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Project: Fairview Ecological
Assessment Report
Proposed Springwater Camp Extension 3
– Lot 8 on AB200

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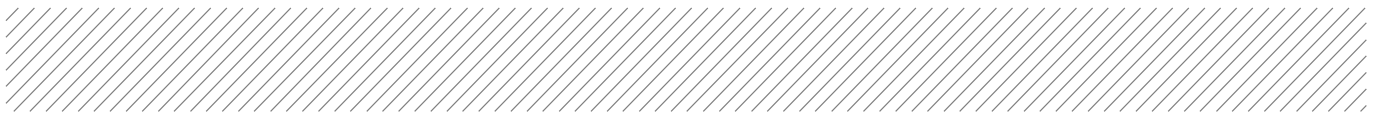
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Appendix A Botanical species list



1 Background

1.1 Project description

Santos Ltd (Santos) has commissioned Aurecon Australia Pty Ltd (Aurecon) to undertake ecological investigations of proposed areas of development for the expansion of the Fairview Gas Fields.

The Fairview gas fields are situated approximately 40km from Injune in southern Queensland. This area is characterised by elevated sandstone ranges including the Carnarvon and Expedition Ranges and part of the Mount Hutton and Kongabula Ranges. The Dawson River and other smaller watercourses drain this area and the vegetation is dominated by Eucalyptus and White Cypress Pine woodland, Brigalow and Semi-evergreen Vine Thicket (Eddie, 2007). Much of this area has been subjected to cattle grazing and other agricultural practices as well as previous development associated with the gas fields.

This report is specific to the proposed expansion of the Springwater Camp which is contained within Lot 8 on AB200 and shown in Figure 1.

1.2 Purpose of report

The aim of this report is to provide an ecological assessment of the proposed development area located within Lot 8 on AB200 (Figure 1), and to identify areas and species of notable ecological or conservation value. This report does not make any recommendations regarding the development in relation to any Santos environmental authorities or other approvals.

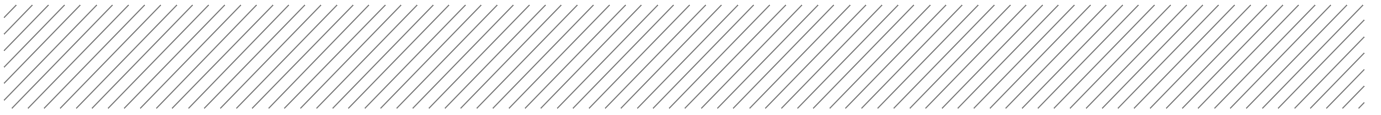


Figure 1



2 Methodology

2.1 Desktop methodology

Proposed development areas have been projected on a range of maps provided by Santos. These maps include Regional Ecosystem (RE) Mapping (version 6.1; Department of Environment and Resource Management [DERM]), Environmentally Sensitive Areas (ESA) mapping, drainage mapping and aerial photography. Where available ahead of time, these resources were reviewed to determine target areas for the field inspection. It is important to note that the RE classifications referred to in this report are based on the 'biodiversity status' of the vegetation and not the '*Vegetation Management Act 1999* (VM Act) status' of the vegetation. Note that the official DERM mapping (based on the VM Act status) is used to generate the figures within this report.

2.2 Field methodology

The proposed development area was assessed by two Aurecon ecologists (Chris Schell and Cassandra Arkinstall) during the month of November 2011. This assessment was undertaken to determine the existing vegetation communities and habitat value of the proposed clearing within the development areas as well as to verify the RE mapping as produced by DERM.

GIS environmental constraints layers (eg RE Mapping, ESA mapping etc) and high resolution aerial photography were uploaded onto a toughbook (C5 mobile clinical assistant CFT-001 – Motion computing), with an integrated GPS used to locate surveys areas. Handheld Garmin GPS units (GPS map 76) were also used during the field investigations. It should be noted that while efforts were made to ensure the GPS co-ordinates provided in this report are accurate, a margin of error approximately +/- 15 m is expected due to the limitations of the devices used and the recording environment.

