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Assessment Report – Lot 586 WV394

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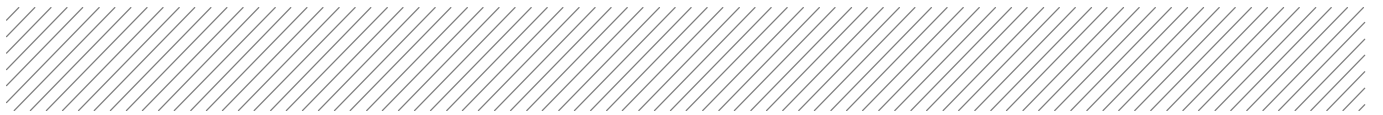
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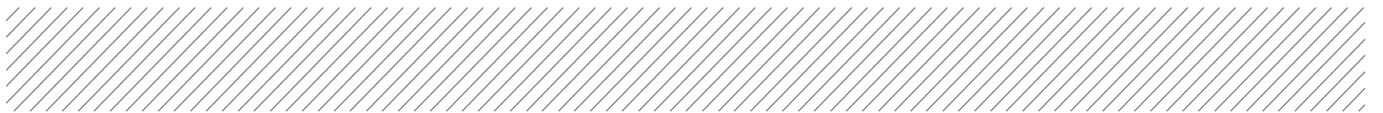
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Contents

1	Background	1
1.1	Project description	1
1.2	Purpose of report	1
2	Methodology	3
2.1	Desktop methodology	3
2.2	Field methodology	3
3	Ecological assessment	4
3.1	Corridor R1	4
	General	4
	Floristics	5
	Habitat values	5
3.2	Corridor R2 and R16	6
	General	6
	Floristics	9
	Habitat values	9
3.3	Corridor R3	10
	General	10
	Floristics	12
	Habitat values	12
3.4	Corridor R17	12
	General	12
	Floristics	14
	Habitat values	14
3.5	Corridor R19	14
	General	14
	Floristics	15
	Habitat values	15
3.6	Corridor R24	16
	General	16
	Floristics	18
	Habitat values	18
3.7	Corridor R78	19
	General	19



Floristics	24
Habitat values	25
3.8 Powerline easements	25
General	25
Floristics	26
Habitat values	27
4 Conclusion	28
5 References	29

Appendices

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.

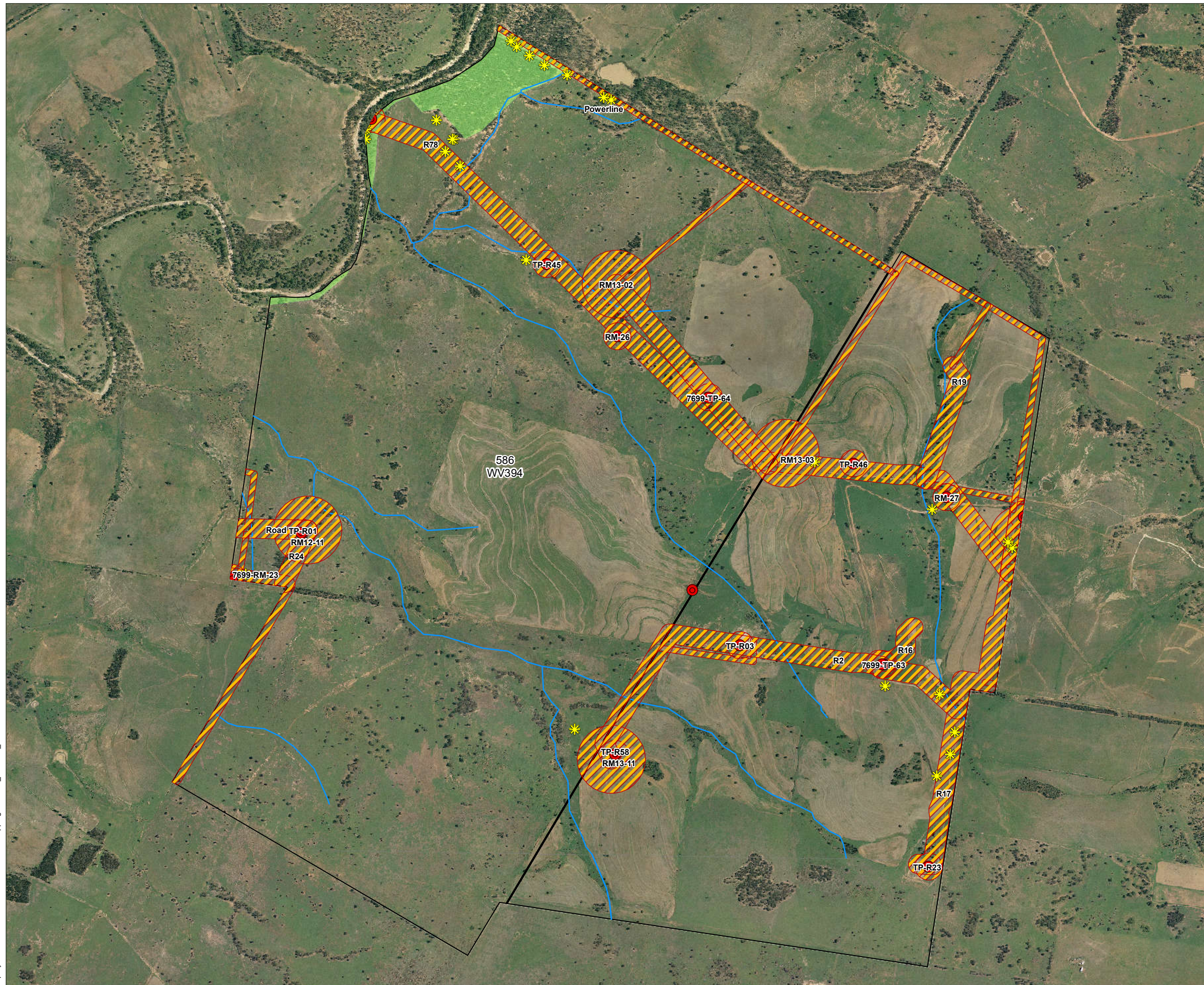
This report is specific to the proposed development areas listed below and shown in Figure 1.1:

- Pipeline corridors R1, R2, R3, R16, R17, R19, R24 and R78
- Geotechnical survey locations situated within the above corridors
- Road corridors
- Powerline easements

These areas are collectively referred to as the 'proposed development area', and are located entirely within Lot 586 WV394. Note that the subject of this report is solely related to Lot 586 WV394. 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 586 WV394 (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.



Legend

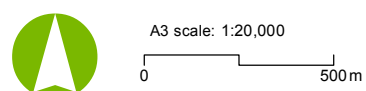
- Notable Species
 - Geotech Borehole Locations
 - Ground Truthed Areas
 - Drainage (100K)
 - ESA Category A
 - ESA Category B
 - ESA Category C
- Regional Ecosystem Mapping**
- Non-remnant / regrowth
 - Endangered - Sub-dominant
 - Endangered - Dominant
 - Of Concern - Sub-dominant
 - Of Concern - Dominant
 - Not Of Concern
 - Plantation forest
 - Water

Notes: Regional Ecosystem (RE) colours depicted in this map are based on the Vegetation Management Status of the RE as described in the Regional Ecosystem Description Database. The Biodiversity Status of the vegetation is not shown on this map.

Date: 18/07/2011

Version: 1

Map by: Moore NK P:\CW\215648 Santos\Mapping\3\WT18_Fairview_Overview.mxd 09/06/2011 09:01



Job No: 215648
Coordinate system: GDA 1994 MGA Zone 55



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 6.0; 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 development areas were assessed by five (5) Aurecon ecologists (Chris Schell, Leesa Lethbridge, Matthew Bailey, Sarah Stone and Samara Schulz) from the 27 June to the 2 July 2011. These assessments were 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 corridors were 100 m wide and of varying lengths, and the circular well pad areas had a radius of 175 m. Geotechnical survey locations were also assessed as part of the survey areas (a 50m buffer zone around each survey location was assessed).

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 Corridor R1

General

Corridor R1 is located along the south western border of Lot 586 WV394 and is associated with geo-tech site 7699-RM-23. This section of this report will address the areas of the corridor and geo-tech within lot 586 WV394 only.

The area that the corridor falls is mapped as non-remnant and has been extensively disturbed due to land clearing, grazing and other agricultural activities. The nearest ESA is over 1 km from the proposed disturbance area.

There are no major tracks within the corridor or geo-tech. The proposed corridor intersects two watercourses (stream order 1) were dry at the time of the survey. The riparian vegetation associated with the watercourses has been heavily disturbed and fragmented. Corridor R1 and the associated geo-tech are illustrated in Figures 3.1 and Figure 3.2.

