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Appendices

1 Background

1.1 Project description

Santos Ltd (Santos) have commissioned Aurecon Australia Pty Ltd (Aurecon) to undertake ecological investigations of proposed areas of development for the Roma gas fields.

The Roma gas fields are located near the township of Roma and are characterised by undulating terrain with small elevated areas including the Thomby and Grafton Range. The dominant vegetation types within the Roma gas fields include Eucalypt and/or Brigalow woodlands, Blue grass or Mitchell grass downs, and smaller areas of White Cypress Pine and Mulga (Eddie 2007). The Roma gas fields are located within the Balonne River catchment.

Much of this area has been subject to cattle grazing and other agricultural practices, as well as previous development associated with the gas fields.

This report is specific to the proposed development area listed below and shown in Figure 1.1:

- Pipeline corridor R78

This area is referred to as the 'proposed development area', and is located entirely within Lot 111 on SP 113920. Note that the subject of this report is solely related to Lot 111 on SP 113920. Where survey areas overlap additional properties, these sites will be further addressed in the report relevant to those properties/lots.

1.2 Purpose of report

The aim of this report is to provide an ecological assessment of the proposed development areas located on Lot 111 on SP 113920 (Figure 1.1) 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.

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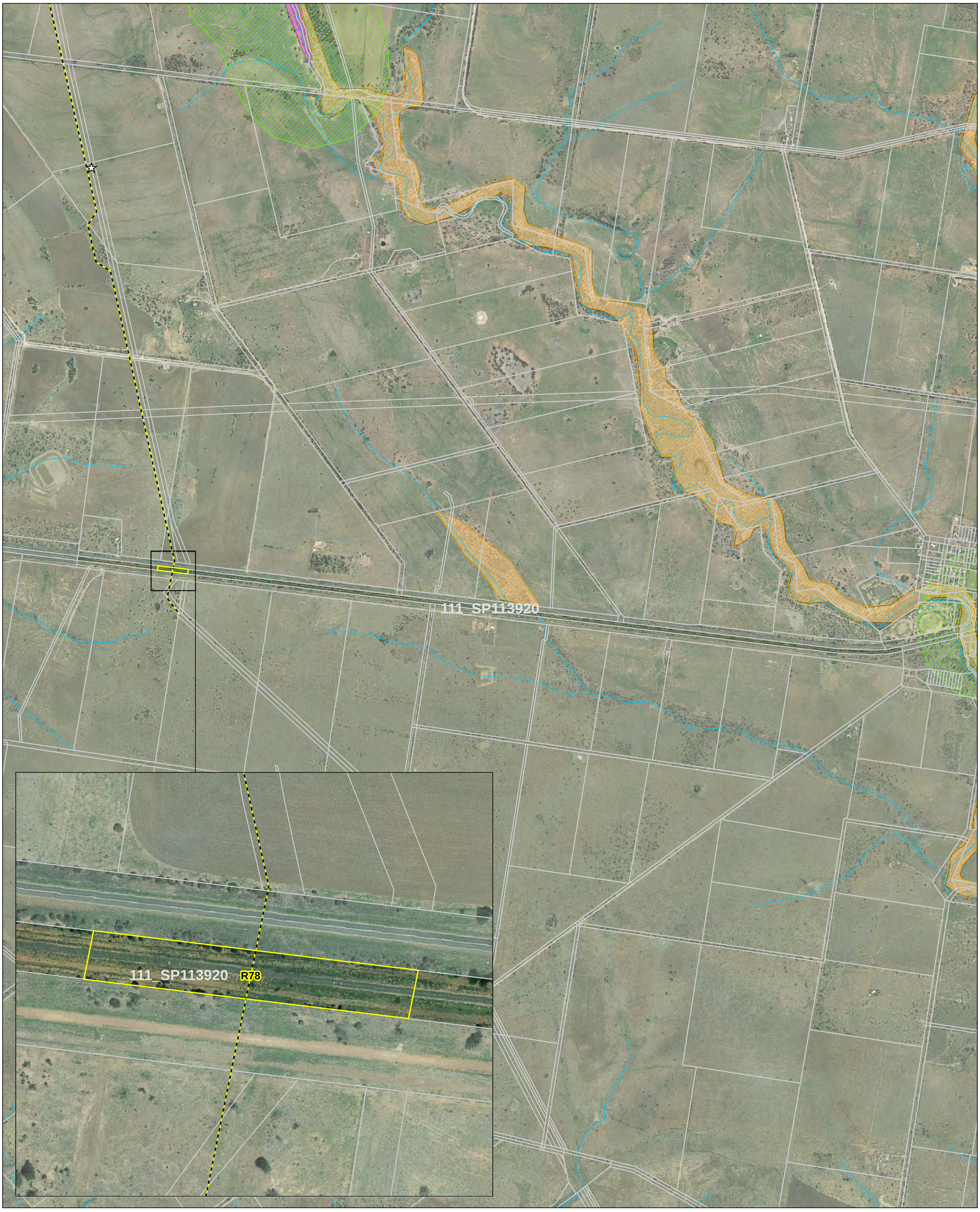

