the subject trees by using the Safe Useful Life Expectancy (SULE) matrix. The report also identifies trees suitable for retention by considering the proposed development footprint.

The tree survey was undertaken using the ground based Visual Tree Assessment (VTA) method. Thirty-seven trees were assessed comprising 11 species. Tree species included Australian natives and exotic species. Most trees were judged mature. Assuming high people movement at the subject site and the resultant high risk of potential injury to people or damage to property in the event of tree failure, 25 trees are recommended for removal (i.e. all trees with a SULE of 4 or 3). An additional six trees will require removal due to the proposed development. Overall, six trees are proposed for retention (i.e. trees with a SULE of 1 or 2 and which are not within the development footprint). To achieve successful retention of trees on site it is recommended that the prescribed tree protection zone(s) (TPZs) are implemented throughout the development process, and that the hydrology and soil level within the TPZ's are not be altered.

1 Background

1.1 INTRODUCTION

Hydrox Nominees Pty Ltd. has commissioned Eco Logical Australia (ELA) to undertake a tree assessment of trees at the subject site (21-23 Victoria Ave, Castle Hill). The reason for the tree assessment and report is due to the proposed development of the subject site and the associated need to describe and understand the existing tree cover.

The scope of works includes the description and assessment of the trees (subject trees) growing at the subject site including the use of the Safe Useful Life Expectancy (SULE) matrix. In addition, the indicative Tree Protection Zone (TPZ) is calculated following the Australian Standard (SA, 2009) to guide the development layout where feasible. The information provided in this report reflects the condition of the trees at the time of inspection and covers solely the trees examined. It was assumed that post development; the area will experience high people traffic.

1.2 THE SUBJECT SITE

The subject site is located in an industrial area within The Hills Shire Local Government Area (LGA). The area is bound by Victoria Road to the west, Salisbury Road to the north, Carrington Road to the south and industrial developments to the east (**Figure 1**). The terrain is relatively flat, sloping down from the northern and southern ends to a low point in the centre of the site. The site contains a relatively sparse tree cover. Most of the site consists of impervious surfaces such as asphalt (driveways and car parks) and existing industrial buildings with trees found growing near the site's boundaries. The plant understorey composition within the subject site consists of mowed grass and intermittent ornamental shrubs.

