

**Roma Ecological Assessment
Report
Water to Grade Pipeline
Corridor Investigations - Lot
114 WV463
Santos Ltd**


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Contents

1.	Background	1
1.1	Project description	1
1.2	Purpose of the report	1
2.	Methodology	3
2.1	Desktop methodology	3
2.2	Field methodology	3
3.	Ecological assessment	4
3.1	General	4
3.2	Floristics	4
3.3	Habitat values	5
4.	Conclusions	6
5.	References	7

Appendix A

Flora species list

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.

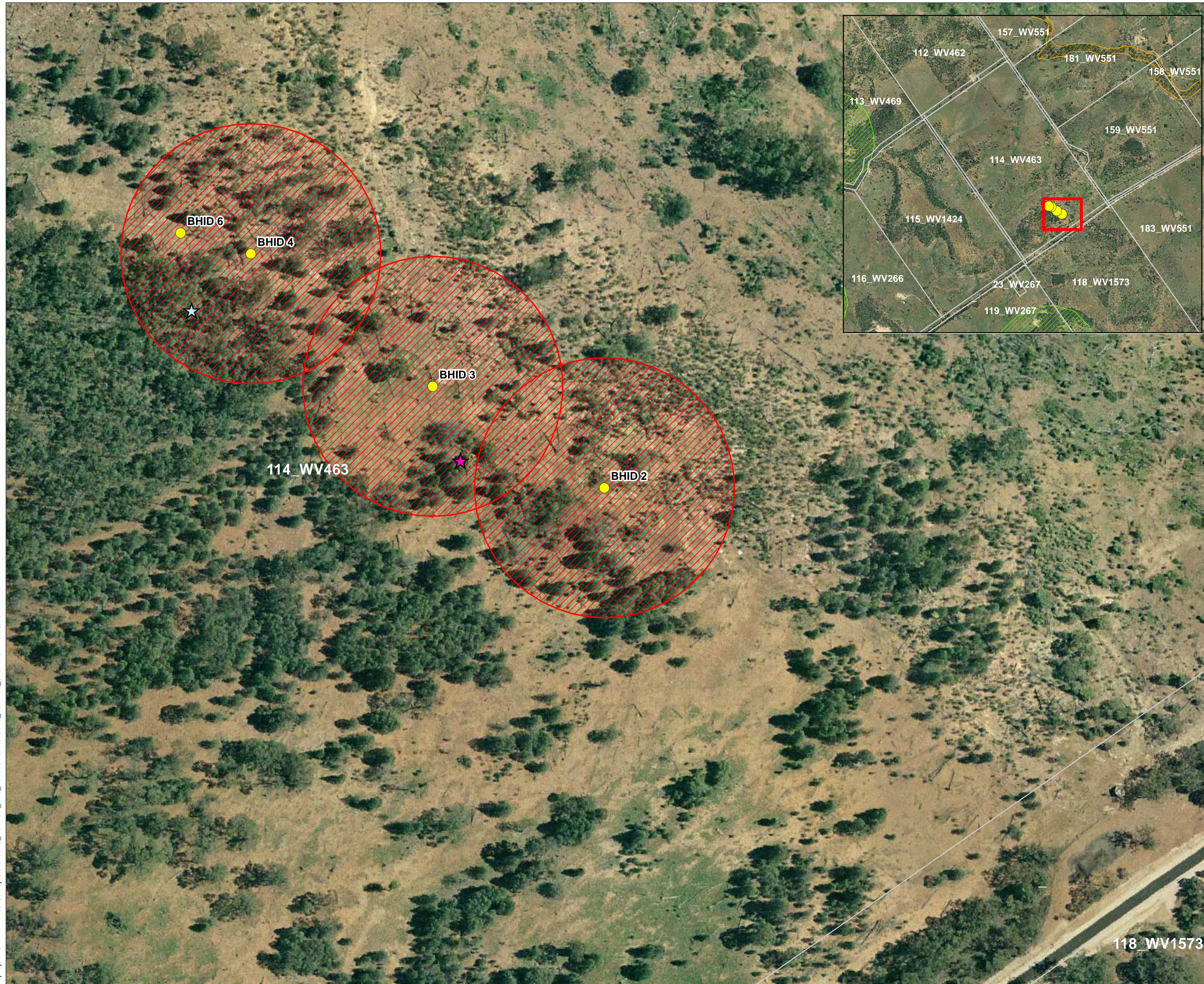
Much of this area has been subject to cattle grazing and other agricultural practices, as well as previous development associated with the gas fields.

This report is specific to the proposed development areas listed below and shown in Figure 1:

- Borehole locations on Lot 114 on WV463 (BHID 2, BHID 3, BHID 4, BHID 6)

1.2 Purpose of the report

The aim of this report is to provide an ecological assessment of the proposed development areas located on Lot 114 WV463 (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.