The ground-truthing of the proposed development areas included undertaking detailed flora species surveys including sampling of unknown flora, and recording all incidental fauna observations. All species known to be of conservation significance (such as endangered, vulnerable, near threatened or Type A species under the *Nature Conservation Act 1992* [NC Act] or endangered, vulnerable or rare species under the *Environment Protection and Biodiversity Conservation Act 1999* [EPBC Act]) were recorded using the toughbook.

A list of flora species observed in the proposed development areas has been included in Appendix A. Incidental fauna observations are provided in the relevant sections throughout this report.



3 Ecological assessment

3.1 General

The proposed development area is located within an existing clearing, directly adjacent to the existing Springwater Camp (Figure 1).

The proposed development area is mapped as non-remnant vegetation on the DERM Certified RE mapping. Ground-truthing of the proposed development area has confirmed that the site occurs entirely within non-remnant vegetation.

As a result of its close proximity to a mapped Endangered RE community, the extreme western portion of the proposed development area is mapped as occurring within a Category B ESA (Figure 1).

No mapped watercourses occur within the proposed development area.

3.2 Floristics

The proposed development area is located within a highly modified environment which has resulted from historical vegetation clearing and historic land management practices. As discussed in Section 3.1, the proposed development area occurs entirely within non-remnant vegetation.

The canopy stratum within the proposed development footprint is considered very sparse (ie canopy cover of approximately 1%), and is composed of *Eucalyptus populneus* (Poplar Box) and *Brachychiton populnea* (Kurrajong). Planted *Brachychiton rupestris* (Narrow-leaved Bottle Tree) were also located within the proposed expansion area. Canopy species approximated 15 m in height.

The shrub stratum contained species including *Atalaya hemiglauca* (White wood), *Acacia* species, *Geijera parvifolia* (Wilga) and *Eremophila* species. The shrub layer was very sparse (ie 2% cover), and approximated 3 m in height.

The ground stratum varied in density, from absent (ie. in car park areas and roads) to very dense (ie 90% cover in areas devoid of infrastructure). Native and exotic grasses and forbs dominated the ground stratum.

No species of conservation significance under the provisions of the NC Act or EPBC Act were observed within the proposed development area. However, two (2) Type A restricted plants (under the provisions of the NC Act) (ie *Brachychiton populnea* [Kurrajong] and *Brachychiton rupestris* [Narrow-leaved Bottle Tree]) were detected within the proposed development area. The location of these species is presented in Table 3.1 and indicated in Figure 1.

Table 3.1 Location of Type A restricted Flora Species within the proposed development area

Scientific Name	Common Name	Easting	Northing
<i>Brachychiton populnea</i>	Kurrajong	693580.35	7148914.11
<i>Brachychiton populnea</i>	Kurrajong	693748.36	7148794.63
<i>Brachychiton rupestris</i>	Narrow-leaved Bottle Tree	693645.11	7148999.47
<i>Brachychiton rupestris</i>	Narrow-leaved Bottle Tree	693560.99	7148921.15
<i>Brachychiton rupestris</i>	Narrow-leaved Bottle Tree	693569.46	7148916.92
<i>Brachychiton rupestris</i>	Narrow-leaved Bottle Tree	693565.06	7148918.10
<i>Brachychiton rupestris</i>	Narrow-leaved Bottle Tree	693488.60	7148972.51
<i>Brachychiton rupestris</i>	Narrow-leaved Bottle Tree	693605.98	7148944.53
<i>Brachychiton rupestris</i>	Narrow-leaved Bottle Tree	693597.18	7148932.92
<i>Brachychiton rupestris</i>	Narrow-leaved Bottle Tree	693593.72	7148929.31

A list of flora species observed within the proposed development area is provided in Appendix A.

