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Memorandum

To	Mr Andrew Stannard	From	Aurecon C/o Jane Stark
Copy		Reference	225678
Date	25 July 2012	Pages (including this page)	14
Subject	Roma Ecological Assessment – Addendum to Lot 24 WV432 Report		

Mr Stannard,

This memorandum relates to the ground-truthing of three proposed development areas shown in Figure 1.1 and documents the results of ecological investigations of these areas.

These ecological investigations were undertaken on 25 June 2012 and 12 July 2012 by three (3) Aurecon ecologists (Vanessa Boettcher, Jenny Grundy and Sandra Walters).

A report specific to additional proposed development areas within Lot 24 on WV432 has been previously prepared and submitted to Santos (Ecological Assessment Report – Lot 22, 23 and 24 WV432; Santos Document Reference 0020-GLNG-4-1.3-0062).

This memorandum should be considered as an addendum to the report listed above. This memorandum is specific to the ecology of the proposed development areas shown in Figure 1.1. For additional ecological information related to the proposed development that is in addition to that covered by this report, please refer to the appropriate Lot-specific report.

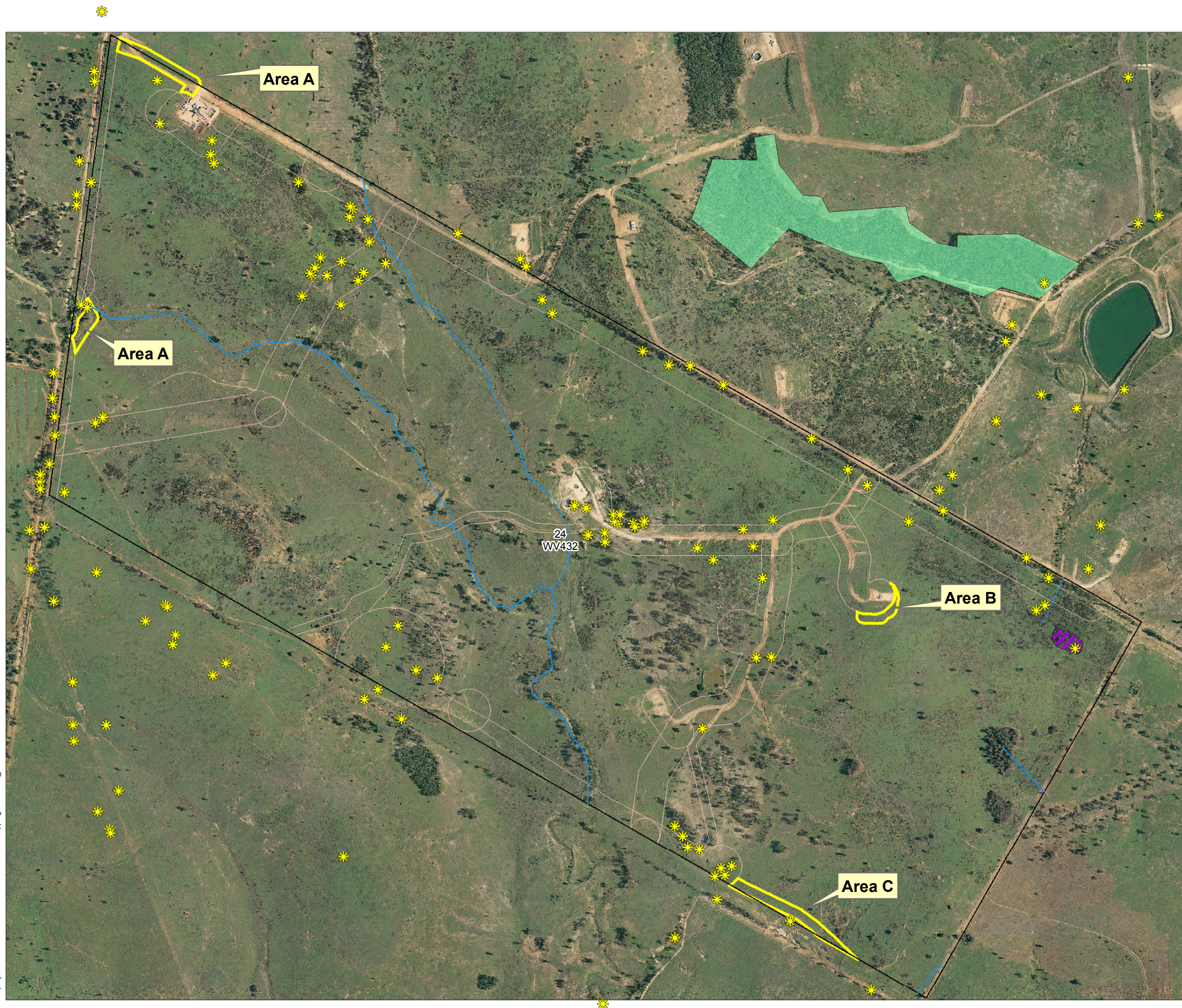
