BIODIVERSITY | BUSHFIRE | ARBORICULTURE

NEWCASTLE SYDNEY

Our Ref: **3063**

Date: **6 December 2024**

To **Monteath & Powys**

ATTN: **Jamie Graham**

Via Email **J.Graham@monteathpowys.com.au**

Dear Jamie,

RE: Further RFI to DA 16-2023-685-1 at 42 Fullerton Cove Road Fullerton Cove, NSW (Lot 14 DP2588480) as requested by Port Stephens Council / Hunter & Central Coast Regional Planning Panel

At the request of Monteath and Powys Ltd Pty, Anderson Environment & Planning (AEP) herewith provides a concise summary of the design process undertaken in collaboration with Port Stephens Council and the Design Team to ensure a nature positive proposal. This letter addresses the concerns raised by the Hunter & Central Coast Regional Planning Panel as raised on 13th November 2024 in relation to ecology.

- *"The Panel has previously raised issues with how biodiversity was being addressed on the site. The Panel acknowledges that the site has been rezoned for the purpose of providing a small-scale shopping centre to meet the needs of the community and to conserve ecologically important lands.*
- *The biodiversity needs further consideration of just the E1 Local Centre zoned land and identify from Figure 4 of the BDAR the nature of vegetation, the areas avoided and how impacts have been minimised on the E1 Local Centre lands, and why this is appropriate in the context of the quality of vegetation.*
- *Engineering, landscape and ecological outcomes need to demonstrate that they are consistent.*
- *The Panel notes that a Vegetation Management Plan (VMP) for the C2 Environment Conservation land is proposed to be a condition.*
- *The Panel requests:*
    - *Analysis of the vegetation and ecology, specific to the E1 Local Centre zone lands and the avoidance and minimisation undertaken*
    - *Council is to prepare a supplementary assessment report that considers the above, and relevant conditions, including any required in respect to management of the C2 Environmental Conservation Lands. "*

Summary of Ecological Assessment

Throughout this process, Monteath & Powys have collaborated holistically with all parties involved in developing this Proposed Commercial Retail Development at 42 Fullerton Cove Road, Fullerton Cove (Lot 14 DP 258848), NSW 2318. Regular team meetings, including with the Hunter & Central Coast Regional Planning Panel and Port Stephens Council, along with all concerned parties to ensure that the Engineering, Landscape and Ecological outcomes are consistent.

Throughout the design process AEP have strived to achieve a nature positive development with the majority of the impact area ground truthed as consisting of moderate to high levels of vegetation degradation, with high weed loads, presence of high-threat exotics (HTE) and minimal habitat features (Refer **Figure 1**).

The *Department of Planning, Industry & Environment Biodiversity Assessment Method* (BAM) 2020 is enabled by Section 6.7 of the *BC Act (2016) with avoid and minimise required to be included within the Biodiversity Assessment Report* (BDAR) by Section 6.12. The BAM Operational Manual Stage 2 states:

> "*Impact assessment (biodiversity values) applies the avoid, minimise and offset hierarchy and assesses direct, indirect and prescribed biodiversity impacts associated with proposed activities. This stage also provides for the application of the no net loss standard through the calculation of the offset requirements for impacts on the biodiversity values at a development site and the establishment of the credit class and offset trading group for ecosystem credits and species credits".*

It is also noted that the Department of Climate Change, Energy, the Environment and Water, following the release of the '*Five-year review of the Biodiversity Assessment Method Findings and recommendations of the review*' in March 2024, is further seeking to incorporate the outcomes of matters brought to the NSW Land and Environment Court (NSWLEC 2021b, 2021c, 2021d). The changes are intended to further strengthen the application of, and requirements under 'Avoid and Minimise'.

AVOID and MINIMISE within the E1 zoned land is as identified in **Figure 2.** Areas identified are shown with context to C2 lands due to location, connectivity and associated Plant Community Types (PCT's), as indicated in **Figures 3 & 4.**

- The northern boundary (0.09ha) is **avoiding** changes to the land form and increasing buffer area to mapped hydroline improving filtration and water quality that flows into the Hunter Estuary Wetlands Ramsar site that supports 112 species of waterbirds and 45 species of migratory birds listed under international agreement to name a few. The detailed assessment of the biodiversity values within the Subject Site and adjoining lands showed that this area required avoidance to ensure water quality is improved and the protection the listed threatened species *Syzygium paniculatum* (Magenta Lily Pilly), the Arborist Impact Assessment of the tree showed the tree is in good condition.
- The eastern boundary (0.05ha) is **avoiding** impacts after an Arborist Impact Assessment (refer **Appendix A**) was undertaken and the development design was adjusted to ensure that all trees within the C2 were not impacted which resulted in avoidance of the eastern area. The Arborist identified two (2) Port Stephens Council Comprehensive Koala Plan of Management (PSCKPoM) preferred Koala feed trees *Eucalyptus robusta*, hence additional avoidance within the E1 zoned land. This area provides a further buffer to the C2 lands, increases connective vegetation, reduces edge effects and protects the listed Koala feed trees within the C2 lands.
- The E1 zoned lands in the northern and eastern areas will be included in the Biodiversity Management Plan (total BMP 4.54ha or 66% of Study Area), to protect, regenerate and manage these areas to ensure the proposal is **minimising** impacts. All regeneration will include the planting of native species associated with endemic PCT's providing additional habitat for both flora and fauna. At a minimum eight (8) *Eucalyptus Robusta* are to be planted within retained BMP lands.
- The Landscape Documentation prepared by Terras has been designed to ensure a nature positive outcome **minimising** impacts by incorporating and utilising terrestrial and aquatic native endemic species within the plan (0.30ha of native endemic species including associated PCT species *Casuarina glauca, Banksia serrata, Dianella Caerula, Gahnia clarkei* and

Lomandra longifolia and an additional 20 suitable native endemic species). Additional foraging trees and native wetland plants within the landscape zones will increase native seed banks in the local area reducing the weed loads that dominant such system.

Under the BAM, the proponent has applied the key principles of avoiding and minimising the direct, indirect and prescribed impacts on biodiversity values. Biodiversity offset determined for the residual direct impacts on biodiversity values and credits include:

- 1 x PCT 1646 (moderate);
- 2 x PCT 1717 (poor/managed);
- 8 x PCT 1717 (poor);
- 1 X PCT 1728 (moderate); and
- 8 x PCT 1737 (moderate).

PCT 1646 Severely Degraded VIS score was below 17 (VIS <9) and therefore no credits are applicable due to the condition class will be incurred for impacts to 1.42ha of this vegetation zone.