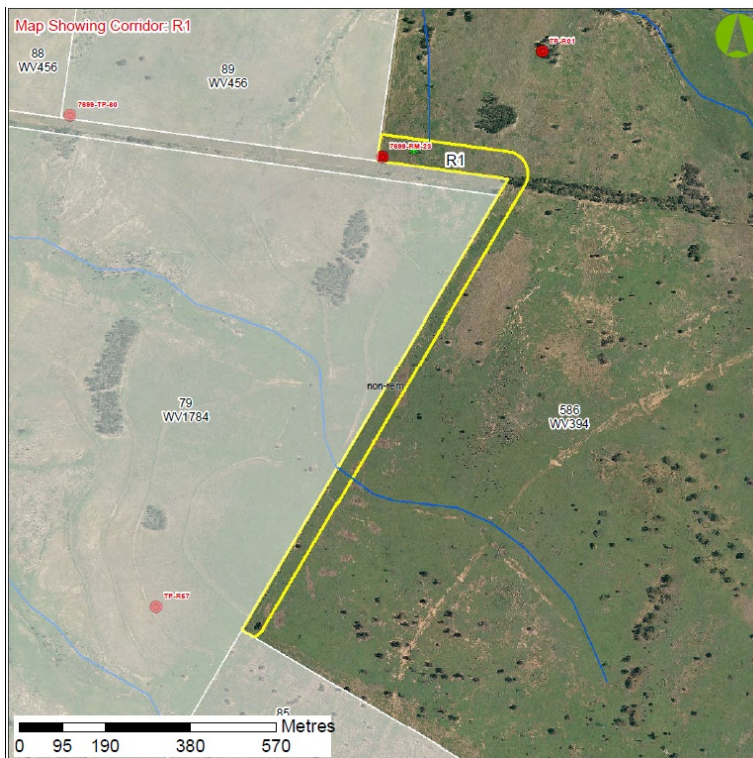


Figure 3.1 Aerial photograph and associated RE mapping of proposed corridor R1

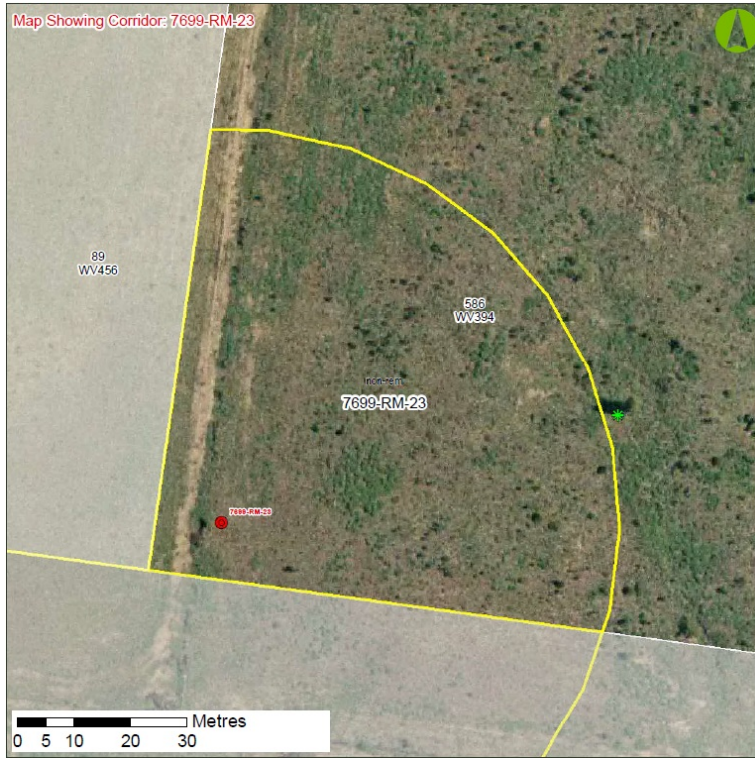


Figure 3.2 Aerial photograph and associated RE mapping of proposed geo-tech 7699-RM-23

Floristics

The landscape within corridor R1 has been previously cleared and disturbed as a result of grazing and other agricultural practices. The vegetation within the proposed development area is dominated by *Pennisetum ciliare* (Buffel Grass). Isolated native species including *Acacia excelsa* (Ironwood), *Atalaya hemiglauca* (Whitewood), *Canthium oleifolium* (Wild lemon) and *Geijera parviflora* (Wilga) are scattered across the proposed road corridor.

One Type A species was found within the proposed disturbance area, *Brachychiton populneus* (Kurrajong), the location of the plant found is shown in Table 3.1

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 populneus</i>	703456	7068906

No other species of conservation significance under the EPBC Act or NC Act were present. A species list is provided in Appendix A.

Habitat values

The overall habitat value of the corridors is classed as being low due to the lack of remnant vegetation and the dominance of *Pennisetum ciliare* (Buffel grass).

The proposed disturbance area typically contained sparse shrubby re-growth with limited mature vegetation, with no surrounding remnant vegetation and little woody debris and rocky areas the potential habitat for native fauna is very limited. However, species utilising resources in the proposed

development area are most likely to be common, generalist species that are able to adapt to significant habitat disturbances.

No fauna species of conservation significance under the EPBC Act or NC Act were observed.

3.2 Corridor R2 and R16

General

Corridors R2 and R16 are located in the south eastern section of Lot 586 WV394. This section of this report will also address geo-tech site RM13-11, TP-R03, TP-R58, 7699-TP-63 and the powerline as they are within or connected to corridor R2.

The entire proposed disturbance area is within an area mapped as non-remnant and occurs on clay based soil. The vegetation within the corridors has been extensively disturbed due to land clearing, grazing and other agricultural activities. The proposed disturbance area largely follows existing tracks and fence lines and goes partly into cultivated areas. Corridor R16 incorporates an already existing well site.

There are no ESA's in proximity to the proposed disturbance area. The corridors intersect three watercourses (all stream order 1) and they were all dry at the time of surveying. Corridors R2, R16 and the associated geo-tech sites are shown in Figure 3.3 to Figure 3.8, the powerline is shown in Figure 3.29.

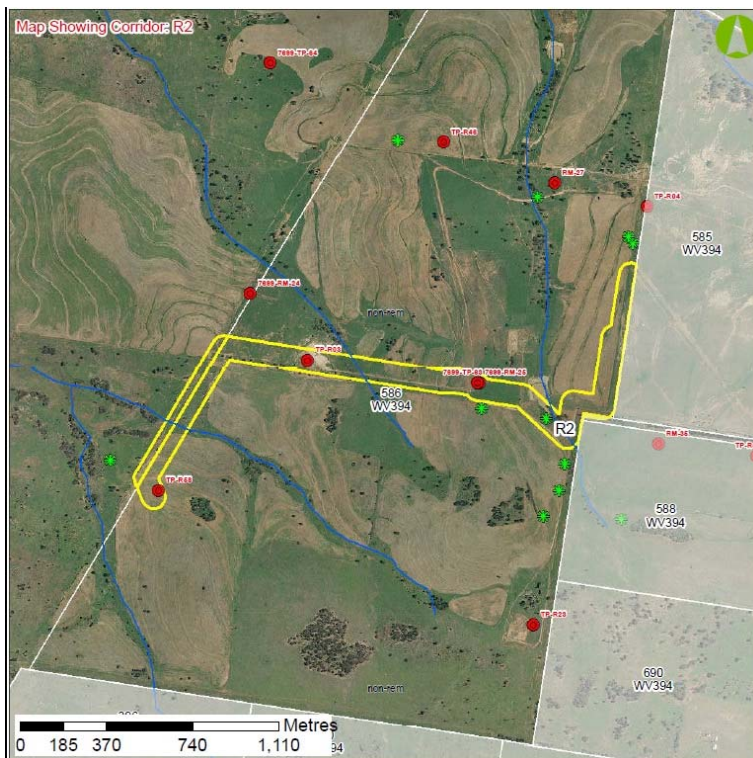


Figure 3.3 Aerial photograph and associated RE mapping of proposed corridor R2

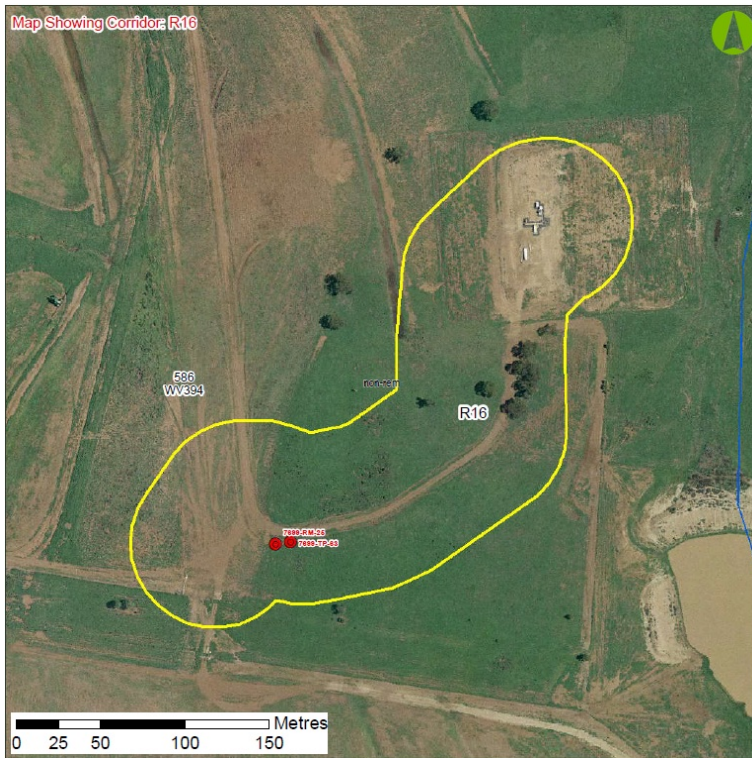
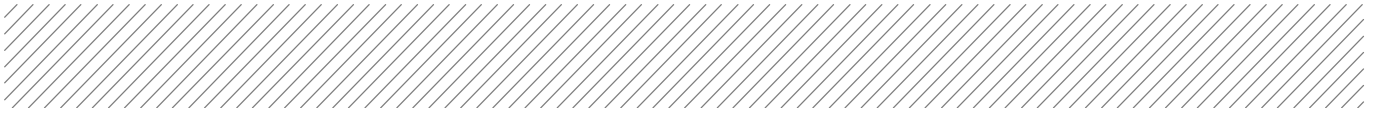