Ecological Assessment

1 Area A

General

The northern area of Area A (refer to Figure 1.2) is situated on land previously cleared for agriculture practices (including stock grazing) and adjacent roads. The southern area of Area A (refer to Figure 1.3) is situated partly in previously cleared agriculture paddocks, and partly in the riparian zone of a 'stream-order 3' watercourse (Queensland Government, 2012).

No Regional Ecosystems (REs) are mapped within the development areas. No Environmentally Sensitive Areas (ESAs) are located within 1 km of the development areas.



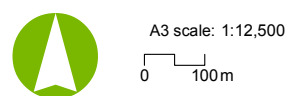
Legend

- Notable Species
- EVNT Species Regions
- 24WV432 Ground Truthed Areas
- Drainage (100K)
- Upstream ground truth areas
- Regional Ecosystem (Biodiversity Status)**
- Endangered - Dominant
- Endangered - Sub-dominant
- Of Concern - Dominant
- Of Concern - Sub-dominant
- Not of Concern

Notes:

Date: 23/07/2012 Version: 1

Map by: Moore NK P:\Aurecon\215648 Santos\Mapping\24WV432_Overview.mxd 23/07/2012 15:56



Job No: 225678
Coordinate system: GDA 1994 MGA Zone 55

Figure 1.1: Overview Map

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Figure 1.2 Aerial photography showing northern area of Area A