Legend

- Proposed Borehole Locations
- Environmental Clearance Area
- Watercourse
- Cadastre
- Type A and EVNT Species**
- Brachychiton rupestris*
- Wedge-tailed Eagle Nest
- Regional Ecosystem**
- Endangered - Dominant
- Endangered - Sub-dominant
- Of Concern - Dominant
- Of Concern - Sub-dominant
- Least Concern
- ESA Mapping**
- Category A
- Category B
- Category C

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

Date: 16/06/2011

Version: 1

P:\GIS\Projects\215648_Fairview_Eco_Assessment\215648_Fairview_040.mxd 16/06/2011 11:42

Map by: PIC



A1 scale: 1:750
 0 10 20 30 40 50m

Job No: 215648
 Coordinate system: GDA_1994_MGA_Zone_55

Santos Upstream Ecological Assessment

Figure 1: Lot 114 WV463 Broadah B - Proposed Borehole Locations, Roma

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 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 Regional Ecosystem classifications used in this report are based on the 'biodiversity status' of the vegetation and not the '*Vegetation Management Act 1999* status' of the vegetation.

2.2 Field methodology

The proposed corridors were assessed by four (4) Aurecon ecologists (Cassandra Arkinstall, Vanessa Boettcher, Sarah Glauert and Chris Schell) during May and June 2011. These assessments were undertaken to determine the existing vegetation communities and habitat value of the proposed clearing within the proposed borehole locations, and to identify potential ecological constraints in relation to the flora and fauna values of the site.

GIS layers of the proposed development areas and environmental constraints mapping (eg RE Mapping, ESA mapping) and high resolution aerial photography were uploaded onto a toughbook (C5 mobile clinical assistant CFT-001 – Motion computing) with an integrated GPS to assist in locating the areas to be assessed whilst on site. 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 accuracy of GPS co-ordinates provided in this report, they should only be considered to be accurate to +/- 15 metres due to the limitations of the GPS devices used.

A 50 metre buffer around each borehole was assessed, and where significant environmental constraints were identified (i.e. presence of a species of conservation significance – *Gonocarpus urceolatus*, Rasp Weed), borehole locations were relocated in consultation with a Cultural Heritage Officer (Che Cockatoo-Collins) and a Fluor Field Civil Engineer (Andrew Byrnes).

The ground-truthing of the proposed boreholes 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* or critically endangered, endangered, vulnerable or conservation dependent species under the *Environment Protection and Biodiversity Conservation Act 1999*) 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 area of disturbance is currently mapped as non-remnant by the Department of Environmental Resource Management (DERM) (Regional Ecosystem Mapping, version 6.0). There are no Environmentally Sensitive Areas (ESA's) or watercourses mapped as occurring within the proposed area of impact. The site has been subject to land clearing activities as a result of previous land management practices and is currently used as a stock watering point. Geologically, this area is rocky with a well formed duricrust (ie DERM Landzone 7).

During the initial ecological assessments (undertaken on 5 May 2011), areas of *Gonocarpus urceolatus* (Rasp Weed) were identified throughout the initial borehole locations (refer Figure 1). Based on the distribution of this conservation significant species within the original proposed borehole locations, it was determined necessary to relocate a number of the boreholes to avoid impacts on this species. The proposed borehole locations referred to in this report include relocated boreholes, as well as two of the initially proposed locations (as no species of conservation significance were identified within the 50 metre buffer zones of the pegged locations).

Where proposed boreholes were relocated, the final proposed borehole locations were determined *in situ* and in consultation with: two (2) Aurecon ecologists (Chris Schell and Cassandra Arkinstall), a Fluor Field Civil Engineer (Andrew Byrnes) and a Santos Cultural Heritage Officer (Che Cockatoo-Collins) (refer Figure 1). Sites were selected to avoid/minimise impacts on *G. urceolatus* and would be suitable drilling locations (refer to Cultural Heritage report for specific management measures/recommendations for this area).

A potential vehicle access track into the borehole locations was also identified as a guide to minimise impacts on *G. urceolatus*. However, this will need to be surveyed by a qualified ecologist immediately prior to works on site to confirm and demarcate a suitable access track at this site.

The floristics of the proposed area of disturbance and its habitat values are discussed below.

3.2 Floristics

The proposed area of disturbance has been previously cleared for stock grazing. The area is characterised by shrubby regrowth and *Callitris glaucophylla* (White Cypress Pine) growing on a rocky substrate. The understory is relatively sparse and is dominated by native and exotic grass and forb species. Although relatively rich in floral diversity (refer to Appendix A) most of these species are grasses and forbs, with low species diversity within the canopy and sub-canopy layers.