Figure 3.4 Aerial photograph and associated RE mapping of proposed corridor R16

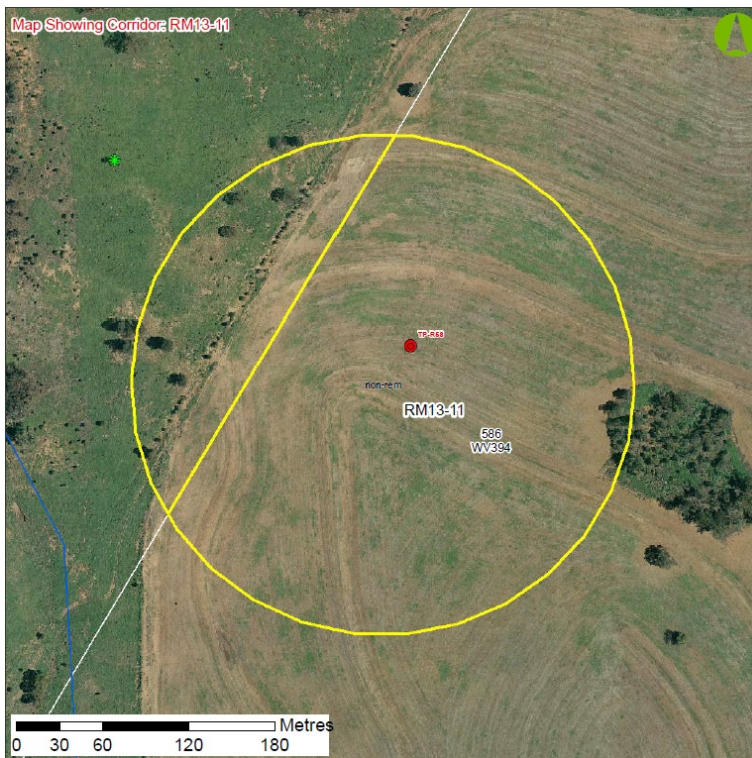


Figure 3.5 Aerial photograph and associated RE mapping of proposed geo-tech RM13-11

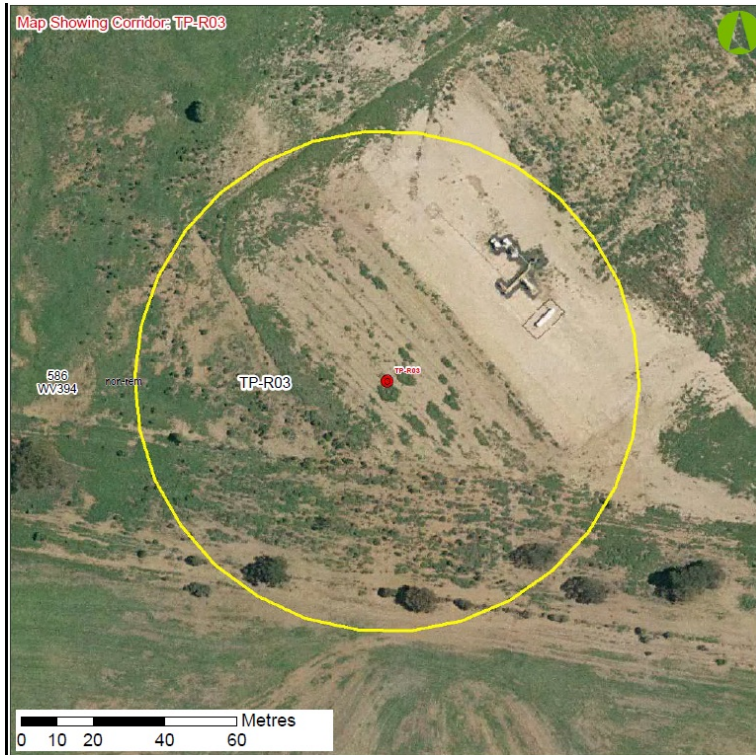
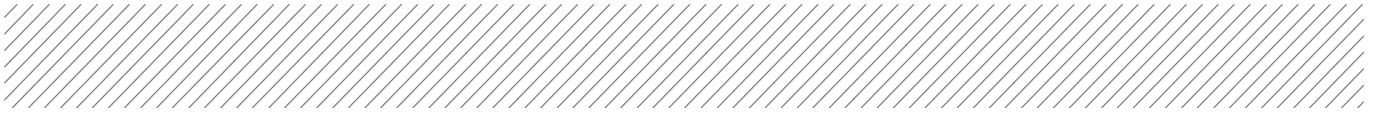


Figure 3.6 Aerial photograph and associated RE mapping of proposed geo-tech TP-R03

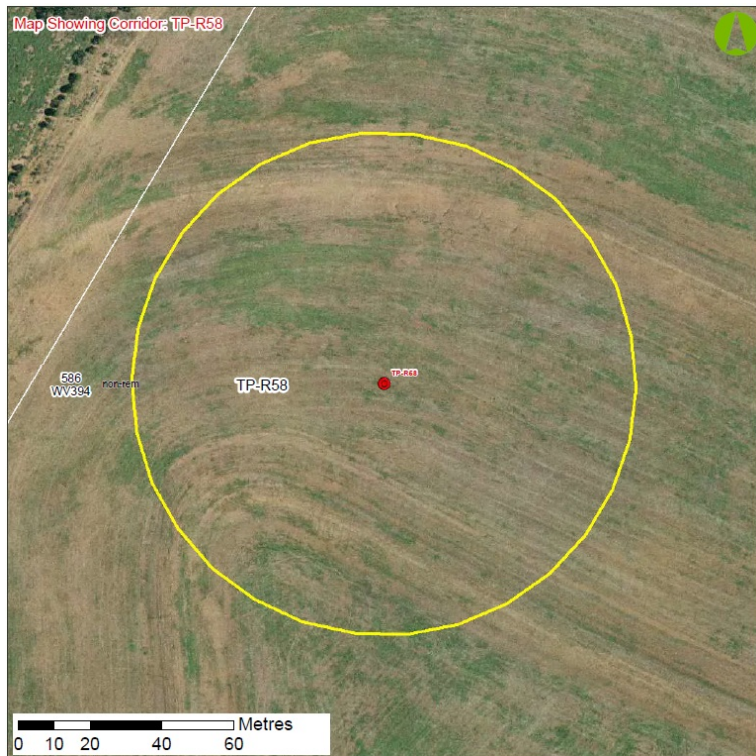


Figure 3.7 Aerial photograph and associated RE mapping of proposed geo-tech TP-R58

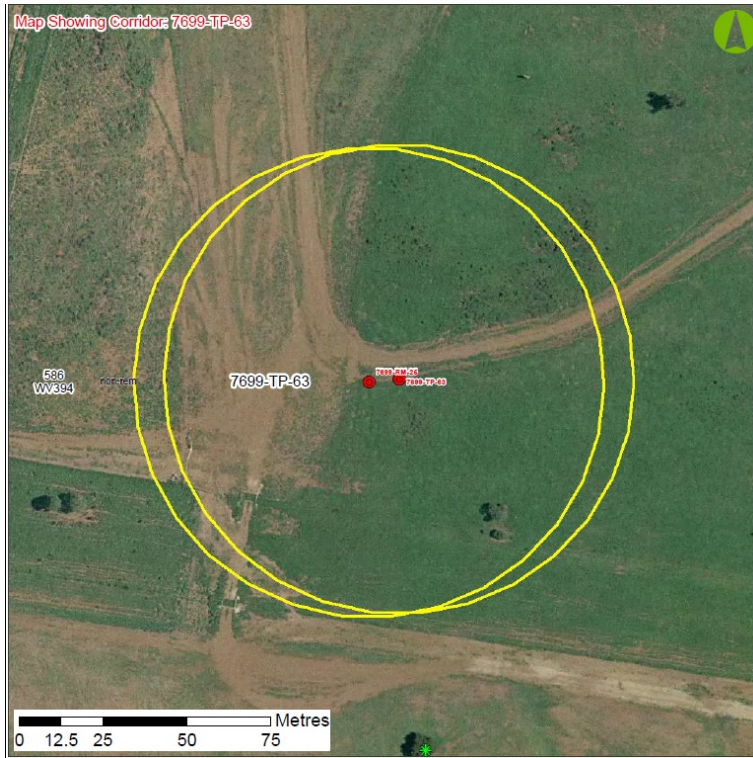


Figure 3.8 Aerial photograph and associated RE mapping of proposed geo-tech 7699-TP-63

Floristics

The vegetation within the proposed development area has been previously cleared and disturbed as a result of grazing and other agricultural practices. The vegetation within the corridors is dominated by *Pennisetum ciliare* (Buffel Grass) with isolated native species including *Eucalyptus populnea* (Poplar Box), *Allocasuarina leuhmannii* (Bull Oak), *Acacia harpophylla* (Brigalow) and *Eremophila mitchellii* (False sandalwood). Areas of the proposed corridor have also been cultivated; these areas are dominated by the sown grass crops and possess very little diversity.

One Type A species was found within the proposed disturbance area, a *Brachychiton populneus* (Kurrajong). Table 3.2 contains the location of the individual observed.

Table 3.2 Location of Type A Restricted Plants (*Nature Conservation Act 1992*)

Species	Easting (GDA 94, Zone 55J)	Northing (GDA 94, Zone 55J)
<i>Brachychiton populneus</i>	707014	7068291

No other species of conservation significance under the EPBC Act or NC Act were observed. A species list is provided in Appendix A.

Habitat values

The habitat value of the proposed road corridor is considered low due to the low species richness, dominance of *Pennisetum ciliare* (Buffel grass) and lack of mature vegetation.

The area has been extensively disturbed by stock grazing, invasion of exotic pasture species and cropping. The corridor typically contained some sparse shrubby re-growth with limited mature

vegetation and predominantly open areas dominated by exotic species. With no surrounding remnant vegetation, little woody debris and rocky areas the potential habitat for native fauna is limited and fragmented. Species utilising resources in the proposed development area are most likely to be common, generalist and exotic species that are able to adapt to significant habitat disturbance.

Rabbit and wallaby scats were observed, and two birds next were identified in the corridor area. Incidental sightings during the survey included an Australian Bustard (*Ardeotis australis*), Magpie (*Cracticus tibicen*), Nankeen Kestrel (*Falco cenchroides*), Richard's pipit (*Anthus richardi*) and Willie wagtail (*Rhipidura leucophrys*).

