

16 March 2021

Doc. Ref: NCA20R115895

AGL Macquarie Pty Ltd

Attention: Mathew Parkinson

Subject: Bayswater Power Station Upgrade (SSD 9697) – Review of Response to Submission (RtS) Report – Response to BCD Comments on the Paddock Tree Calculator in the BDAR

1. INTRODUCTION

Background

Kleinfelder was engaged by Jacobs, on behalf of AGL Macquarie Pty Ltd (AGLM), to prepare a Biodiversity Development Assessment Report (BDAR) to support the Environmental Impact Statement (EIS) for the Bayswater Power Station Upgrade (SSD 9697). The EIS was reviewed by the Biodiversity Conservation Division (BCD) of the Department of Planning, Industry and Environment (DPIE), in relation to impacts on biodiversity (including matters of national environmental significance (MNES) under the *Environment Protection and Biodiversity Conservation Act 1999*. Muswellbrook Council were also invited to comment on the BDAR. Kleinfelder has previously revised the BDAR based on comments provided in both the EIS and RtS stage of the Project.

In a recent request for information (RFI) ((DOC20/1055712-7 dated 29/01/2021), BCD have requested that the BAM Accredited Assessor for the project provides further justification for use of the Paddock Tree Module in the BAM Calculator. BCD stated the following:

“Table 5.2 (pages 21 & 22) and Section 3.2.1.10 of the RTS Report provides a summary of the exotic groundcover species in the areas of non-native vegetation where the paddock tree calculator has been applied. However, the proponent has not demonstrated that the native vegetation meets the definition of non-native vegetation that comprises the groundcover, which is:

I. less than 50% of the cover of indigenous species of vegetation, and

II. not less than 10% of the area is covered with vegetation (whether dead or alive), and

III. the assessment is made at the time of year when the proportion of the amount of indigenous vegetation in the area to the amount of non-indigenous vegetation in the area is likely to be at its maximum.

Given it appears that no plots or transects were conducted in the vegetation zones identified as Non-native Vegetation - Exotic Grasslands, the vegetation present may not meet the definition outlined above for non-native groundcover. Additional Biodiversity Assessment Method (BAM) plots or appropriate justification is required from the accredited assessor to demonstrate that these communities are non-native and permissible for use under the Paddock Tree Calculator. In the absence of such data vegetation with the paddock trees must be treated as a zone of native vegetation and included in the BAM, with the credits to be offset.”

Scope

The aim of this letter is to provide BCD with the requested information to address the above. BAM plot data is provided to justify the use of the Paddock Tree Module.

