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Memorandum

To	**Mr Andrew Stannard**	From	**Aurecon C/o Jane Stark**
Copy		Reference	**225678**
Date	**5 October 2012**	Pages (including this page)	**20**
Subject	**Roma Ecological Report – Lot 25 on SP214993 Addendum Memo**		

Mr Stannard

This memorandum documents the results of an ecological investigation of proposed development areas within Lot 25 on SP214993 (refer Figure 1.1).

Ecological investigations of the area were conducted on 4 September 2012 by two (2) Aurecon ecologists (Joseph Callaghan and Sandra Walters).

A report specific to the additional proposed development areas has been previously prepared and submitted to Santos (Ecological Assessment Report - Roma Lot 25 on SP214993, Santos Document Reference: 0020-GLNG-4-1.3-0044).

This memorandum should be treated as an addendum to the report listed above. This memorandum is specific to the ecology of the proposed development areas illustrated in Figure 1.1.

1 Ecological Assessment

1.1 Area A

1.1.1 General

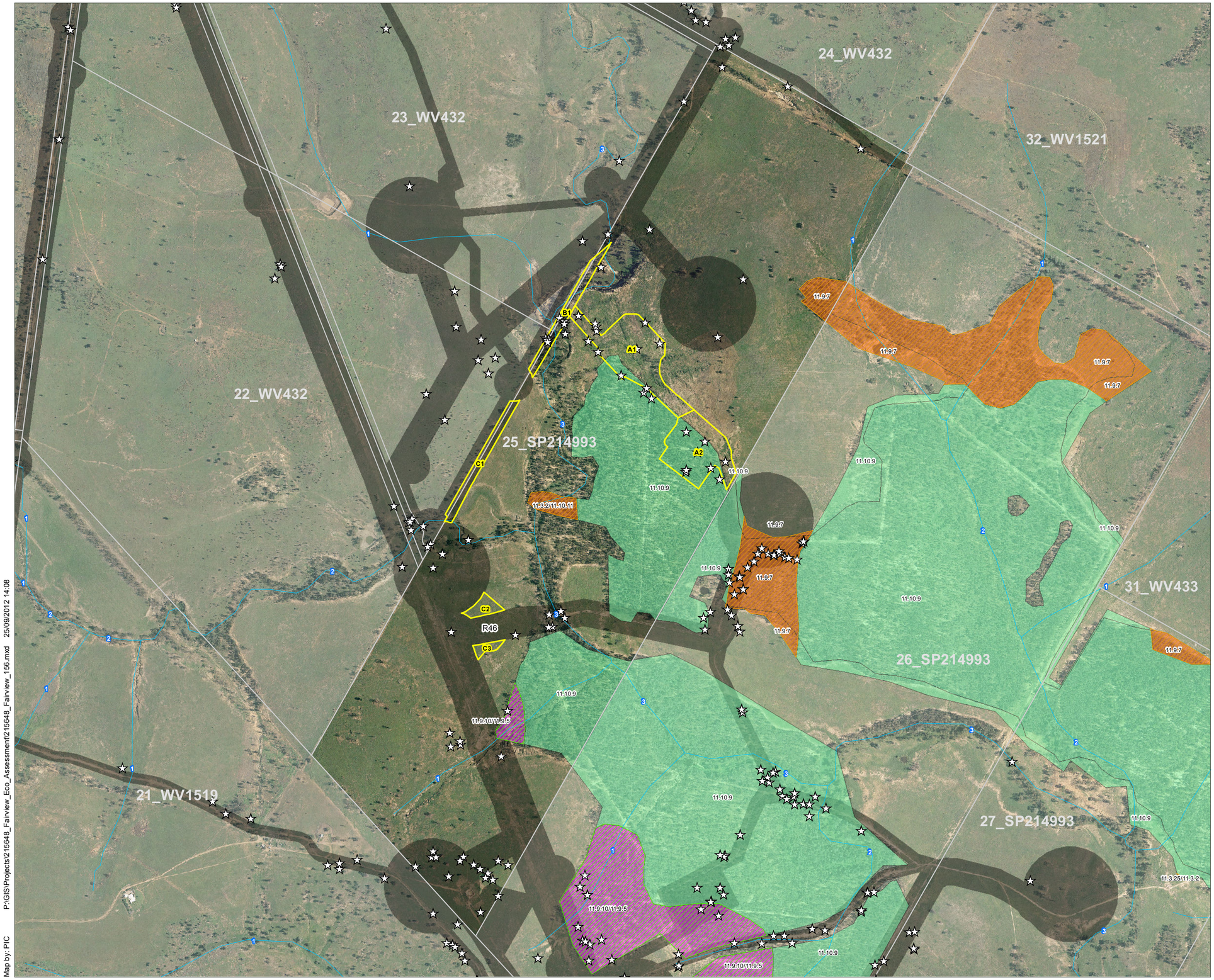
The proposed development areas comprise of two (2) investigation sections within the middle portion of Lot 25 on SP214993 (referred as Area A1 and A2 in Figure 1.1) Area A1 is located mostly within non-remnant, cleared vegetation but also partially contains a patch of remnant vegetation along the southern edge. Area A2 follows the extent of an existing access road and contains non-remnant vegetation and approximately 890 m^2 remnant vegetation. The patch of remnant vegetation that occurs within Areas A1 and A2 is mapped as Regional Ecosystem (RE) 11.10.9 (No Concern at Present – Biodiversity Status) on the Department of Environment and Heritage Protection's (DEHP's) certified RE mapping (Version 6.1).