Within the proposed borehole locations and the 50 metre buffer zones of BHID2, 3 & 4 no species of conservation significance (ie listed under the provisions of the NC Act and/or the EPBC Act) were observed (refer Figure 1). It is noted that the BHID6 clearance is to be located within the 50 metre buffer zone of BHID4 to avoid impacts on *G. urceolatus*.

The site also contained a *Brachychiton rupestris* (Narrow-leaved Bottle Tree) individual which is a Type A Restricted Plant under the NC Act. Table 3-1 below outlines the approximate location of this individual. It is important to note that this list may not include every *Brachychiton* plant within the site due to the likelihood of juvenile specimens occurring which may not have been observed as a result of their limited size.

Table 3-1 Location of Type A Restricted Plants (*Nature Conservation Act 1992*)

Species	Easting (GDA 94, Zone 55J)	Northing (GDA 94, Zone 55J)
<i>Brachychiton rupestris</i>	727972	7070568

3.3 Habitat values

The habitat values of the proposed boreholes within Lot 114 WV463 have been diminished as a result of previous vegetation clearing, and current grazing activities. However, regrowth vegetation is likely to provide shelter and foraging habitat for a host of insectivorous bird species. The rocky substrate and rocky crevices within the site are likely to provide habitat for a range of reptile species.

Directly to the west of the proposed borehole 3 (BHID3), is an area of *C. glaucophylla*, with *Eucalyptus decorticans* (Gum-topped Ironbark) and *Corymbia clarksoniana* (Clarkson's Bloodwood) present as associated species. This vegetation has not yet reached remnant status; however it does provide limited fallen woody material and exfoliating bark, thus containing faunal habitat value of the area for reptiles and small mammals. A raptor's nest was identified within a larger *E. decorticans* tree on the eastern side of this vegetation (refer Figure 1 for location).

Four (4) incidental fauna species were recorded within the proposed disturbance area, namely Mudlark (*Grallina cyanoleuca*), Noisy Miner (*Manorina melanocephala*), Striated pardalote (*Pardalotus striatus*), and Pied butcherbird (*Gymnorhina tibicen*). All of these species are listed as least concern under the provisions of the NC Act and EPBC Act.

Habitat features associated with the proposed disturbance area include:

- Canopy cover suitable for shelter, foraging and perching
- Limited fissured tree bark
- Dense groundcover vegetation (i.e. grassy tussocks)
- Limited woody debris (i.e. fallen/felled timber, including hollow-bearing logs)

The habitat values of the site are considered moderate overall, as the site contains some woody regrowth vegetation but has been disturbed by grazing stock, previous vegetation clearing and the invasion of exotic pasture species.

4. Conclusions

The proposed borehole locations and buffer zones indicated on Figure 1 have been primarily located in existing cleared/disturbed areas to avoid impacts on the vulnerable (NC Act) *Gonocarpus urceolatus* (Rasp Weed).

The proposed area of disturbance is currently mapped as non-remnant by the Department of Environmental Resource Management (DERM) (Regional Ecosystem Mapping, version 6.0). There are no Environmentally Sensitive Areas (ESA's) or watercourses mapped as occurring within the proposed area of disturbance.

One (1) Type A plant species was recorded within the site – within the buffer zone of BHID3 (refer Figure 1).

A number of locations/regions were recorded as containing *G. urceolatus*; however this species was not recorded within the proposed borehole locations or buffer zones shown on Figure 1 during these field investigations.

A potential vehicle access track into the borehole locations was also identified as a guide to minimise impacts on *G. urceolatus*. However, this will need to be surveyed by a qualified ecologist immediately prior to works on site to confirm and demarcate a suitable access track at this site.