The proposal will require the following Species credits to offset the residual impact of the proposed development with assumed presence of Common Planigale due to heritage complications at this stage:

- 24 x Southern Myotis (*Myotis macropus*); and
- 18 x Common Planigale (*Planigale maculata*).

Kleinfelder BDAR Planning Proposal 24th December 2021 undertook ecological studies within the retained lands and identified Hollow bearing trees, potential Koala habitat and noted Powerful Owl, Southern Myotis, Little Bent-wing Bat, Eastern False Pipistrelle, Eastern Coastal Free-tailed Bat and Yellow-bellied sheath-tail Bat. These habitat features and threatened species were only noted within the C2 lands and will be further protected with the implementation of a BMP.

The principals of avoid and minimise within the Subject Site have been considered, whereby the site fundamentally lacks ecosystem regeneration and connectivity, however proactively creating nature positive outcomes and results that will improve biodiversity values over time from its current state through proposing the following works;

- Landscape Plan utilising native endemic species;
- Residual land within the Study Area be placed under a Biodiversity Management Plan;
- Enhancement of flora and fauna habitat within the C2 lands, improving the condition ensuring an improved future vegetation integrity score;
- Environmentally-friendly lighting design that avoids light-spill into surrounding areas of native vegetation;
- Water quality and quantity treatment devices designed to ensure an improvement; and
- Fencing where relevant, to reduce the likelihood of edge effects and prevent fauna incursions in active commercial land.

Avoid and minimise principles were considered through the planning stage of the proposed development as well as the location within the wider lot. The location of the proposed development upon the E1 zoned land is appropriately located in order to service the retail needs of the surrounding residential development with residual C2 lands, therefore, the proposal is considered a suitable position for the Subject Site. The thorough investigation and design iterations during the Planning Proposal ensured the principles of avoid and minimise by utilising the lower quality cleared land that continues to be managed whilst the area containing higher quality vegetation of biodiversity value will be retained, illustrating that the development is located within the most suitable, disturbed part of the site.

Creating a nature positive outcome on a site that has minimal biodiversity value across the majority of the site has been part of a reiterative design process. If the Subject Site was not developed, weeds and

exotic species would become more dominant and VIS's would continue to decline, but with the BMP and stormwater management plan the vegetation and water within the area will significantly improve. This proactive approach presents a nature positive outcome for all local flora and fauna species present, and provides greater protection for the Ramsar Wetlands.

To assist the Panel with their determination AEP also provide the following information to ensure all issues raised above are comprehensively addressed:

- *The biodiversity needs further consideration of just the E1 Local Centre zoned land and identify from Figure 4 of the BDAR the nature of vegetation, the areas avoided and how impacts have been minimised on the E1 Local Centre lands, and why this is appropriate in the context of the quality of vegetation.*

As stated above additional land was surveyed by AEP AQF5 Arborist, Ecologists to determine additional retention areas (refer **Table 1**). The additional retention within the Commercial land was retained for several ecological reasons:

- Retention of Listed Koala Trees (**Figure 2**);
- Retention of listed species, and incorporation of weed removal to increase its health (**Figure 2**);
- Retention of vegetation along the watercourse (adjoining lands in the north) to provide an additional riparian vegetation, which as shown through many studies; increases water quality. This was an aim of the development to ensure there was an improvement to the water quality entering the Ramsar Wetlands located downstream of the adjoining watercourse (**Figure 2**).
- Provide additional foraging, roosting and nesting habitat for mobile fauna.
- Increase native seed banks within the local area and lower catchment.

Additional Figures have been prepared to demonstrate the above:

- **Figure 1: Ground truthed vegetation within E1 zoned lands (extracted from Figure 4 BDAR)**
- **Figure 2: Avoid (BMP Lands) and Minimise (Landscape plan native species)**
- **Figure 3: BMP lands**
- **Figure 4: Ground- truthed vegetation within E1 zoned lands and C2 lands**

Disclaimer: While all reasonable care has been taken to ensure the information shown on this map is up to date and accurate, no guarantee is given that the information portrayed is free from error or omission. Please verify the accuracy of all information prior to use.

Legend

- Study Area
- Subject Site
- BMP Lands
- 10m VRZ
- Ground-truthed Top of Bank

Plant Community Types

- PCT 1646: Smooth-barked Apple - Blackbutt - Old Man Banksia woodland on coastal sands of the Central and Lower North Coast (Moderate)
- PCT 1717: Broad-leaved Paperbark - Swamp Mahogany - Swamp Oak - Saw Sedge swamp forest of the Central Coast and Lower North Coast (Poor)
- PCT 1717: Broad-leaved Paperbark - Swamp Mahogany - Swamp Oak - Saw Sedge swamp forest of the Central Coast and Lower North Coast (Managed)
- PCT 1646: Smooth-barked Apple - Blackbutt - Old Man Banksia woodland on coastal sands of the Central and Lower North Coast (Severely Degraded)
- PCT 1737: Typha rushland (Moderate) EEC
- Tracks and Infrastructure

N
W E
S

AEP

0 50
metres

Note:
1. Boundaries are not survey accurate
2. Do not scale off this Plan

Title: Figure 1 - Ground truthed vegetation within E1 zoned lands (extracted from Figure 4 BDAR)

Date: December 2024

Location: 42 Fullerton Cove Road, Fullerton Cove NSW

BOAMS: 36338

Client: Monteath and Powys

AEP Ref: 3063

Disclaimer: While all reasonable care has been taken to ensure the information shown on this map is up to date and accurate, no guarantee is given that the information portrayed is free from error or omission. Please verify the accuracy of all information prior to use.

Legend

N
W E
S

- Study Area
- Subject Site
- BMP Lands (Avoid)
- Landscape Plan Native Species (Minimise)
- 10m VRZ
- Ground-truthed Top of Bank

Retained Trees

- *Melaleuca quinquenervia*
- *Eucalyptus robusta*
- *Syzygium paniculatum*

AEP

0 50
metres

Note:
1. Boundaries are not survey accurate
2. Do not scale off this plan

Title: Figure 2 - Avoid (BMP Lands) and Minimise (Landscape Plan Native Species)	Date: December 2024
Location: 42 Fullerton Cove Road, Fullerton Cove NSW	BOAMS: 36338
Client: Monteath and Powys	AEP Ref: 3063

Disclaimer: While all reasonable care has been taken to ensure the information shown on this map is up to date and accurate, no guarantee is given that the information portrayed is free from error or omission. Please verify the accuracy of all information prior to use.