No fauna species of conservation significance under the EPBC Act or NC Act were observed.

3.3 Corridor R3

General

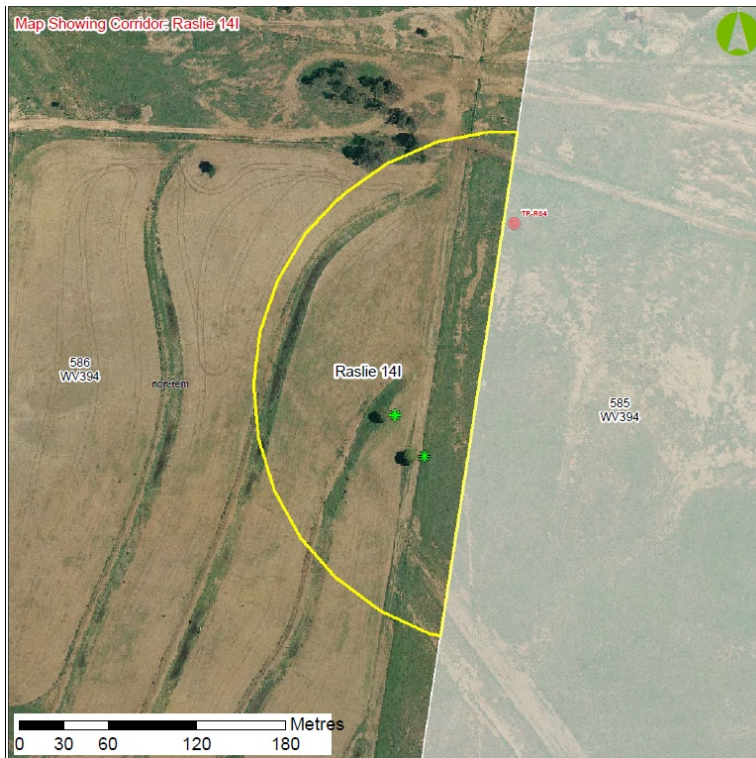
Part of corridor R3 is located is the eastern edge of Lot 586 WV394. This section of this report will also address geo-tech site Raslie 141 and TP-R04 as they are within or connected to corridor R2.

The proposed corridor occurs within non-remnant vegetation and occurs on clay based soil. The vegetation within the corridor has been extensively disturbed due to land clearing, grazing and other agricultural activities. The corridor occurs along a fence line and partly occurs in cultivated areas.

There are no ESA's in proximity to the proposed disturbance area. There are no watercourses or tracks within the proposed disturbance area, corridor R3 and the associated geo-techs are shown in Figures 3.9 to Figures 3.11.



Figure 3.9 Aerial photograph and associated RE mapping of proposed corridor R3



Figures 3.10 Aerial photograph and associated RE mapping of proposed geo-tech Raslie 141



Figure 3.11 Aerial photograph and associated RE mapping of proposed geo-tech TP-R04

Floristics

The landscape with corridor R3 has been previously cleared and disturbed as a result of grazing and other agricultural practices. The vegetation within the proposed development area is very limited, there is a grassland area dominated by *Pennisetum ciliare* (Buffel Grass) with other species such as *Verbena tenuisecta* (Mayne's Curse) and *Sida subspicata* (Queensland Hemp). This occurs next to a cultivated area that is dominated by sown grass crops and contains very little diversity. There is little to no canopy layer present within the lot 586 WV394 section of corridor R3 with the most notable trees being two *Brachychiton rupestris* (Narrow Leaved Bottle Tree) present as shade trees.

One Type A restricted species was found along the corridor, *Brachychiton rupestris* (Narrow Leaved Bottle Tree) and the locations are listed in Table 3.3.

Table 3.3 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>	707366	7069071
<i>Brachychiton rupestris</i>	707385	7069043

No other species of conservation significance under the EPBC Act or NC Act were observed. A species list is provided in Appendix A.

Habitat values

The habitat value of the proposed road corridor is considered low due to the low species richness, dominance of *Pennisetum ciliare* (Buffel grass) and lack of mature vegetation.

The area has been extensively disturbed by stock grazing, invasion of exotic pasture species and cropping. With no surrounding remnant vegetation, little woody debris and rocky areas the potential habitat for native fauna is limited and fragmented. Species utilising resources in the proposed development area are most likely to be common, generalist and exotic species that are able to adapt to significant habitat disturbance. This is demonstrated in the observation of rabbit and wallaby scats.

No fauna species of conservation significance under the EPBC Act or NC Act were observed.

3.4 Corridor R17

General

Corridor R17 occurs along the south western boundary of Lot 586 WV394, geo-tech site TP-R23 is attached with the corridor and is also assessed within this section of this report.

The proposed corridor occurs within non-remnant vegetation and occurs on a silty clay based soil. The vegetation within the corridor has been extensively disturbed due to land clearing, grazing and other agricultural activities.

There are no ESA's in proximity to the proposed disturbance area. There is one watercourse (stream order 1) in the north of the corridor that was dry at the time of surveying. The corridor follows a fence line and a small track, part of the corridor occurs within cultivated areas and in the south of the corridor there is an existing well site and a dam. Corridor R17 and the associated geo-tech are show in Figure 3.12 and Figure 3.13.

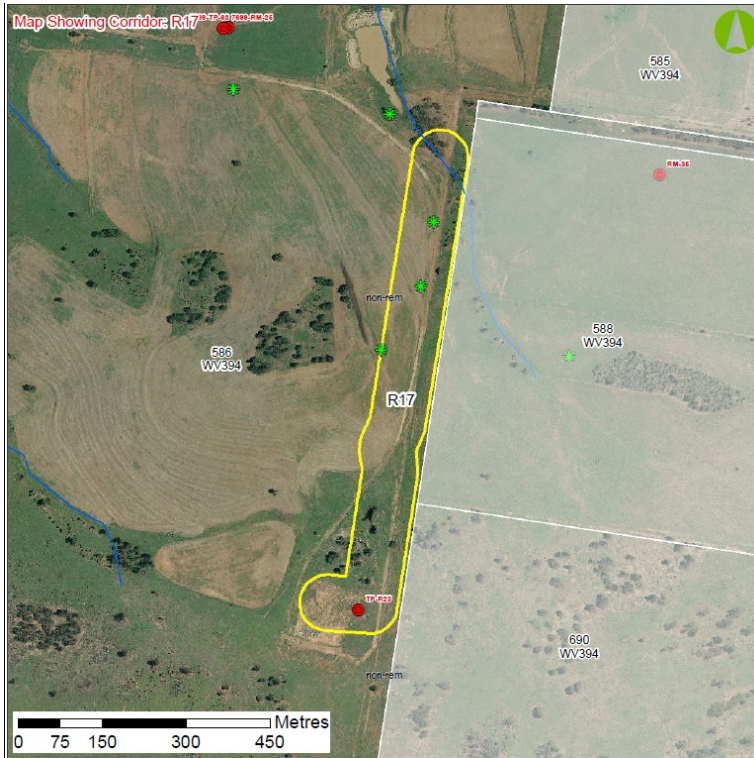
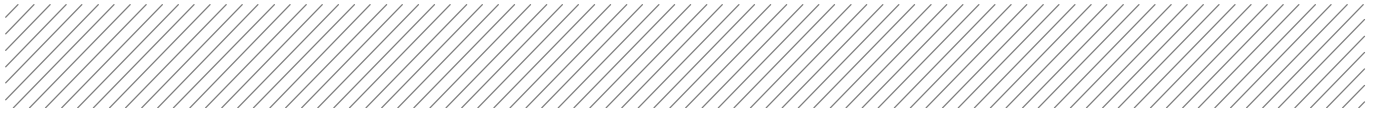


Figure 3.12 Aerial photograph and associated RE mapping of proposed corridor R17

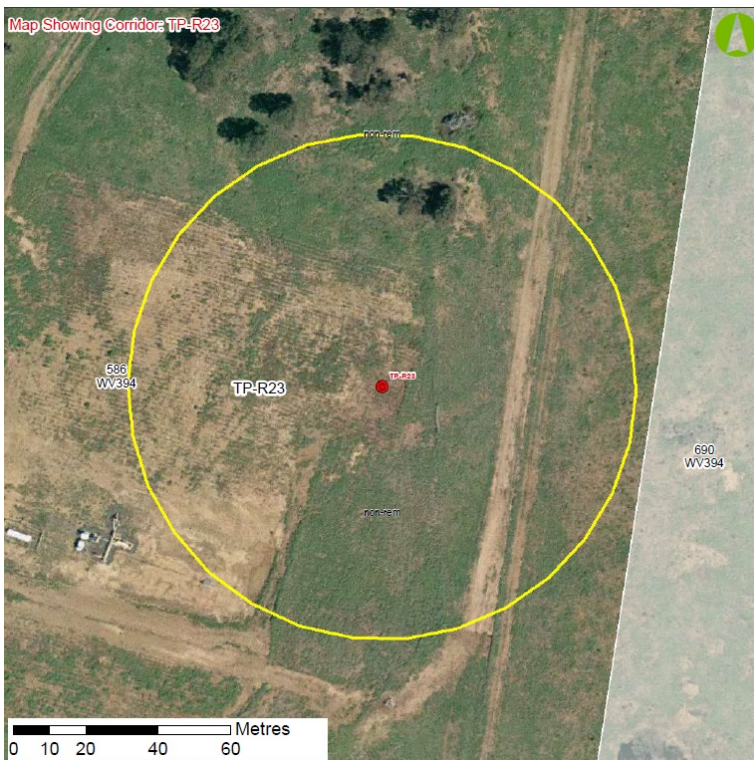


Figure 3.13 Aerial photograph and associated RE mapping of proposed geo-tech TP-R23

Floristics

The landscape within the proposed development area has been previously cleared and disturbed as a result of grazing and other agricultural practices. The vegetation within the corridor is predominantly grassland dominated by *Pennisetum ciliare* (Buffel Grass). There are some isolated patches of native vegetation in the north and south of the corridor around the watercourse and existing dam, these include *Eucalyptus populnea* (Poplar Box), *Allocasuarina leuhmannii* (Bull Oak), *Acacia harpophylla* (Brigalow), *Eremophila mitchellii* (False sandalwood) and *Alectryon diversifolius* (Scrub Boonaree). Areas of the proposed corridor have also been cultivated; these areas are dominated by the sown grass crops and possess very little diversity.

