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ECOLOGY | OFFSETS | BUSHFIRE | ARBORICULTURE

Arborist Impact Assessment

Proposed Manufactured Home Estate
Lot 100 DP1286524 & Lot 11 DP615229
40-80 & 82 Chapmans Road Tuncurry, NSW

Prepared for: Allam MHE Development No. 2 P/L

c/- ADW Johnson

9 December 2024

AEP Ref: 3295

Revision: 02

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Document Control

Document Name	Arborist Impact Assessment for Proposed Manufactured Home Estate at 40 – 80 & 82 Chapmans Road, Tuncurry NSW
Project Number	3295
Client Name	Allam MHE Development No.2 P/L c/ ADWJ
AEP Project Team	Warwick Muir Joe Young John Atkins Thomas Stephens Natalie Black

Revision

Revision	Date	Author	Reviewed	Approved
00	05/09/2023	John Atkins	Thomas Stephens	Warwick Muir
01	11/06/2024	John Atkins	Thomas Stephens	Warwick Muir
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Distribution

Revision	Date	Name	Organisation
00	05/09/2023	Mark Cerone and Michael Elliot	Allam MHE Development No.2 P/L
01	11/06/2024	Susan Blake	ADWJ
02	09/12/2024	Susan Blake	ADWJ

Disclaimer

Direct observations are relevant only to the trees identified within this report. This report utilizes a rapid assessment of tree health and condition to inform retention value. This assessment of tree health and condition is based on non-destructive visual observations from ground level. Thus, it is not possible to identify all structural faults at high levels in the tree, internal structural faults or within the root system. Observations about Tree Health, Structure, Safe Useful Life Expectancy (SULE) and other characteristics have been made at the time of assessment and these characteristics may change over time due to natural growth of the tree as a living organism or due to unforeseen events. As such the observations that are supplied within are relevant for a period of 12 months from the time of assessment, after which re-assessment may be required for the trees assessed within this report. The recommendations and methodologies for Tree Protection within this report are relevant only to the Trees assessed within this report. The author is not responsible for tree damage related to failure to apply these recommendations or methodologies for Tree Protection in full within this report or for tree damage relating to works conducted by an unaffiliated person. No responsibility for damage to persons or property is accepted for damage by trees referred to within this report.

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1.0 Introduction

1.1 Background

At the request of the Allam MHE Development c/- ADW Johnson (the client), Anderson Environment & Planning (AEP) have prepared an Arborist Impact Assessment and Tree Protection Plan to address the potential arboricultural impacts from the proposed residential subdivision and associated civil infrastructure (the Proposal) at 40 – 80 & 82 Chapmans Rd, Tuncurry (the Subject Site).

1.2 Objectives

Further to the above the following objectives for this report have been assigned:

- Tree identification plan and schedule identifying tree species, size, canopy spread and other dimensions**;**
- Assessment of all trees located along the limit of works for the development and the adjacent Conservation Zone within the Subject Site, including, but not limited to, the health and vigour of the trees, structural integrity, life expectancy, retention value and landscape significance;
- Likely impact the proposed development will have on assessed trees, including TPZ and SRZ encroachments; and
- Tree protection plan and methodologies throughout the development for all impacted trees to be retained.

2.0 Site Description and Locality

Table 1 provide the site details for the Subject Site.

Table 1: Site Particulars

Detail	Comments
Client	Allam MHE Development No. 2 P/L
Address	40 – 80 & 82 Chapmans Rd, Tuncurry NSW
Title(s)	Lot 100 DP1286524 & Lot 11 DP615229
Subject Site	The Subject Site encompasses the entirety buffer zone of the areas zoned C2 on or adjacent to Lot 100 DP 1259867 & Lot 11 DP615229
LGA	Mid Coast Council
Zoning	For both lots, under the Great Lakes Local Environmental Plan 2014 (the LEP), the Subject Site is zoned C2 - Environmental Conservation and R2 – Low Density Residential.
Current Land Use	The subject site consists of cleared land previously used for grazing surrounded by dense native vegetation on the western and southern areas. No observed structures or dwellings were present on Lot 100. On the eastern boundary a defined Conservation Zone consisting of PCT 4006 *Northern Paperbark-Swamp Mahogany Saw-sedge Forest* remnants (recovering from bushfire) is present. A shed is located in Lot 11 adjacent to Chapmans Road, with the central section of the lot now cleared and slashed. The greater area of the Lot consists of low-lying land and was at a saturated state when inspected. Lot 11 contains a section of C2 zoned land consisting of PCT 4004 *Native Melaleuca quinquenervia Swamp Forest*.

Detail	Comments
Surrounding Land Use	The eastern side of Lot 100 and Lot 11 has been cleared and is not currently used for a specific purpose. Adjacent to the southern boundary of Lot 11, land is partially cleared and remnant Blackbutt trees are present, the understorey has been grazed by horses. The south west of Lot 11 extends into the Conservation zoned land consisting of PCT 4004. The western side of Lot 11 is zoned C2 and consists of PCT 4004
Soil	Previous soil assessment of Acid Sulphate soils in the region shows a sample and report in close proximity to the site (Technical Report 19753 eSpade). The soil was described as a Hydrosol, Extratidal, Sulfidic, medium, non-gravelly, loam to a sand. The soil report indicated very acidic conditions (pH 2.8 – 2.2 in H_2O_2 solution).

3.0 Proposed Development

It is proposed to develop Lot 100 DP1286524 & Lot 11 DP615229 into a manufactured home estate with associated civil infrastructure.

Figure 1 depicts the extent of the Subject Site overlain on an aerial photograph of the locality.

Figure 2 shows a concept plan for the proposed development.