There is one (1) Environmentally Sensitive Area (ESA) located in close proximity to Area A:

- A 'Category C' ESA associated with an 'Of Concern' RE (11.9.7) is located approximately 130 m south of Area A2

No 'watercourses', as mapped on the DEHP hydrology layer, are located within or in close proximity to the proposed development areas. There was, however, erosion associated with an unmapped drainage line observed in the south-eastern portion of Area A2 (refer Figure 1.2).

The landform of Area A is gently undulating to sloping and contains medium-coarse sandy soils.



Legend

- Areas Assessed
- EVNT and Type A Species
- EVNT Region
- Corridors - Ground Truth
- Watercourse

Amended Regional Ecosystem (Biodiversity Status)

- Endangered - Dominant
- Endangered - Sub-dominant
- Of Concern - Dominant
- Of Concern - Sub-dominant
- No Concern At Present

ESA Mapping

- Category A
- Category B
- Category C

Source:
Cadastre: DERM, 2011.
Regional Ecosystems: Version 6.1, The State of Queensland (Department of Environment and Resource Management), Sept 2011. As amended by Aurecon, 2011.
ESAs: Coordinator-General's Evaluation Report for an Environmental Impact Statement – Gladstone Liquified Natural Gas GLNG Project (May 2010) and the Santos GLNG Project CSG Fields – Environmental Protocol for Constraints Planning and Field Development (September 2011). Note: No ESA buffers have been included on this figure.
Wetlands: Qld Wetland Data Version 3.0

Date: 25/09/2012 Version: 1

Map by: PIC P:\GIS\Projects\215648_Fairview_Eco_Assessment\215648_Fairview_156.mxd 25/09/2012 14:08

A1 scale: 1:7,000

0 100 200 400 600 Meters

Job No: 225678

Coordinate system: GDA_1994_MGA_Zone_55

Santos Upstream Ecological Assessment

Figure 1.1: Additional Development Areas on Lot 25SP214993

Figure 1.2 **Erosion associated with unmapped drainage line within Area A2**

1.1.2 Floristics

The vegetation within the landscape of Area A is variable and included isolated stands of mature trees within the cleared fields and a large (approximately 260 ha) patch of remnant vegetation (RE 11.10.9)

(refer Figure 1.3). Clearing has occurred north of the remnant vegetation as a result of agricultural activities and the soil was actively cultivated. The remnant vegetation has been subject to minor disturbance as a result of clearing for an access road. Erosion has also resulted in disturbance to the remnant vegetation contained within area A1.

Figure 1.3 **Landscape within Area A2 depicting typical vegetation within the 'remnant' patch (RE 11.10.9)**

The canopy stratum within the mapped remnant vegetation in Area A was dominated by *Callitris glaucophylla* (White cypress pine), with *Eucalyptus populnea* (Poplar box) and *Eucalyptus melanophloia* (Silver leaved ironbark) recorded as associated species. The canopy stratum had a height range of 13 to 18 m, a Foliage Projection Cover (FPC) of approximately 48% and a stem count of 50 stems per hectare. FPC was calculated using the line-intercept method over two (2) 50 m transects (adapted from Eyre *et al*, 2011) which was performed within the RE 11.10.9 polygon in Area A2 (refer Appendix A). Stem count per hectare was extrapolated from five (5) 10 m by 20 m survey quadrats (refer Appendix A).

Outside the remnant vegetation canopy cover was relatively sparse and was restricted to a small stand of *Eucalyptus melanophloia* (Silver leaved ironbark) and *Casuarina cristata* (Belah) in the eastern portion of Area A1.

The sub-canopy stratum within the mapped remnant vegetation in Area A, had a height range of 6 to 12 m with an FPC of approximately 42% (refer Appendix A). The sub-canopy stratum within the mapped remnant vegetation had a stem count of approximately 630 stems/ha (refer Appendix A). The sub-canopy stratum was dominated by *C. glaucophylla* (White cypress pine), with *E. populnea* (Poplar box), *Grevillia striata* (Beefwood), *Hakea lorea* (Bootlace oak) and *E. melanophloia* (Silver leaved ironbark) recorded as associated species. The cleared non-remnant sections and the isolated stands of mature trees were devoid of any vegetation constituting a sub-canopy stratum.