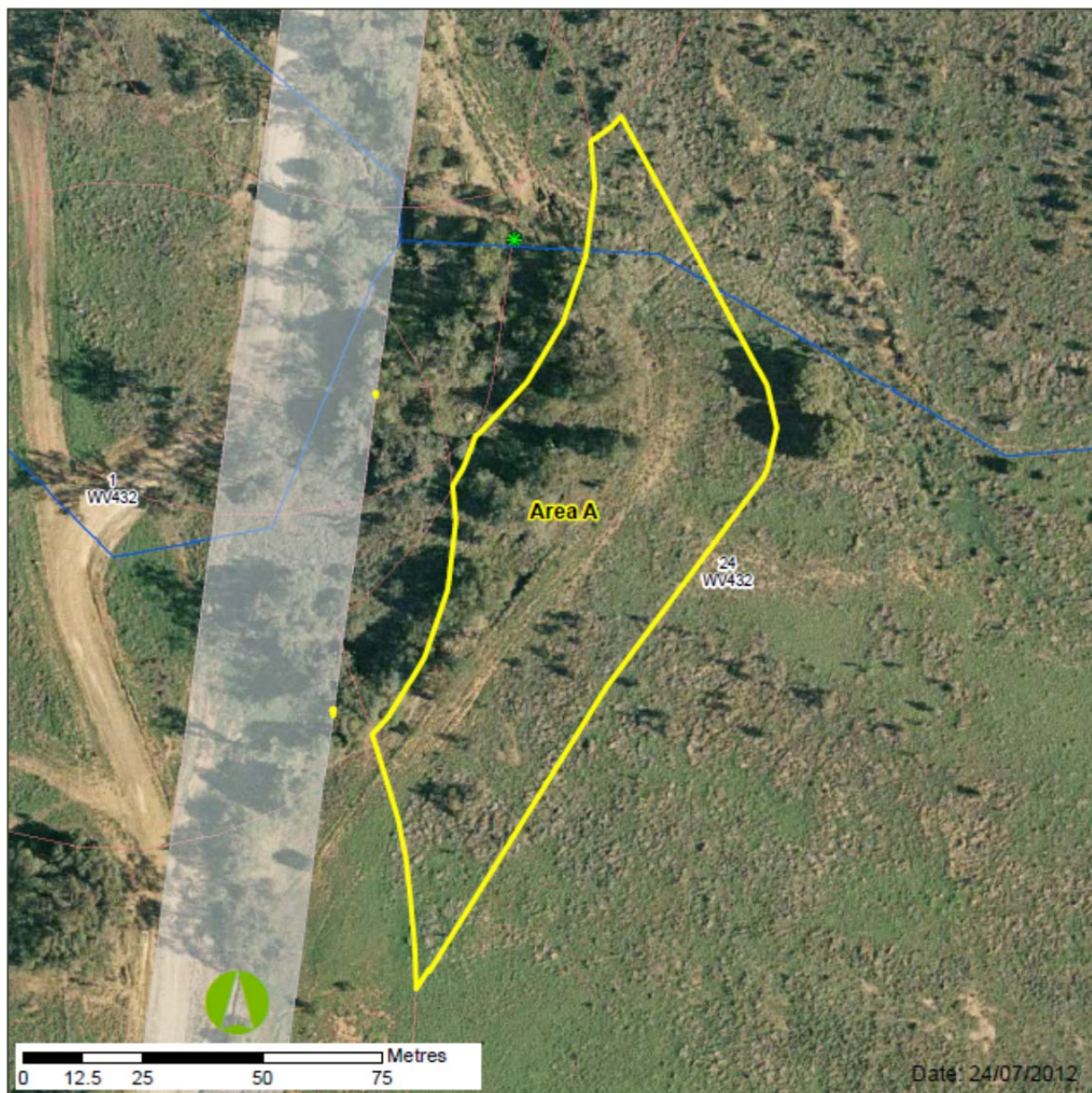


Figure 1.3 Aerial photography showing southern area of Area A

Floristics

The majority of the development areas have been extensively cleared for agriculture, mainly grazing livestock. As such, the areas are dominated by *Pennisetum ciliare* (Buffel Grass) with very sparse, low shrubby regrowth, with the exception of the area of riparian vegetation in southern Area A. Photo 1.1 and Photo 1.2 are representations of each area.



Photo 1.1 Northern section of Area A



Photo 1.2 Southern section of Area A (Riparian vegetation in the right of this photo)

Canopy within the riparian zone of southern Area A is between 15 - 20 m with approximately 80% canopy cover and was dominated by *Eucalyptus melanophloia* (Silver Leaved Ironbark), *Callitris glaucophylla* (White Cypress Pine), *Geijera parviflora* (Wilga) and *Eucalyptus fibrosa nubila* (Dusky Leaved Ironbark). Outside the riparian zone, no canopy stratum was present.

A shrub layer was present in both northern and southern Area A and ranged in height from 1 - 6 m (average height approximately 4 m) and was less than 10% cover of the total development area. The dominant species in the shrub layer were *Eucalyptus melanophloia* with *Capparis* spp. and juvenile *Acacia* spp.

The ground cover is relatively dense (approximately 90% cover of the total area assessed) and was dominated by *Pennisetum ciliare* and *Sporobolus creber* (Western Rats Tail Grass). Other groundcover species recorded to a lesser extent included *Heteropogon contortus* (Black Spear Grass), *Verbena tenuisecta* (Mayne's Curse), *Themeda triandra* (Kangaroo Grass) and *Conyza bonariensis* (Fleabane).

No species of conservation significance (i.e. 'endangered', 'vulnerable' and 'near threatened' species protected under the provisions of the *Nature Conservation Act 1992* [NC Act] and/or 'critically endangered', 'endangered' or 'vulnerable' under the provisions of the *Environmental Protection and Biodiversity Conservation Act 1999* [EPBC Act]) were recorded within the proposed development areas.