3.3 Habitat values

Habitat features associated with the proposed development area include:

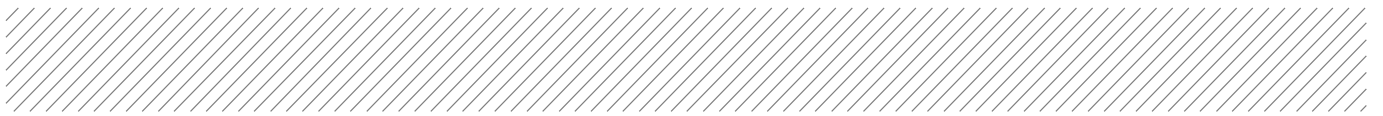
- Very limited canopy cover suitable for shelter, foraging and perching
- Moderate groundcover vegetation (ie grassy tussocks)
- Very limited Woody debris (ie fallen/felled timber, including hollow-bearing logs)

The habitat value of the proposed development area can be considered to be low overall, especially for EVNT species, given its highly modified state. Notwithstanding, it provides limited sources of fauna habitat, particularly for more common species normally associated with disturbed sites. The scattered trees have the potential to provide refuge and nesting niches for some larger bird species, such as Torresian crows (*Corvus orru*) and Magpies (*Gymnorhina tibicen*).

Fifteen (15) incidental fauna species were recorded within the proposed development area, as indicated in Table 3.2. All of these species are listed as Least Concern under the provisions of the NC Act, and are not listed under the provisions of the EPBC Act.

Table 3.2 Incidental fauna species recorded within the proposed development area

Common Name	Species Name
Apostle Bird	<i>Struthidea cinerea</i>
Australian magpie	<i>Gymnorhina tibicen</i>
Australian Pipit	<i>Anthus australis</i>
Brown Honey-eater	<i>Lichmera indistincta</i>
Black-faced Cuckoo-shrike	<i>Coracina novaehollandiae</i>
Channel-billed Cuckoo	<i>Scythrops novaehollandiae</i>
Cow	<i>Bos indicus x taurus</i>
Grey Butcherbird	<i>Cracticus torquatus</i>



Common Name	Species Name
Magpie Lark	<i>Grallina cyanoleuca</i>
Noisy Friarbird	<i>Philemon corniculatus</i>
Noisy miner	<i>Manorina melanocephala</i>
Pale-headed Rosella	<i>Platycercus eximius</i>
Striated pardalote	<i>Pardalotus striatus</i>
Torresian Crow	<i>Corvus orru</i>
Willie Wagtail	<i>Rhipidura leucophrys</i>



4 Conclusion

The proposed development area occurs within non-remnant vegetation. A small portion within the western section of the proposed disturbance area occurs within the buffer area of a Category B ESA. No mapped waterways occur within the proposed disturbance area.

No flora or fauna species listed as endangered, vulnerable or near-threatened under the provisions of the EPBC Act and/or the NC Act was identified within the proposed development area. However, several individuals of two species listed as Type A species under the provisions of the NC Act were identified within the proposed development area.

Typically, the habitat values associated with the proposed development area is considered to be relatively low.



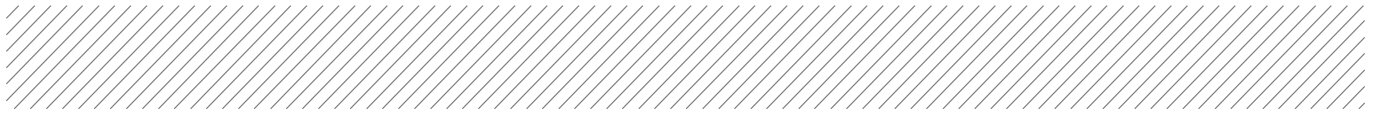
5 References

Eddie, C (2007) Field Guide to Trees and Shrubs of Eastern Queensland Oil and Gas Fields, First Edition, Santos Ltd, Adelaide.

Regional Ecosystem Mapping, Version 6.1, Queensland Government Department of Environment and Resource Management (DERM).