The shrub stratum within the mapped remnant vegetation in Area A had a height range of 1 to 5 m with a vegetation cover of approximately 30%. The shrub stratum within the remnant vegetation had a stem count of approximately 670 stems/ha (refer Appendix A). The dominant species in the shrub layer was juvenile *C. glaucophylla* (White cypress pine) with a range of other common native shrub species also recorded including *Eremophila mitchellii* (False sandalwood), *Geijera parviflora* (Wilga), *Bursaria incana* (Prickly pine) and *Acacia excelsa* (Ironwood).

The ground stratum varied in species composition and structure throughout the proposed development area. Within the cleared non-remnant sections of the proposed development areas the ground stratum was dominated by *Chloris ventricosa* (Tall chloris), with associated *Bothriochloa bladhii* (Forest blue grass), *Pennisetum ciliare* (Buffel grass), *Verbena tenuisecta* (Mayne's curse), *Cynodon dactylon* (Green couch) and *Chloris truncata* (Windmill grass). The ground cover in this section was approximately 90%. The ground stratum within the remnant vegetation was co-dominated by *Aristida caput-medusae* (Many headed wire grass) and *Aristida holathera* (Tall wire grass). The ground cover in this section was approximately 45% which was extrapolated from five (5) 1 m by 1 m quadrat plots (refer Appendix A).

Three Type A restricted plant species listed under the provisions of the Queensland *Nature Conservation Act 1992* (NC Act) were recorded within Area A (ie *Cymbidium canaliculatum (*Black orchid), *Brachychiton rupestris* (Narrow leaved bottle tree) and *Brachychiton populneus* (Kurrajong)). These individuals and their locations are listed in Table 1.1.

Table 1.1 Type A restricted plant species recorded within Area A

Scientific name	Common name	Easting (GDA 94, Zone 55)	Northing (GDA 94, Zone 55)
Brachychiton populneus	Kurrajong	702927.07	7080390.20
Brachychiton populneus	Kurrajong	702895.66	7080429.92
Brachychiton populneus	Kurrajong	702846.95	7080487.21
Brachychiton populneus	Kurrajong	702948.32	7080452.81
Brachychiton populneus	Kurrajong	702874.22	7080526.34
Brachychiton populneus	Kurrajong	702661.68	7080720.41
Brachychiton populneus	Kurrajong	702627.19	7080862.81
Brachychiton populneus	Kurrajong	702709.34	7080882.23
Brachychiton populneus	Kurrajong	702569.96	7080765.63
Brachychiton populneus	Kurrajong	702486.67	7080852.16
Brachychiton populneus	Kurrajong	702450.56	7080891.19
Brachychiton populneus	Kurrajong	702481.39	7080928.60
Brachychiton populneus	Kurrajong	702478.53	7080943.83
Brachychiton rupestris	Narrow leaved bottle tree	702805.41	7080422.92
Brachychiton rupestris	Narrow leaved bottle tree	702656.24	7080958.54
Cymbidium canaliculatum	Black orchid	702804.31	7080416.51

Scientific name	Common name	Easting (GDA 94, Zone 55)	Northing (GDA 94, Zone 55)
Cymbidium canaliculatum	Black orchid	702805.60	7080561.22

No flora species of conservation significance (ie 'endangered', 'vulnerable' and 'near threatened' species under the provisions of the NC Act or 'critically endangered', 'endangered' and 'vulnerable' species as listed under the provisions of the Commonwealth *Environment Protection and Biodiversity Conservation Act 1999* [EPBC Act]) were recorded within Area A.

A full list of flora species recorded within the proposed development areas is presented in Appendix B.

1.1.3 Habitat Value

Twenty-three bird and one mammal species were recorded within the vicinity of Area A during the field investigations. These species are listed in Table 1.2.

Table 1.2 Fauna species observed within Area A

Scientific name	Common name	Notes
Birds		
Cacatua galerita	Sulphur-crested cockatoo	
Corvus coronoides	Australian raven	
Corvus orru	Torresian crow	
Cracticus nigrogularis	Pied butcherbird	
Cracticus torquatus	Grey butcherbird	
Dacelo novaeguineae	Laughing kookaburra	
Eolophus roseicapilla	Galah	
Gerygone albogularis	White-throated gerygone	
Grallina cyanoleuca	Magpie-lark	
Gymnorhina tibicen	Australian magpie	
Haliastur sphenurus	Whistling kite	
Manorina melanocephala	Noisy miner	
Pachycephala rufiventris	Rufous whistler	
Pardalotus striatus	Striated pardalote	
Philemon citreogularis	Little friarbird	
Philemon corniculatus	Noisy friarbird	
Platycercus adscitus	Pale-headed rosella	
Pomatostomus temporalis	Grey-crowned babbler	
Psephotus haematonotus	Red-rumped parrot	Flyover
Rhipidura albiscapa	Grey fantail	
Smicrornis brevirostris	Weebill	
Strepera graculina	Pied currawong	
Struthidea cinerea	Apostle bird	

Scientific name	Common name	Notes
Mammals		
Macropus rufogriseus	Red-necked wallaby	

Area A contained the following habitat resources:

- Canopy cover suitable for shelter, foraging and perching
- Fissured tree bark
- Dense groundcover vegetation in the cleared sections
- Woody debris (ie felled timber, including hollow-bearing logs and tree bark in groundcover)
- Limited amounts of leaf litter in the groundcover
- Limited watercourse habitat (ie small eroded sand banks)

The canopy cover within Area A may provide suitable habitat (eg feeding, nesting and shelter sites) for birds and arboreal mammals. There was also potential habitat for birds and arboreal mammals provided by numerous standing canopy stratum stags. Within Area A there was a moderate amount of felled timber that contained hollows which could provide shelter and nesting sites for mammal species. The fissured and peeling tree bark on standing stags and on felled timber may provide suitable habitat opportunities for a range of reptiles (eg Golden-tailed gecko [*Strophurus taenicauda*] which are suited to sandy soil types present throughout Area A).

A bird nest of an unidentified bird species was observed in a juvenile *Eucalyptus chloroclada* (Dirty gum) (Easting: 702414.96, Northing: 7080982.62).

No fauna species of conservation significance as listed under the provisions of the NC Act and/or EPBC Act were recorded within Area A.

The overall habitat value of Area A is considered moderate as a result of the large proportion of remnant vegetation.

1.2 Area B1

1.2.1 General

The proposed development area is comprised of a single investigation section located adjacent to the western property border of Lot 25 SP214993. Area B1 also partially extends into Lot 22 and 23 on WV432. The landscape of Area B1 is comprised of flat cleared sections in addition to steep bank walls and beds associated with a large drainage line.

Mature woody vegetation within Area B1 is limited to close proximity of the drainage line and there is evidence of selective timber clearing (eg ring-barked stags). Area B1 is mapped as non-remnant on DEHP certified RE mapping.

There are no ESAs mapped within the proposed development area (closest occurs approximately 410 m to the south).

The drainage line that traverses Area B1 is mapped on the DEHP hydrology layer as a ‘stream order 3’ ‘watercourse’ (refer Figure 1.1). This ‘watercourse’ intersects with Area B1 at three (3) locations and most of Area B1 can be considered as being within the high bank area. The general flow direction of the ‘watercourse’ is north to south through the proposed development area.

The landform of Area B1 is moderately sloping to steep within the 'watercourse' and contains sandy soils. Outside of the drainage line, the landform was generally flat and contained silty/clay loamy soils.

1.2.2 Floristics

Mature woody vegetation was restricted to the extent of the 'watercourse' and was absent in a small cleared section within the east of Area B1 (refer Figure 1.4). This section in the central-eastern portion of Area B1 has been cleared for agricultural purposes.

Figure 1.4 **Landscape facing north within the southern portion of Area B1 depicting typical vegetation along the extent of the 'watercourse'**

The canopy stratum had a height range of 11 to 16 m and a vegetation cover of approximately 15%. The canopy stratum was co-dominated by *E. melanophloia* (Silver leaved ironbark) and *Angophora floribunda* (Rough bark apple) and *E. populnea* (Poplar box). In the northern portion of the proposed development area the canopy stratum was co-dominated by *E. populnea* (Poplar box) and *E. melanophloia* (Silver leaved ironbark). Other species recorded within the canopy stratum of Area B1 were *Eucalyptus chloroclada* (Dirty gum), *C. glaucophylla* (White cypress pine) and *Eucalyptus crebra* (Narrow leaved ironbark).

The sub-canopy stratum had a height range of 6 to 10 m and a vegetation cover of approximately 22%. The sub-canopy stratum was dominated by *C. glaucophylla* (White cypress pine) with *A. floribunda* (Rough bark apple) and *E. crebra* (Narrow leaved ironbark) as associated species. In the southern portion of Area B1 (within the 'watercourse') the sub-canopy was dominated by *A. floribunda* (Rough bark apple). Other species recorded within the sub-canopy stratum were *E. chloroclada* (Dirty gum), *E. melanophloia* (Silver leaved ironbark), *A. excelsa* (Ironwood) and *E. populnea* (Poplar box).

The shrub stratum had a height range of 3 to 5 m and a vegetation cover of approximately 5%. In the northern portion the sub-canopy stratum was dominated by *A. excelsa* (Ironwood) and vegetation was

denser (approximately 15%). In the middle portion, *C. glaucophylla* (White cypress pine) was the dominant shrub species and within the southern portion the shrub stratum was dominated by *E. mitchellii* (False sandalwood).

The ground stratum was relatively patchy with a large proportion devoid of vegetative cover. The ground stratum within the 'watercourse' was dominated by *Themeda triandra* (Kangaroo grass) with a vegetation cover of approximately 50%. In the areas devoid of canopy and shrub strata the ground stratum was dominated by *C. ventricosa* (Tall chloris) and had a vegetation cover of approximately 50%.

One Type A restricted plant species listed under the provisions of the NC Act was recorded within Area B (ie *Brachychiton populneus* (Kurrajong)). The location of these individuals are listed in Table 1.3 and indicated in Figure 1.1.