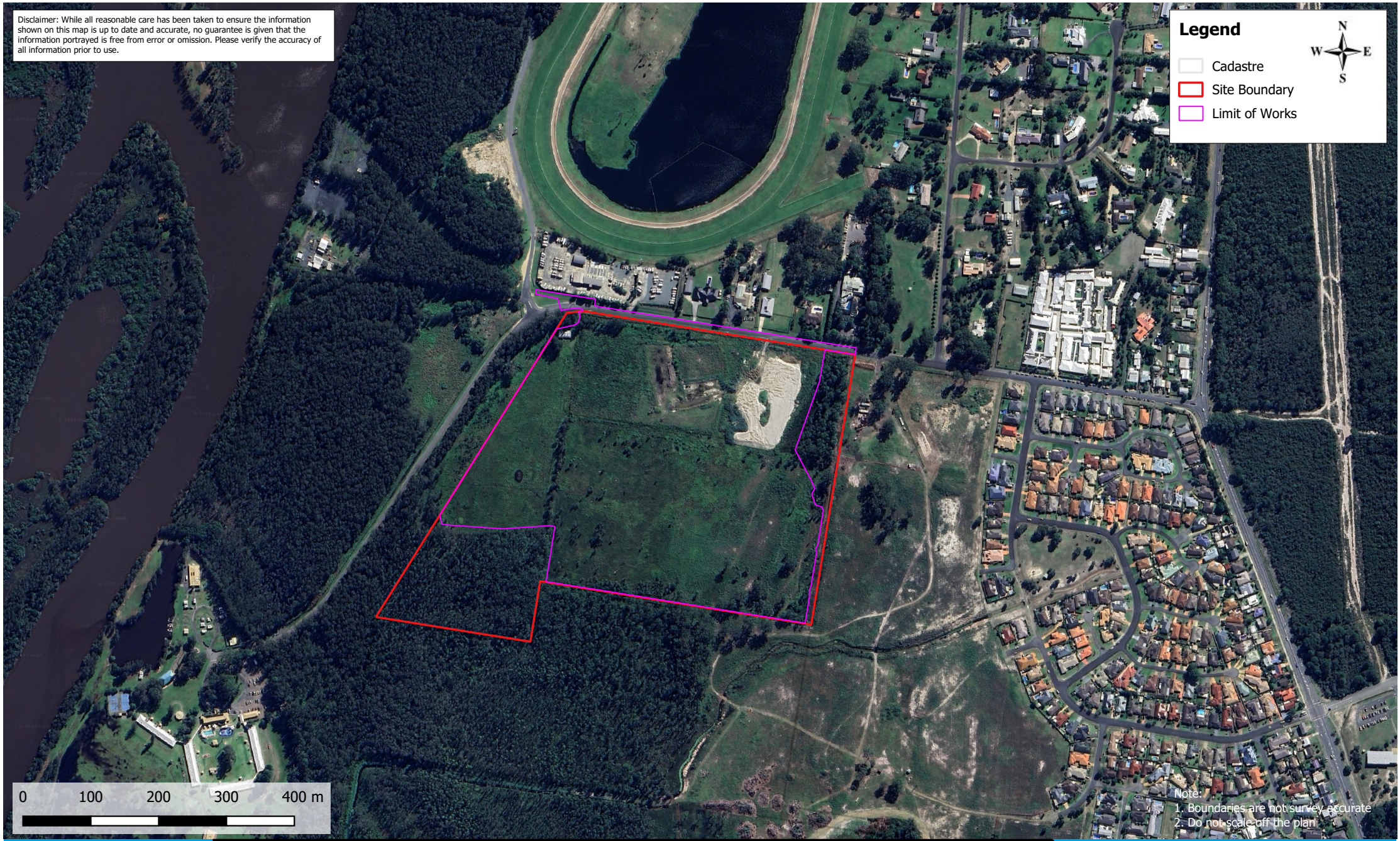

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Figure 1 - Site Location

Date: December 2024

Location: 40-80 & 82 Chapmans Road, Tuncurry

Client: Allam MHE Development No.2 P/L

AEP ref: 3295

190835-S2-DA-101

LOT 23 DP1119858 | LOT 16 DP1102422 | LOT 15 DP1102422 | LOT 37 DP815191 | LOT 36 DP815191 | LOT 35 DP815191 | LOT 34 DP815191 | LOT 33 DP815191 | LOT 7 DP513151

SHEET 102 | SHEET 103 | SHEET 104 | SHEET 105

ELECTRONIC SLIDING VEHICLE ACCESS GATE
TEMPORARY COMMUNITY FACILITIES
ENTRY SIGN
ROAD 1
CARPARK 8
PEDESTRIAN GATE
SALES OFFICE AND 2 DISPLAYS
MAINTENANCE SHED
HALF ROAD CONSTRUCTION AND FOOTPATH UPGRADES
TEMP OPEN SPACE
CHAPMANS ROAD
TO THE LAKES WAY
PROPOSED GATE
DETENTION BASIN
CARPARK 1
RAINGARDEN
EMERGENCY ACCESS ONLY
LOT 120 DP1290862
LOT 100 DP1286524
LOT 194 DP1193875
CARPARK 2
CARPARK 7
CARPARK 6
CARPARK 5
PICKLEBALL COURT
INDICATIVE SUBSTATION LOCATION
LOT 11 DP615229
SWIMMING POOL
BOWLING GREEN
BUS PARKING
TO TUNCURRY LAKES RESORT
SPS
CARAVAN PARKING
DUMP POINT
WASH DOWN BAY
CARPARK 3
CARPARK 4
LOT 59 DP753207

ROAD No.1 | ROAD No.2 | ROAD No.3 | ROAD No.4 | ROAD No.5 | ROAD No.6 | ROAD No.7 | ROAD No.8 | ROAD No.9 | ROAD No.10 | ROAD No.11 | ROAD No.12

LEGEND

- PROPERTY BOUNDARY
- LIMIT OF WORKS BOUNDARY
- APZ
- PROPOSED SITE BOUNDARY
- EXISTING LOT BOUNDARY
- PROPOSED SITE
- FOOTPATH
- ROAD PAVEMENT
- VERGE (INCLUDING LANDSCAPING)
- OPEN SPACE
- RAINGARDEN
- DETENTION BASIN

GENERAL NOTES:

1. REFER TO 190835-S2-CENG & 190835-S2-WCMP FOR FURTHER DETAILS

NOT FOR CONSTRUCTION

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ver.	date	comment	drawn	pm	level information	scale (A1 original size)	notes
A	09.12.2024	INITIAL ISSUE	LK	JY	DATUM: GDA2020 MGA56 CONTOUR INTERVAL:	A1 1:1000 — 0 25 50m — A3 1:2000	

drawing title:

SORRENTO OVERALL DETAIL PLAN

location: 40-80, 82 CHAPMANS ROAD, TUNCURRY

council: MIDCOAST COUNCIL

dwg ref: 190835-S2-DA-101

client: ALLAM PROPERTY GROUP

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4.0 Methodology

The arborist site survey was undertaken on 9 August 2023. Each tree observed within the Subject Site was assigned a unique tree number. Tree species were identified based on guidance from regional identification guides (Fairley and Moore 1989, Robinson 2003), and descriptions and records provided by the Royal Botanic Gardens (Plantnet 2022).

A review of the Midcoast Council Vegetation Management Policy (2021) V2 was undertaken to clarify the requirements for reporting of the local government authority.

4.1 Visual Tree Assessment

A visual tree assessment to evaluate the health and condition of these trees in relation to the impacts of the proposed development was undertaken from ground level following the methodology described by Mattheck and Breloer (1994). Tree height was estimated following the guidance outlined in the Private Native Forestry Code of Practice (DECC 2007) and confirmed with a laser range finder. The Diameter at Breast Height (DBH) and Diameter Above Buttress (DAB) was determined using a DBH tape and methods of calculation for the Structural Root Zone (SRZ) and Tree Protection Zone (TPZ) applied as outlined in Australian Standard 4970-2009 *Protection of trees on development Sites* (AS 4970 – 2009) (Standards Australia 2009). Tree Total Canopy Area was estimated from the formula Pi x (average canopy spread)^2.