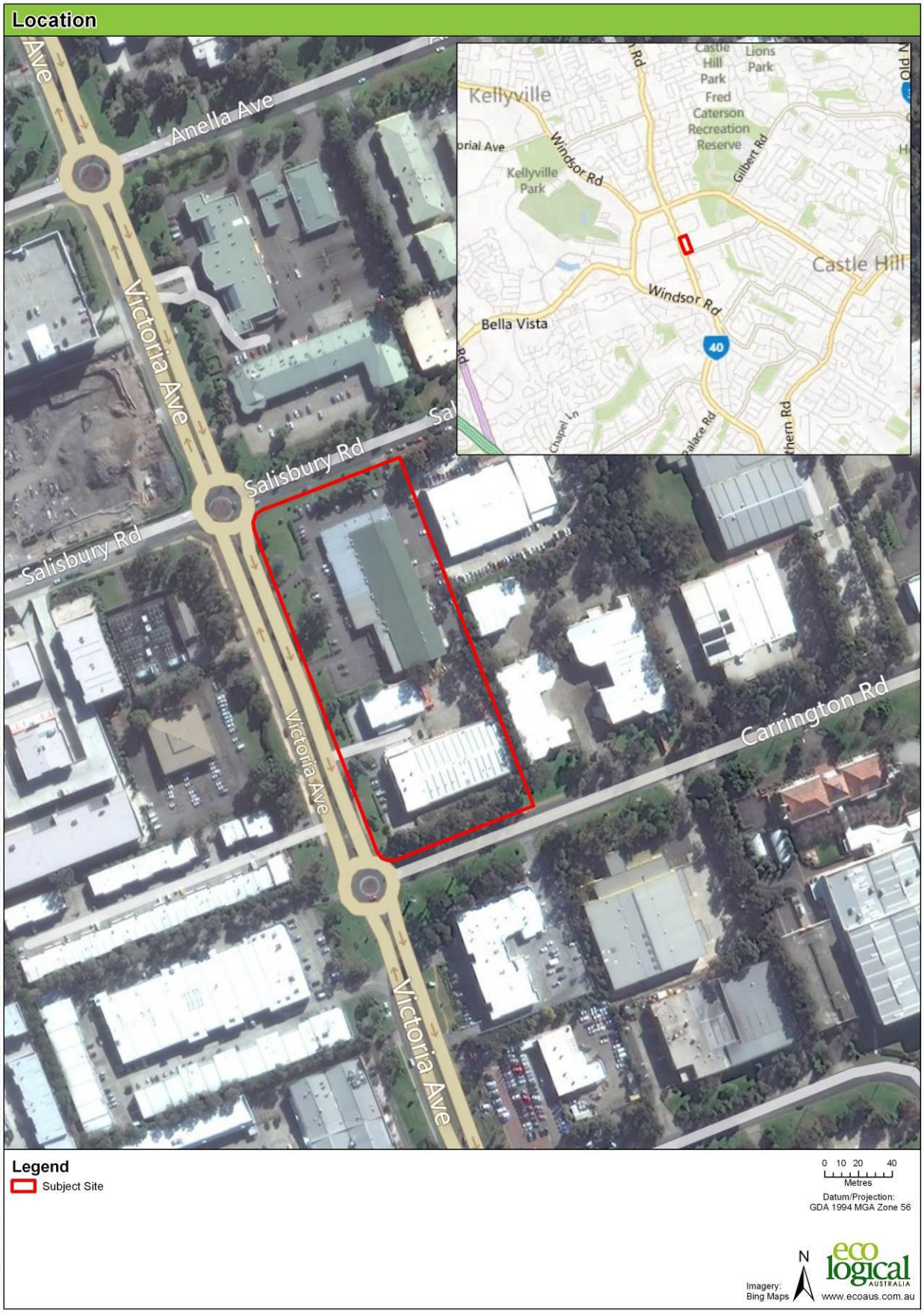

Figure 1. Map showing the location of the subject site (red outline).

2 Methodology

A site assessment was undertaken on 11th February 2013. Trees were assessed by conducting a ground based Visual Tree Assessment (VTA). No diagnostic equipment was used. No aerial inspection (climbing) or tree root mapping was undertaken. Trees were assessed individually and the SULE determined. One patch of recently planted trees (trees estimated to be ~10 years old) was not assessed individually but instead were clumped together and described as a group. Location data for individual trees were obtained using a handheld Global Positioning System (GPS). Given that the accuracy of the location data obtained by the handheld GPS is not to survey accuracy, the Atkins and Associates (2012) Survey Plan and tree location data were used for mapping and orientation in the field. It is noted here that the provided tree location data and the location of the proposed development footprint is indicative only and accuracy is within a few metres. As the source data was not projected to a standard coordinate system, a spatial adjustment of this data was undertaken to move it to GDA 1994 MGA Zone 56 which may have resulted in slight misalignments. If all trees outlined for retention are to be maintained (**see section 4.1**), the development outline may need to be slightly adapted to ensure the prescribed TPZs can be provided.

The height and crown spread of trees were estimated and the diameter at breast height (DBH) measured using a measuring tape and rounded up to the nearest 5 cm. For each tree, the SULE was determined based on the health and structure of the tree (following Barrell, 2001). SULE is a commonly used rating system that describes the timeframe a tree can be usefully retained (see **Table 1** and **Appendix A** for a SULE code description). Subject trees were evaluated by assessing their health and structural integrity (**Table 2**).

Table 1. SULE code description

SULE CODE	DESCRIPTION
A1	Tree that appear to be retainable at the time of assessment for > 40 years with an acceptable degree of risk, assuming reasonable maintenance.
A2	Tree that appear to be retainable at the time of assessment for 15 to 40 years with an acceptable degree of risk, assuming reasonable maintenance.
A3	Tree that appear to be retainable at the time of assessment for 5 to 15 years with an acceptable degree of risk, assuming reasonable maintenance.
A4	Trees which should be removed within the next 5 years.

Table 2. List of items used to determine tree structure and health.

STRUCTURAL CONSIDERATIONS *	
Presence/absence of cankers (surface injuries caused by fungi or bacteria)	Evidence of 'end weight' (accumulation of mass at the end of a branch)
Presence/absence of cavities (open wound characterised by decay)	Presence/absence of epicormic shoots (shoots arising from latent or adventitious buds)
Presence/absence of co-dominant stems (Stems or branches of equal diametre, often weekly attached)	Presence/absence of previous branch or trunk failure

Presence/absence of conks (fruiting body of decay fungi e.g. Bracken Fungus)	Evidence of girdling roots (roost that encircle the base (above ground) of the stem)
Presence/absence of decay (degradation of wood by fungi / bacteria)	Leaning trunk
Evidence of decline (loss of vigor)	Low canopy (branches that are close to ground may require heavy pruning for construction clearance)
Evidence of dieback (death of twigs and branches)	Presence/absence of wounds (injuries on the surface of a stem or branch)
HEALTH CONSIDERATION	
Presence/absence of pest and diseases	Deadwood percentage
Extent of extension growth	Absence/presence of epicormic growth
Density of canopy	Foliage size and colour

* Adapted from Matheny & Clark (1998).

The estimate of a tree's age was based on the definitions outlined by Draper and Richards (2009). Trees were considered young if they were judged to be of an age <20% of their life expectancy in situ. Trees of mature age are defined as trees being aged between 20 to 80% of their life expectancy in situ, while trees aged >80% of their life expectancy in situ were considered over-mature (Draper & Richards, 2009). The calculation of the TPZ was based on the tree's DBH as outlined in *Australian Standard 4970 'Protection of Trees on Development Sites'* (SA, 2009). Subject trees were tagged non-invasively using a strip of packaging tape containing the tree number (written with a permanent marker) and a staple gun to attach the strip to the bark (**Figure 2**).

Figure 2. A strip of packaging tape and staples were used to tag trees.