2. ASSESSMENT METHODS

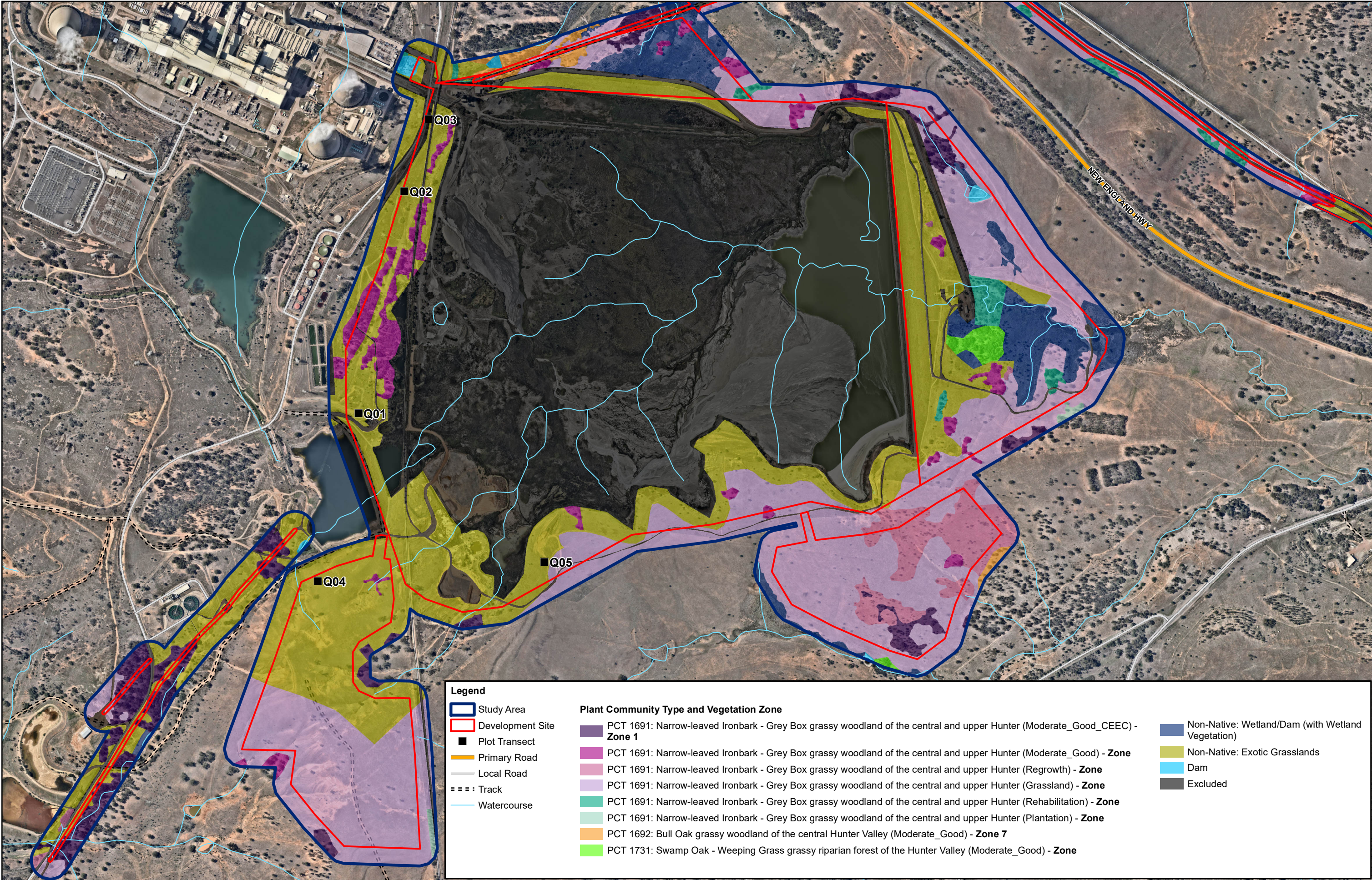
Surveys

Dr. Gilbert Whyte (BAM Accredited Assessor - BAAS18041) and Ecologist David Martin conducted a site-based assessment at the Bayswater Power Station Development Site on 04/03/2020.

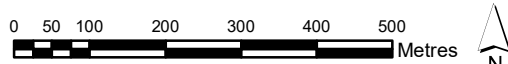
Five plots/transects were sampled to collect site condition data for the composition, structure and function attributes listed in **Table 1** in accordance with Section 5.3 of the BAM (OEH, 2017). The location of the plots/transects were to provide a representative sample of the variation in vegetation composition and condition within the area of the site where the paddock tree module was applied. The locations of the plots are shown in **Figure 1**.

Table 1: Composition, Structure and Function components of vegetation integrity

Growth form groups used to assess composition (species richness) and structure (percent foliage cover)	Function attributes
<ul style="list-style-type: none"> • Tree (TG) • Shrub (SG) • Grass and grass-like (GG) • Forb (FG) • Fern (EG) • Other (OG) 	<ul style="list-style-type: none"> • Number of large trees • Tree regeneration (presence/absence) • Tree stem size class (presence/absence) • Total length of fallen logs • Litter cover • High threat exotic vegetation cover (HTE) • Hollow-bearing trees (HBT)



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PROJECT REFERENCE: 20214030

DATE DRAWN: 2021/03/09 13:11 Version 1

DRAWN BY: GJoyce

DATA SOURCE:
NSW DFSI - 2020
AGL - 2020
Nearmap - 2021

Plant Community Types, Vegetation Zones and Plot Locations

AGL Macquarie
Scattered Tree Survey
Bayswater Water and Other Associated
Operational Works (WAOAW) Project

FIGURE:

1

3. RESULTS

A summary of the floristic composition and structure of each BAM survey plot is presented in **Tables 2-6**. A summary of the data is also presented in **Table 7**.