Table 1.3 Type A restricted plant species recorded within Area B

Scientific Name	Common Name	Easting (GDA 94, Zone 55)	Northing (GDA 94, Zone 55)
Brachychiton populneus	Kurrajong	702363.67	7080964.25
Brachychiton populneus	Kurrajong	702362.59	7080953.19
Brachychiton populneus	Kurrajong	702300.28	7080894.44

No flora species of conservation significance as listed under the provisions of the NC Act and/or the EPBC Act were recorded within Area B.

1.2.3 Habitat Value

Fifteen bird and one mammal species were recorded within the vicinity proposed development area. These species are listed in Table 1.4.

Table 1.4 Fauna species observed within Area B

Scientific name	Common name
Birds	
Corvus orru	Torresian crow
Cracticus nigrogularis	Pied butcherbird
Cracticus tibicen	Australian magpie
Cracticus torquatus	Grey butcherbird
Dicaeum hirundinaceum	Mistletoe bird
Falco cenchroides	Nankeen kestrel
Malurus lamberti	Variegated fairy-wren
Malurus melanocephalus	Red-backed fairy-wren
Manorina melanocephala	Noisy miner
Pardalotus striatus	Striated pardalote
Platycercus adscitus	Pale-headed rosella

Pomatostomus temporalis	Grey-crowned babbler
Rhipidura leucophrys	Willie wagtail
Smicrornis brevirostris	Weebill
Strepera graculina	Pied currawong
Mammals	
Macropus rufogriseus	Red-necked wallaby

Area B contained the following habitat opportunities:

- Canopy cover suitable for shelter, foraging and perching
- Fissured tree bark
- Limited dense groundcover vegetation (ie grassy tussocks)
- Large amounts of woody debris (ie fallen / felled timber and standing hollow-bearing stags)
- Limited leaf litter
- Limited rocky crevices
- Watercourse habitat (ie bank walls)

The canopy cover within Area B could provide habitat (eg feeding, shelter and nesting sites) for a range of birds. Two bird nests were observed within Area B and are listed in Table 1.5. There were numerous hollows within standing stags and ground timber that may provide nesting and shelter sites for a range of mammal species (eg gliders). The fissured tree bark, limited amounts of leaf litter and rocky crevices have the potential to provide habitat opportunities for reptiles and small mammals. The sandy bank walls of the 'watercourse' are potential nesting sites for reptiles and birds (eg Rainbow bee eater). The 'watercourse' was dry at the time of field investigations and is unlikely to be supportive of species dependent on permanent water supplies.

Table 1.5 List of bird nests observed within Area B

Nest Description	Tree	Easting (Zone: 55 GDA 94)	Northing (Zone: 55 GDA 94)
Ball-shaped. Approximately 40 cm diameter. Possible communal nest for Grey Crowned Babbler (*Pomatostomus temporalis*)	*A. excelsa* (Ironwood)	702306.23	7080898.22
Ball-shaped. Possible communal nest for Grey Crowned Babbler	*C. glaucophylla* (White cypress pine)	702303.37	7080887.74

No fauna species of conservation significance as listed under the provisions of the NC Act and/or EPBC Act were recorded within Area B.

The overall habitat value of Area B is considered moderate due to the 'watercourse' habitat and fauna species observed.

1.3 Area C

1.3.1 General

The proposed development areas are comprised of three (3) investigation polygons within Lot 25 SP214993 (referred as Area C1, C2 and C3). Area C1 is located on the western property border of Lot 25 SP214993 along the extent of an access road and also extends partially into Lot 22 WV432. Area C2 and Area C3 are located to the north and south respectively of the R46 corridor.

The landscape of the proposed development area has been extensively modified as a result of previous vegetation clearing for agricultural purposes (eg grazing of livestock) and road construction activities. Mature woody vegetation within the proposed development areas is very sparse and is restricted to the western property boundary within Area C1.

There are no ESAs mapped within the proposed development areas. There are, however, two ESAs located within close proximity. These include:

- A 'Category C' ESA associated with an 'Of concern' RE is located approximately 200 m east of Area C1
- A 'Category B' ESA associated with an 'Endangered' RE is located approximately 145 m south of Area C3

There is one 'stream order 2' 'watercourse' mapped on the DEHP hydrology layer within the proposed development areas. This 'watercourse' is located within the south of Area C1 and flows west to east.

The landform of Area C is gently undulating and contained brown/red silty-clay soils.

1.3.2 Floristics

The vegetation within the proposed development areas has been previously cleared and an access road occurs within Area C1. The landscape has therefore been extensively modified/disturbed and is fragmented from surrounding vegetation (refer Figure 1.5).

Figure 1.5 **Landscape facing south within Area C1 depicting typical vegetation and cleared access road**

Mature, woody vegetation was restricted to a low, sparse (less than 5% vegetation cover) canopy stratum along the western property boundary within Area C1 and was absent in Areas C2 and C3. The canopy stratum had a height range of 5 to 7 m and was dominated by *E. populnea* (Poplar box). There was no sub-canopy layer present within the proposed development areas.