3 Results

3.1 TREE SPECIES ON SITE

The types of trees found growing within the subject site were predominantly Australian natives with species being both indigenous and non-indigenous to the area. The dominant tree species was *Corymbia maculata* (Spotted Gum) and *C. citriodora* (Lemon-scented Gum). *Corymbia maculata* is indigenous to the area, while *C. citriodora* is native to Queensland (PlantNet, 2013). The tree species found at the site are not listed as threatened under NSW State or Commonwealth legislation. Overall, 37 trees were surveyed (see **Appendix C** for a description of each) encompassing 11 species (**Table 3**). The majority of trees (34) were judged to be of mature age in situ, while two trees were classified as young and one as over-mature. The vegetation understorey comprised of a mowed exotic grass cover with sporadic ornamental shrubs. Soil compaction and a lack of organic matter were evident in some sections of the subject site. No hollow-bearing trees were identified.

Table 3. List of subject tree species.

SCIENTIFIC NAME	COMMON NAME	NATIVE/EXOTIC SPECIES
Allocasuarina sp.	She-oak	Native species but non-indigenous to subject site
Corymbia citriodora	Lemon-scented Gum	Environmental weed
Corymbia maculata	Spotted gum	Native to the subject site
Cupressus sempervirens	Pencil Pine	Exotic species (not considered an environmental weed)
Eucalyptus amplifolia	Cabbage Gum	Native to the subject site
Eucalyptus cinerea	Argyle Apple	Native species but non-indigenous to subject site
Eucalyptus citriodora	Lemon-scented gum	Native species but non-indigenous to subject site
Eucalyptus eugenioides	Thin-leaved Stringybark	Native to the subject site
Eucalyptus punctata	Grey Gum	Native to the subject site
Eucalyptus saligna	Sydney Blue Gum	Native to the subject site
Eucalyptus sp.	Planted	Native species but non-indigenous to subject site
Robinia pseudoacacia 'Frisia'	Golden Robinia	Ornamental species (known to be an environmental weed in some areas)

3.2 RESULTS OF SUBJECT TREES

Using the SULE classification, 8 trees (22% of all trees observed) were identified to have a SULE Class of 4, i.e. recommended for removal either due to the tree's poor health, instability and/or poor structure, or, trees that could live for more than 5 years but may be removed to prevent interference with more suitable individual. An additional 17 trees (46% of all trees observed) were classified into SULE Class 3, i.e. have a SULE of 5 to 15 years. Thirty per cent (11 trees) of the existing tree cover was considered retainable for the medium term (15-40 years; SULE 2) and 3% (1 tree) retainable for the long-term (>40 years; SULE 1) (**Figure 3**). **Appendix C** provides a complete list of all trees assessed and their corresponding SULE rating, tree retention value and TPZs.

Several trees mapped on the Atkins and Associates (2012) survey plan were not found, and have been removed since previous assessments. Many of these removed trees, whilst mapped by the surveyor, occurred on an adjacent property to the east. The assessed trees were clumped into six patches based on their location (**Figure 3**).

Figure 3. Subject site depicting the 6 tree patches and the SULE classification.

3.2.1 Patch 1

Patch 1 is located along Victoria Avenue. It consists of five trees (# 1 - 5) located in a turfed area along Victoria Avenue. Trees #1 to 4 were assessed to have a SULE 3 rating (i.e. SULE of 5 to 15 years), while tree # 5 (*E. punctata*) received a SULE 2 rating (SULE of 15 to 40 years) (**Figure 4, Figure 5**).

Figure 4. Tree # 1 (large) and tree # 2.

Figure 5. Tree # 3 (in foreground) to 5.

3.2.2 Patch 2

Patch 2 is located along Carrington Road and consists of 21 trees predominately made up of *C. maculata* (**Figure 6**). This patch currently acts as a screen and holds a high amenity value for the proposed development.

Figure 6. Showing Patch 2 (looking southwards).

3.2.3 Patch 3

Patch 3 contains three trees (all *C. maculata*). This patch is located along the northern boundary adjacent to a car park (**Figure 7**).

Figure 7. Patch 3 showing the three *C. maculata* trees.

3.2.4 Patch 4

Patch 4 consists of two *C. citriodora*. They are located between two buildings in the centre of the subject site (**Figure 8**).

Figure 8. Patch 4 showing the two *C. citriodora* trees.

3.2.5 Patch 5

Patch 5 is made up of six trees, four Eucalypts, one *Robinia pseudoacacia* 'Frisia' and one *Allocasuarina* species (Figure 9). This patch is located between Victoria Avenue and a car park.

Figure 9. Patch 5. a) Showing three Eucalypts within turfed area. b) Showing Robinia in garden bed adjacent to car park. c) Showing *Allocasuarina* adjacent to a power line and Victoria Avenue. d) Showing *Eucalyptus cinerea* adjacent to a power line and Victoria Avenue.

3.2.6 Patch 6

Patch 6 is located along Salisbury Road and is made up of recently planted Eucalypts (predominantly *E. microcorys* (Tallow Wood)). Trees are estimated to be approximately 10 years old (**Figure 10**). Trees within this patch were not individually assessed due to their young age. Overall, condition and structure of the trees ranged between fair to good.

Figure 10. Patch 6 made up of immature planting.