4.2 SULE

The SULE method (Safe Useful Life Expectancy) estimates the suitability of the tree in the urban landscape based on the species and age of the subject tree (Barrell 1996). The following ranges have been allocated to each assessed tree:

- Greater than 40 years (Long);
- Between 15 and 40 years (Medium);
- Between 5 and 15 years (Short);
- Dead, dying, suppressed, defective or damaged (Remove); and
- Less than 5m in height or 15years of age (Young or small tree).

A full explanation of SULE methodology is included in **Appendix B**.

4.3 Tree Retention Value

To determine tree Retention Value a Landscape Significance Rating (LSR) was assigned to each tree. The LSR value provides consideration of the trees amenity, environmental and heritage values (refer **Appendix B**). Trees are then assigned one of the following LSR categories:

- Significant (1);
- Very High (2);
- High (3);
- Moderate (4);
- Low (5);
- Very Low (6); and
- Insignificant (7).

Once the landscape significance value has been determined the following assessment matrix that utilises estimated life expectancy and landscape significance (**Table 2**) was applied to each tree.

Table 2: Tree Retention Status Matrix Assessment matrix adopted from Morton (2006).

Landscape significance rating							
Estimated Life Expectancy	**1**	**2**	**3**	**4**	**5**	**6**	**7**
Greater than 40 Years	High						
15 to 40 Years			Moderate				
5 to 15 Years				Low			
Less than 5 Years					Very low		
Dead or Hazardous							

4.4 Limitations

This report utilises a rapid assessment of tree health and condition to inform retention value. Should a detailed assessment of tree structural health and condition be required a tree risk assessment report should be commissioned.

This assessment of tree health and condition is based on non-destructive visual observations from ground level. Thus, it is not possible to identify all structural faults at high levels in the tree, internal structural faults or within the root system. Should a detailed assessment for structural faults be required a tree risk assessment report should be commissioned.

Weather conditions such as extreme wind, storm activity, lightning as well as other events or disturbances independent of the proposed activities are unpredictable. Unforeseeable damage to trees may occur as a result of unpredictable or unplanned weather events or disturbances.

Tree identifications are based on identifying features (fruit, inflorescence, etc.) found when on site and made at ground level from within the Subject Site.

The total canopy area for each tree utilised within this report is an estimation based on field observation of canopy spread and the true amount of canopy area may differ.

Trees identified within by this plan are located to GPS accuracy and there may be some minor discrepancy in the true location.

Impact assessment was based to limited concept design confined to identification of the approximate proposal footprint at the time of preparation of this report. Variation of this concept design will alter some of the recommendations and this report should be updated to reflect these changes.

5.0 Tree Assessment Results

A total of 26 trees identified within the site and neighbouring properties were assessed. Clusters of emerging trees were evaluated. Observations were made for each assessed tree **(Appendix A).** Tree locations are shown in **Figures 3.**

It should be noted

5.1 Summary of Tree Condition and Characteristics

Of the 26 trees assessed, 24 of these trees are located within the Subject Site.

All trees assessed within the site are native species. The condition of the assessed trees includes 15 in fair condition and 11 in good condition.

A large portion of the trees on the Subject Site or adjacent property had been impacted by bushfire, presumably from the 2019-2020 summer period. Smaller Eucalypts were more noticeably impacted.

It was observed that *Casuarina glauca* within the Conservation zone on the south-western side were damaged and in poor condition from fire damage. These trees were further than 10 m from the proposed development site and were not likely to pose a significant risk to the proposed development.

Trees within the Conservation Zone on the eastern side of Lot 100 were also impacted by fire damage but showed signs of good vigour and recovery.

5.2 Summary of Landscape Significance and Retention Value

The following landscape significance ratings (LSRs) have been applied to the assessed trees;

- Trees 14, 15 and 17 were assessed as having Very High Landscape Significance due to their large canopy areas (exceeding 200m^2), visual prominence in the landscape and are representative original vegetation of the area.
- The remaining 24 trees have a ‘High” Landscape significance as they are representative original vegetation of the area.

With consideration of the estimated life expectancy for each tree, Retention Values were assigned to each tree within the site. This identified the following;

- Trees 1 – 9, 11, 13 -21 and 26 all have High retention values; and
- Trees 10, 12 and 22 – 25 have Moderate retention values.

No hollows or large stick nests were noted in the assessed trees.

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Figure 3 - Tree Locations

Date: December 2024

Location: 40-80 & 82 Chapmans Road, Tuncurry

Client: Allam MHE Development No.2 P/L

AEP ref:3295

6.0 Tree Impact Assessment

The Tree Protection Zone (TPZ) and Structural Root Zone (SRZ) are indicative areas critical for maintaining a tree's viability and stability respectively, holding the majority of the roots necessary for each function. Any ground works within these zones is likely to impact the viability or stability of the tree by injuring the root system.

6.1 Proposal Impacts

Upon review of the supplied proposal footprint, one assessed tree (Tree 3) has encroachment into the SRZ of this tree by a proposed retaining wall and "fill" area behind the wall. This could be a major impact upon the stability of this tree. The following should be considered within engineering design and construction detail for works within the TPZ of this tree to mitigate these potential impacts;

- Engineering controls such as a pier and bridge footing for the retaining wall should be considered and utilised within the design of the retaining wall for areas within 5m of this tree. Furthermore, placement of piers should be a minimum of 4m from the base of this tree. Retaining wall footings should be on grade within this area where possible. This option would greatly reduce potential impacts;
- If the above cannot be achieved then construction controls during excavation works for the footing should be applied. This should include arborist supervision of retaining wall construction with potential pruning of roots and using "soft" construction techniques (pneumatic/ hydraulic excavation of soils) to excavate within 4m of this tree to establish the footings for the retaining wall;
- Soils that are applied within the "fill" areas that intersect with the tree protection zone of Tree 3 should be a "Structural Filler" soil that complies with the requirements within *AS 4419:2018 Soils for Landscape Use* for this type of soil. The supplier of the soil must provide written certification that the soil provided complies with AS 4419:2018;
- Compaction of existing soil should be limited;
- Soils that are applied should be coarser or more porous than current site soil within these areas; and
- This tree should be monitored at regular periods during and post-construction.

If the above is applied then impacts from the construction of the retaining wall and fill areas can be mitigated, and this tree should be retained.

Trees 1 & 2 within the eastern Conservation Zone of Lot 100 will only have minor impacts to the TPZ by the proposed by the proposed retaining wall and "fill" area behind the wall. The TPZ of these trees can feasibly be offset into unimpacted areas and these trees should be retained. Other Assessed Trees within (Tree 4-9) will not have any impacts by the proposed works.

The western entrance to the ring road off Chapmans Rd may require earthworks in the proximity of Trees 24 – 26 and pruning may be required to permit higher vehicle access where the canopy extends over the proposed road.

All other assessed trees are unlikely to have major impacts by the design and feasibly be retained.