No Type A restricted plant species are located within the proposed development areas. However, it is important to note that *Brachychiton spp.*, which are Type A restricted plants under the NC Act, were recorded in close proximity to the proposed development area as shown in Figure 1.2 and Figure 1.3 (represented by the green asterisk).

A list of species recorded is outlined in Table 4 at the end of this document.

Habitat values

Six (6) incidental fauna species were recorded within Area A as listed in Table 1.1 below. No conservation significant fauna species under the provisions of the EPBC Act and/or the NC Act were recorded during field investigations.

Table 1.1 Incidental fauna observed at the development sites within Area A on Lot 24 WV432

Scientific name	Common name
<i>Manorina melanocephala</i>	Noisy Miner
<i>Corvus orru</i>	Torresian Crow
<i>Macropus giganteus</i>	Eastern Grey Kangaroo
<i>Pomatostomus temporalis</i>	Grey Crowned Babblers
<i>Northiella haematogaster</i>	Blue Bonnet
<i>Grallina cyanoleuca</i>	Magpie Lark

Within the riparian zone, two (2) bird nests, consistent with Grey Crowned Babbler nests, were present in a *Eucalyptus melanophloia* tree (GPS Easting 700866, Northing 7083782). No birds were witnessed using the nests during the investigation. The watercourse in the riparian zone contained stagnant water and was highly degraded at the time of the investigation. Banks of the watercourse ranged from 1 - 1.5 m with the gradient of the banks ranging from 15 - 45%.

The riparian zones contains moderate habitat, with significant habitat trees, canopy cover suitable for shelter, foraging and perching, fissured tree bark, woody debris (ie fallen/felled timber) and riparian habitat. However, given the area is linear and fragmented, its value to ground-dwelling and arboreal mammals would be marginal.

The remainder of Area A contains limited woody vegetation and has been extensively disturbed as a result of previous vegetation clearing for agricultural purposes and the surrounding development. Habitat features present within the area were limited to dense groundcover vegetation (ie grassy tussocks), a limited amount of woody debris, and limited shrubby vegetation suitable for shelter, foraging and perching. As a result, the habitat values of Area A on Lot 24 WV432 are considered low overall.

2 Area B on Lot 24 WV432

General

The proposed development area in Area B is shown in Figure 2.1. This area has been extensively cleared for agriculture and adjacent gas wells and contains no woody vegetation over 3 m. No REs are mapped within the development areas and no ESAs are located within 1 km of the development area. There are also no watercourses within or adjacent to the development area.