4 Discussion

4.1 TREE ASSESSMENT

The assessment identified tree species and characteristics. In addition, the report provides guidelines as to the condition of the subject trees within the subject site and the predicted life expectancy by using the SULE matrix (**Appendix A**). Given the existing environment at the subject site and the associated frequent use of the area by people, it would be recommended that trees identified to have a SULE classification of 3 and 4 (i.e. have a safe useful life expectancy of < 15 years) should be removed (i.e. 25 trees).

The contributing factors that resulted in 25 (68%) trees' short SULE ratings (SULE 3 and 4) included the following:

1) **Poor structure** – including trees that:
   - Contain wounds
   - Contain uneven tree crowns
   - Contain heavy horizontal branches (end weight)
   - Experienced detrimental pruning of trees for power line clearance
   - Are leaning/suppressed
   - Comprise major branch or trunk forks (i.e. are co-dominant) (**Figure 11d**). Narrow branch/stem junctions can result in trees enclosing bark which in turn results in a weakened junction/twin stems attachment (Mattheck and Breloer, 1994). Advanced cases of included bark show a split at the fork junction or show severe reaction wood grown at the fork junction (overgrowing an existing crack).

2) **Poor health** - including trees that:
   - Have thin crowns
   - Contain large amounts of dead wood/dieback
   - Contain epicormic growth
   - Are suppressed

Figure 11 below depicts some of the subject trees that received a SULE 3 or 4 rating.

Figure 11. a) Poorly structured tree due to heavy pruning for power line clearance. b) Old wound partially overgrown (potential internal decay). c) Leaning / suppressed tree. d) Co-dominant stems with included bark. e) Over-mature senescent tree.

The proposed development footprint and soil excavation, which includes the proposed access ramps for the car park and the loading area, will require the removal of an additional six trees as well as the recently planted *Eucalyptus* patch (Patch 6). As a result, six trees could be retained overall (see **Table 4, Figure 12**) provided adequate tree protection is ensured during the construction phase (see **section 4.3** and **Appendix B and C**)

Table 4. Trees identified for retention based on their SULE and location outside the development footprint.

TREE NO.	SPECIES NAME	SULE CLASS	TPZ RADIUS (M)
5	*Eucalyptus punctata*	A2	5.4
7	*Eucalyptus saligna*	A1	4.2
10	*Corymbia maculata*	A2	5.4
13	*Corymbia maculata*	A2	6
15	*Corymbia citriodora*	A2	5.4
16	*Corymbia citriodora*	A2	6

Figure 12. Trees identified for retention including their associated TPZ (indicative locations).

4.2 TREES IDENTIFIED FOR RETENTION

Trees identified for retention should be re-inspected by a more in-depth assessment and remedial work prescribed where necessary to reduce the risk to people and property. Remedial work may include:

- Pruning of canopy for development and construction access;
- Pruning of dead limbs (dead-wooding);
- Corrective pruning;
- Thinning of crown;
- Weight reduction of heavy branches; and / or
- Removal of diseased branches (e.g. bracket fungi) or poorly attached branches.

In addition, the retained trees should be monitored 12 months after completion of the proposed development to inspect their health, vigour and identify potential hazards. This is of particular importance given the expected high frequency of people moving through the landscape and the potential property damage by trees. It is important to note that some defects, ill-health or decay in a tree is not always identifiable from the outside and thus is not identifiable using VTA. In addition, there are occasions where yet healthy and defect-free trees break or become wind-thrown. This is termed a 'normal failure rate' and is due to the trees having an energy-saving, cost-effective and lightweight structure. As such, every tree represents some potential danger of failure (Mattheck and Breloer, 2003).

4.3 TREE PROTECTION ZONES

4.3.1 TPZ

The TPZ intends to protect the trees identified for retention from development impacts and maintain their health and vigour during and post development. The TPZ was calculated for each of the assessed trees (see **Appendix C**). The provision of the TPZ in this report can guide development layout to preserve individual trees. The TPZ, as well as the Structural Root Zone (SRZ), are prescribed in SA (2009).

The TPZ is an area (above and below ground), isolated from construction disturbance, at a given distance from the trunk set aside for the protection of a tree's root system and crown to provide for the viability and stability of a tree to be retained where it is potentially subject to damage by development (SA, 2009). TPZ fencing should be erected before any machinery or materials are brought onto the site. See **Appendix B** for an example of tree protection fencing. The calculation for the TPZ radius is as follows:

$$\text{TPZ radius} = \text{DBH} \times 12$$

Some encroachments of the TPZ may be possible (see SA 2009 for further guidance). Wherever possible, tree sensitive construction measures such as pier and beam, suspended slabs, cantilevered building sections, screw piles and contiguous piling should be utilised within the protection zone (SA, 2009).

If minor encroachment of the TPZ is required (i.e. 10 % of the TPZ's area and is outside of the SRZ) detailed root investigation should not be required. The area lost to this encroachment should be compensated for elsewhere and be contiguous with the TPZ.

If major encroachment of the TPZ is proposed (i.e. > 10 % of the TPZ's area or inside the SRZ), a detailed root investigation by the project arborist, using non-destructive methods (e.g. hand digging), is required to determine the size and extent of the affected root structure by the proposed encroachment.