Appendices





Appendix A

Botanical species list

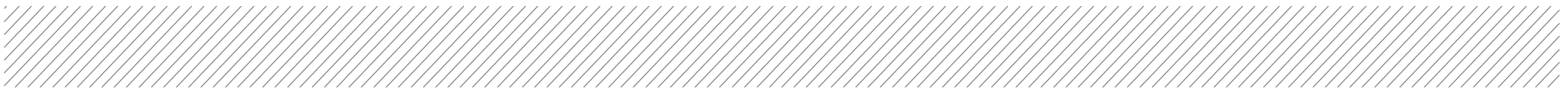


Family	Scientific name	Common Name	NC Act	EPBC Act	Sig	Notes
Adiantaceae	<i>Cheilanthes sieberi</i>	Mulga Fern	C	U		
Amaranthaceae	<i>Alternanthera denticulata</i>	Lesser Joyweed	C	U		
Amaranthaceae	<i>Alternanthera nodiflora</i>	Joyweed	C	U		
Amaranthaceae	<i>Alternanthera pungens</i>	Khaki Weed	U	U		non-native
Amaranthaceae	<i>Gomphrena celosioides</i>	Gomphrena Weed	U	U		non-native
Amaranthaceae	<i>Ptilotus exaltatus</i>	Lamb's Tail	C	U		
Amaranthaceae	<i>Ptilotus macrocephalus</i>	Green Pussetails	C	U		
Apiaceae	<i>Hydrocotyle trachycarpa</i>	Wild Parsley	C	U		
Apiaceae	<i>Trachymene ochracea</i>	White Parsnip	C	U		
Asclepiadaceae	<i>Gomphocarpus physocarpus</i>	Balloon Cottonbush	U	U		non-native
Asteraceae	<i>Bracteantha bracteata</i>	Yellow Everlasting Daisy	C	U		
Asteraceae	<i>Calotis cuneifolia</i>	Burr Daisy	C	U		
Asteraceae	<i>Calotis lappulacea</i>	Yellow Burr Daisy	C	U		
Asteraceae	<i>Chrysocephalum apiculatum</i>	Yellow Buttons	C	U		
Asteraceae	<i>Cirsium vulgare</i>	Spear Thistle	U	U		non-native
Asteraceae	<i>Conyza canadensis</i>	Fleabane	U	U		non-native
Asteraceae	<i>Epaltes australis</i>	Spreading Nutheads	C	U		
Asteraceae	<i>Podolepis jaceoides</i>	Showy Copper-Wire Daisy	C	U		
Asteraceae	<i>Pseudognaphalium luteoalbum</i>	Jersey Cudweed	C	U		

Family	Scientific name	Common Name	NC Act	EPBC Act	Sig	Notes
Asteraceae	<i>Pterocaulon sphacelatum</i>	Applebush	C	U		
Asteraceae	<i>Senecio lautus</i>	Native Fireweed	C	U		
Asteraceae	<i>Sonchus oleraceus</i>	Common Sowthistle	U	U		non-native
Asteraceae	<i>Tagetes minuta</i>	Stinking Roger	U	U		non-native
Asteraceae	<i>Tridax procumbens</i>	Tridax Daisy	U	U		non-native
Boraginaceae	<i>Heliotropium amplexicaule</i>	Blue Heliotrope	U	U		non-native
Brassicaceae	<i>Lepidium africanum</i>	Common Peppergrass	U	U		non-native
Brassicaceae	<i>Rapistrum rugosum</i>	Turnip Weed	U	U		non-native
Cactaceae	<i>Opuntia tomentosa</i>	Velvety Tree Pear	U	U	Class 2 weed	non-native
Campanulaceae	<i>Wahlenbergia communis</i>	Tufted Bluebell	C	U		
Campanulaceae	<i>Wahlenbergia gracilis</i>	Sprawling Bluebell	C	U		
Chenopodiaceae	<i>Chenopodium desertorum</i>	Desert Goosefoot	C	U		
Chenopodiaceae	<i>Maireana microphylla</i>	Small-Leaved Cottonbush	C	U		
Chenopodiaceae	<i>Salsola kali</i>	Soft Roly-Poly	C	U		
Chenopodiaceae	<i>Sclerolaena birchii</i>	Galvanised Burr	C	U		
Chenopodiaceae	<i>Sclerolaena muricata</i>	Black Roly-poly	C	U		
Commelinaceae	<i>Murdannia graminea</i>	Murdannia	C	U		
Convolvulaceae	<i>Convolvulus erubescens</i>	Australian Bindweed	C	U		
Cyperaceae	<i>Cyperus difformis</i>	Rice Sedge	C	U		