Table 2: BAM Plot 1 Floristics - Paddock Tree Assessment


BAM Plot 1
 <p> Date & Time: Thu: 04 Mar 2021, 09:27:32 AEDT Position: -032.404894° / +150.953362° (±25.7ft) Altitude: 601ft (±38.1ft) Datum: WGS-84 Azimuth/Bearing: 081° N81E 1440mils True (±13°) Elevation Angle: +01.3° Horizon Angle: -02.7° Zoom: 1.0X Bayswater Paddock Tree Survey Q01 </p>
<p>The paddock tree within the plot is identified as <i>Eucalyptus moluccana</i> (DBH 44cm). Two other tree species also occur within the plot: <i>Acacia salicina</i> (Sally Wattle) (DBH 9.5cm) and <i>Casuarina glauca</i> (Swamp Oak) (DBH 3.0cm).</p> <p>The groundcover within the plot is dominated by <i>Hyparrhenia hirta</i> (Coolatai Grass). Species that occur to a lesser extent include <i>Bidens subalternans</i> (Greater Peggers Ticks) and <i>Gomphocarpus fruticosus</i> (Narrow-leaved Cotton Bush).</p> <p>Based on the plot data presented in Table 7, approximately 91% of the groundcover is comprised of exotic species. Approximately 2.2% of the groundcover is comprised of native species.</p>

Table 3: BAM Plot 2 Floristics - Paddock Tree Assessment

BAM Plot 2
<p> Date & Time: Thu, 04 Mar 2021, 09:56:48 AEDT Position: -032.399102° / +150.954949° (±19.4ft) Altitude: 624ft (±19.4ft) Datum: WGS-84 Azimuth/Bearing: 223° S43W 3964mils True (±12°) Elevation Angle: -03.9° Horizon Angle: +01.1° Zoom: 1.0X Bayswater Paddock Tree Survey Q02 </p> 
<p>No paddock trees occur within the plot.</p>
<p>The groundcover within the plot is dominated by <i>Hyparrhenia hirta</i> (Coolatai Grass). Species that occur to a lesser extent include <i>Bidens subalternans</i> (Greater Peggers Ticks), <i>Gomphocarpus fruticosus</i> (Narrow-leaved Cotton Bush) and <i>Senecio madagascariensis</i> (Fireweed).</p>
<p>Based on the plot data presented in Table 7, approximately 101.7% of the groundcover is comprised of exotic species (greater than 100% due to species overlap). Approximately 0.3% of the groundcover is comprised of native species.</p>

Table 4: BAM Plot 3 Floristics - Paddock Tree Assessment

BAM Plot 3
<p> Date & Time: Thu, 04 Mar 2021, 10:15:07 AEDT Position: -032.397217° / +150.955739° (±36.9ft) Altitude: 597ft (±43.4ft) Datum: WGS-84 Azimuth/Bearing: 196° S16W 3484mils True (±12°) Elevation Angle: +08.4° Horizon Angle: +00.4° Zoom: 1.0X Bayswater Paddock Tree Survey Q03 </p> 
<p>The paddock tree within the plot is identified <i>Acacia salicina</i> (Sally Wattle) (DBH 32 cm). All adjacent trees are also <i>A. salicina</i>. All of these trees are less than 10cm DBH.</p>
<p>The groundcover within the plot is dominated by <i>Chloris gayana</i> (Rhodes Grass). Species that occur to a lesser extent include <i>Megathyrsus maxima</i> (Guinea Grass) and <i>Hyparrhenia hirta</i> (Coolatai Grass).</p>
<p>Based on the plot data presented in Table 7, approximately 100.5% of the groundcover is comprised of exotic species (greater than 100% due to species overlap). Approximately 10% of the groundcover is comprised of native species.</p>

Table 5: BAM Plot 4 Floristics - Paddock Tree Assessment

BAM Plot 4

Date & Time: Thu, 04 Mar 2021, 10:50:31 AEDT
 Position: -032.409239° / +150.951943° (±15.5ft)
 Altitude: 644ft (±18.5ft)
 Datum: WGS-84
 Azimuth/Bearing: 131° S49E 2329mils True (±16°)
 Elevation Angle: +14.6°
 Horizon Angle: +01.1°
 Zoom: 1.0X
 Bayswater Paddock Tree Survey Q04



The paddock tree within the plot is identified as *Eucalyptus moluccana* (Grey Box) (DBH 91 cm).