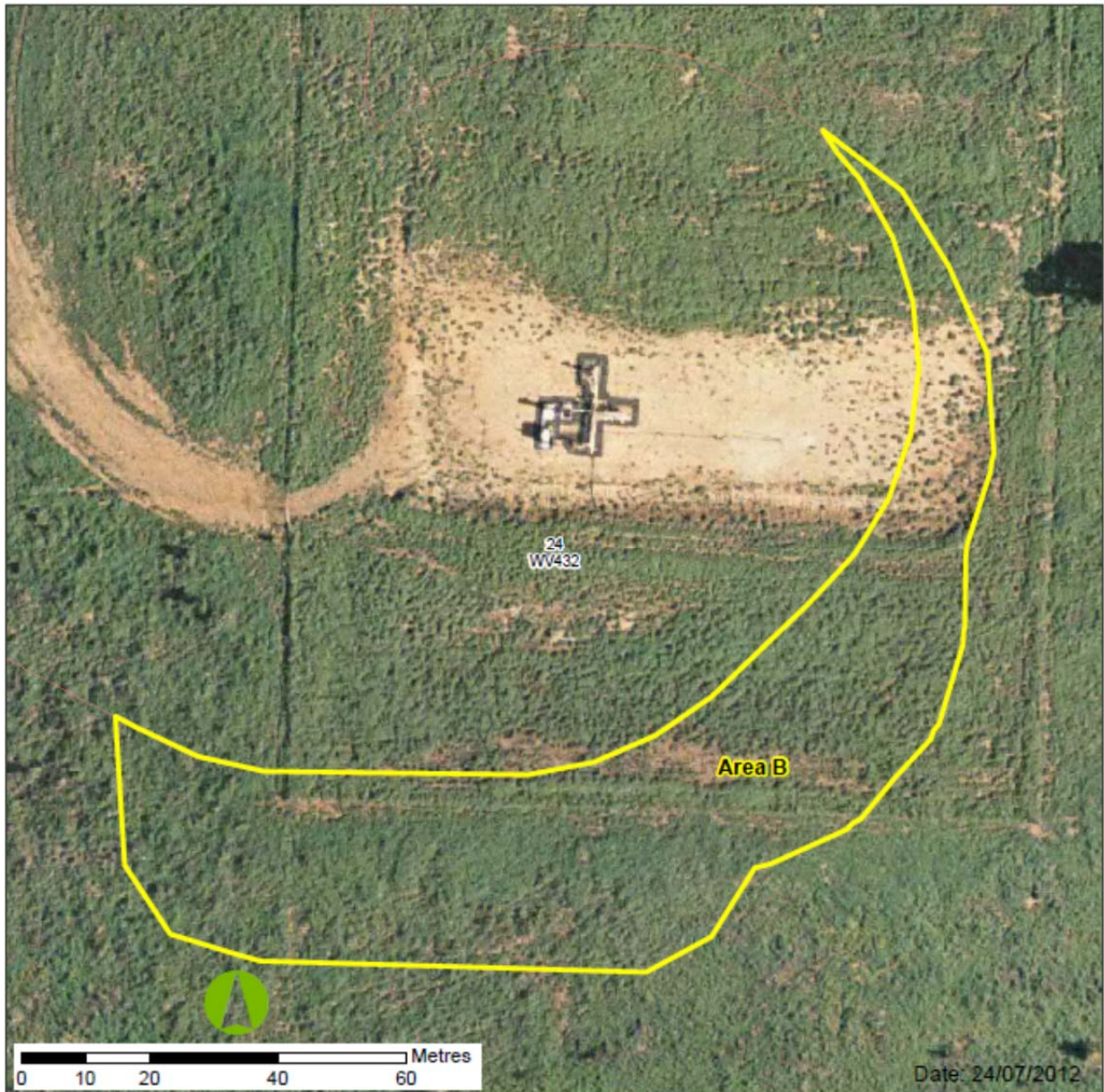


Figure 2.1 Aerial photography showing Area B

Floristics

The development area has been extensively cleared for agriculture, mainly grazing livestock. As such, the area is dominated by *Pennisetum ciliare* (Buffel Grass) with isolated *Acacia harpophylla* (Brigalow) regrowth.

The shrub layer within the development area is mostly sparse (less than 20% cover) and has a height range of 1.5 - 3 m, with an average height of 1.5 m.

The ground cover is relatively dense (approximately 95% cover of the total area assessed) and is dominated by *Pennisetum ciliare* with lower occurrences of *Sporobolus creber* (Western Rats Tail Grass), *Verbena tenuisecta* (Mayne's Curse), *Medicago polymorpha* (Burr Medic), *Sclerolaena birchii* (Galvanised Burr) and *Conyza bonariensis* (Fleabane).

A list of species recorded is outlined in Table 4 at the end of this document.

No flora species of conservation significance under the provisions of the NC Act and/or the EPBC Act were recorded within the proposed development area.

No Type A restricted plant species are located within the proposed development area.

Habitat values

No incidental fauna species were recorded within the proposed development area during the field investigations. The proposed development area contains limited woody vegetation and has been extensively disturbed as a result of previous vegetation clearing for agricultural purposes and the surrounding development. Habitat features present within the area were limited to dense groundcover vegetation, a limited amount of woody debris, and limited shrubby canopy cover suitable for shelter, foraging and perching. As a result, the habitat value of the proposed development in Area B is considered low overall.

3 Area C

General

The proposed development corridor in Area C is shown in Figure 3.1. The proposed corridor is situated within areas previously cleared for agriculture practices, including stock grazing, tracks and fence lines.

No REs are mapped within the development areas. No ESAs are located within 1 km of the development area.