Two Type A species was found within the proposed disturbance area, *Brachychiton populneus* (Kurrajong) and *Brachychiton rupestris* (Narrow Leaved Bottle Tree). Table 3.4 contains the locations of the plants.

Table 3.4 Location of Type A Restricted Plants (*Nature Conservation Act 1992*)

Species	Easting (GDA 94, Zone 55J)	Northing (GDA 94, Zone 55J)
<i>Brachychiton populneus</i>	706999	7067872
<i>Brachychiton rupestris</i>	707069	7067984
<i>Brachychiton rupestris</i>	707093	7068097

No other species of conservation significance under the EPBC Act or NC Act were observed. A species list is provided in Appendix A.

Habitat values

The habitat value of corridor R17 is considered low due to the low species richness, dominance of *Pennisetum ciliare* (Buffel grass) and lack of mature vegetation.

The area has been extensively disturbed by stock grazing, invasion of exotic pasture species and cropping. The corridor typically contained some sparse shrubby re-growth around the watercourse and dam and these areas would have the greatest habitat potential. Generally the corridor had limited mature vegetation and open areas dominated by exotic species. With no surrounding remnant vegetation, limited woody debris, little fissured tree bark and rocky areas the potential habitat for native fauna is limited and fragmented. Species utilising resources in the proposed development area are most likely to be common, generalist and exotic species that are able to adapt to significant habitat disturbance.

Incidental sightings during the survey included a Galah (*Eolophus roseicapilla*), Magpie (*Cracticus tibicen*), Magpie-lark (*Grallina cyanoleuca*) and Willie wagtail (*Rhipidura leucophrys*).

No fauna species of conservation significance under the EPBC Act or NC Act were observed.

3.5 Corridor R19

General

Corridor R19 occurs in the north east of Lot 586 WV394, there are no geo-tech sites associated with the corridor.

The proposed corridor occurs within non-remnant vegetation and occurs on a clay based soil. The vegetation within the corridor has been extensively disturbed due to land clearing, grazing and other agricultural activities. The proposed disturbance area occurs within grassland and partly in cultivated

land. In the north of the corridor there is an existing well site and an access track runs the length of the corridor.

There are no ESA's in proximity to the proposed disturbance area. There is one watercourse (stream order 1) that the corridor follows and was dry at the time of surveying. There is a constructed dam occurring part way along this watercourse. Corridor R19 is show in Figure 3.14.

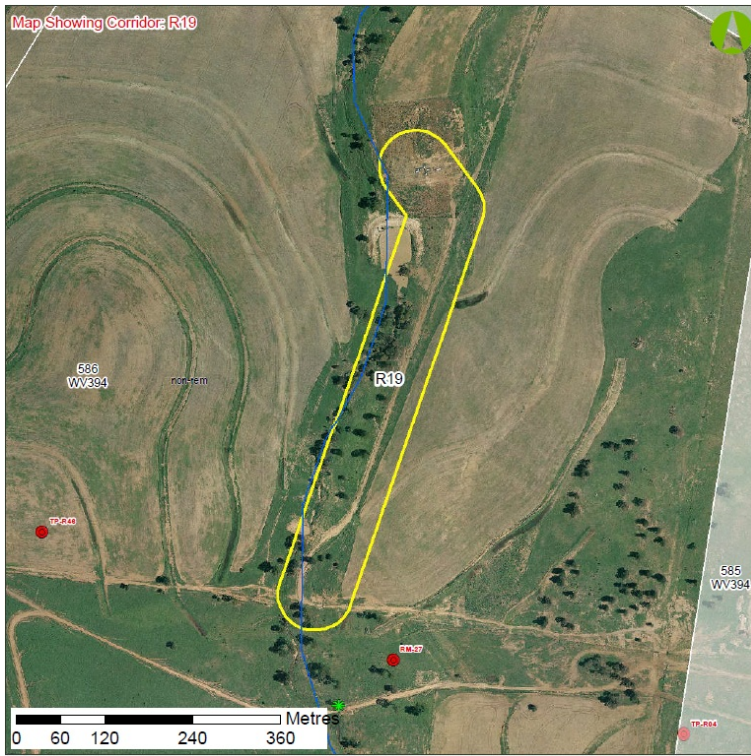


Figure 3.14 Aerial photograph and associated RE mapping of proposed corridor R19

Floristics

The landscape within the proposed development area has been previously cleared and disturbed as a result of grazing and other agricultural practices. The vegetation within the corridors is dominated by *Pennisetum ciliare* (Buffel Grass) with isolated native species including *Eucalyptus populnea* (Poplar Box), *Casuarina cristata* (Belah), *Acacia harpophylla* (Brigalow) and *Acacia excelsa* (Ironwood). A small area of the proposed corridor has been cultivated, this area is dominated by sown grass crops and possess very little diversity.

No species of conservation significance under the EPBC Act or NC Act were observed. A species list is provided in Appendix A.

Habitat values

The habitat value of corridor R19 is considered low due to the low species richness, dominance of *Pennisetum ciliare* (Buffel grass) and lack of mature vegetation.

The area has been extensively disturbed by land clearing, invasion of exotic pasture species and grazing. The area has limited potential habitat for native fauna as it consist of exotic pasture with some scattered regrowth, little woody debris, limited fissured tree bark and rocky areas. The area is also isolated from remnant vegetation. Species utilising resources in the proposed development area are most likely to be common, generalist and exotic species that are able to adapt to significant habitat disturbance.

Incidental fauna sightings during the survey included Apostlebird (*Struthidea cinerea*), Australian Magpie (*Gymnorhina tibicen*), Brown Falcon (*Falco berigora*), Cockatiel (*Nymphicus hollandicus*), Galah (*Eolophus roseicapilla*), Grey Butcherbird (*Cracticus torquatus*), Grey Crowned Babbler (*Pomatostomus temporalis*), Nankeen Kestrel (*Falco cenchroides*), Noisy Miner (*Manorina melanocephala*), Pale-headed Rosella (*Platycercus adscitus*), Pied Butcherbird (*Cracticus nigrogularis*), Red-backed Fairy-wren (*Malurus melanocephalus*), Striated Pardalote (*Pardalotus striatus*), Sulphur-crested Cockatoo (*Cacatua galerita*), Torresian Crow (*Corvus orru*), Variegated Fairy-wren (*Malurus lamberti*) and Willie Wagtail (*Rhipidura leucophrys*).

No fauna species of conservation significance under the EPBC Act or NC Act were observed.

3.6 Corridor R24

General

Corridor R24 is located in the south west of Lot 586 WV394, associated with the corridor is TP-R01, RM12-11, a Road corridor and a powerline easement. This section of this report will address corridor R24 along with these other corridors and geo-tech sites as they are within or connected to corridor R24.

The area that the corridor falls is mapped as non-remnant and has been extensively disturbed due to land clearing, grazing and other agricultural activities. The nearest ESA is over 1 km from the proposed disturbance area.

There are no major tracks within the proposed disturbance area. The proposed corridor intersects two watercourses, one stream order 1 and the other stream order 2, both were dry at the time of the survey. The riparian vegetation associated with the watercourses has been heavily disturbed and fragmented. Corridor R24 and its associated geo-techs and road are illustrated in Figure 3.15 to Figure 3.18, the powerline is shown in Figure 3.29.