The groundcover within the plot is dominated by *Bothriochloa macra* (Red-leg Grass). Other species that occur to a lesser extent include *Chloris gayana* (Rhodes Grass), *Megathyrsus maxima* (Guinea Grass) and *Senecio madagascariensis* (Fireweed).

Based on the plot data presented in **Table 7**, approximately 27.3% of the groundcover is comprised of exotic species. Approximately 48.9% of the groundcover is comprised of native species.

Table 6: BAM Plot 5 Floristics - Paddock Tree Assessment

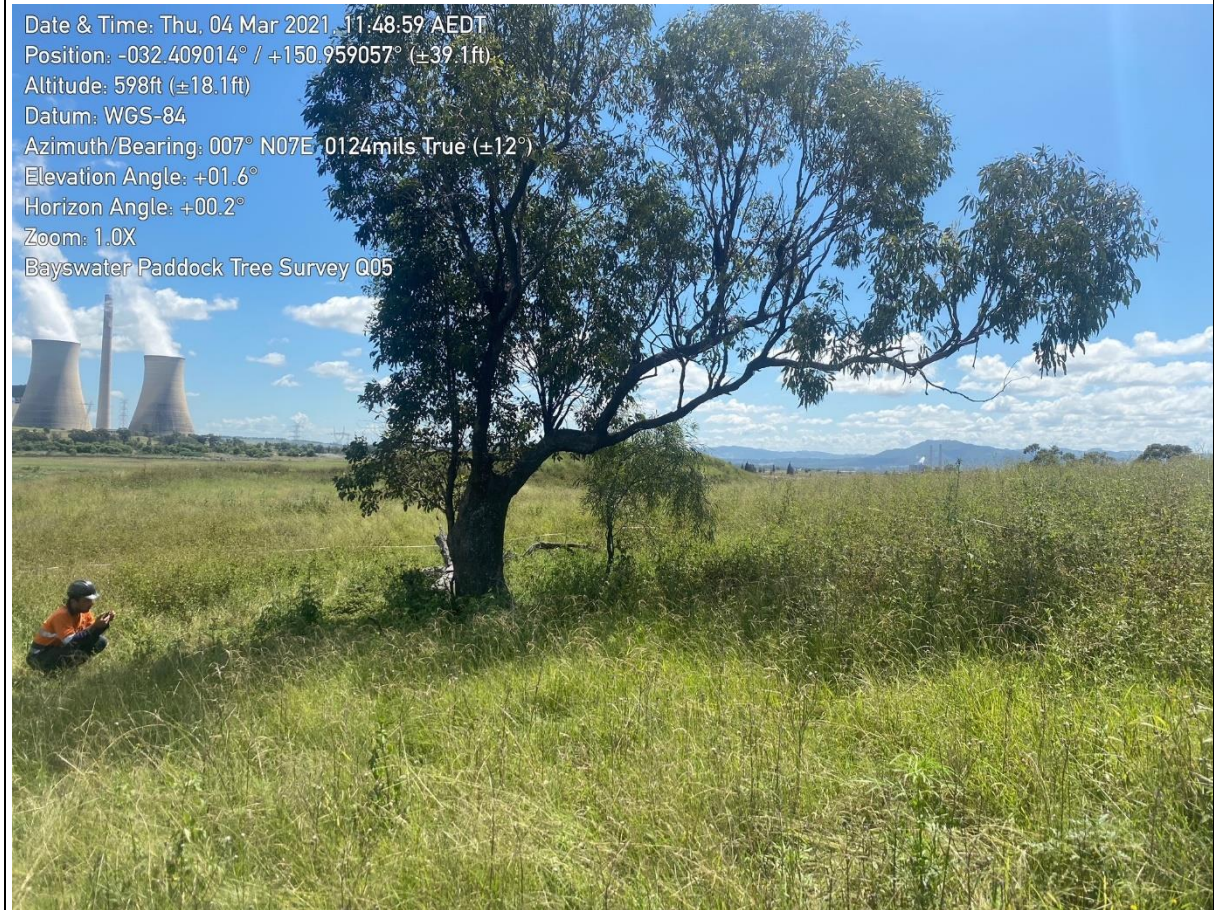
BAM Plot 5
<p> Date & Time: Thu, 04 Mar 2021, 11:48:59 AEDT Position: -032.409014° / +150.959057° (±39.1ft) Altitude: 598ft (±18.1ft) Datum: WGS-84 Azimuth/Bearing: 007° N07E, 0124mils True (±12°) Elevation Angle: +01.6° Horizon Angle: +00.2° Zoom: 1.0X Bayswater Paddock Tree Survey Q05 </p> 
<p>The paddock tree within the plot is identified as <i>Eucalyptus moluccana</i> (Grey Box) (DBH 58 cm). One <i>Acacia salicina</i> (Sally Wattle) (DBH 3.5cm) is also present.</p>
<p>The groundcover within the plot is dominated by <i>Chloris truncata</i> (Windmill Grass), <i>Chloris gayana</i> (Rhodes Grass) and <i>Bidens subalternans</i> (Greater Beggar's Ticks).</p>
<p>Based on the plot data presented in Table 7, approximately 60.3% of the groundcover is comprised of exotic species. Approximately 34.9% of the groundcover is comprised of native species.</p>