Legend

- Study Area
- Subject Site
- BMP Lands (Subject Site)
- BMP Lands (Conservation Zone)
- 10m VRZ
- Ground-truthed Top of Bank

N
W E
S

AEP

0 50
metres

Title: Figure 3 - BMP lands

Date: December 2024

Location: 42 Fullerton Cove Road, Fullerton Cove NSW

BOAMS: 36338

Client: Monteath and Powys

AEP Ref: 3063

Disclaimer: While all reasonable care has been taken to ensure the information shown on this map is up to date and accurate, no guarantee is given that the information portrayed is free from error or omission. Please verify the accuracy of all information prior to use.

Legend

- Study Area
- Subject Site
- 10m VRZ
- BMP Lands
- Ground-truthed Top of Bank

Vegetation Community

- PCT 1646: Smooth-barked Apple - Blackbutt - Old Man Banksia woodland on coastal sands of the Central and Lower North Coast (Moderate)
- PCT 1717: Broad-leaved Paperbark - Swamp Mahogany - Swamp Oak - Saw Sedge swamp forest of the Central Coast and Lower North Coast (Poor)
- PCT 1717: Broad-leaved Paperbark - Swamp Mahogany - Swamp Oak - Saw Sedge swamp forest of the Central Coast and Lower North Coast (Managed)
- PCT 1646: Smooth-barked Apple - Blackbutt - Old Man Banksia woodland on coastal sands of the Central and Lower North Coast (Severely Degraded)
- PCT 1737: Typha rushland (Moderate) EEC
- PCT 1728: Swamp Oak - Prickly Paperbark - Tall Sedge swamp forest (Moderate)
- Tracks and Infrastructure

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W E
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AEP

0 100
metres

Notes:
1. Boundaries are not survey accurate.
2. Do not scale off this plan.

Title: Figure 4 - Ground truthed vegetation within E1 zoned and C2 Lands

Date: December 2024

Location: 42 Fullerton Cove Road, Fullerton Cove NSW

BOAMS: 36338

Client: Monteath and Powys

AEP Ref: 3063

Table 1– Summary of Vegetation zones, updated November 2024

Vegetation Zone	Condition	VIS	Study Area	Subject Site	Development Footprint	Subject Site BMP Lands	Conservation zone BMP Lands
PCT 1646: *Smooth-barked Apple - Blackbutt - Old Man Banksia woodland on coastal sands of the Central and Lower North Coast* (Moderate)	Moderate	57.9	1.14	0.02	0.00	0.02	1.12
PCT 1646: *Smooth-barked Apple - Blackbutt - Old Man Banksia woodland on coastal sands of the Central and Lower North Coast* (Severely Degraded)	Severely Degraded	8.2 & 7.9	1.66	1.49	1.40	0.09	0.17
PCT 1717: *Broad-leaved Paperbark - Swamp Mahogany - Swamp Oak - Saw Sedge swamp forest of the Central Coast and Lower North Coast* (Managed)	Managed	36.4	0.11	0.11	0.11	0.00	0.00
PCT 1717: *Broad-leaved Paperbark - Swamp Mahogany - Swamp Oak - Saw Sedge swamp forest of the Central Coast and Lower North Coast* (Poor)	Poor	35.5	2.78	0.45	0.45	0.00	2.33
PCT 1728: *Swamp Oak - Prickly Paperbark - Tall Sedge swamp forest on coastal lowlands of the Central Coast and Lower North Coast* (Moderate) EEC	Moderate	61.5	0.36	0.00	0.00	0.00	0.36
PCT 1737: *Typha rushland* (Moderate) EEC	Moderate	59.1	0.49	0.24	0.24	0.00	0.25
Tracks and Infrastructure			0.36	0.20	0.16	0.03	0.16
Total			**6.90**	**2.50**	**2.37**	**0.14**	**4.40**

Summary

Throughout this process, Monteath & Powys have collaborated holistically with all parties involved in developing this Proposed Commercial Retail Development at 42 Fullerton Cove Road, Fullerton Cove (Lot 14 DP 258848) NSW 2318.

The principals of avoid and minimise within the Subject Site have been considered, whereby the site fundamentally lacks ecosystem regeneration and connectivity, however proactively creating nature positive outcomes and results, as outlined in the report, will improve biodiversity values over time from its current state.

Creating a nature positive outcome on a site that has minimal biodiversity value across the majority of the site has been part of a reiterative design process. If the Subject Site was not developed, weeds and exotic species would become more dominant and VIS's would continue to decline, but with the BMP and stormwater management plan the vegetation and water within the area will significantly improve. This proactive approach presents a nature positive outcome for all local flora and fauna species present, and provides greater protection for the Ramsar Wetlands.

We thank you for the opportunity to be involved in this project. Should you require any further clarification on this matter, please contact Natalie Black (Senior Environmental Manager- 0431 249 360, BAAS 19076) or the undersigned.

Regards

Anderson Environment & Planning

Kelly Drysdale

Ecology Project Manager

0428 296 470

Attachments:

Appendix A: Arborist Impact Assessment

AEP

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NEWCASTLE SYDNEY

Arborist Impact Assessment

Proposed Commercial Retail Development
Lot 14, DP 258848
42 Fullerton Cove Road, Fullerton Cove, NSW

Prepared for: Monteath & Powys

21 June 2024

AEP Ref: 3063.03

Revision: 02

Newcastle | Sydney
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Executive Summary

At the request of the Monteath & Powys (the client), Anderson Environment & Planning (AEP) have prepared an Arborist Impact Assessment to address the potential arboricultural impacts from the proposed Commercial Retail Development (the Proposal) at 42 Fullerton Cove Road, Fullerton Cove, NSW (the Subject Site).

The arborist site survey was undertaken on 13 February 2024. Tree Assessment was undertaken by the following methodologies (**Section 4**);

- A visual tree assessment as described by Mattheck and Breloer (1994).
- Characteristic features for each tree were recorded;
- Structural Root Zone (SRZ) and Tree Protection Zone (TPZ) using methods of calculation as outlined in AS 4970 – 2009.
- Landscape Significance Rating (LSR) and Retention Values as outlined by Morton (2006).

A total of six (6) trees identified within the site and surrounds were assessed. The condition of the assessed trees includes four (4) in good condition and two (2) in poor condition. (**Section 5.1**)

The following landscape significance ratings (LSRs) have been applied to the assessed trees (S**ection 5.2**);

- Six (6) 'High', due to their canopy size and good health and as representatives of the 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;

- One (1) 'High'; and
- Five (5) 'Moderate' Retention Value Trees.