TPZ fencing as displayed in **Figure 4** will be required for the duration of works to protect assessed and unassessed trees on the eastern, southern and western boundaries. This can be concurrent with the no-go fencing installed at the boundary of the C2 zone.

Table 3 provides a summary of impact assessment.

Table 3 Summary of Impact Assessment

Tree Assessment	Retention Value (Tree No)			Total
	High	Moderate	Low	
Retain (Protection fencing)	Trees 1 – 9 Tree 11 Tree 13-21 All trees along the south-western and eastern boundary	Trees 10, 12, 22		**23 + Numerous unassessed trees**
Retain (Pruning,)	Tree 26	Trees 24 & 25		**3**
Total Tree Retention	**21**	**5**	**0**	**26**

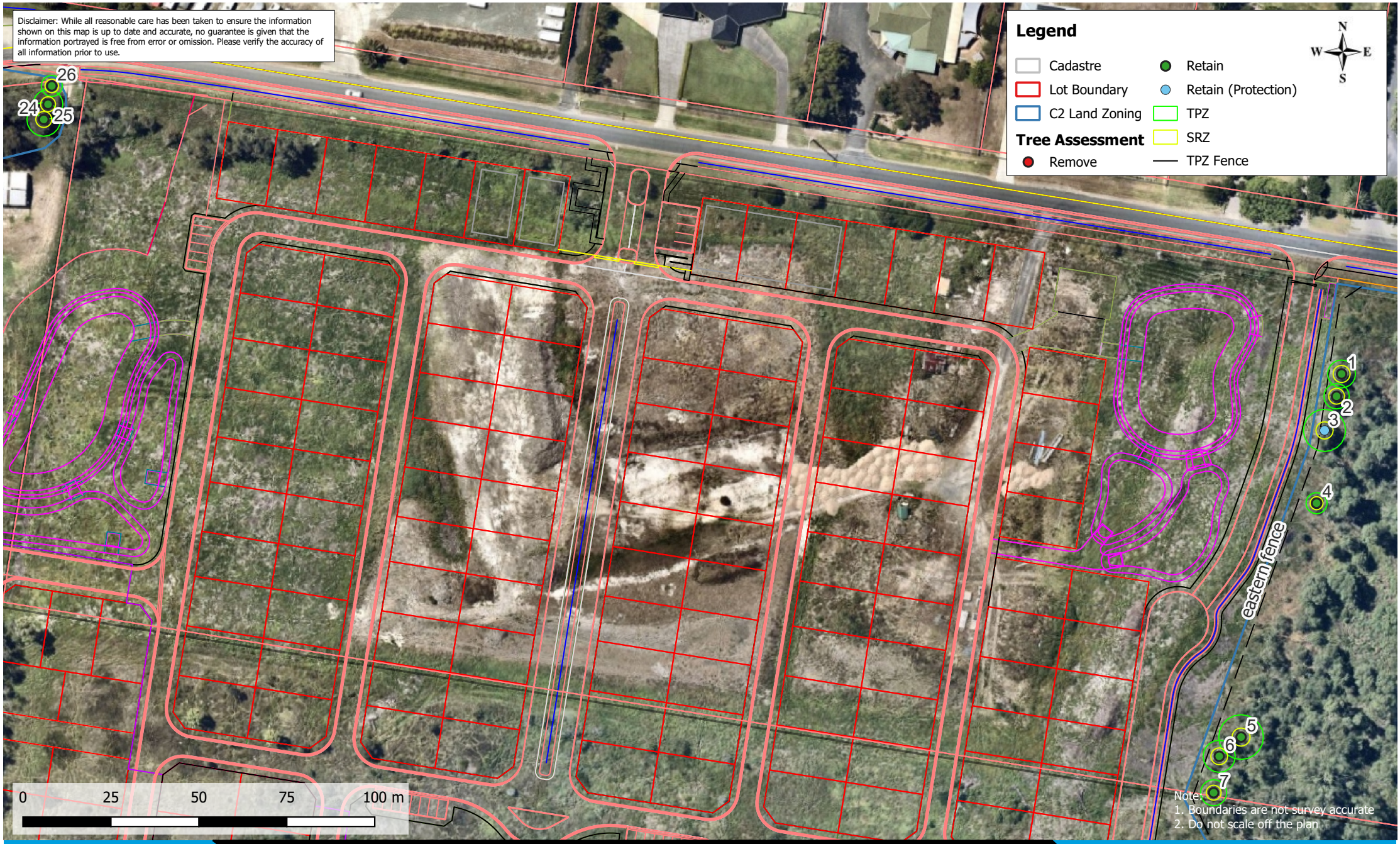

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Figure 4 - Tree Assessment (North) Date: December 2024

Location: 40-80 & 82 Chapmans Road, Tuncurry

Client: Allam MHE Development No.2 P/L AEP ref: 3295

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Figure 5 - Tree Assessment (South) Date: December 2024

Location: 40-80 & 82 Chapmans Road, Tuncurry

Client: Allam MHE Development No.2 P/L AEP ref: 3295

7.0 Recommendations

7.1 Tree Retention and Removal

- Tree 3 will require specific engineering and construction controls as specified in **Section 6.1** to mitigate the impact of the proposed works on this tree.
- All other Trees designated for retention within this report as outlined in **Section 6.1** to the development footprint should be retained with Tree Protection Measures.

7.2 Tree Protection Measures

- All tree maintenance and pruning works should be carried out by or under the supervision of a qualified tree worker (holding AQF level 3 in Arboriculture) in accordance with AS4373 –2007 Pruning of Amenity Trees.
- A continuous TPZ fence shall be installed for retained trees as displayed in **Figure 4 and 5 .** The TPZ shall be delineated by a 1.8m interlocking chain wire fence located around trees designated to be retained within close proximity to the Works, in accordance with AS 4687. **Appendix D** details tree protection fencing that should be implemented.
- TPZ fencing must be installed before the commencement of any Works. The fencing should not be removed or altered until after the completion of works.
- All Contractors working in close proximity to the TPZ of Trees to be retained should be briefed as to the requirements of the Tree Protection Zone.
- The Project Arborist shall provide clear instruction and guidance on the position of the Tree Protection fences prior to any earthworks on site. The TPZ fencing and zone should be certified by the Project Arborist before construction commences.
- Tree health and condition should be monitored by the Project Arborist at regular stages during construction, at practical completion of construction, and after completion.
- The following activities should be avoided within the TPZ of trees to be retained where practicable:
    - Machine excavation of soil including trenching;
    - Operation of heavy equipment;
    - Stockpiling of soils;
    - Storage of heavy or other equipment;
    - Parking of vehicles;
    - Wash down and cleaning of equipment;
    - Excavation for silt fencing;
    - Dumping of waste;
    - Change of soil level or gradient; and
    - Covering with concrete, impermeable, or compacted surfaces.
- Where works are required that encroach into TPZ of trees to be retained, additional protection measures, which include trunk and low branch guards, and ground protection measures should be implemented following guidance in Australian standard *AS 4970 – 2009 Protection of trees on development Sites* (**Appendix D**). These works should only be conducted under supervision

of the project arborist. The use of “soft” construction methods including manual and vacuum removal of soils is recommended for works conducted within the TPZ of Trees to be retained.