Table 7: BAM Plot Data Summary – Paddock Tree Assessment

Native/ Exotic	Growth Form	Species	Plot 1		Plot 2		Plot 3		Plot 4		Plot 5	
			Cov.	Abun.	Cov.	Abun.	Cov.	Abun.	Cov.	Abun.	Cov.	Abun.
Trees and Shrubs												
Exotic	Shrub	<i>Opuntia stricta</i> (Prickly Pear)							0.5	5		
Native	Shrub	<i>Acacia salicina</i> (Sally Wattle)	2	4			10	6	0.1	1	1	1
Native	Tree	<i>Eucalyptus moluccana</i> (Grey Box)	20	1					10	1	10	1
Native	Tree	<i>Casuarina glauca</i> (Swamp Oak)	0.5	1								
Exotic Groundcover												
Exotic	Groundcover	<i>Bidens pilosa</i> (Cobbler's Pegs)					0.1	10				
Exotic	Groundcover	<i>Bidens subalternans</i> (Greater Beggars Ticks)	1	50	5	100	0.5	100			20	1000
Exotic	Groundcover	<i>Conyza bonariensis</i> (Flax-leaf Fleabane)	0.1	5			0.5	50			0.1	5
Exotic	Groundcover	<i>Eragrostis curvula</i>							2	500		
Exotic	Groundcover	<i>Galenia pubescens</i>					0.1	10	2	20	5	500
Exotic	Groundcover	<i>Gomphocarpus fruticosus</i>	1	10	1	50	0.1	10	0.1	5		
Exotic	Groundcover	<i>Hyparrhenia hirta</i> (Coolatai Grass)	90	10000	95	10000	2	50			10	10000
Exotic	Groundcover	<i>Lepidium bonariense</i>							0.1	20		
Exotic	Groundcover	<i>Lysimachia arvensis</i> (Scarlet Pimpernel)							0.1	20		
Exotic	Groundcover	<i>Megathyrsus maxima</i> (Guinea Grass)					5	1000	5	100		
Exotic	Groundcover	<i>Paspalum dilatatum</i> (Paspalum)	0.5	50								
Exotic	Groundcover	<i>Plantago lanceolata</i>	0.5	20								
Exotic	Groundcover	<i>Schkuhria pinnata</i> (Curious Weed)									0.1	5
Exotic	Groundcover	<i>Senecio madagascariensis</i> (Fireweed)	1	50	0.5	20			5	100		
Exotic	Groundcover	<i>Setaria parviflora</i> (Pigeon Grass)					0.1	10				
Exotic	Groundcover	<i>Sida rhombifolia</i> (Paddy's Lucerne)	0.5	20			2	50	5	100		
Exotic	Groundcover	<i>Solanum nigrum</i> (Blackberry Nightshade)									0.1	5
Exotic	Groundcover	<i>Sporobolus africanus</i> (Parramatta Grass)							1	50		