A total of one (1) assessed trees are proposed to be removed due to the development works (**Section 6.1, Table 3**), including;

- One (1) trees (Tree 1) which will have encroachment into the Structural Root Zone by the development footprint.

The remaining five (5) trees can be retained with Tree Protection Measures (**Section 6.1, Table 3**).

Document Control

Document Name	Arborist Impact Assessment for Proposed Commercial Retail Development at 42 Fullerton Cove Road, Fullerton Cove, NSW
Project Number	3063.03
Client Name	Monteath & Powys
AEP Project Team	Warwick Muir Joe Young Natalie Black

Revision

Revision	Date	Author	Reviewed	Approved
00	20/02/2024	Joe Young	Warwick Muir	Kelly Drysdale
01	22/03/2024	Joe Young	Warwick Muir	Kelly Drysdale
02	21/06/2024	Joe Young	Warwick Muir	Kelly Drysdale

Distribution

Revision	Date	Name	Organisation
00	20/02/2024	Jamie Graham	Monteath &Powys
01	23/03/2024	Jamie Graham	Monteath &Powys
02	21/06/2024	Jamie Graham	Monteath &Powys

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, 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 Monteath & Powys (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 Commercial Retail Development and associated civil infrastructure (the Proposal) at 42 Fullerton Cove Road, Fullerton Cove, NSW (the Subject Site).

This report considers the Biodiversity Development Assessment Report (BDAR) undertaken for this development (AEP 2023).

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 pre nominated trees 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	Monteath & Powys
Address	42 Fullerton Cove Road, Fullerton Cove, NSW
Title(s)	Lot 14, DP258848
Subject Site	The Subject Site (2.46ha) primarily consists of existing vegetation, with cleared areas and existing tracks throughout and residential dwellings in the north. The residential dwellings are accessed from Fullerton Cove Road, at the northern end of the Study Area. To the north west and south west of the Study Area land has been cleared for residential development. Bushland exists to the east and south. Between the south eastern border of the Study Area and Nelson Bay Road is a 50m stretch of bushland.
LGA	Port Stephens Council
Zoning	Subject Site is zoned E1 – Local Centre. C2 – Environmental Conservation; C2, Environmental Management.
Current Land Use	The land has been semi maintained around the residential dwelling and sheds.
Surrounding Land Use	To the north and west of the site land is zoned RU2 Rural Landscape. To the east and the south, land is zoned SP2 Infrastructure - Classified Road as it adjoins Nelson Bay Road and Fullerton Cove Road respectively.

Detail	Comments
Soil	The Subject site is within the Tomago Coastal Plain Soil Landscape, characterised by either Loose brownish black loamy sand topsoil—Bleached loose sand (shallow subsoil.) (eSpade, 2023).

3.0 Proposed Development

It is proposed to construct a Commercial Retail Development, associated civil infrastructure and Asset Protection Zone (APZ). It should be noted that the entirety of the Subject Site will be managed as an APZ.

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.

AEP

Figure 1 - Site Location

Date: February 2024

Location: 42 Fullerton Cove Road, Fullerton Cove, NSW

Client: Monteath & Powys

AEP ref: 3063.03

REVISIONS LEGEND

- 01 NEW TREES & LANDSCAPING REMOVED FRO FLOOD ZONE
- 02 CAR PARKING SPACES REMOVED
- 03 CAR PARKING SPACES ADDED
- 04 KERB & RETAINING WALL ALIGNMENT REVISED
- 05 ACCESS GATES TO TELSTRA TOWER ADDED
- 06 FUTURE EV PARKING ADDED
- 07 KIOSK SUBSTATION RELOCATED & CAR SPACE REMOVED
- 08 TROLLEY BAY RELOCATED & CAR SPACE ADDED

DEVELOPMENT SCHEDULE

BUILT FLOOR AREA (BFA)
6,992m²

LETTABLE / NET FLOOR AREA (NFA)
SUPERMARKET + LIQUOR STORE = 2,655m²
TENANCIES 01-05 = 2,343m²

TOTAL = 4,998m² (*REFER TO DRWG. A05)

GROSS FLOOR AREA (GFA)
TOTAL = 6,304m² (*REFER TO DRWG. A21)

CAR PARKING
12 x ACCESSIBLE SPACES (5.5 x 2.6m each)
5 x DIRECT to BOOT SPACES (5.5 x 3.0m each)
263 x STANDARD SPACES (5.5 x 2.6m each)

OVERALL TOTAL = 280 SPACES

16 x MOTORBIKE SPACES
10 x BICYCLES

PROPOSED RETAIL DEVELOPMENT
BFA = 6,992 m²
FL.2.900

FORECOURT
1,564 m²

CARPARK
280 SPACES

LOADING DOCK

TRUCK MANOEUVERING AREA

SERVICE ENTRY

ENTRY

EXIT

FULLERTON COVE ROAD

BOUNDARY

24m BUSHFIRE APZ

'E2' LAND ZONE

E1-E2 LAND ZONE BOUNDARY

DEVELOPMENT APPLICATION

N

DEVELOPMENT SITE PLAN
1:500 @ A1

14311 - DA - A04 - 19/06/2024 - rev. B+

PROPOSED RETAIL DEVELOPMENT
42 FULLERTON COVE RD., FULLERTON COVE

EJE Integrity Innovation Inspiration

4.0 Methodology

The arborist site survey was undertaken on 13 February 2024. 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).

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 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							

4.3 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 during February 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.

Tree 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 six (6) trees identified within the site, the trees assessed are positioned in close proximity of the boundary of the development footprint and C2 –zoned land. Observations were made for each assessed tree **(Appendix A).** Tree locations are shown in **Figures 3.**

5.1 Summary of Tree Condition and Characteristics

All trees assessed within the site are native species. The condition of the assessed trees includes two (2) in poor or dead condition and four (4) in good to fair condition.

Notable Trees within this grouping include the following:

- Tree 1 – *Melaleuca quinquenervia* (Broad Leaved Paperbark) is the largest assessed tree the area with multiple large leaders and extensive low (<4m) canopy branches within the subject site;
- Tree 2 - *Melaleuca quinquenervia* (Broad Leaved Paperbark) is a mature tree in good condition with hangers from a neighbouring dead tree;
- Tree 3 – *Eucalyptus robusta* (Swamp Mahogany) is an over- mature tree with a large central column of decay, multiple recent branch failures, the head of the tree has failed in the past leading to an asymmetric canopy. This tree is in poor structural condition with cavities and has associated borer attack;
- Tree 4 – *Melaleuca quinquenervia* (Broad Leaved Paperbark) is a mature tree in good condition;
- Tree 5 – *Melaleuca quinquenervia* (Broad Leaved Paperbark) is a mature tree in good condition; and
- Tree 6 – *Eucalyptus robusta* (Swamp Mahogany) is an over- mature tree impacted by borer attack, with a strangler fig that has established roots and is into the upper canopy with the high potential to dominate and suppress the original tree.