7.3 Other Recommendations

- Clothing, equipment and boots should be clean and sanitised prior to each site visit to prevent onsite introduction of plant pests and diseases such as Myrtle rust.
- Vehicles and construction equipment should utilise designated entry and egress points to avoid potential of impacts on Trees to be retained.

8.0 Conclusion

The recommendations for tree retention and removal have been made with consideration of minimising impacts on trees within the Conservation Zones.

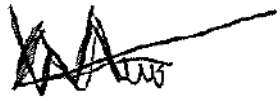
Based on the tree retention and removal proposed all 26 assessed trees can be retained within the site. Tree Protection Measures including tree protection fencing along the interface between the Conservation Zones and the proposed development are stated.

Please note that assessment of tree removal and retention has been made with regards to a concept plan. These recommendations may be subject to change once further design and engineering detail has been prepared and this report will require updating in accordance with these changes.

The implementation of a detailed Tree Protection Plan and Tree Protection measures will be an essential part of the Construction Environment Management Plan to avoid further loss of trees in close proximity to the construction footprint.

We trust this meets your requirements. Should you require further details or clarification, please do not hesitate to contact the undersigned or Natalie Black, Senior Environmental Manager (0431 249 360).

Yours faithfully,



Warwick Muir

Ecologist / Arborist

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0448 689 698

9.0 References

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Standards Australia (2018) *AS 4419 :2018 Soils for Landscape use.* Standards Australia Limited, NSW

Appendix A – Tree Schedule

Appendix A– Assessed Tree Schedule

Tree ID	*Scientific Name*	Common Name	DBH (m)	DAB (m)	Canopy Spread (m)				Canopy Spread Average	Estimated Total Canopy Area	Height (m)	SULE	Age Class	Health	Structure	Landscape significance rating	Estimated life expectancy	Retention Value	TPZ (m)	SRZ (m)	Remove / Retain
					N	E	S	W	(m)	(m^2)											
1	*Eucalyptus robusta*	Swamp Mahogany	0.33	0.48	5	4	3	4	4	50	9	Moderate (15-40)	Mature	Fair	Fair	High	40+	High	4.0	2.4	Retain
2	*Eucalyptus robusta*	Swamp Mahogany	0.30	0.40	2	3	1	2	2	13	13	Moderate (15-40)	Mature	Good	Good	High	40+	High	3.6	2.3	Retain
3	*Eucalyptus robusta*	Swamp Mahogany	0.50	0.49	6	5	6	4	5.25	87	13	Moderate (15-40)	Mature	Good	Fair	High	40+	High	6.0	2.5	Retain (Protection)
4	*Eucalyptus robusta*	Swamp Mahogany	0.25	0.25	1	2	2	1.5	1.625	8	10	High (40+)	Semi-mature	Good	Good	High	40+	High	3.0	1.8	Retain
5	*Eucalyptus robusta*	Swamp Mahogany	0.53	0.55	7	7	7	7	7	154	23	Moderate (15-40)	Mature	Good	Good	Moderate	40+	High	6.4	2.6	Retain
6	*Melaleuca quinquenervia*	Broad-leaved Paperbark	0.38	0.46	1	2	3	0.5	1.625	8	15	High (40+)	Semi-mature	Fair	Fair	High	40+	High	4.6	2.4	Retain
7	*Eucalyptus robusta*	Swamp Mahogany	0.31	0.35	4	5	8	6	5.75	104	16	Moderate (15-40)	Mature	Good	Fair	High	40+	High	3.7	2.1	Retain
8	*Melaleuca quinquenervia*	Broad-leaved Paperbark	0.48	0.60	2	3	5	4	3.5	38	12	High (40+)	Mature	Good	Good	High	40+	High	5.8	2.7	Retain
9	*Casuarina glauca*	Swamp Oak	0.12	0.15	2	2	2	2	2	13	5	Moderate (15-40)	Semi-mature	Fair	Good	High	15-40	High	2.0	1.5	Retain
10	*Eucalyptus robusta*	Swamp Mahogany	0.21	0.22	3	3	3	3	3	28	10	Moderate (15-40)	Semi-mature	Fair	Good	High	15-40	Moderate	2.5	1.8	Retain
11	*Melaleuca quinquenervia*	Broad-leaved Paperbark	0.16	0.20	1	1	0.5	0.5	0.75	2	6	Young or Small Tree	Semi-mature	Good	Fair	High	40+	High	2.0	1.7	Retain
12	*Eucalyptus robusta*	Swamp Mahogany	0.27	0.28	3	4	3	3	3.25	33	6	Moderate (15-40)	Semi-mature	Fair	Good	High	15-40	Moderate	3.2	1.9	Retain
13	*Eucalyptus robusta*	Swamp Mahogany	0.32	0.35	4	2	3	2	2.75	24	16	High (40+)	Semi-mature	Good	Good	High	40+	High	3.8	2.1	Retain
14	*Eucalyptus pilularis*	Blackbutt	0.81	0.95	11	9	9	10	9.75	299	29	High (40+)	Mature	Good	Fair	Very High	40+	High	9.7	3.2	Retain
15	*Eucalyptus pilularis*	Blackbutt	0.68	0.90	11	9	10	12	10.5	346	29	High (40+)	Mature	Good	Good	Very High	40+	High	8.2	3.2	Retain

Tree ID	*Scientific Name*	Common Name	DBH (m)	DAB (m)	Canopy Spread (m)				Canopy Spread Average	Estimated Total Canopy Area	Height (m)	SULE	Age Class	Health	Structure	Landscape significance rating	Estimated life expectancy	Retention Value	TPZ (m)	SRZ (m)	Remove / Retain
					N	E	S	W	(m)	(m^2)											
16	*Eucalyptus robusta*	Swamp Mahogany	0.46	0.60	9	8	5	2	6	113	22	High (40+)	Mature	Good	Good	High	40+	High	5.5	2.7	Retain
17	*Eucalyptus robusta*	Swamp Mahogany	0.73	0.85	8	8	8	8	8	201	23	Moderate (15-40)	Mature	Good	Fair	Very High	40+	High	8.8	3.1	Retain
18	*Melaleuca quinquenervia*	Broad-leaved Paperbark	0.30	0.35	4	4	2	2	3	28	12	High (40+)	Semi-mature	Good	Good	High	40+	High	3.6	2.1	Retain
19	*Eucalyptus robusta*	Swamp Mahogany	0.40	0.45	2	6	5	3	4	50	17	Short (5-15)	Mature	Good	Fair	High	40+	High	4.8	2.4	Retain
20	*Melaleuca quinquenervia*	Broad-leaved Paperbark	0.36	0.40	3	5	2	2	3	28	16	High (40+)	Mature	Good	Fair	High	40+	High	4.3	2.3	Retain
21	*Melaleuca linariifolia*	Snow in Summer	0.40	0.50	4	3	3	2	3	28	6	High (40+)	Mature	Good	Good	High	40+	High	4.8	2.5	Retain
22	*Casuarina glauca*	Swamp Oak	0.17	0.22	4	2	3	3	3	28	9	Short (5-15)	Mature	Fair	Fair	High	.5-15	Moderate	2.0	1.8	Retain
24	*Casuarina glauca*	Swamp Oak	0.40	0.41	5	6	5	4	5	79	18	Moderate (15-40)	Mature	Good	Fair	High	15-40	Moderate	4.8	2.3	Retain
25	*Casuarina glauca*	Swamp Oak	0.35	0.35	6	6	6	4	5.5	95	18	Moderate (15-40)	Mature	Good	Good	High	15-40	Moderate	4.2	2.1	Retain
26	*Casuarina glauca*	Swamp Oak	0.25	0.28	3	3	1	2	2.25	16	18	High (40+)	Mature	Good	Good	High	40+	High	3.0	1.9	Retain