The shrub layer had a height range of 1.5 to 4 m and had a vegetation cover of approximately 5%. The dominant species recorded in the shrub layer was *E. mitchellii* (False sandalwood) in addition to *G. parviflora* (Wilga), *Sclerolaena birchii* (Galvanised burr), *A. excelsa* (Ironwood), *Eremophila deserti* (Turkey bush), juvenile *E. populnea* (Poplar box) and juvenile *C. glaucophylla* (White cypress pine).

The ground stratum had a vegetation cover of approximately 85% and was dominated by *P. ciliare* (Buffel grass). A range of native and exotic grasses and forbs typical of cleared, agricultural areas were also recorded within Area C including *V. tenuisecta* (Mayne's curse), *Senecio lautus* (Fire weed), *Chloris gayana* (Rhodes grass), *Urochloa mosambicensis* (Sabi grass) and *Eragrostis sororia* (Woodland love grass).

No flora species of conservation significance as listed under the provisions of the NC Act and/or EPBC Act were recorded within Area C. There were no Type A restricted plant species as listed under the provisions of the NC Act recorded within Area C.

1.3.3 Habitat Value

Four bird species were recorded within the vicinity of the proposed development area, namely Grey butcherbird (*Cracticus torquatus*), Noisy miner (*Manorina melanocephala*), Australian raven (*Corvus coronoides*) and Weebill (*Smicrornis brevirostris*). All of these species are listed as 'Least concern' under the provisions of the NC Act and are not listed under the EPBC Act.

Habitat opportunities within Area C were restricted to limited amounts dense groundcover vegetation and watercourse habitat. Habitat value within the proposed development areas is therefore considered low overall, as it contained very limited vegetation and had been disturbed by grazing stock and the invasion of exotic pasture species. Species utilising resources in this area are most likely to be limited to common, generalist species capable of adapting to significant habitat disturbances.

No fauna species of conservation significance as listed under the provisions of the NC Act and/or EPBC Act were recorded within Area C.

The overall habitat value of Area C is considered low due to the limited amount of mature vegetation and dominance of exotic pasture species.

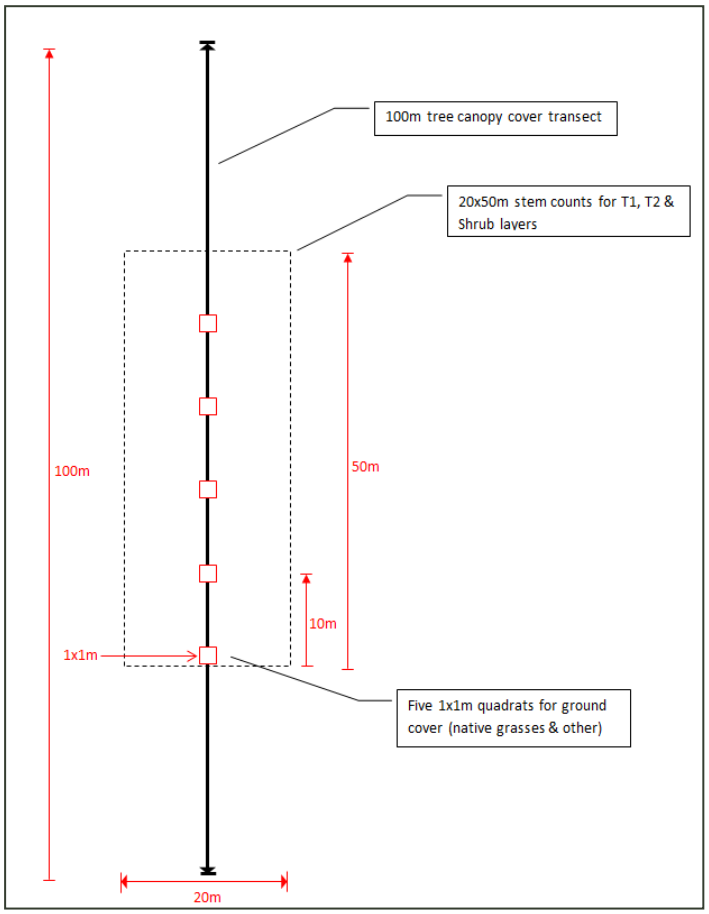
2 References

Queensland Herbarium (2011) *Regional Ecosystem Description Database (REDD). Version 6.0b - January 2011, (January 2011)* Department of Environment and Heritage Protection. Brisbane.

Eyre, T.J., Kelly, A.L, Neldner, V.J., Wilson, B.A., Ferguson, D.J., Laidlaw, M.J. and Franks, A.J. (2011). *BioCondition: A Condition Assessment Framework for Terrestrial Biodiversity in Queensland,Assessment Manual. Version 2.1*. Department of Environment and Resource Management (DERM), Biodiversity and Ecosystem Sciences, Brisbane.

Appendix A Detailed vegetation survey data

This attachment provides the ground cover, canopy cover and stem count data collected during the field investigation for Area A which is referenced throughout the ecological assessment. The diagram below shows the transect arrangement in the field.