5.2 Summary of Landscape Significance and Retention Value

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

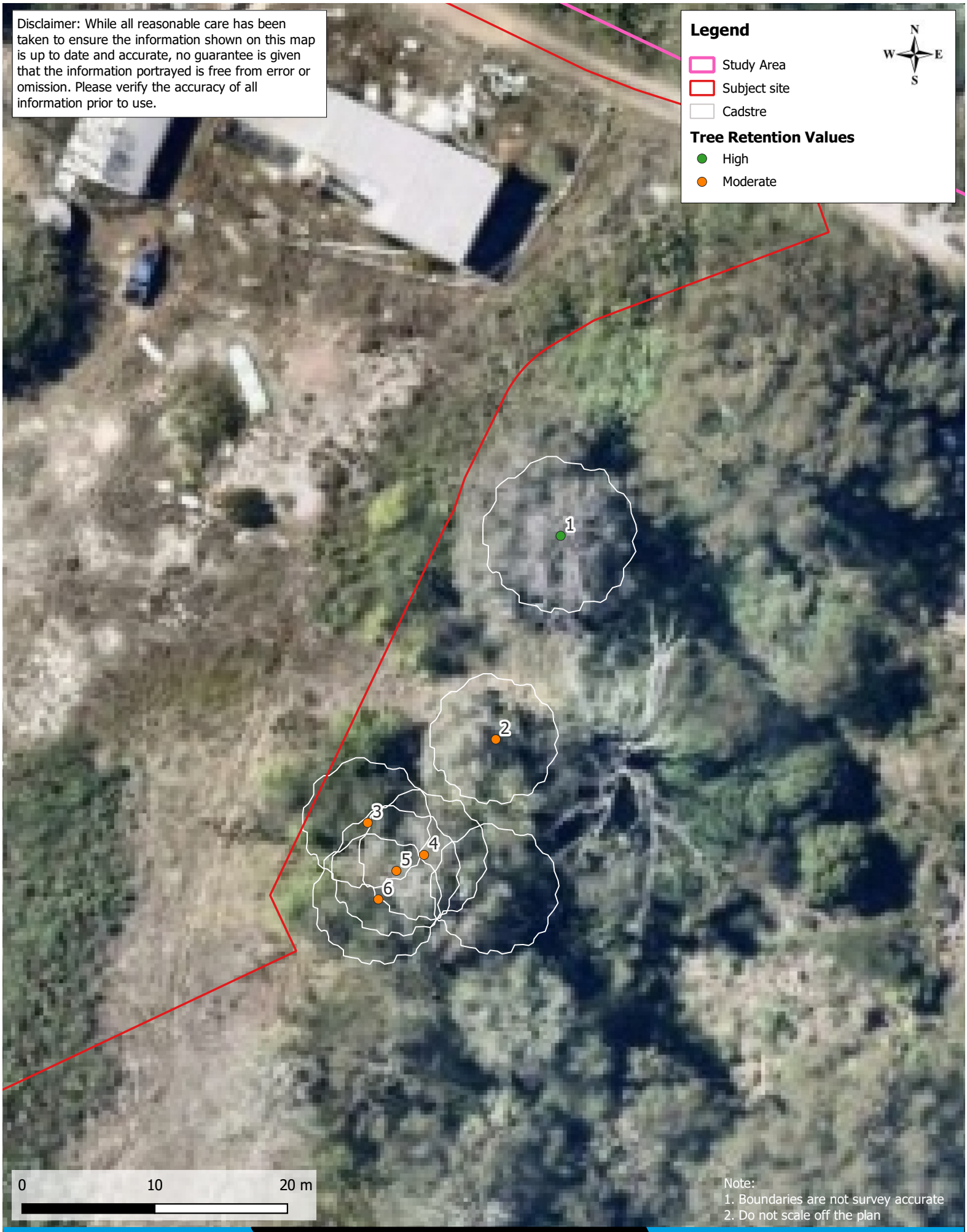
- Six (6) ‘High’, due to their canopy size and as representatives of the original vegetation of the area.

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

- One (1) ‘High’ Retention Value Tree; and
- Five (5) ‘Moderate’ Retention Value Trees.

The following habitat features were observed in the trees;

- Tree 1 was observed to have a bird’s nest in the western canopy; and
- Tree 3 has cavities and decay forming potential hollows in the trees structure.



AEP

Figure 3 - Tree Location & Retention Values

Date: June 2024

Location: 42 Fullerton Cove Rd, Fullerton Cove, NSW

Client: Monteath & Powys

AEP ref: 3063.03

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 (1) trees will require removal as these trees will be impacted by predicted structural root zone encroachment due to excavation (cut and fill) and retaining wall requirements for the construction of the adjacent bio-detention basin. These include:

- One (1) Moderate Retention Value Trees (Tree 1)

Impacts are unlikely to be mitigated through tree protection measures without major design changes, and tree stability and viability cannot be guaranteed. Of particular note is Tree 1, which will have ~50% of the SRZ impacted by the proposed retaining wall and detention basin. Furthermore, Tree 1 would require extensive pruning of the western canopy to access the site area, which will further impact this tree by unbalancing the canopy.

The remaining five (5) trees can be retained within close proximity to the development footprint. The following relates to tree protection for these trees;

- Tree 3 has TPZ encroachment by the development footprint of approximately 20%, this area will require excavation and compacted fill during the construction phase, however this tree has potential to be retained with the establishment of a tree protection zone and critical care to be taken during excavation in the vicinity of the tree structure and SRZ area. TPZ fencing as displayed in **Figure 5** will be required for the duration of works. If a TPZ fence is impractical for construction, additional protection measures must be applied in lieu of fencing. These include trunk and low branch guards, and ground protection measures installed as displayed in **Figure 5** following guidance in Australian standard AS 4970 – 2009 Protection of trees on development Sites (**Appendix D**). The use of "soft" construction methods including manual and vacuum removal of soils is recommended for ground works conducted within the TPZ of Trees to be retained.
    - It should be noted that this tree is in poor health and structural condition, and retention of this tree within close proximity to the development footprint could be hazardous to contractors and eventual site users. To mitigate this hazard, the western canopy of this tree should be reduced in weight, with branches that extend over the development footprint removed. All tree maintenance and pruning works should be carried out by a qualified tree worker in accordance with AS4373 –2007 Pruning of Amenity Trees.
- Trees 2 & 4-6 have minimal to no encroachment into the TPZ by the development footprint, and can be retained with minimal impacts to tree viability. These trees will require the establishment of a tree protection zone similar to the above points, with TPZ fencing as displayed in **Figure 5** will be required for the duration of works. If a TPZ fence is impractical for construction, additional protection measures must be applied in lieu of fencing. These include trunk and low branch guards, and ground protection measures installed as displayed in **Figure 5** following guidance in Australian standard AS 4970 – 2009 Protection of trees on development Sites (**Appendix D**). The use of "soft" construction methods including manual and vacuum removal of soils is recommended for ground works conducted within the TPZ of Trees to be retained.