Appendix B – SULE Methodology

SULE (Safe Useful Life Expectancy)

In planning context, the time a tree can expect to be usefully retained is the most important long- term consideration. SULE i.e. a system designed to classify trees into a number of categories so that information regarding tree retention can be concisely communicated in a non-technical manner. SULE categories are easily verifiable by experienced personnel without great disparity. A tree's SULE category is the life expectancy of the tree modified first by its age, health, condition, safety and location (to give safe life expectancy), then by economics (i.e. cost of maintenance: retaining trees at an excessive management cost is not normally acceptable), effect on better trees, and sustained amenity (i.e. establishing a range of age classes in a local population). SULE assessments are not static but may be modified as dictated by changes in tree health and environment. Trees with a short SULE may be at present by making a contribution to the landscape but their value to the local amenity will decrease rapidly towards the end of this period, prior to their being removed for safety or aesthetic reasons.

SULE Methodology

1. Long SULE - tree appeared retainable at the time of assessment for over 40 years with an acceptable degree of risk, assuming reasonable maintenance;

A. Structurally sound trees located in positions that can accommodate future growth.

B. Trees which could be made suitable for long term retention by remedial care

C. Trees of special significance which would warrant extraordinary efforts to secure their long-term retention.

2. Medium SULE- tree appeared to be retainable at the time of assessment for 15 to 40 years with an acceptable degree of risk, assuming reasonable maintenance;

A. Trees which may only live from 15 to 40 years.

B. Trees which may live for more than 40 years but would be removed for safety or nuisance reasons.

C. Trees which 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.

D. Trees which could be made suitable for retention in the medium term by remedial care.

3. Short SULE - tree appeared to be retainable at the time of assessment for 5 to 15 years with an acceptable degree of risk, assuming reasonable maintenance:

A. Trees which may only live from 5 to 15 years.

B. Trees which may live for more than 15 years but would be removed for safety or nuisance reasons.

C. Trees which may live for more than 15 years but would be removed to prevent interference with more suitable individuals or to provide space for new planting.

D. Trees which require substantial remediation and are only suitable for retention in the short term.

4. Removal - trees which should be removed within the next 5 years;

A. Dead, dying, suppressed or declining trees.

B. Dangerous trees through instability or recent loss of adjacent trees.

C. Dangerous trees because of structural defects including cavities, decay, included bark, wounds or poor form.

D. Damaged trees that are clearly not safe to retain.

E. Trees which may live for more than 5 years but would be removed to prevent interference with more suitable individuals or to provide space for new planting.

F. Trees which are damaging or may cause damage to existing structures within the next 5 years.

G. Trees that will become dangerous after removal of other trees for the reasons given in (a) to (f).

H. Trees in categories (a) to (g) that have a high wildlife habitat value and, with appropriate treatment, could be retained subject to regular review.

5. Small, young or regularly pruned - Trees that can be moved or replaced;

A. Small trees less than 5m in height.

B. Young trees less than 15 years old but over 3m in height.

C. Formal hedges and trees intended for regular pruning to artificially control growth.

GLOSSARY

Age Classes

- Juvenile refers to an immature tree.
- Semi-mature refers to a tree between immaturity and full size.
- Mature refers to a full-sized tree with some capacity for further growth.
- Over-mature refers to a tree already in decline.

Diameter at breast height (DBH)

Tree stem diameter at 1.4 metres above ground level.

Diameter at buttress (DAB)

Tree stem diameter as measured above the root buttress at ground level.

Tree Protection Zone (TPZ)

An indicative measure of the area necessary to protect for tree viability, encompassing the area necessary to protect both the crown and woody roots as calculated by the formula TPZ= DBH x 12

Structural Root Zone (SRZ)

An indicative measure of the spread of the primary woody and structural roots necessary for tree stability, as calculated by the formula SRZ= $(DAB*50)^{0.42}x0.64$

Visual Tree Assessment (VTA)

Visual inspection of tree only.

Co-dominant leaders

A tree where two or more stems are of similar diameter.

Included Bark Junctions

A junction where the angle of the union creates an area of ingrown bark. This can create a structural weakness, and is often found on co-dominant stems.

Crown

The portion of the tree consisting of branches and leaves and any part of the trunk from which branches arise.

Stem

The position of the tree consisting of branches and leaves and any part of the trunk from which branches arise. An organ which supports branches, leaves, flowers and fruits.

Epicormic Growth

Refers to shoots produced by dormant buds within the bark or stem of a tree as a result of stress, incorrect pruning or increased light.

Health Condition

Exceptional

- Visually complete crown with dense foliage throughout that indicates strong health and vigour.
- Leaf size and colour that is true to type for the species and free from pest (insect) and disease (pathogen) damage.
- Expected levels of primary growth or seasonal extension and internodal growth evident for the species.

- No evidence of colonising saprophytes and no deadwood evident.

Good

- Visually complete crown, varying in foliage density throughout.
- Leaf size and colour that is true to type for the species with none or minor levels of pest (insect) and/or disease (pathogen) damage evident.
- Expected levels of primary growth or seasonal extension and internodal growth evident for the species.
- No evidence of colonising saprophytes and low levels of deadwood present and approximately 10mm or less in size.

Fair

- Sparse crown, varying in foliage density throughout.
- Reduced leaf size and atypical in colour for the species.
- Low to medium levels of pest (insect) and/or disease (pathogen) damage.
- Reduced, seasonal extension and internodal growth.
- Deadwood easily visible and less than approximately 30mm in size.
- Epicormic growth may be evident.