No watercourses are mapped within or adjacent to the proposed development area.

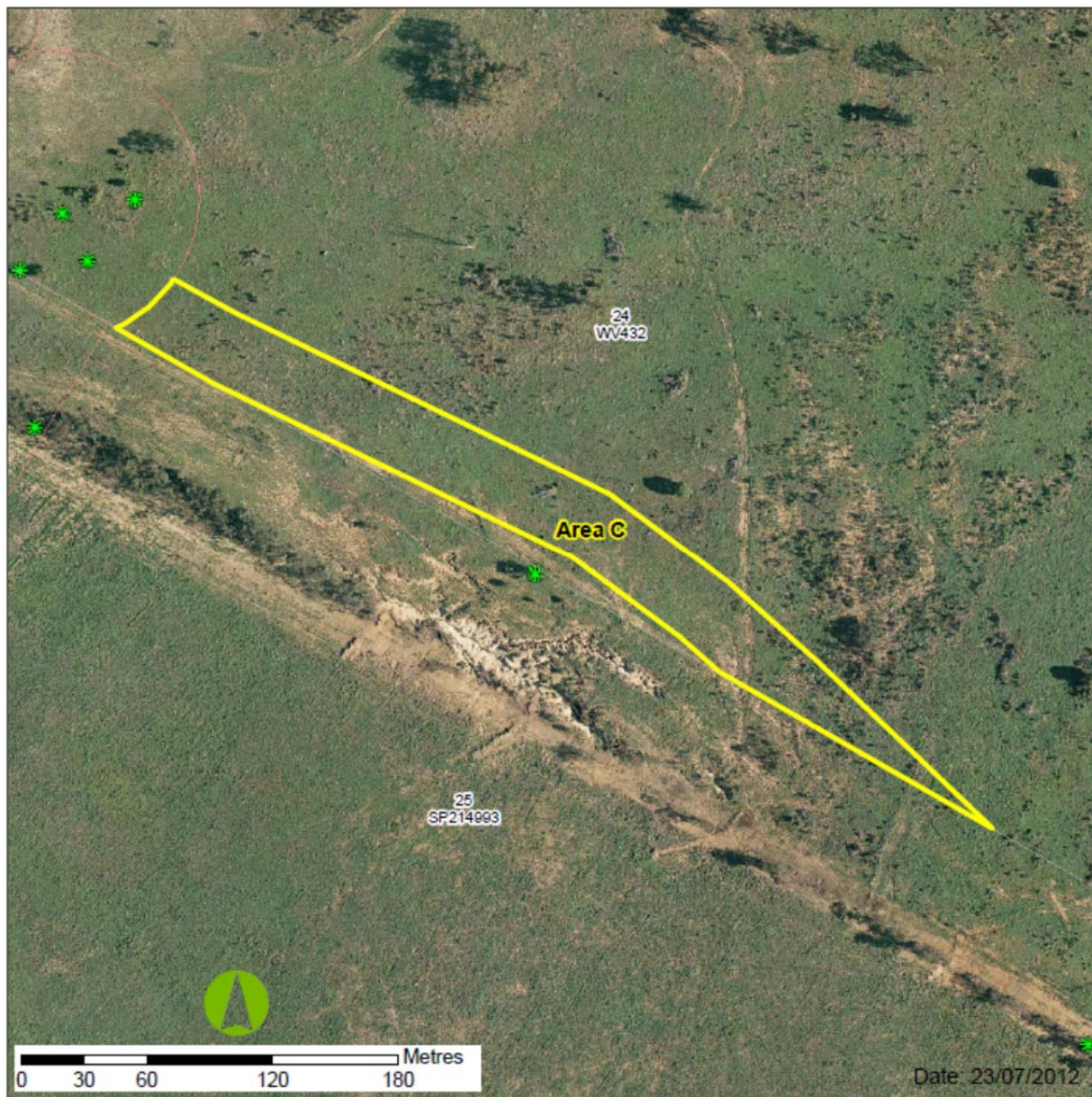


Figure 3.1 Aerial photography showing Area C

Floristics

The majority of the development area has been extensively cleared for agriculture, mainly grazing livestock. As such, the area is dominated by grass species with areas of low shrubby regrowth. Photo 3.1 is a photograph indicative of the area.