Family	Scientific name	Common Name	NC Act	EPBC Act	Sig	Notes
Cyperaceae	<i>Fimbristylis dichotoma</i>	Common Fringe-Rush	C	U		
Cyperaceae	<i>Gahnia aspera</i>	Saw Sedge	C	U		
Euphorbiaceae	<i>Euphorbia drummondii</i>	Caustic Weed	C	U		
Euphorbiaceae	<i>Phyllanthus virgatus</i>	Hen And Chicken	C	U		
Fabaceae	<i>Desmodium varians</i>	Slender Tick Trefoil	C	U		
Fabaceae	<i>Glycine tabacina</i>	Glycine Pea	C	U		
Fabaceae	<i>Glycine tomentella</i>	Woolly Glycine	C	U		
Fabaceae	<i>Indigofera linnaei</i>	Birdsville Indigo	C	U		
Fabaceae	<i>Indigofera pratensis</i>		C	U		
Fabaceae	<i>Medicago polymorpha</i>	Burr Medic	U	U		non-native
Fabaceae	<i>Psoralea tenax</i>	Emu Foot	C	U		
Fabaceae	<i>Rhynchosia minima</i>		C	U		
Geraniaceae	<i>Erodium crinitum</i>	Blue Crowfoot	C	U		
Goodeniaceae	<i>Goodenia glabra</i>	Goodenia	C	U		
Juncaceae	<i>Juncus usitatus</i>	Reed	C	U		
Laxmanniaceae	<i>Laxmannia gracilis</i>	Slender Wire Lily	C	U		
Malvaceae	<i>Hibiscus sturtii</i>	Hill Hibiscus	C	U		
Malvaceae	<i>Malvastrum americanum</i>	Malvastrum	C	U		
Malvaceae	<i>Sida corrugata</i>	Currigated Sida	C	U		

Family	Scientific name	Common Name	NC Act	EPBC Act	Sig	Notes
Malvaceae	<i>Sida rhombifolia</i>	Paddy's Lucerne	U	U		non-native
Malvaceae	<i>Sida subspicata</i>	Spiked Sida	C	U		
Marsileaceae	<i>Marsilea drummondii</i>	Common Nardoo	C	U		
Mimosaceae	<i>Acacia leiocalyx</i>	Black Wattle	C	U		
Mimosaceae	<i>Acacia longispicata</i>	Wattle	C	U		
Mimosaceae	<i>Neptunia gracilis</i>	Native Sensitive Plant	C	U		
Myoporaceae	<i>Eremophila debilis</i>	Winter Apple	C	U		
Myoporaceae	<i>Eremophila deserti</i>		C	U		
Myoporaceae	<i>Eremophila mitchellii</i>		C	U		
Myrtaceae	<i>Eucalyptus chloroclada</i>	Baradine Red Gum	C	U		
Myrtaceae	<i>Eucalyptus populnea</i>	Poplar Box	C	U		
Oxalidaceae	<i>Oxalis corniculata</i>	Wood Sorrel	C	U		
Plantaginaceae	<i>Plantago cunninghamii</i>	Sago Weed	C	U		
Plantaginaceae	<i>Plantago drummondii</i>	Dark Sago Weed	C	U		
Poaceae	<i>Alloteropsis semialata</i>	Cockatoo Grass	C	U		
Poaceae	<i>Aristida calycina</i>	Dark Wiregrass	C	U		
Poaceae	<i>Aristida caput-medusae</i>	Many-Headed Wiregrass	C	U		
Poaceae	<i>Aristida jerichoensis</i>	Jericho Wiregrass	C	U		
Poaceae	<i>Aristida leptopoda</i>	White Speargrass	C	U		