Mapped RE 11.10.9 within Area A2

Ground cover data

The following values indicate the percentage of each ground cover category for five (5), 1x1 m quadrats. The average ground cover for each category is also provided in the 'Averages' column.

Groundcover	Q 1 (%)	Q 2 (%)	Q 3 (%)	Q 4 (%)	Q 5 (%)	Averages (%)
Native grasses	30	80	60	15	40	45
Native forbs & herbs				5		5
Non-native grasses						-
Non-native forbs and herbs						-
Shrubs				10		10
Bare ground	5		15	15	10	11.25
Rock						-
Leaf litter	50	10	20	30	40	30
Woody debris	15	10	5	25	10	13

Stem count data

The following table is the stem count data collected during the field investigation for the Canopy (T1), Sub-canopy (T2) and Shrub layer (S1). The heights for each of the stratum are also defined below.

Transect	Stem counts per stratum per 10 x 20 m plots (50x 20m plot overall)		
	T1 (13-18 m)	T2 (6-12 m)	S1 (1-5 m)
0-10 m	0	27	44
10- 20 m	0	13	3
20- 30 m	1	5	9
30- 40 m	1	10	5
40- 50 m	3	8	6
Totals	5	63	67

Stems per hectare calculations

- **T1** (13-18 m) – 50 stems per hectare
- **T2** (6-12 m) – 630 stems per hectare
- **S1** (1-5 m) – 670 stems per hectare

Foliage projective cover data

The total Foliage Projective Cover (FPC) for the T1 and T2 canopies along two (2), 50 m transects, expressed as a percentage is:

- **T1** (13-18 m) – **48% FPC**
- **T2** (6-12 m) – **42% FPC**

- The canopy transect data collected during the field investigation is provided in the following table.

Stratum	Distance		Total (m)
	Start (m)	End (m)	
0-50 m #1			
T1	0	9.5	9.5
T2	0	3	3
T1	8	9	1
T2	12	14.5	2.5
T2	20	29	9
T2	23.5	29	5.5
T1	39	45	6
T2	47	50	3
T2	49	50	1
0-50 m #2			
T1	0	2	2
T2	1.5	7	5.5
T2	11	15	4
T1	13	29	16
T1	21	26.5	5.5
T2	35.5	41	5.5
T1	37.5	45.5	8
T2	42.5	45.5	3
Total T1			**48**
Total T2			**42**

Appendix B Detailed vegetation survey data

Family name	Scientific name	Common name	Notes
Adiantaceae	*Cheilanthes sieberi*	Mulga fern	
Amaranthaceae	*Alternanthera dentata*	Joy weed	
Apocynaceae	*Alstonia constricta*	Bitter bark	
Apocynaceae	*Carissa ovata*	Currant bush	
Asteraceae	*Calotis cuneifolia*	Purple burr daisy	
Asteraceae	*Chrysocephalum apiculatum*	Yellow buttons	
Asteraceae	*Cirsium vulgare*	Spear thistle	Non-native
Asteraceae	*Conyza bonariensis*	Fleabane	Non-native
Asteraceae	*Cotula australis*	Carrot weed	
Asteraceae	*Podolepis jaceoides*	Showy copper wire daisy	
Asteraceae	*Senecio lautus*	Fire weed	
Asteraceae	*Xanthium occidentale*	Noogoora burr	Non-native
Brassicaceae	*Lepidium sagittulatum*	Pepper cress	
Cactaceae	*Opuntia stricta*	Prickly pear	Non-native ,LP Act Class 2 Weed
Cactaceae	*Opuntia tomentosa*	Velvety tree pear	Non-native , LP Act Class 2 Weed
Capparaceae	*Capparis lasiantha*	Nipan	
Capparaceae	*Capparis mitchellii*	Bumble fruit	
Casuarinaceae	*Casuarina cristata*	Belah	
Chenopodiaceae	*Maireana microphylla*	Small-leaf bluebush	
Chenopodiaceae	*Sclerolaena birchii*	Galvanised burr	
Cupressaceae	*Callitris glaucophylla*	White cypress pine	
Droseraceae	*Drosera burmannii*	Sundew	
Fabaceae	*Acacia deanei*	Dean's wattle	
Fabaceae	*Acacia decora*	Pretty wattle	
Fabaceae	*Acacia excelsa*	Iron wood	
Fabaceae	*Acacia fasciculifera*	Scrub Ironbark	
Fabaceae	*Acacia harpophylla*	Brigalow	
Fabaceae	*Acacia implexa*	Hickory wattle	
Fabaceae	*Acacia leiocalyx*	Black wattle	