Table 3 provides a summary of impact assessment.

Table 3 Summary of Impact Assessment

Tree Assessment	Retention Value (Tree No)			Total
	High	Moderate	Low	
Remove (TPZ/SRZ Encroachment)	Trees 1			**1**
Total Tree Removal	**1**	**0**	**0**	**1**
Retain (Protection, fencing)		Tree 2, 3, 4, 5, 6		**5**
Total Tree Retention	**0**	**5**	**0**	**5**

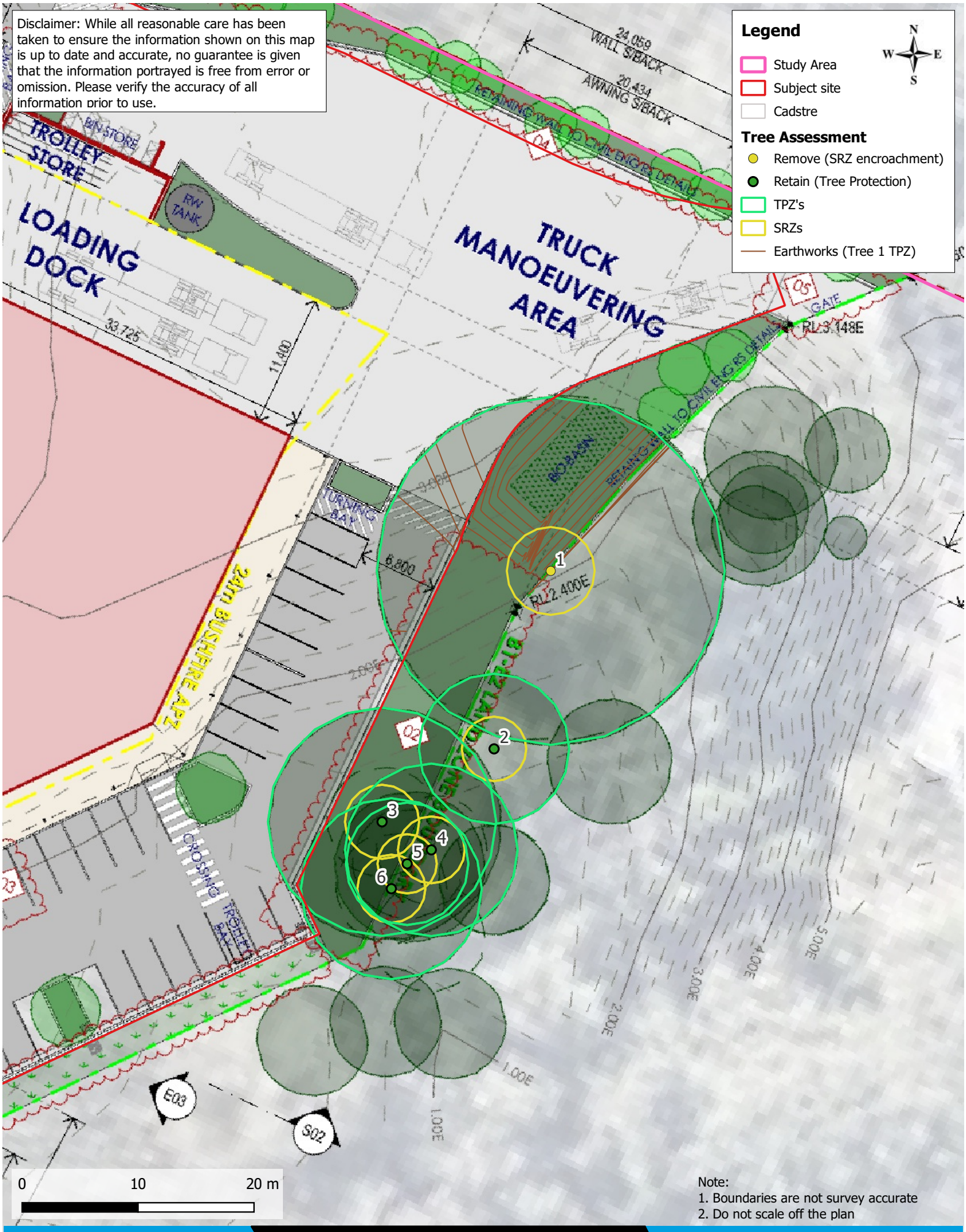


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Figure 4 - Tree Assessment

Date: June 2024

Location: 42 Fullerton Cove Rd, Fullerton Cove, NSW

Client: Monteath & Powys

AEP ref: 3063.03

7.0 Recommendations

7.1 Tree Retention and Removal

- Trees designated for removal within this report as outlined in **Section 6** should be removed by a qualified tree worker with appropriate professional liability insurance, and removed in a manner to prevent damage to retained trees.
- Trees designated for retention within this report as outlined in **Section 6** 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 a qualified tree worker in accordance with AS4373 –2007 Pruning of Amenity Trees.
- A continuous TPZ fence should be installed for retained trees as displayed in **Figure 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 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.