To protect soil within the TPZ, a layer of mulch may be applied (no less than 75 mm thick). Any mulch used should comply with the Australian Standard – composts, soil conditioners and mulches AS4454-2012 (SA 2012). Irrigation systems may be installed if an extended period of drought occurs. As a guide, the watering should occur at least once per week and allow deep soil penetration. The specific watering requirements will depend, however, on the climatic conditions.

The following TPZ specifications are applicable for successful tree retention and should be adhered to during the construction phase:

- The TPZ are not to be used as a storage facility and should to be kept free at any time. As a guide, the following activities should be excluded unless otherwise stated:
    - Storage of materials, plants or equipment
    - Installation of site sheds or portable toilets
    - Excavations, trenching, ripping or cultivation of soils
    - Modification of existing soil level changes or adding fill materials
    - Disposal of waste materials and chemicals (both solid or liquid)
    - Mechanical removal of vegetation
    - Pedestrian or vehicular movement
- Any root pruning required within the TPZ should be approved by the project arborist and any digging and pruning of roots to be pruned (only roots < 5cm may be pruned) within the TPZ should be conducted by hand for a clean cut.

4.3.2 SRZ

The SRZ is the area around the base of a tree required for the tree's stability in the ground. The woody root growth and soil cohesion in this area are necessary to hold the tree upright. The SRZ is nominally circular with the trunk at its centre and is expressed by it radius in meters. The SRZ considers a tree's structural stability only, not the root zone required for a tree's vigour and long-term viability, which is usually a much larger area (SA, 2009) (see **section 4.3.1** above). The calculation for the SRZ radius is as follows:

$$\text{SRZ radius} = (D \times 50)^{0.42} \times 0.64,$$

where:

D = trunk diameter (in m) measured above the root buttress.

4.4 RECOMMENDED ACTION AND STAGES OF TREE MANAGEMENT DURING DEVELOPMENT

In order to successfully preserve the trees identified for retention, the guidelines and stages of the tree management process as outlined in **Table 5** (adapted from the SA, 2009) should be followed. It is crucial that the design and planning team as well as the people involved in site works appreciate the need for maintaining the area of protection around trees. A project arborist may be appointed to monitor and supervise tree protection measures prior, during and post development works.

Table 5: Stages in development and the management of trees (Source: SA 2009).

STAGE IN DEVELOPMENT	TREE MANAGEMENT PROCESS	
	MATTERS FOR CONSIDERATION	ACTIONS AND CERTIFICATIONS
PLANNING		
Site acquisition	Legal constraints	
Detail survey	Council plans and policies Planning instruments and controls Heritage Threatened Species	Existing trees accurately plotted on survey plan
Preliminary tree assessment	Description of trees SULE	Evaluation of trees suitable for retention and mark on plan Provide preliminary arboricultural report and indicative TPZs to guide development layout.
Preliminary development design	Conditions of trees Proximity to buildings Location of services Roads Level changes Building operations space Lon-term management	Planning selection of trees for retention Design review by proponent Design modification to minimise impact to trees
Development submission	Identify trees for retention through comprehensive arboricultural impact assessment of proposed construction Determine tree protection measures Landscape design	Provide arboricultural impact assessment including tree protection plan (drawing) and specification.
Development approval	Development controls Condition of consent	Review consent conditions relating to trees.
PRE-CONSTRUCTION		
Initial site preparation	State based OHS requirements for tree work Approved retention/removal Refer to AS 4373 for the	Compliance with conditions of consent Tree removal/tree retention/transplanting Tree pruning

STAGE IN DEVELOPMENT	TREE MANAGEMENT PROCESS	
	MATTERS FOR CONSIDERATION	ACTIONS AND CERTIFICATIONS
	requirements on the pruning of amenity trees Specifications for tree protection measures	Certification of tree removal and pruning Establish/delineate TPZ Install protective measures Certification of tree protection measures
CONSTRUCTION		
Site establishment	Temporary infrastructure Demolition, bulk earthworks, hydrology	Locate temporary infrastructure to minimise impact on retained trees Maintain protective measures Certification of tree protection measures
Construction work	Liaison with site manager, compliance Deviation from approved plan	Maintain or amend protective measures Supervision and monitoring
Implement hard and soft landscape works	Installation of irrigation services Control of compaction work Installation of pavement and retaining walls	Remove selected protective measures as necessary Remedial tree works Supervision and monitoring
Practical completion	Tree vigour and structure	Remove all remaining tree protection measures Certification of tree protection
POST CONSTRUCTION		
Defects liability/maintenance period	Tree vigour and structure	Maintenance and monitoring Final remedial tree works Final certification of tree conditions

Note: Certification of tree protection and condition should be carried out by the Project Arborist.

5 Conclusion

The subject site is considered to be a high risk area in the event of tree failure post development due to high people traffic being anticipated. This report focused on the identification, characteristics and SULE of the existing trees at the subject site and described the tree retention potential by considering the proposed development. Around 70 % of trees (SULE 3 & 4 trees) currently exhibit structural or health conditions which suggest they should be removed within the next 15 years if the public were to have access underneath the trees. An additional six trees will need to be removed to accommodate the proposed development. As a result, six trees can be retained overall on site. In order to successfully retain these trees, TPZs will need to be maintained throughout the development process and a project arborist may be involved in managing tree protection prior, during and post construction.