Legend

- EVNT and Type A Species
- Corridors - Ground Truth
- Geotech Borehole
- Cadastre
- Watercourse

ESA Mapping (Including Buffer Areas)

- Category A
- Category B
- Category C

Regional Ecosystem

- Endangered - Dominant
- Endangered - Sub-dominant
- Of Concern - Dominant
- Of Concern - Sub-dominant
- Least Concern

Source:
Cadastre: DERM, 2011.
Regional Ecosystems: Version 6, The State of Queensland (Department of Environment and Resource Management), Nov 2009.

A1 scale: 1:12,500

0 125 250 500 750 1,000 Meters

Date: 03/08/2011 Version: 1 Job No: 215648

Coordinate system: GDA_1994_MGA_Zone_55

Santos Upstream Ecological Assessment

Figure 1-1: Location of Proposed Pipeline Corridors Investigated

2 Methodology

2.1 Desktop methodology

Areas of development have been projected on a range of maps provided by Santos. These maps include Regional Ecosystem (RE) Mapping (version 6.0, 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 used 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.

2.2 Field methodology

The proposed corridors were assessed by one (1) ecologist (Dr Chris Schell) between 1 June to 7 June 2011. This assessment was to determine the existing vegetation communities and habitat value of the proposed clearing within the pipeline corridors 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 corridor assessed was 100 m wide. The ground-truthing of the corridor 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* and/or the *Environment Protection and Biodiversity Conservation Act 1999* [EPBC Act]) were recorded using the tough book.

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 Corridor R78

General

The proposed corridor is on Lot 111 SP113920 (Figure 1.1 and Figure 1.2). The site is bisected by a rail corridor. R78 is located perpendicular to this rail corridor and divides Lot 111 on SP113920 into to roughly even portions. The proposed development area has been extensively disturbed as a result of previous vegetation clearing and the instillation of infrastructure (ie rail corridor and easement).

The development area is currently mapped as non remnant vegetation on the DERM RE mapping (Figure 1.1). There are no ESA's mapped within the development area.

No watercourses are mapped within the proposed well pad.

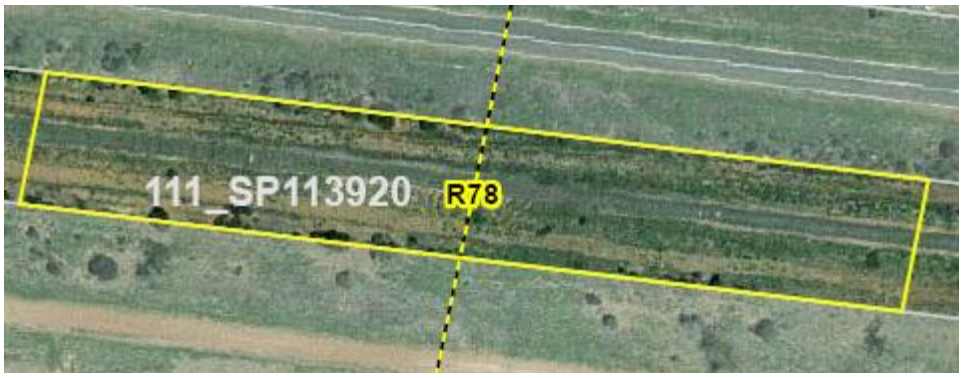

Figure 1.2 Aerial Photograph of R78

Geotechnical survey locations

No geotechnical survey locations were assessed as part of this well pad.

Floristics

The vegetation within the proposed development area has been previously cleared. The vegetation associated with the impact area is characterised by a dense ground cover layer which is dominated by exotic grass species including *Pennisetum ciliare* (Buffel Grass), and *Melinis repens* (Red Natal Grass). Canopy and shrub layers are generally absent from the proposed disturbance area.