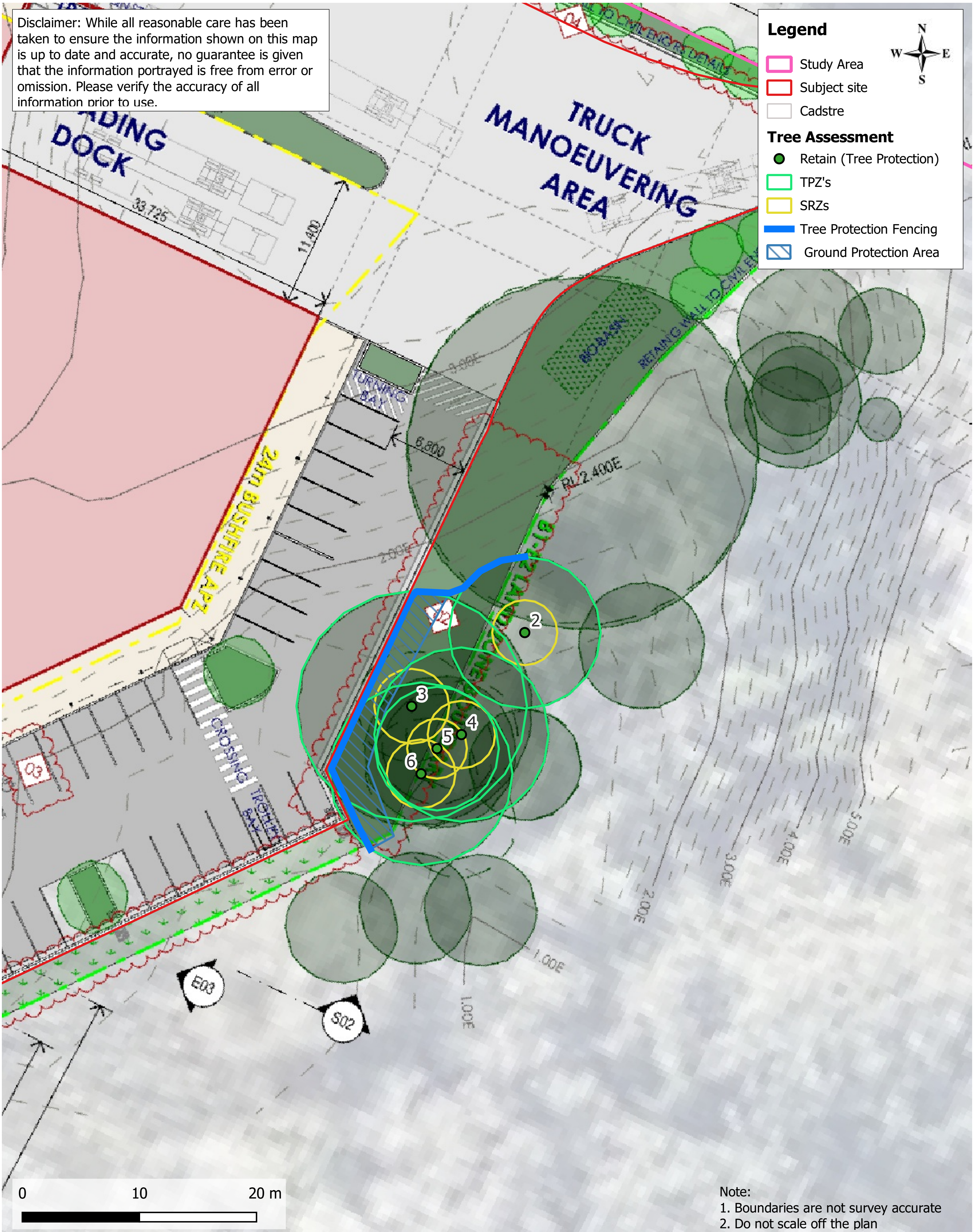

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Figure 5 - Tree Protection

Date: June 2024

Location: 42 Fullerton Cove Rd, Fullerton Cove, NSW

Client: Monteath & Powys

AEP ref: 3063.03

8.0 Conclusion

The recommendations for tree retention and removal have been made with consideration of minimising Arboricultural impacts.

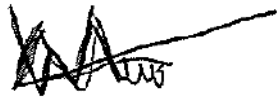
Based on the tree retention and removal proposed above the current proposal footprint will require the direct removal of one (1) of the assessed trees, while five (5) assessed trees can be retained requiring Tree Protection Measures including tree protection fencing.

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,



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Ecologist / Arborist

BSc AQF5

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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)	Age Class	Health	Structure	Landscape significance rating	Estimated life expectancy	Retention Value	TPZ (m)	SRZ (m)	Remove/Retain	TPZ Encroachment
					N	E	S	W	(m)	(m^2)											
1	*Melaleuca quinquenervia*	Broad-leaved Paperbark	1.27	1.38	8	7	6	8	7.25	165	14	Mature	Good	Fair	High	15-40	High	15.0	3.8	Remove (SRZ Encroachment)	
2	*Melaleuca quinquenervia*	Broad-leaved Paperbark	0.54	0.66	7	5	5	7	6	113	14	Mature	Good	Good	High	15-40	Moderate	6.5	2.8	Retain (Protection)	
3	*Eucalyptus robusta*	Swamp Mahogany	0.82	0.92	6	4	2	6	4.5	64	10	Over-mature	Poor	Poor	High	.5-15	Moderate	9.8	3.2	Retain (Protection	20%
4	*Melaleuca quinquenervia*	Broad-leaved Paperbark	0.62	0.72	5	5	4	6	5	79	13	Mature	Good	Good	High	15-40	Moderate	7.4	2.9	Retain (Protection	
5	*Melaleuca quinquenervia*	Broad-leaved Paperbark	0.44	0.54	4	3	3	4	3.5	38	13	Mature	Good	Good	High	15-40	Moderate	5.3	2.6	Retain (Protection	
6	*Eucalyptus robusta*	Swamp Mahogany	0.65	0.75	4	5	5	5	4.75	71	15	Over-mature	Poor	Fair	High	.5-15	Moderate	7.8	2.9	Retain (Protection	

Appendix B – Glossary

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 Above: Tree 3. Note the central decay column which extends from the crown to base.

Plate 2 Below: Tree 3. Note the failed branches and canopy head.

Plate 3 Above: Trees 4 (Left), 5 (Centre) and 6 (Right).

Plate 4 Below: Trees 1 (Left) to 6 (Right) from the development footprint.

Plate 5 Above: Tree 1 Canopy.

Plate 6 Below: Tree 2.

Plate 7 Above: Tree 1 Canopy branches within the subject site.

Plate 8 Below: Tree 6 canopy, with established strangler fig visible.