It is further recommended that trees identified for retention should be re-inspected in more depth and remedial pruning works prescribed and carried out where necessary, such works may include the removal of dead wood, corrective pruning and/or reducing the weight of horizontal branches, in particular where branches are weakly attached (e.g. contain enclosed bark at branch junctions). The re-inspection may be conducted by a consulting arborist or, perhaps more efficiently, by engaging a suitably experienced and qualified tree management company that could carry out necessary remedial pruning works directly (preferably prior to construction work commencement). It is further recommended that the retained trees are inspected 12 months after completion of the development in order to identify senescence and/or potential hazards.

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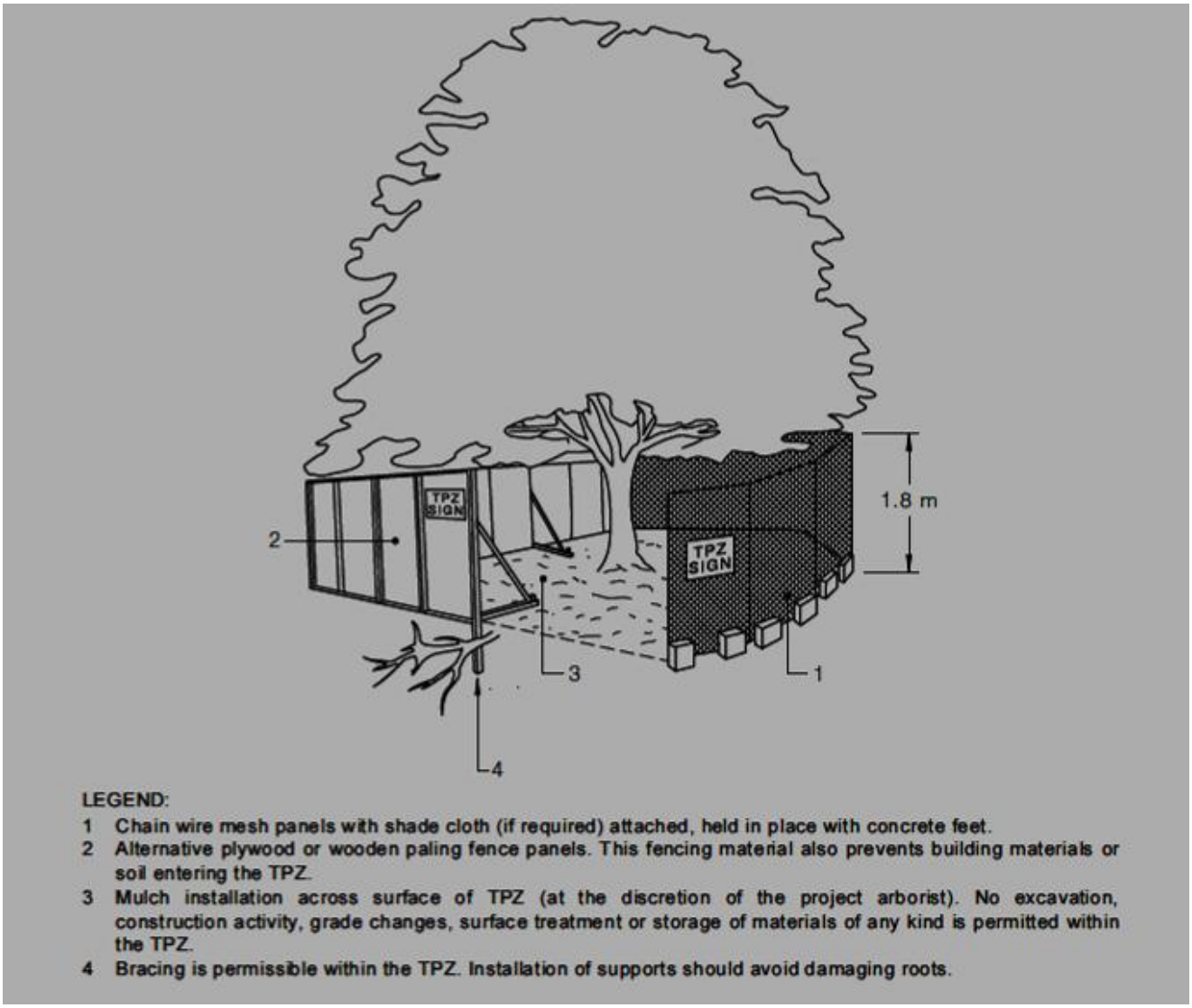
Appendix A - Safe Useful Life Expectancy (SULE) Matrix

The SULE value generated by the below matrix gives an indication of the time a tree is expected to be usefully retained. Adapted from Barrell (2001).