Poor

- Obvious signs of crown decline, exhibiting significant reduction in live crown volume and foliage density with reduced leaf size and atypical in colour for the species.
- Evidence of defoliation and/or dieback of branch tips.
- Medium to high levels of pest (insect) and disease (pathogen) damage.
- Presence of exudates (kino and resins) from wounds (open and/or weeping).
- Significant reduction in seasonal extension and internodal growth, with significant levels of epicormic growth evident.
- Deadwood easily visible, approximately 30mm to 100mm in size.

Dead

- No evidence of live foliage observed throughout the crown.
- Obvious signs of cracking and shrinking wood.
- Visible evidence of delaminating bark to stems and branches.

Structure Condition

Very Good

- Strong branch unions at attachment points with no acute angles (compression and tension forks) and good branch taper at unions.
- No visibly, defective tree parts or structural defects.
- No wounds to stems and branches, no crossing and rubbing of branches and no wounds to exposed roots.
- No fungal fruiting bodies present to stems, branches and roots indicating, a presence of fungal pathogens.

Good to Fair

- Developing inclusions at unions of leading, codominant stems and branches.

- Evidence of defective tree parts (low levels) including branch and stem inclusions and crossing and rubbing of branches.
- Evidence of mechanical damage to periderm of stems, branches and roots, exposing vascular tissues.
- Exposed wounds for surface, colonising pathogens and entry points for developing decay.
- Presence of fungal fruiting bodies.
- Some evidence of cavities or hollows. (Fair only)
- No evidence of soil upheaval surrounding base of tree.

Poor

- Obvious signs and evidence of included bark to basal unions of codominant, leading stems and branches.
- Advanced, structural defects evident with failure of tree parts determined within 5 years from time of inspection and assessment.
- Evidence of decay from open wounds with presence of exudates (kino and resins) and exposed and degraded woody tissues.
- Presence of fungal fruiting bodies.
- Presence of cavities and hollows.
- Evidence of mechanical damage with advanced degradation of exposed roots.

a) Hazardous Tree

b) Immediate Removal

- Advanced, structural defects evident. Open cracks to codominant stem and branch unions evident.
- Previous branch and stem failures evident. Failure of remaining tree parts determined within 3 months 6 months, from time of inspection and assessment. Arboricultural works to be scheduled immediately to mitigate associated hazard and risk.
- Severed roots and soil upheaval evident indicating failure of root zone.
- Tree failure imminent within 12 months from time of inspection and assessment

Landscape Significance

Assesses a tree within the landscape and rates according to criteria taken from Morton (2006):

1. Significant

- The subject tree is listed as a Heritage Item under the Local Environment Plan (LEP) with a local, state or national level of significance; or
- The subject tree forms part of the curtilage of a Heritage Item (building / structure /artifact as defined under the LEP) and has a known or documented association with that item; or
- The subject tree is a Commemorative Planting having been planted by an important historical person (s) or to commemorate an important historical event; or
- The subject tree is scheduled as a Threatened Species or is a key indicator species of an Endangered Ecological Community as defined under the or Biodiversity Conservation Act 2016 (NSW) or The Environmental Protection and Biodiversity Conservation Act 1999 (Federal); or

- The tree is a locally indigenous species, representative of the original vegetation of the area and is known as an important food, shelter or nesting tree for endangered or threatened fauna species; or
- The subject tree is a Remnant Tree, being a tree in existence prior to development of the area; or
- The subject tree has a very large live crown size exceeding 300m² with normal to dense foliage cover, is located in a visually prominent in the landscape, exhibits very good form and habit typical of the species and makes a significant contribution to the amenity and visual character of the area by creating a sense of place or creating a sense of identity; or
- The tree is visually prominent in view from surrounding areas, being a landmark or visible from a considerable distance.

2. Very high

- The tree has a strong historical association with a heritage item (building/structure/artifact/garden etc) within or adjacent the property and/or
- Exemplifies a particular era or style of landscape design associated with the original development of the site; or
- The subject tree is listed on Council's Significant Tree Register; or
- The tree is a locally-indigenous species and representative of the original vegetation of the area and the tree is located within a defined Vegetation Link/ Wildlife Corridor or has known wildlife habitat value;
- The subject tree has a very large live crown size exceeding 200m²; a crown density exceeding 70% Crown Cover (normal-dense), is a very good representative of the species in terms of its form and branching habit or is aesthetically distinctive and makes a positive contribution to the visual character and the amenity of the area.

3. High

- The tree has a suspected historical association with a heritage item or landscape supported by anecdotal or visual evidence; or
- The tree is a locally-indigenous species and representative of the original vegetation of the area; or
- The subject tree has a large live crown size exceeding 100m²; and
- The tree is a good representative of the species in terms of its form and branching habit with minor deviations from normal (eg crown distortion/suppression) with a crown density of at least 70% Crown Cover (normal); and
- The subject tree is visible from the street and surrounding properties and makes a positive contribution to the visual character and the amenity of the area.

4. Moderate

- The subject tree has a medium live crown size exceeding 40m²; and
- The tree is a fair representative of the species, exhibiting moderate deviations from typical form (distortion/suppression etc) with a crown density of more than 50% Crown Cover (thinning to normal); and
- The tree makes a fair contribution to the visual character and amenity of the area; and
- The tree is visible from surrounding properties, but is not visually prominent – view may be partially obscured by other vegetation or built forms.
- The tree has no known or suspected historical association

5. Low

- The subject tree has a small live crown size of less than 40m² and can be replaced within the short term with new tree planting; or
- The tree is a poor representative of the species, showing significant deviations from the typical form and branching habit with a crown density of less than 50% Crown Cover (sparse); and
- The subject tree is not visible from surrounding properties (visibility obscured) and makes a negligible contribution or has a negative impact on the amenity and visual character of the area.

6. Very low

- The subject tree is listed as an Environment Weed Species in the relevant Local Government Area, being invasive, or a nuisance species.
- The subject tree is scheduled as exempt (not protected) under the provisions of the local Council's Tree Preservation Order due to its species, nuisance or position relative to buildings or other structures.

7. Insignificant

- The tree is a declared Noxious Weed under the Biosecurity Act (NSW) 2015or identified as a priority weed within the local region.

Appendix C – Site Photographs

Plate 1: Looking north along the sediment fence. To the right of the fence, the trees are located in the C2 zone along the eastern boundary of Lot 100. Fencing to protect this zone will be required at the approximate position of the bunting string-line.

Plate 2: The view looking North along the approximate edge of the eastern Conservation Zone. A Tree Protection Zone fence is recommended in this area to protect vegetation.

Plate 3: The view in the opposite direction (south) to Plate 2. Tree protection fencing should be implemented in this area.

Plate 4: Tree 7 is located just within the eastern Conservation Zone. On site, the estimated position of the Conservation Zone boundary was approximately 2 – 3 m to the right of this tree.

Plate 5: Tree 12 – *Eucalyptus robusta* in the rear of the image.

Plate 6: Looking west along the southern boundary fence. The left side of the fence is an adjoining property.