No species of conservation significance as listed under the der the provisions of the EPBC Act and/or NC Act were observed within the proposed disturbance area. In addition, no Type A flora species as listed under the provisions of the NC Act were recorded within the proposed well pad.

A list of flora species observed within the proposed corridor is presented in Appendix A.

Habitat values

No incidental fauna species were recorded within the proposed disturbance area

Only a single habitat feature was associated with the proposed disturbance area was recorded (ie Dense groundcover vegetation).

The habitat value of the proposed development area is low overall, as it contains no canopy or mid storey vegetation. In addition, it is highly fragmented and is isolated from areas containing structurally complex vegetation.

4 Conclusion

The proposed development areas occur within a highly disturbed landscape comprised of relatively homogenous flora species.

No areas mapped as remnant vegetation on the DERM certified RE mapping will be traversed by the proposed corridors.

No watercourses occur within, or in close proximity to, development areas and the disturbance has a relatively low fauna habitat value.

No species protected under the provisions of the EPBC Act and/or NC Act were observed within the proposed development areas during these investigations.

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 6.0, Queensland Government Department of Environment and Resource Management (DERM).

Appendix A
Flora Species List

Appendix A

Family Name	Scientific Name	Common Name
Amaranthaceae	*Alternanthera dentata*	Lesser Joy Weed
Asteraceae	*Bidens bipinnata*	Cobblers Pegs
Asteraceae	*Brachycome dentata*	Lobe-Seed Daisy
Asteraceae	*Calotis lappulacea*	Yellow Burr Daisy
Asteraceae	*Chrysocephalum apiculatum*	Yellow Buttons
Asteraceae	*Cirsium vulgare*	Spear Thistle, Black Thistle
Asteraceae	*Conyza canadensis*	Fleabane
Asteraceae	*Epaltes australis*	Spreading Nut heads
Asteraceae	*Senecio latus*	Fire Weed
Asteraceae	*Sonchus oleraceus*	Common Sow thistle
Asteraceae	*Tagetes minuta*	Stinking Rodger
Brassicaceae	*Lepidium africanum*	Pepper Cress
Chenopodiaceae	*Maireana microphylla*	Small-Leaf Bluebush
Chenopodiaceae	*Sclerolaena muricata*	Black Rolly-Polly
Cyperaceae	*Cyperus gracilis*	Bunchy Sedge
Euphorbiaceae	*Chamaesyce drummondii*	Caustic Weed
Euphorbiaceae	*Phyllanthus gunnii*	Scrubby Spurge
Fabaceae	*Indigofera linnaei*	Birdsville Indigo
Malvaceae	*Sida rhombifolia*	Paddy's Lucerne
Myoporaceae	*Eremophila debilis*	Winter Apple
Myoporaceae	*Eremophila mitchellii*	False Sandalwood
Myrsinaceae	*Anagallis arvensis*	Scarlet Pimpernel
Oxalidaceae	*Oxalis stricta*	Yellow Wood Sorrel
Papaveraceae	*Argemone ochroleuca*	Mexican Poppy
Poaceae	*Aristida jerichoensis*	Jericho Wire Grass
Poaceae	*Chloris pectinata*	Chloris
Poaceae	*Cymbopogon refractus*	Barbed-Wire Grass
Poaceae	*Cynodon dactylon*	Couch Grass
Poaceae	*Dichanthium sericeum*	Queensland Blue Grass
Poaceae	*Eragrostis brownii*	Browns Lovegrass
Poaceae	*Eragrostis cilianensis*	Stink grass
Poaceae	*Melinis repens*	Red Natal

Family Name	Scientific Name	Common Name
Poaceae	*Panicum effusum*	Inquisitive Grass
Poaceae	*Pennisetum ciliare*	Buffel Grass
Poaceae	*Perotis rara*	Comet Grass
Poaceae	*Sorghum halepense*	Johnson Grass
Poaceae	*Sporobolus creber*	Western Rats Tail Grass
Poaceae	*Themeda triandra*	Kangaroo Grass
Poaceae	*Urochloa mosambicensis*	Urochloa
Solanaceae	*Solanum nigrum*	Black Nightshade
Verbenaceae	*Verbena officinalis*	Common Verbena, Native Verbena
Verbenaceae	*Verbena tenuisecta*	Mayne's Curse

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