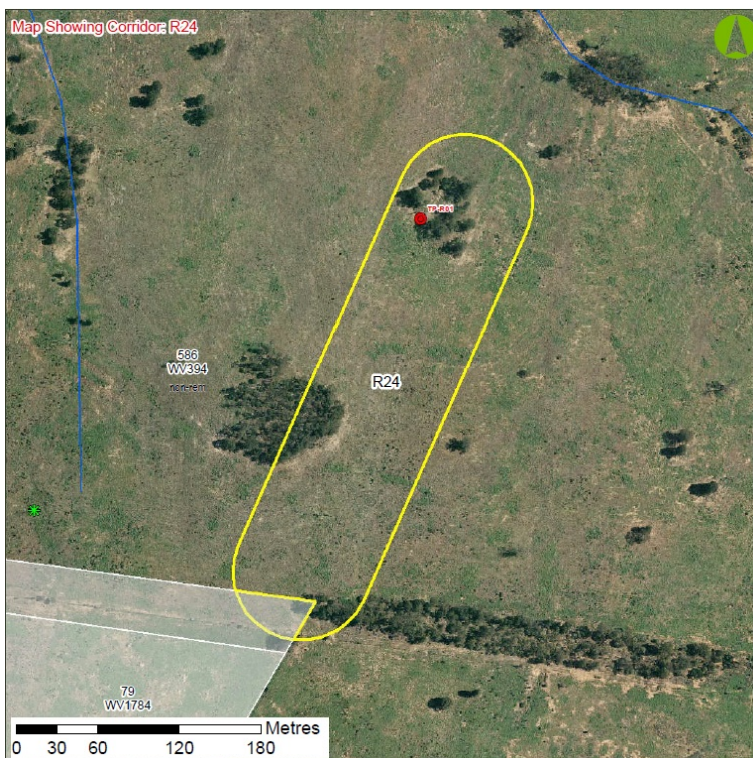


Figure 3.15 Aerial photograph and associated RE mapping of proposed corridor R24

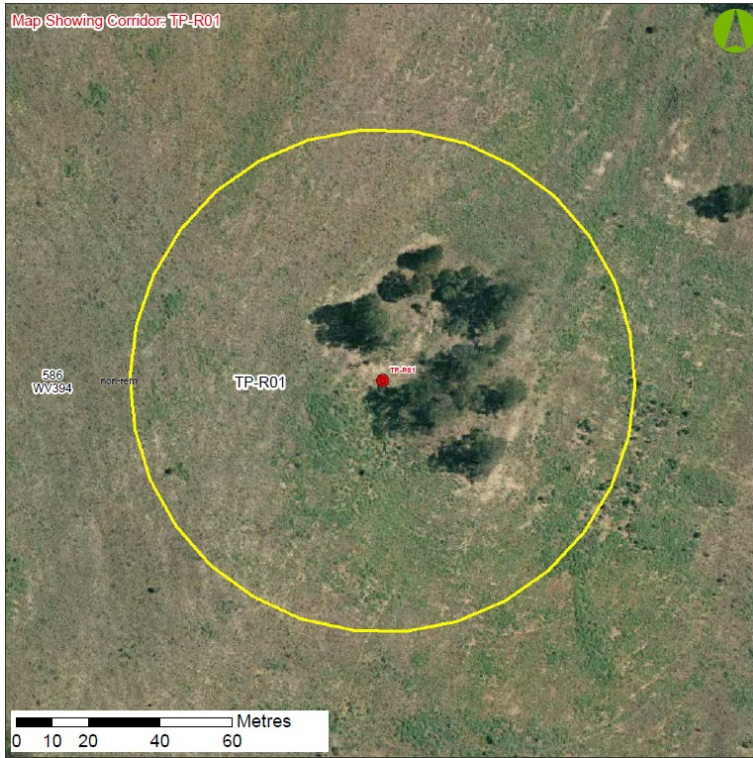
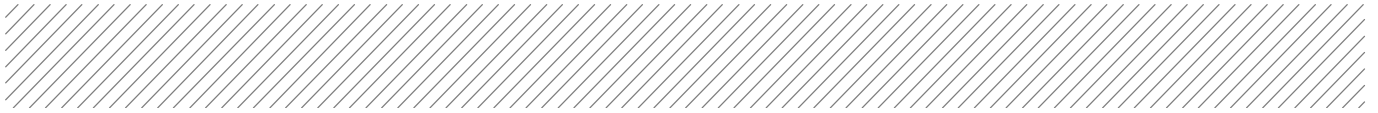


Figure 3.16 Aerial photograph and associated RE mapping of proposed corridor TP-R01

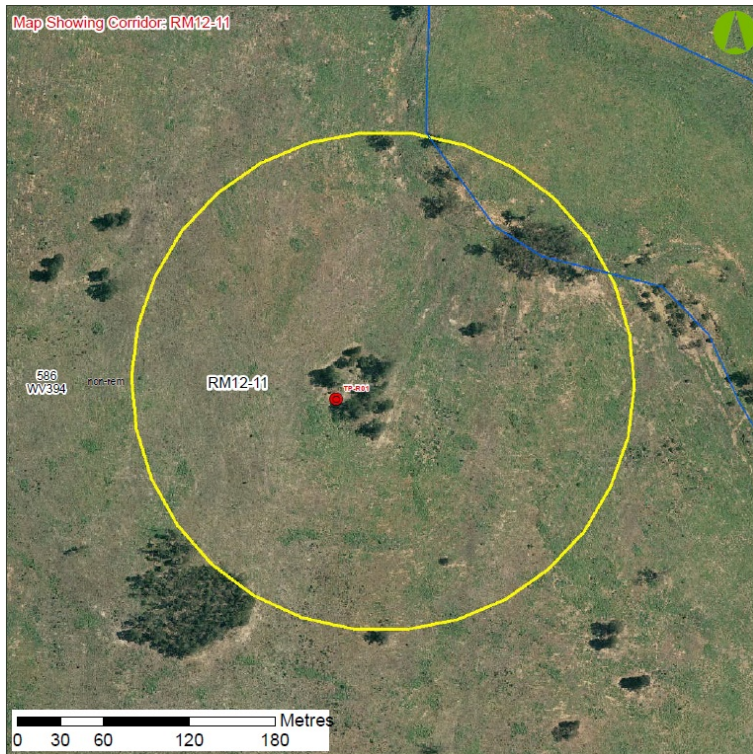


Figure 3.17 Aerial photograph and associated RE mapping of proposed corridor RM12-11

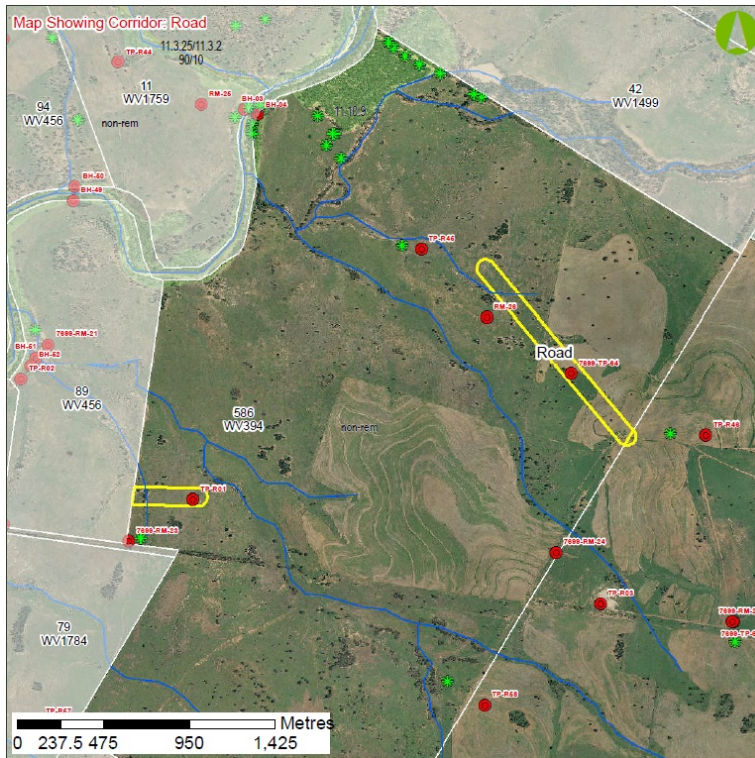


Figure 3.18 Aerial photograph and associated RE mapping of proposed Road corridor, the corridor under discussion in the western road corridor

Floristics

The area within the proposed development area has been previously cleared and disturbed as a result of grazing and other agricultural practices. The vegetation within the proposed development area is dominated by *Pennisetum ciliare* (Buffel Grass). Isolated regrowth of native species occurs across the proposed corridor, species include *Acacia excelsa* (Ironwood), *Atalaya hemiglauca* (Whitewood), *Geijera parviflora* (Wilga) and *Dodonaea viscosa* (Sticky hopbush).

No species of conservation significance under the EPBC Act or NC Act were observed. A species list is provide in Appendix A.

Habitat values

The habitat value of the proposed road corridor is considered low due to the low species richness, dominance of *Pennisetum ciliare* (Buffel grass) and lack of mature vegetation.

The area has been extensively disturbed by stock grazing, invasion of exotic pasture species and cropping. The proposed road corridor does contain isolated patches of regrowth vegetation but generally the corridor provides limited canopy cover suitable for shelter, foraging and perching, woody debris and other habitat features likely to provide habitat for native fauna species. The species able to adapt and utilise these areas will be generalist species, this is reflected in the species observed during surveying.

Incidental fauna observations which were recorded during investigations of the proposed road corridor included Red-necked wallaby (*Macropus rufogriseus*), Australian magpie (*Gymnorhina tibicen*), Grey fantail (*Rhipidura fuliginosa*), Noisy minor (*Manorina melanocephala*) and Willie wagtail (*Rhipidura leucophrys*).

No fauna species of conservation significance under the EPBC Act or NC Act were observed.

3.7 Corridor R78

General

Corridor R78 occurs across the north of lot 586 WV394, geo-tech sites RM13-02, RM13-03, RM-26, RM-27, TP-R45, TP-R46, 7699-TP-64, BH-04 and a road corridor area address in this section of this report as they are within or connected to R78.

The majority of the area that the corridor occurs is mapped as non-remnant and has been extensively disturbed due to land clearing, grazing and other agricultural activities. In the north west end of the corridor there is an area associated with a watercourse that is mapped as RE 11.10.9 'least concern' vegetation. This mapping was not confirmed during the surveys and is discussed further below. The nearest ESA is over 1 km from the proposed disturbance area.

The corridor occurs predominantly within grasslands and cultivated areas, in the east the corridor follows an access track. The proposed corridor intersects three watercourses, one stream order 3 and the others both stream order 1, all were dry at the time of the survey. The riparian vegetation associated with the watercourses has been heavily disturbed and fragmented. There is a watercourse (stream order 5) just outside the lot boundary that the corridor bisects, it is associated with high quality riparian vegetation that is within lot 586 WV394. Corridor R78 and the associated geo-techs and the road corridor are illustrated in Figures 3.19 to Figure 3.28.