Plate 7: Tree 14 – *Eucalyptus pilularis* listed as having a very high landscape significance due to its height (29 m), and large canopy area 299 m^2)

Plate 8: Tree 21 – *Melaleuca linariifolia* located just on the boundary of the Conservation zone.

Plate 9: Tree 18 – *Melaleuca quinquenervia* positioned on the edge of the Conservation Zone and boundary in the south-west of the site. The dense Swamp Mahogany/Paperbark.

Plate 10: Looking along the south-west boundary line from Tree 21. The Conservation Zone is on the left and background of the photo.

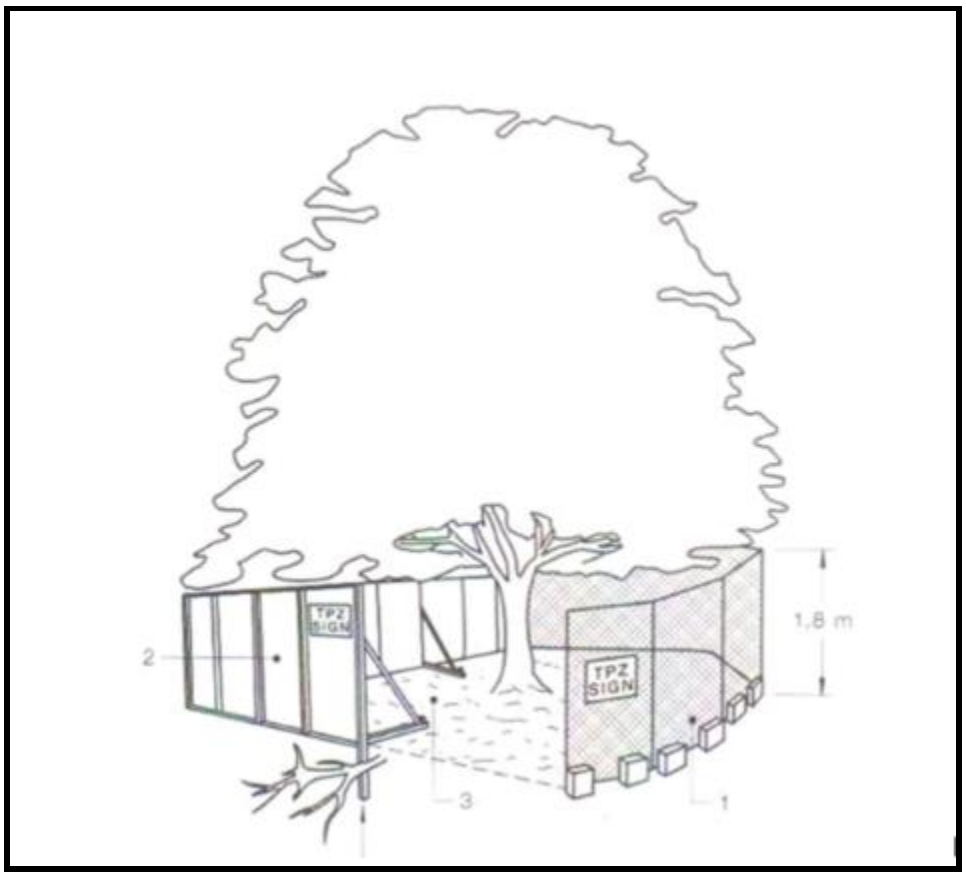
Appendix D –Tree Protection Fencing and Ground Protection

Example of tree protection fencing:

1. Fence off all trees noted for retention with 1.8m steel mesh fencing at the perimeter of the designated protection zone. Attach signs relating to the importance of tree protection and penalties for breaching tree protection orders to the fencing. If the area is large, install multiple signs.

2. Signs should state that this is a restricted area, no entry unless in the company of the arborist. Authorised access to the protected zone could be through a locked gate or via ladders

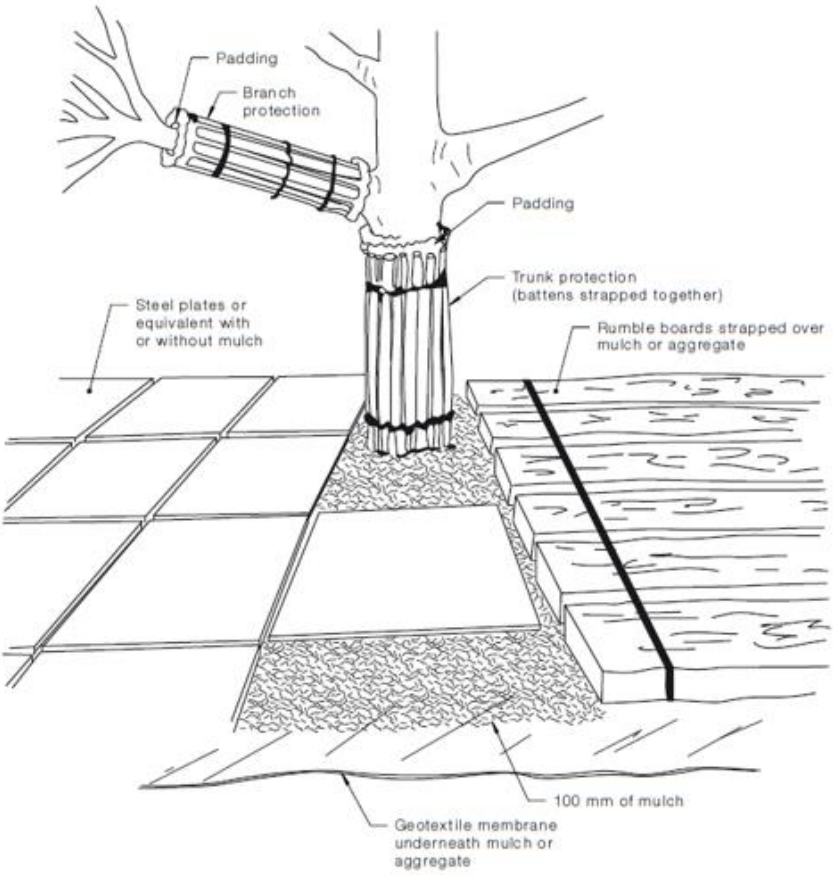
3. Mulching and semi-regular watering for established protection zones.



4.5.3 Ground protection

If temporary access for machinery is required within the TPZ ground protection measures will be required. The purpose of ground protection is to prevent root damage and soil compaction within the TPZ. Measures may include a permeable membrane such as geotextile fabric beneath a layer of mulch or crushed rock below rumble boards as per Figure 4.

These measures may be applied to root zones beyond the TPZ.



NOTES:

1 For trunk and branch protection use boards and padding that will prevent damage to bark. Boards are to be strapped to trees, not nailed or screwed.

2 Rumble boards should be of a suitable thickness to prevent soil compaction and root damage.

FIGURE 4 EXAMPLES OF TRUNK, BRANCH AND GROUND PROTECTION