Family name	Scientific name	Common name	Notes
Fabaceae	*Acacia macradenia*	Zigzag wattle	
Fabaceae	*Acacia salicina*	Sally wattle	
Fabaceae	*Acacia* sp.		Juvenile
Fabaceae	*Desmodium varians*	Tree foil	
Fabaceae	*Glycine tabacina*		
Fabaceae	*Hovea lorata*	Hovea	
Fabaceae	*Lotus cruentus*	Red-flowered lotus	
Fabaceae	*Medicago polymorpha*	Burr medic	Non-native
Fabaceae	*Swainsona galegifolia*	Swainsona	
Goodeniaceae	*Goodenia glabra*	Smooth goodenia	
Juncaceae	*Juncus usitatus*	Juncus	
Laxmanniaceae	*Lomandra multiflora*		
Lomandraceae	*Lomanda leucocephala*	Lomandra	
Lomandraceae	*Lomandra hystrix*	Creek mat rush	
Lomandraceae	*Lomandra longifolia*	Lomandra	
Malvaceae	*Abutilon leucopetalum*	Abutilon	
Malvaceae	*Malvastrum americanum*	Spiny malvastrum	Non-native
Malvaceae	*Sida hackettiana*	Queensland hemp	
Malvaceae	*Sida spinosa*	Spiny sida	
Meliaceae	*Owenia acidula*	Emu apple	
Myoporaceae	*Eremophila deserti*	Turkey bush	
Myoporaceae	*Eremophila mitchellii*	False sandalwood	
Myrtaceae	*Angophora floribunda*	Rough-barked apple	
Myrtaceae	*Corymbia erythrophloia*	Variable-barked bloodwood	
Myrtaceae	*Corymbia tessellaris*	Moreton bay ash	
Myrtaceae	*Eucalyptus chloroclada*	Dirty gum	
Myrtaceae	*Eucalyptus crebra*	Narrow leaved ironbark	
Myrtaceae	*Eucalyptus melanophloia*	Silver leaved ironbark	
Myrtaceae	*Eucalyptus melanophloia x e fibrosa*		
Myrtaceae	*Eucalyptus populnea*	Poplar box	
Oxalidaceae	*Oxalis stricta*	Yellow wood sorrel	Non-native
Papaveraceae	*Argemone ochroleuca*	Mexican poppy	Non-native

Family name	Scientific name	Common name	Notes
Phormiaceae	*Dianella* sp.		
Picrodendraceae	*Petalostigma pubescens*	Quinine	
Pittosporaceae	*Bursaria incana*		
Poaceae	*Ancistrachne uncinulata*	Giant spear grass	
Poaceae	*Aristida jerichoensis*	Jericho wire grass	
Poaceae	*Austrostipa verticillata*	Slender bamboo grass	
Poaceae	*Bothriochloa bladhii*	Forest blue grass	
Poaceae	*Chloris gayana*	Rhodes grass	Non-native
Poaceae	*Chloris pectinata*	Comb chloris	
Poaceae	*Chloris truncata*		
Poaceae	*Chloris ventricosa*	Tall chloris	
Poaceae	*Cymbopogon refractus*	Barbed wire grass	
Poaceae	*Cynodon dactylon*	Green couch	
Poaceae	*Dichanthium sericeum*	Queensland blue grass	
Poaceae	*Enneapogon pallidus*	Conetop nineawn	
Poaceae	*Eragrostis brownii*	Browns love grass	
Poaceae	*Eragrostis cilianensis*		
Poaceae	*Eragrostis sororia*	Woodland love grass	
Poaceae	*Heteropogon contortus*	Black spear grass	
Poaceae	*Melinis repens*	Red natal	Non-native
Poaceae	*Panicum effusum*	Inquisitive grass	
Poaceae	*Pennisetum ciliare*	Buffel grass	Non-native
Poaceae	*Setaria australiensis*	Pigeon grass	
Poaceae	*Sporobolus creber*	Western rats tail grass	
Poaceae	*Themeda avenacea*	Wild oats grass	
Poaceae	*Themeda triandra*	Kangaroo grass	
Poaceae	*Urochloa mosambicensis*	Sabi grass	Non-native
Proteaceae	*Grevillea striata*	Beefwood	
Proteaceae	*Hakea lorea*	Bootlace oak	
Rhamnaceae	*Alphitonia excelsa*	Red ash	
Rutaceae	*Citrus glauca*	Lime bush	
Rutaceae	*Geijera parviflora*	Wilga	

Family name	Scientific name	Common name	Notes
Sapindaceae	*Alectryon diversifolius*	Scrub boonaree	
Sapindaceae	*Atalaya hemiglauca*	Whitewood	
Solanaceae	*Lycium ferocissimum*	African boxthorn	Non-native , LP Act Class 2 Pest
Sterculiaceae	*Brachychiton populneus*	Kurrajong	NC Act Type A species
Sterculiaceae	*Brachychiton rupestris*	Narrow leaved bottle tree	NC Act Type A species
Verbenaceae	*Verbena litoralis*	Tall verbena	Non-native
Verbenaceae	*Verbena rigida var. Rigida*	Veined verbena	Non-native
Verbenaceae	*Verbena tenuisecta*	Mayne's curse	Non-native

Table Notes: LP Act – Land Protection (Pest and Stock Route Management) Act 2002