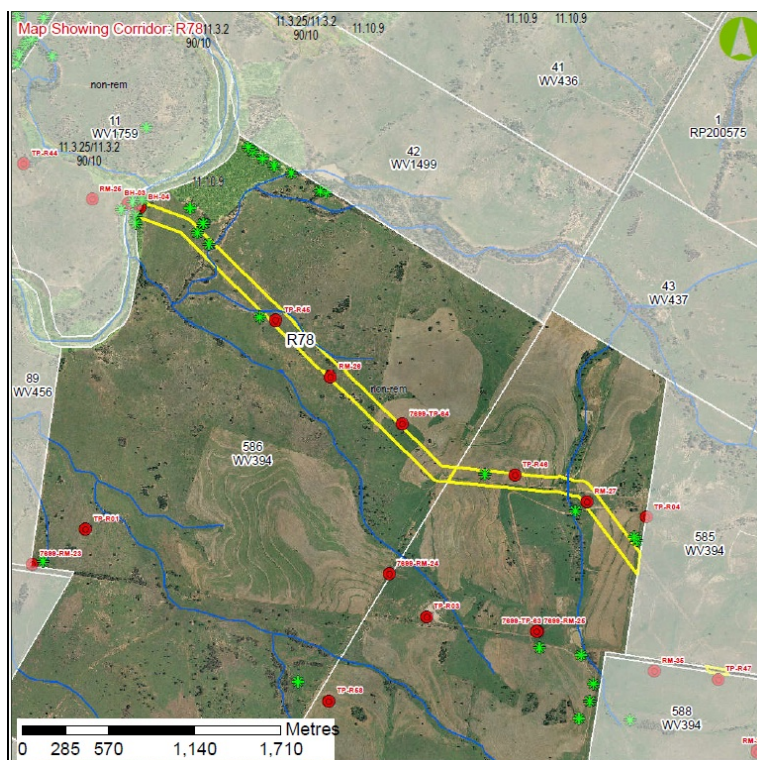


Figure 3.19 Aerial photograph and associated RE mapping of proposed corridor R78

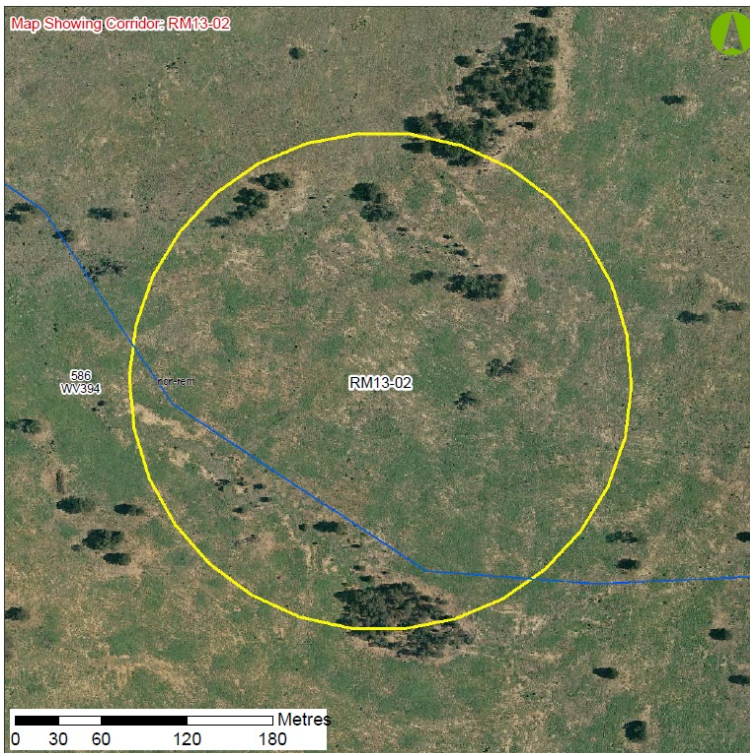
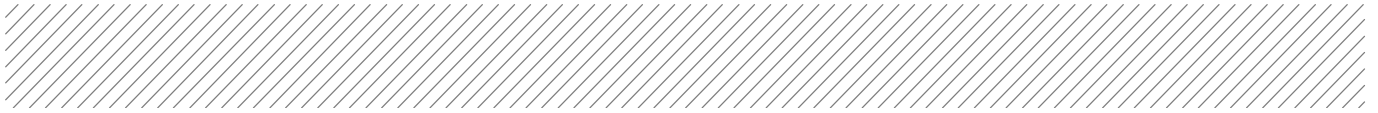


Figure 3.20 Aerial photograph and associated RE mapping of proposed geo-tech RM13-02

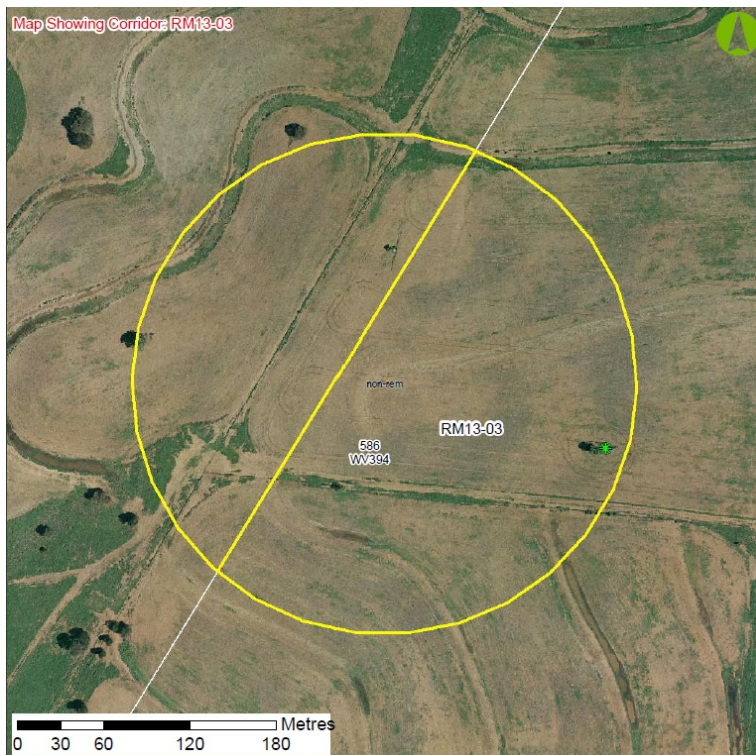


Figure 3.21 Aerial photograph and associated RE mapping of proposed geo-tech RM13-03

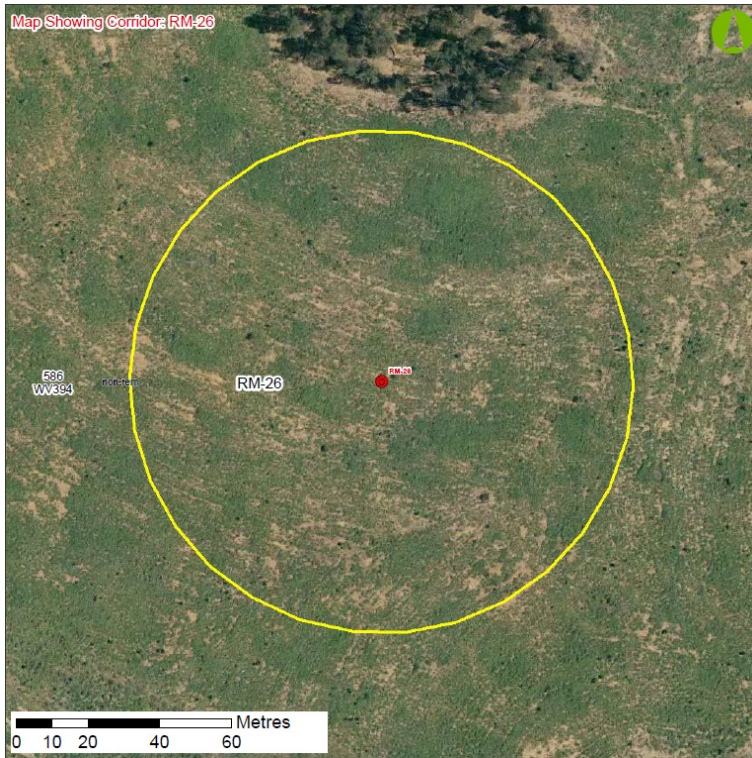
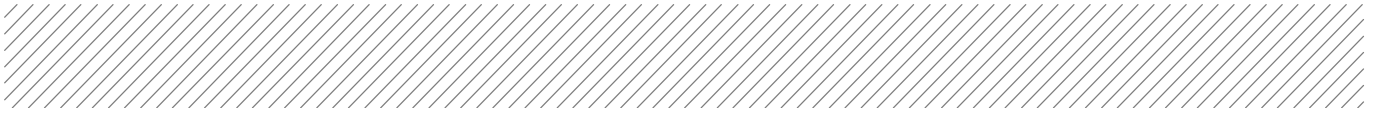


Figure 3.22 Aerial photograph and associated RE mapping of proposed geo-tech RM-26

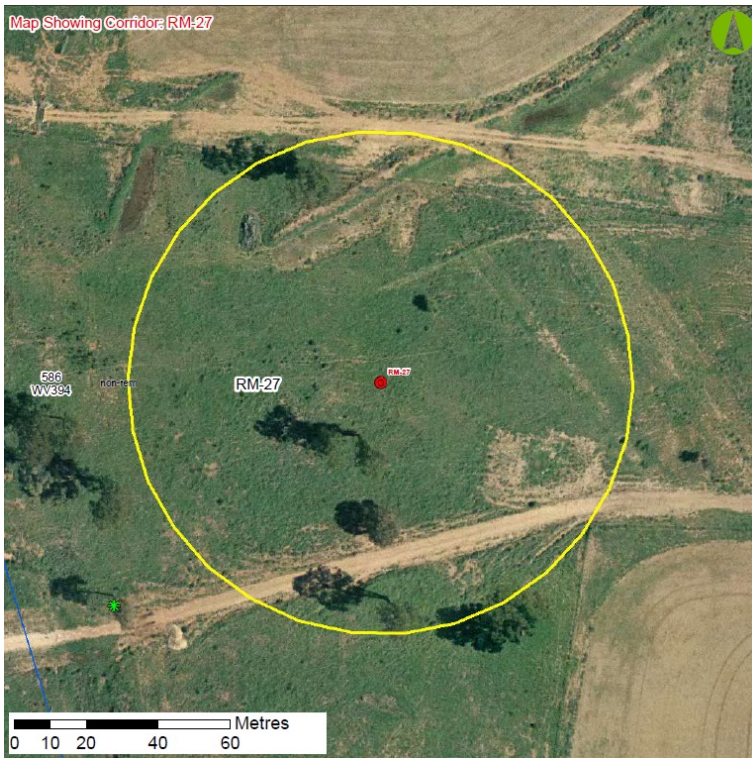


Figure 3.23 Aerial photograph and associated RE mapping of proposed geo-tech RM-27