Family	Scientific name	Common Name	NC Act	EPBC Act	Sig	Notes
Poaceae	<i>Aristida platychaeta</i>	Curled Wiregrass	C	U		
Poaceae	<i>Bothriochloa bladhii</i>	Forest Bluegrass	C	U		
Poaceae	<i>Bothriochloa erianthoides</i>	Satintop Grass	C	U		
Poaceae	<i>Bothriochloa ewartiana</i>	Desert Bluegrass	C	U		
Poaceae	<i>Bromus catharticus</i>	Prairie Grass	U	U		non-native
Poaceae	<i>Chloris gayana</i>	Rhodes Grass	U	U		non-native
Poaceae	<i>Chloris pectinata</i>	Comb Chloris	C	U		
Poaceae	<i>Chloris truncata</i>	Windmill Grass	C	U		
Poaceae	<i>Cymbopogon refractus</i>	Barbed-Wire Grass	C	U		
Poaceae	<i>Cynodon dactylon</i>	Coach Grass	U	U		non-native
Poaceae	<i>Dichanthium sericeum</i>	Blue Grass	C	U		
Poaceae	<i>Digitaria ammophila</i>	Silky Umbrella Grass	C	U		
Poaceae	<i>Digitaria brownii</i>	Finger Grass	C	U		
Poaceae	<i>Echinochloa colona</i>	Awnless Barnyard Grass	U	U		non-native
Poaceae	<i>Eragrostis brownii</i>	Brown's Lovegrass	C	U		
Poaceae	<i>Eragrostis cilianensis</i>	Stink Grass	U	U		non-native
Poaceae	<i>Eragrostis parviflora</i>	Weeping Lovegrass	C	U		
Poaceae	<i>Eragrostis sororia</i>	Woodland Lovegrass	C	U		
Poaceae	<i>Eulalia aurea</i>	Silky Browntop	C	U		

Family	Scientific name	Common Name	NC Act	EPBC Act	Sig	Notes
Poaceae	<i>Leptochloa digitata</i>	Umbrella Canegrass	C	U		
Poaceae	<i>Melinis repens</i>	Red Natal Grass	U	U		non-native
Poaceae	<i>Panicum effusum</i>	Panic Grass	C	U		
Poaceae	<i>Paspalum dilatatum</i>	Paspalum	U	U		non-native
Poaceae	<i>Paspalum urvillei</i>	Vasey Grass	U	U		non-native
Poaceae	<i>Pennisetum ciliara</i>	Buffel Grass	U	U		non-native
Poaceae	<i>Sorghum sp.</i>	Sorghum	U	U		non-native
Poaceae	<i>Sporobolus creber</i>	Desert Rats Tail Grass	C	U		
Poaceae	<i>Themeda triandra</i>	Kangaroo Grass	C	U		
Poaceae	<i>Urochloa mosambicensis</i>	Sabi Grass	U	U		non-native
Polygonaceae	<i>Rumex dumosus</i>	Wiry Dock	C	U		
Primulaceae	<i>Anagallis arvensis</i>	Blue Pimpernel	U	U		
Rhamnaceae	<i>Alphitonia excelsa</i>	Soap Tree	C	U		
Rubiaceae	<i>Richardia brasiliensis</i>	White Eye	U	U		non-native
Rutaceae	<i>Geijera parviflora</i>	Wilga	C	U		
Solanaceae	<i>Solanum americanum</i>	Black Nightshade	U	U		non-native
Solanaceae	<i>Solanum esuriale</i>	Potato Weed	C	U		
Sterculiaceae	<i>Brachychiton populneus</i>	Kurrajong	C	U		
Sterculiaceae	<i>Brachychiton rupestris</i>	Narrow-Leaved Bottletree	C	U		



Family	Scientific name	Common Name	NC Act	EPBC Act	Sig	Notes
Verbenaceae	<i>Verbena officinalis</i>	Common Verbena	C	U		
Verbenaceae	<i>Verbena rigida</i>	Veined Verbena	U	U		non-native
Verbenaceae	<i>Verbena tenuisecta</i>	Mayne's Pest	U	U		non-native

Note: C = Least Concern Species; U = species not listed



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