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

Scientific Name	Common Name	Notes
<i>Acacia complanata</i>	Velvet Wattle	
<i>Acacia decora</i>	Pretty Wattle	
<i>Acacia harpophylla</i>	Brigalow	
<i>Acacia shirleyi</i>	Lancewood	
<i>Alphitonia excelsa</i>	Red Ash	
<i>Alstonia constricta</i>	Bitter Bark	
<i>Alternanthera dentata</i>	Joy Weed	
<i>Alternanthera pungens</i>	Khaki Burr	
<i>Aristida calycina</i>	Dark Wiregrass	
<i>Aristida caput medusae</i>	Curly Head Wire Grass	
<i>Aristida jerichoensis</i>	Jericho Wire Grass	
<i>Aristida latifolia</i>	Hairy Aristida	
<i>Bidens pilosa</i>	Cobblers Pegs	
<i>Brachychiton rupestris</i>	Narrow Leaved Bottle Tree	NC Act Type A Species
<i>Brachycome dentata</i>	Lobe-seed Daisy	
<i>Bracteantha bracteata</i>	Everlasting Daisy	
<i>Bursaria spinosa</i>	Prickly Pine	
<i>Bursaria spinosa subsp. lasiophylla</i>		
<i>Callitris glaucophylla</i>	White Cypress Pine	
<i>Calotis cuneifolia</i>	Purple Burr Daisy	
<i>Calotis lappulacea</i>	Yellow Burr Daisy	
<i>Carex inversa</i>	Nut Sedge	
<i>Carissa ovata</i>	Currant Bush	
<i>Cassinia laevis</i>	Cough Bush	
<i>Cheilanthes aspera</i>	Bristly Cloak Fern	
<i>Cheilanthes sieberi</i>	Mulga Fern	
<i>Chenopodium album</i>	Fat Hen	
<i>Chenopodium desertorum</i>	Desert Goosefoot	
<i>Chloris gayana</i>	Rhodes Grass	
<i>Chloris pectinata</i>	Comb Chloris	
<i>Chrysocephalum apiculatum</i>	Yellow Buttons	
<i>Corymbia clarksoniana</i>	Clarkson's Bloodwood	
<i>Crotalaria dissitiflora</i>	Grey Rattlepod	
<i>Crotalaria novae-hollandiae</i>	New Holland Rattlepod	
<i>Cymbopogon refractus</i>	Barbed Wire Grass	
<i>Dichanthium sericeum</i>	Queensland Blue Grass	

Scientific Name	Common Name	Notes
<i>Digitaria ammophila</i>	Digitaria	
<i>Digitaria brownii</i>	Tall Digitaria	
<i>Enteropogon acicularis</i>	Curly Windmill Grass	
<i>Eragrostis brownii</i>	Brown's Lovegrass	
<i>Eragrostis sororia</i>	Woodland Lovegrass	
<i>Eremophila debilis</i>	Winter Apple	
<i>Eremophila mitchellii</i>	False Sandalwood	
<i>Eucalyptus decorticans</i>	Gum Topped Ironbark	
<i>Evolvulus alsinoides</i>	Speed Well	
<i>Fimbristylis dichotoma</i>	Fimbristylis	
<i>Geijera parviflora</i>	Wilga	
<i>Gonocarpus urceolatus</i>	Gonocarpus	NC Act Vulnerable
<i>Goodenia glabra</i>	Smooth Goodenia	
<i>Heliotropium amplexicaule</i>	Blue Heliotrope	
<i>Hibiscus sturtii</i>	Hill Hibiscus	
<i>Jacksonia scoparia</i>	Jacksonia	
<i>Jasminum didymum subsp. racemosum</i>	Native Jasmine	
<i>Keraudrenia collina</i>	Keraudrenia	
<i>Maireana microphylla</i>	Small-leaf Bluebush	
<i>Maireana villosa</i>	Silky Bluebush	
<i>Megathyrsus maximus var maximus</i>	Guinea Grass	
<i>Melinis repens</i>	Red Natal	
<i>Opuntia tomentosa</i>	Velvety Tree Pear	LP Act Class 2 Weed
<i>Pandorea pandorana</i>	Wonga Vine	
<i>Panicum decompositum</i>	Hairy Panic	
<i>Panicum effusum</i>	Inquisitive Grass	
<i>Panicum simile</i>	Two-coloured Panic	
<i>Pennisetum ciliare</i>	Buffel Grass	
<i>Perotis rara</i>	Comet Grass	
<i>Phyllanthus gunnii</i>	Phyllanthus	
<i>Podolepis jaceoides</i>	Showy Copper Wire Daisy	
<i>Portulaca pilosa</i>	Hairy Pigweed	
<i>Psydrax odorata</i>	Shiny-leaved Canthium	
<i>Psydrax oleifolia</i>	Canthium	
<i>Sarcostemma viminalis</i>	Caustic Weed	
<i>Sclerolaena birchii</i>	Galvanised Burr	
<i>Sida fibulifera</i>	Creeping Sida	
<i>Sida platycalyx</i>	Sida	

Scientific Name	Common Name	Notes
<i>Sida rhombifolia</i>	Paddy's Lucerne	
<i>Sida rohlenae</i>	Shrub Sida	
<i>Solanum esuriale</i>	Brown Potato Bush	
<i>Solanum nigrum</i>	Black Nightshade	
<i>Solanum parviflorum</i>		
<i>Sporobolus caroli</i>	Desert Sporobolus	
<i>Themeda triandra</i>	Kangaroo Grass	
<i>Tragus australianus</i>	Burr Grass	
<i>Trianthema triquetra</i>	Red Spinach	
<i>Urochloa mosambicensis</i>	Urochloa	
<i>Verbena officinalis</i>	Common Verbena, Native Verbena	
<i>Verbena tenuisecta</i>	Mayne's Curse	