Photo 3.1 Looking north-west within Area C on Lot 24 WV432

The area contains limited woody vegetation and no mature canopy stratum is present. A shrub layer of regrowth vegetation was present ranging in height between 1 - 6 m (average height 4 m) and was less than 20% cover of the development area. The dominant species in this layer were *Eucalyptus melanophloia*, *Corymbia tessellaris* (Mortén Bay Ash) and *Backhousia angustifolia* (Grey Myrtle) with juvenile *Acacia* spp.

The ground cover is relatively dense (approximately 90% cover of the total area assessed). The areas are dominated by *Pennisetum ciliare*, *Sporobolus creber* and *Heteropogon contortus*. Other ground cover species recorded to a lesser extent included *Verbena tenuisecta*, *Themeda triandra*, *Urochloa mosambicensis* (Mozambique Grass) and *Conyza bonariensis*.

No species of conservation under the provisions of the NC Act and/or the EPBC Act were recorded within the proposed development areas. No Type A restricted plant species are located within the proposed development areas. However, it is important to note that *Brachychiton* spp., which are Type A restricted plants under the NC Act, were recorded in proximity to the proposed development area as shown in Figure 3.1.

A list of species recorded is outlined in Table 4 at the end of this document.

Habitat values

Seven (7) incidental fauna species were recorded within the proposed development area as listed in Table 3.1 below. No conservation significant fauna under the provisions of the EPBC Act and/or the NC Act were recorded during field investigations.

Table 3.1 Incidental fauna observed in Area C on Lot 24 WV432

Scientific name	Common name
<i>Manorina melanocephala</i>	Noisy Miner
<i>Corvus orru</i>	Torresian Crow
<i>Pardalotus straitus</i>	Striated Pardalote
<i>Smicrornis brevirostris</i>	Weebill
<i>Cracticus torquatus</i>	Grey Butcherbird
<i>Acanthiza chysorrhoa</i>	Yellow-rumped Thornbill
<i>Falco cenchroides</i>	Nankeen Kestrel

Habitat features present within Area C were limited to dense groundcover vegetation (ie grassy tussocks), a limited amount of woody debris, and limited shrubby vegetation suitable for shelter, foraging and perching. As a result, the habitat value of the proposed development area is considered low overall.

Species utilising resources in the proposed development areas are most likely to be limited to common, generalist species that are able to adapt to significant habitat disturbances (ie House mouse [*Mus musculus*], common macropods).

References

Queensland Government (2012), *Vegetation Management Act Regional Ecosystem and Remnant Map - Version 6.1*, Centred on Lot on Plan 24 WV432, Online RE Maps, The Department of Environment and Heritage Protection, Brisbane, viewed 16 July 2012, <http://www.ehp.qld.gov.au/REMAP>.