	1 Long SULE	2 Medium SULE	3 Short SULE	4 Removal	5 Move or Replace
A	Tree that appear to be retainable at the time of assessment for > 40 years with an acceptable degree of risk, assuming reasonable maintenance.	Tree that appear to be retainable at the time of assessment for 15 to 40 years with an acceptable degree of risk, assuming reasonable maintenance.	Tree that appear to be retainable at the time of assessment for 5 to 15 years with an acceptable degree of risk, assuming reasonable maintenance.	Trees which should be removed within the next 5 years.	Trees which can be readily moved or replaced.
B	Structurally sound trees located in positions that can accommodate for future growth.	Trees that may only live for 15-40 years.	Trees that may only live for another 5-15 years.	Dead, dying, suppressed or declining trees.	Small trees <5 (m) in height.
C	Trees that could be made suitable for retention in the long term by remedial tree care.	Trees that could live for more than 40 years but may be removed for safety or nuisance reasons.	Trees that could live for more than 15 years but may be removed for safety or nuisance reasons.	Dangerous trees because of instability or loss of adjacent trees.	Young trees less than 15 years old but over 5m in height.
D	Trees of special significance that would warrant extraordinary efforts to secure their long term retention.	Trees that could live for more than 40 years but may be removed to prevent interference with more suitable individuals or to provide for new planting.	Trees that could live for more than 15 years but may be removed to prevent interference with more suitable individuals or to provide for a new planting.	Dangerous trees because of structural defects.	
E		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 not safe to retain.	
F				Trees that could live for more than 5 years but may be removed to prevent interference with more suitable individuals or to provide for a new planting.	
G				Trees that are damaging or may cause damage to existing structures within 5 years.	

Appendix B – Tree protection zone fence example



LEGEND:

1 Chain wire mesh panels with shade cloth (if required) attached, held in place with concrete feet.
2 Alternative plywood or wooden paling fence panels. This fencing material also prevents building materials or soil entering the TPZ.
3 Mulch installation across surface of TPZ (at the discretion of the project arborist). No excavation, construction activity, grade changes, surface treatment or storage of materials of any kind is permitted within the TPZ.
4 Bracing is permissible within the TPZ. Installation of supports should avoid damaging roots.

Source: Australian Standard: Protection of trees on development sites, AS 4770-2009.

Appendix C - List of subject trees.

Patch No.	Tree No.	Species	Common Name	Height (m)	Spread (m)	DBH (m)	Age Class	Health	Structure	SULE	TPZ radius (m)	Comments
Patch 1	1	*Eucalyptus saligna*	Sydney Blue Gum	15	8	0.4	Mature (M)	Good	Poor	C3	4.8	Heavily pruned for power line clearance. Poor structure / one-sided crown.
	2	*Eucalyptus saligna*	Sydney Blue Gum	8	7	0.25	Young (Y)	Good	Poor	C3	3	Triple-stemmed at base.
	3	*Corymbia maculata*	Spotted Gum	9	7	0.3	Y	Good	Fair	C3	3.6	Growing in small garden bed.
	4	*Eucalyptus saligna*	Sydney Blue Gum	15	8	0.55	M	Good	Poor	C3	6.6	Heavily pruned for power line clearance. Poor structure / one-sided crown.
	5	*Eucalyptus punctata*	Grey Grey	17	7	0.45	M	Good	Fair	A2	5.4	
Patch 2	6	*Eucalyptus saligna*	Sydney Blue Gum	15	9	0.45	M	Good	Poor	C3	5.4	Broad crown. 4-stemmed with one dominant leader.
	7	*Eucalyptus saligna*	Sydney Blue Gum	15	7	0.35	M	Good	Good	A1	4.2	
	8	*Corymbia maculata*	Spotted Gum	10	8	0.4	M	Fair	Poor	C3	4.8	Old overgrown wound (potential decay present). Thin crown. Twin-stem 3 m above ground.

Patch No.	Tree No.	Species	Common Name	Height (m)	Spread (m)	DBH (m)	Age Class	Health	Structure	SULE	TPZ radius (m)	Comments
	9	*Corymbia maculata*	Spotted Gum	10	8	0.3	M	Fair	Poor	B4	3.6	Leaning / suppressed. Overhanging footpath and road.
	10	*Corymbia maculata*	Spotted Gum	10	8	0.45	M	Good	Fair	A2	5.4	
	11	*Corymbia maculata*	Spotted Gum	12	10	0.5	M	Good	Fair	D3	6	Twin-stem 4 m above ground. Competing with tree # 12 & 13.
	12	*Corymbia maculata*	Spotted Gum	10	7	0.3	M	Fair	Fair	B4	3.6	Suppressed.
	13	*Corymbia maculata*	Spotted Gum	13	10	0.5	M	Good	Fair	A2	6	
	14	*Eucalyptus* sp.		10	8	0.4	M	Fair	Poor	D4	4.8	Twin stem 1 m above ground with included bark at junction
	15	*Corymbia citriodora*	Lemon-scented Gum	13	9	0.45	M	Fair	Fair	A2	5.4	
	16	*Corymbia citriodora*	Lemon-scented Gum	14	8	0.5	M	Fair	Fair	A2	6	
	17	*Corymbia citriodora*	Lemon-scented Gum	10	8	0.35	M	Fair	Fair	C3	4.2	Twin stem 1 m above ground with included bark at junction