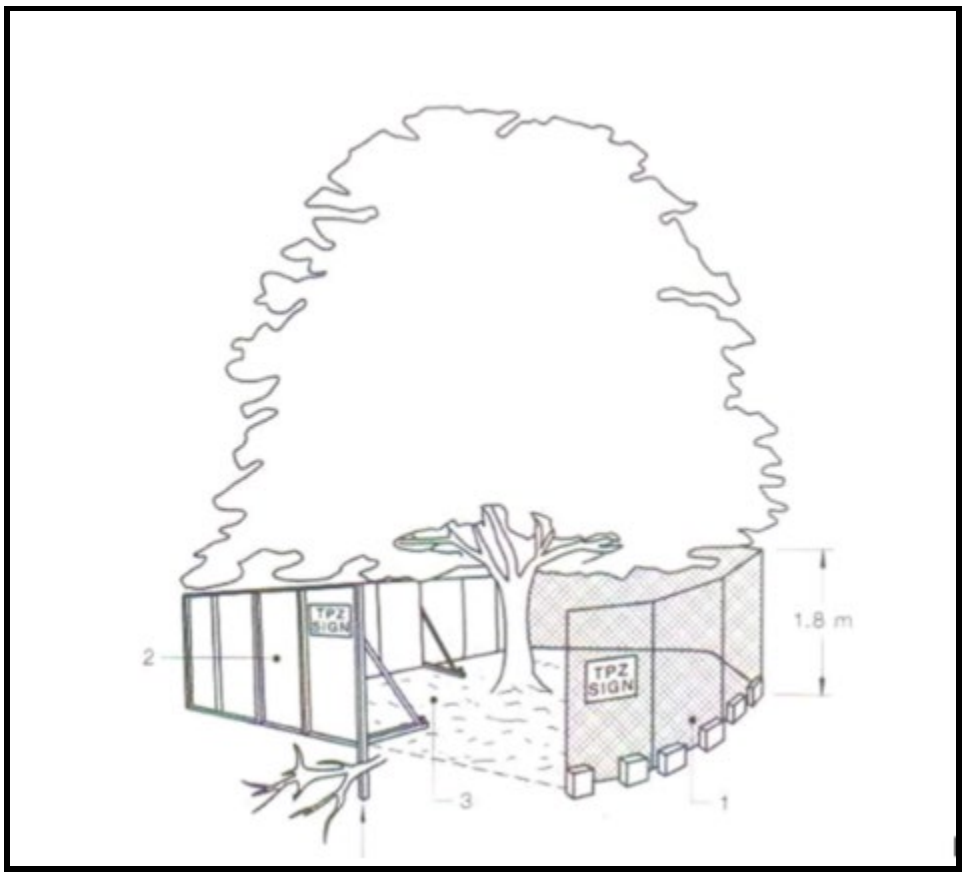
Appendix D –Tree Protection Fencing and Ground Protection

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.

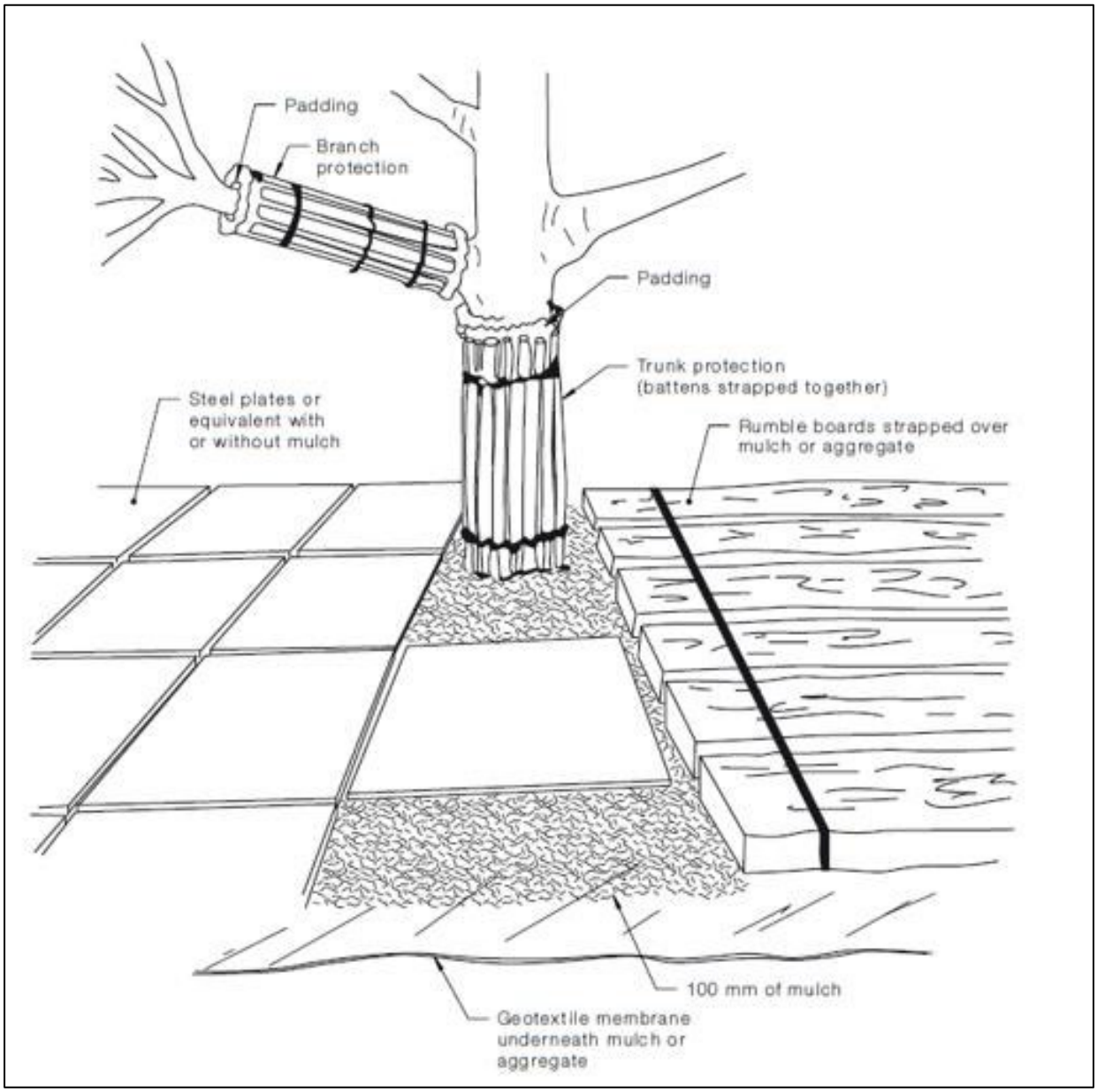
2. Signs should state that this is a restricted area, no entry unless in the company of the arborist. Authorised access to the protected zone could be through a locked gate or via ladders

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



Ground Protection

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



Notes:

1. For trunk and branch protection use boards and padding that will prevent damage to bark. Boards are to be strapped to the trees, not nailed or screwed.
2. Rumble boards should be of suitable thickness to prevent compaction and root damage.