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Botanical Species List

Table 4 Botanical species recorded in Areas A, B and C on Lot 24 WV432

Scientific Name	Common Name	Notes
<i>Abutilon malvifolium</i>	Chinese Lantern	
<i>Acacia deanei</i>	Dean's Wattle	
<i>Acacia excelsa</i>	Iron Wood	
<i>Acacia harpophylla</i>	Brigalow	
<i>Alectryon diversifolia</i>	Scrub Boonaree	
<i>Alstonia constricta</i>	Bitter Bark	
<i>Apophyllum anomalum</i>	Warrior Bush	
<i>Argemone ochroleuca</i>	Mexican Poppy	Non-native species
<i>Aristida caput-medusa</i>	Curly Head Wire Grass	
<i>Aristida holathera</i>	Tall Wire Grass	
<i>Atalaya hemiglauca</i>	Whitewood	
<i>Austrostipa verticillata</i>	Slender Bamboo Grass	
<i>Backhousia angustifolia</i>	Grey Myrtle	
<i>Bidens pilosa</i>	Cobblers Peg	Non-native species
<i>Bothriochloa bladhii</i>	Forest Blue Grass	
<i>Brachychiton populnea</i>	Kurrajong	Type A Restricted Plant under NC Act
<i>Callitris glaucophylla</i>	White Cypress Pine	
<i>Capparis loranthifolia</i>	Nipan, Wait a while	
<i>Capparis spinosa</i>	Capparis	
<i>Carissa ovata</i>	Currant Bush	
<i>Casuarina cristata</i>	Belah	
<i>Cheilanthes sieberi</i>	Mulga Fern	
<i>Chloris divaricata</i>	Windmill Chloris	
<i>Chloris pectinosa</i>	Windmill Grass	
<i>Cirsium vulgare</i>	Spear Thistle	Non-native species
<i>Conyza bonariensis</i>	Fleabane	Non-native species
<i>Corymbia tessellaris</i>	Morten Bay Ash	
<i>Cymbopogon refractus</i>	Barbwire Grass	
<i>Dianella spp.</i>	Dianella	
<i>Elaeodendron australis</i>	Peach Leaf	
<i>Enteropogon acicularis</i>	Curly Windmill Grass	
<i>Enteropogon ramosus</i>	Twirly Windmill Grass	
<i>Eragrostis alveiformis</i>	Granit Love Grass	
<i>Eremophila mitchellii</i>	False Sandalwood	

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Scientific Name	Common Name	Notes
<i>Eucalyptus fibrosa nubila</i>	Dusky Leaved Ironbark	
<i>Eucalyptus melanophloia</i>	Silver Leaved Ironbark	
<i>Eucalyptus populnea</i>	Poplar Box	
<i>Fimbristylis dichotoma</i>	Fimbristylis	
<i>Geijera parviflora</i>	Wilga	
<i>Glycine tabiana</i>	Glycine Pea	
<i>Gomphocarpus physocarpus</i>	Balloon Cotton Bush	Non-native species
<i>Grevillea striata</i>	Beefwood	
<i>Hakea lorea</i>	Bootlace Oak	
<i>Heteropogon contortus</i>	Black Spear Grass	
<i>Hovea lorata</i>	Hovea	
<i>Iseilema vaginiflorum</i>	Red Flinders Grass	
<i>Jasminum didymum</i>	Native Jasmine	
<i>Juncus usitatus</i>	Juncus	
<i>Lomandra hystrix</i>	Creek Mat Rush	
<i>Lomandra longifolia</i>	Lomandra	
<i>Maireana microphylla</i>	Silky Bluebush	
<i>Malvastrum americanum</i>	Malvastrum	Non-native species
<i>Medicago polymorpha</i>	Burr Medic	
<i>Melinis repens</i>	Red Natal	Non-native species
<i>Myoporum acuminatum</i>	Creeping Boobiolla	
<i>Opuntia stricta</i>	Prickly Pear	Non-native species LP Act Class 2 Weed
<i>Panicum effusum</i>	Inquisitive Grass	
<i>Parsonia lancerlerdo</i>	Monkey Rope	
<i>Pennisetum ciliare</i>	Buffel Grass	Non-native species
<i>Pittosporum angustifolium</i>	Native Willow	
<i>Podolepis jaceoides</i>	Showy Copper Wire Daisy	
<i>Psydrax oleifolium</i>	Hat Stand	
<i>Ranunculus spp.</i>		
<i>Sclerolaena birchii</i>	Galvanised Burr	Non-native species
<i>Sida rohlenae</i>	Shrub sida	
<i>Sida spp.</i>	Sida	
<i>Sida subspicata</i>	Queensland Hemp	
<i>Solanum esuriale</i>	Brown Potato Bush	
<i>Sporobolus creber</i>	Western Rats Tail Grass	

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Scientific Name	Common Name	Notes
<i>Swainsona galegifolia</i>	Swainsona	
<i>Themeda triandra</i>	Kangaroo Grass	
<i>Urochloa mosambicensis</i>	Mozambique Grass	Non-native species
<i>Verbena litoralis</i>	Tall Verbena	
<i>Verbena tenuisecta</i>	Mayne's Curse	Non-native species
<i>Xerochyrsum bracteatum</i>	Yellow Paper Daisy	