Patch No.	Tree No.	Species	Common Name	Height (m)	Spread (m)	DBH (m)	Age Class	Health	Structure	SULE	TPZ radius (m)	Comments
	18	*Eucalyptus eugenioides*	Thin-leaved Stringybark	12	10	0.9	Over-mature (OM)	Poor	Poor	E3	10.8	Tree on Council land. Remedial pruning evident. Top part of crown died off (and removed).
	19	*Corymbia citriodora*	Lemon-scented Gum	9	7	0.4	M	Poor	Fair	B4	4.8	Twin stem 1 m above ground. Thin crown. Suppressed.
	20	*Corymbia maculata*	Spotted Gum	12	8	0.4	M	Good	Fair	A2	4.8	
	21	*Corymbia maculata*	Spotted Gum	10	7	0.4	M	Good	Fair	A2	4.8	
	22	*Corymbia maculata*	Spotted Gum	9	6	0.35	M	Fair	Poor	A3	4.2	
	23	*Corymbia maculata*	Spotted Gum	12	4	0.45	M	Poor	Fair	B4	5.4	Thin crown.
	24	*Corymbia maculata*	Spotted Gum	13	8	0.4	M	Fair	Poor	D3	4.8	Suppressed by tree on neighbouring property.
	30	*Cupressus sempervirens*	Pencil Pine	12	3	0.3	M	Fair	Fair	A3	3.6	Next to walk way
	31	*Cupressus sempervirens*	Pencil Pine	12	3	0.3	M	Fair	Fair	A3	3.6	Next to walk way
Patch 3	25	*Corymbia maculata*	Spotted Gum	12	7	0.4	M	Fair	Poor	B4	4.8	Leaning tree. Suppressed by #26.

Patch No.	Tree No.	Species	Common Name	Height (m)	Spread (m)	DBH (m)	Age Class	Health	Structure	SULE	TPZ radius (m)	Comments
	26	*Corymbia maculata*	Spotted Gum	14	8	0.4	M	Good	Fair	A2	4.8	
	27	*Corymbia maculata*	Spotted Gum	15	13	0.7	M	Fair	Fair	A2	8.4	Broad crown. Some heavy branches.
Patch 4	28	*Corymbia citriodora*	Lemon-scented Gum	15	10	0.65	M	Fair	Poor	B4	7.8	Heavy pruning evident of lower branches - epricormic growth present.
	29	*Corymbia citriodora*	Lemon-scented Gum	12	8	0.45	M	Fair	Fair	C3	5.4	Pruned fairly heavily - epicromic growth present.
Patch 5	32	*Eucalyptus* sp.		10	7	0.55	M	Fair	Poor	E4	6.6	Pruned for power lines.
	33	*Eucalyptus amplifolia*	Cabbage Gum	20	12	0.75	M	Good	Good	A2	9	
	34	*Eucalyptus amplifolia*	Cabbage Gum	15	10	0.75	M	Good	Poor	D3	9	Suppressed by # 33 - one-sided crown. Some heavy horizontal branches present.
	35	*Robinia pseudoacacia* 'Frisia'	Golden Robinia	7	5	0.2	M	Good	Fair	A2	2.4	
	36	*Eucalyptus cinerea*	Argyle Apple	13	8	0.9	M	Poor	Poor	B3	10.8	Large dead branch present (35 cm diam.). Crown die-back. Some epicormic growth present. One-sided crown.

Patch No.	Tree No.	Species	Common Name	Height (m)	Spread (m)	DBH (m)	Age Class	Health	Structure	SULE	TPZ radius (m)	Comments
	37	*Allocasuarina* sp.	She-oak	10	5	0.48	M	Fair	Poor	C3	5.76	Heavily pruned for power line clearance. Poor structure / one-sided crown.
Patch 6	Patch of recently planted Eucalypt trees. Structure and health range between Good to Fair.											

HEAD OFFICE
Suite 4, Level 1
2-4 Merton Street
Sutherland NSW 2232
T 02 8536 8600
F 02 9542 5622

SYDNEY
Level 6
299 Sussex Street
Sydney NSW 2000
T 02 8536 8650
F 02 9264 0717

ST GEORGES BASIN
8/128 Island Point Road
St Georges Basin NSW 2540
T 02 4443 5555
F 02 4443 6655

CANBERRA
Level 2
11 London Circuit
Canberra ACT 2601
T 02 6103 0145
F 02 6103 0148

NEWCASTLE
Suite 17, Level 4
19 Bolton Street
Newcastle NSW 2300
T 02 4910 0125
F 02 4910 0126

NAROOMA
5/20 Canty Street
Narooma NSW 2546
T 02 4476 1151
F 02 4476 1161

COFFS HARBOUR
35 Orlando Street
Coffs Harbour Jetty NSW 2450
T 02 6651 5484
F 02 6651 6890

ARMIDALE
92 Taylor Street
Armidale NSW 2350
T 02 8081 2681
F 02 6772 1279

MUDGEE
Unit 1, Level 1
79 Market Street
Mudgee NSW 2850
T 02 4302 1230
F 02 6372 9230

PERTH
Suite 1 & 2
49 Ord Street
West Perth WA 6005
T 08 9227 1070
F 08 9322 1358

WOLLONGONG
Suite 204, Level 2
62 Moore Street
Austinmer NSW 2515
T 02 4201 2200
F 02 4268 4361

GOSFORD
Suite 5, Baker One
1-5 Baker Street
Gosford NSW 2250
T 02 4302 1220
F 02 4322 2897

DARWIN
16/56 Marina Boulevard
Cullen Bay NT 0820
T 0488 050 916