Native/ Exotic	Growth Form	Species	Plot 1		Plot 2		Plot 3		Plot 4		Plot 5	
			Cov.	Abun.	Cov.	Abun.	Cov.	Abun.	Cov.	Abun.	Cov.	Abun.
Exotic	Groundcover	<i>Urochloa panicoides</i> (Liverseed Grass)							2	50	5	1000
Exotic	Groundcover	<i>Verbena bonariensis</i> (Purple Top)	0.5	50			0.1	50				
Exotic	Groundcover	<i>Centaurium tenuifolium</i> (Centaury)			0.1	5						
Exotic	Groundcover	<i>Chloris gayana</i> (Rhodes Grass)					90	10000	5	100	20	10000
Exotic	Groundcover	<i>Cirsium vulgare</i> (Spear Thistle)			0.1	10						
Exotic Groundcover Total			95.1		101.7		100.5		27.3		60.3	
Native Groundcover												
Native	Groundcover	<i>Anthosachne scabra</i> (Wheat Grass)									0.1	20
Native	Groundcover	<i>Asperula conferta</i> (Common Woodruff)			0.1	10						
Native	Groundcover	<i>Aristida ramosa</i> (Purple Wire Grass)							0.5	20	0.5	20
Native	Groundcover	<i>Bothriochloa macra</i> (Red-legged Grass)							45	10000		
Native	Groundcover	<i>Brachycome cuneata</i> (Blue Bottle Daisy)									0.5	50
Native	Groundcover	<i>Calotis lappulacea</i> (Yellow Buttons)							1	50		
Native	Groundcover	<i>Cheilanthes sieberi</i> (Poison Rock Fern)							0.1	20		
Native	Groundcover	<i>Chloris truncata</i> (Windmill Grass)									30	50
Native	Groundcover	<i>Commelina cyanea</i>			0.1	10						
Native	Groundcover	<i>Dichondra repens</i> (Kidney Weed)	0.1	50								
Native	Groundcover	<i>Digitaria brownii</i> (Cotton Panic Grass)							0.1	1	1	50
Native	Groundcover	<i>Einadia nutans</i> (Ruby Saltbush)							0.5	20		
Native	Groundcover	<i>Enchylaena tomentosa</i>							0.1	5		
Native	Groundcover	<i>Euchiton sphaericus</i>									0.5	50
Native	Groundcover	<i>Glycine tabacina</i>							0.1	20		
Native	Groundcover	<i>Maireana microphylla</i> (Small-leaved Bluebush)							0.1	2		
Native	Groundcover	<i>Opercularia diphylla</i>			0.1	5						
Native	Groundcover	<i>Oxalis perrenans</i>							0.1	50	0.5	100

Native/ Exotic	Growth Form	Species	Plot 1		Plot 2		Plot 3		Plot 4		Plot 5	
			Cov.	Abun.	Cov.	Abun.	Cov.	Abun.	Cov.	Abun.	Cov.	Abun.
Native	Groundcover	<i>Panicum effusum</i> (Hairy Panicum)									0.5	20
Native	Groundcover	<i>Rytidosperma</i> sp.							0.1	5		
Native	Groundcover	<i>Solanum prinophyllum</i>							1	20	0.1	10
Native	Groundcover	<i>Solanum</i> sp. (Native)							0.1	1	0.1	5
Native	Groundcover	<i>Sporobolus caroli</i> (Fairy Grass)	0.1	5								
Native	Groundcover	<i>Sporobolus elongatus</i>									0.1	20
Native	Shrub	<i>Acacia salicina</i> (Sally Wattle)	2	4			10	6	0.1	1	1	1
Native Groundcover Total			2.2		0.3		10		48.9		34.9	

4. CLOSING

If you have any questions regarding this assessment, please get in touch at your earliest convenience.

Yours sincerely,

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