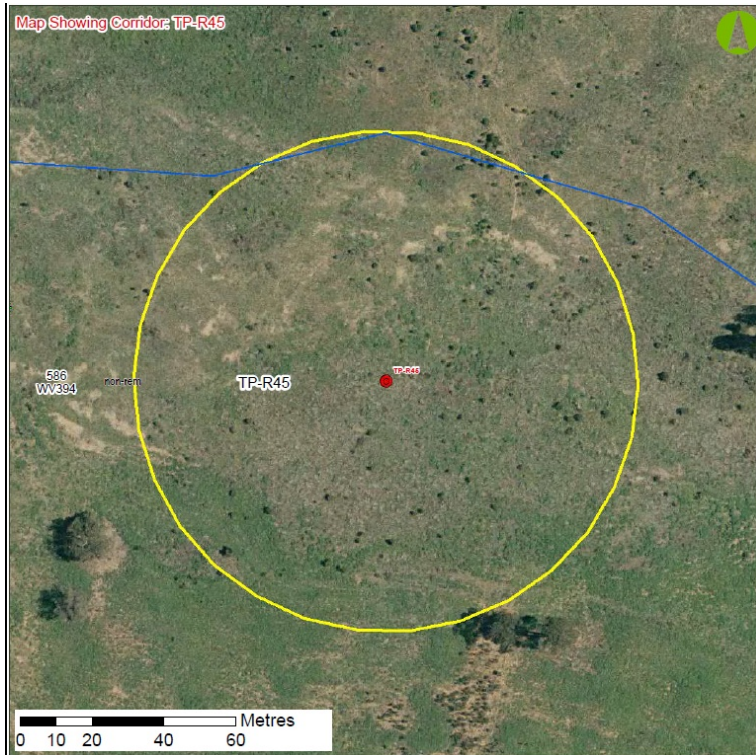
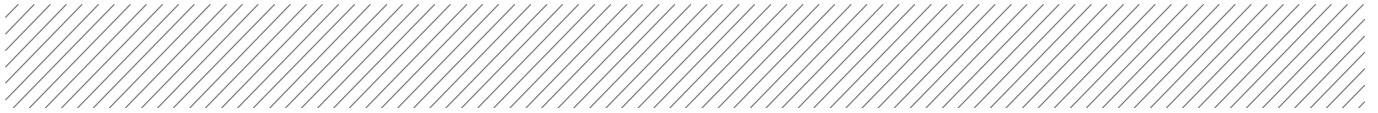


Figure 3.24 Aerial photograph and associated RE mapping of proposed geo-tech TP-R45

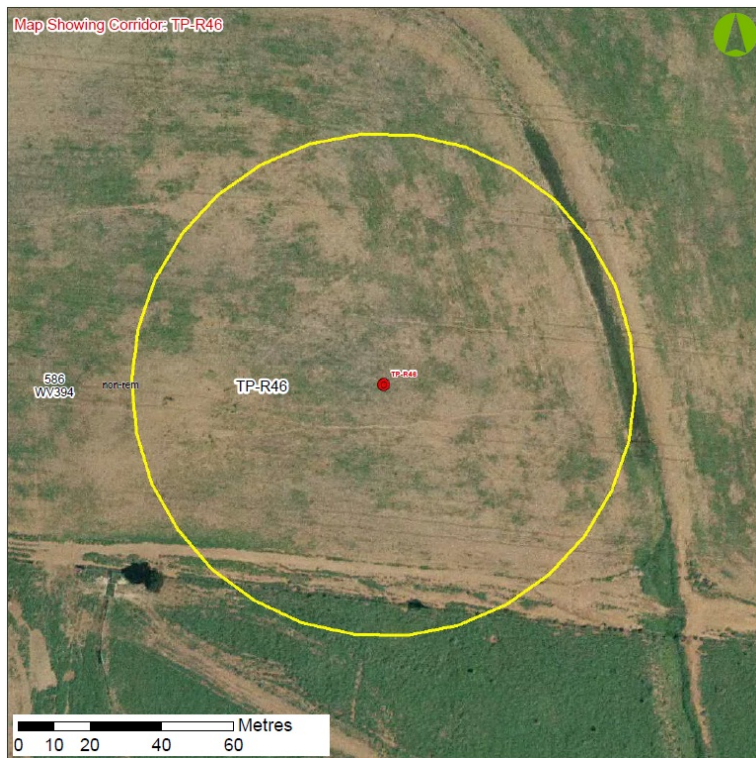


Figure 3.25 Aerial photograph and associated RE mapping of proposed geo-tech TP-R46

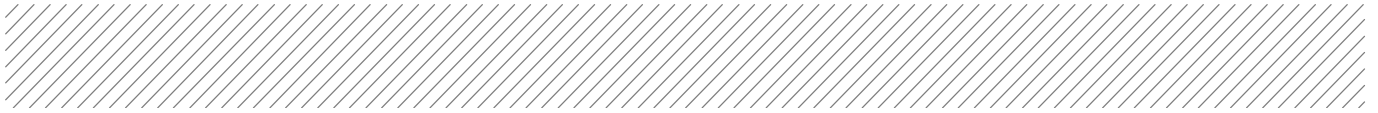


Figure 3.26 Aerial photograph and associated RE mapping of proposed geo-tech 7699-TP-64

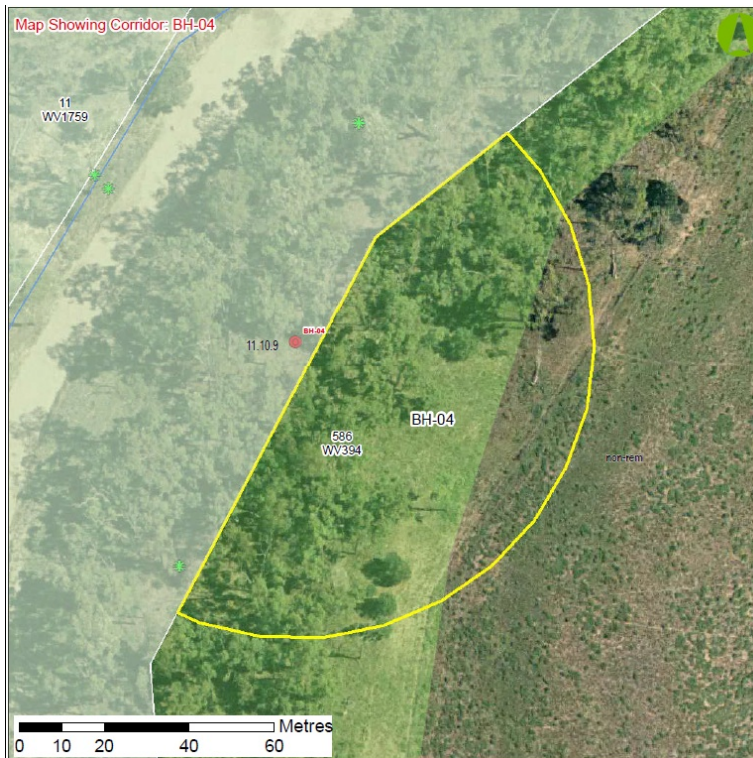


Figure 3.27 Aerial photograph and associated RE mapping of proposed geo-tech BH-04

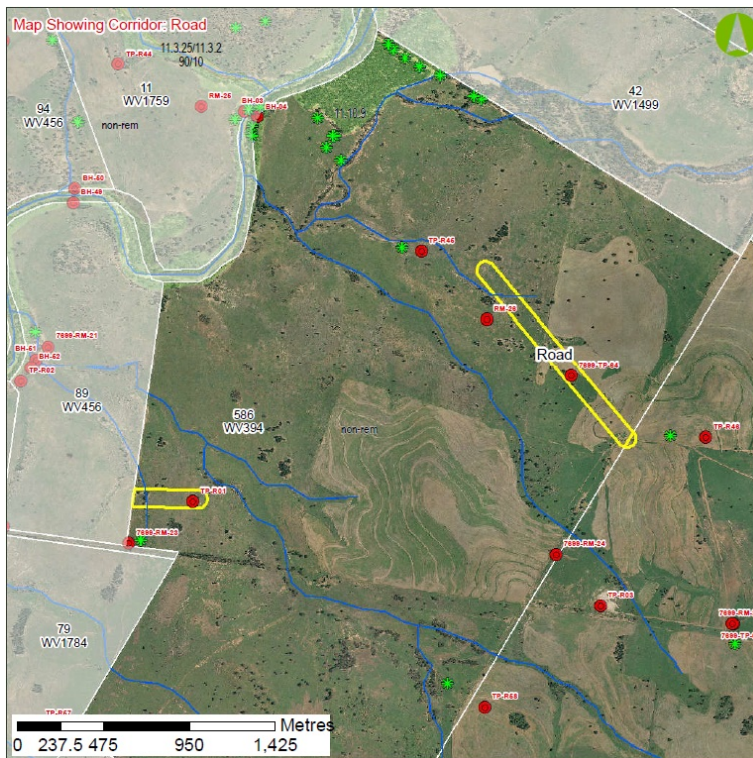


Figure 3.28 Aerial photograph and associated RE mapping of proposed Road corridor, the corridor under discussion is the eastern Road corridor

Floristics

The non-remnant areas within the proposed development area has been previously cleared and disturbed as a result of grazing and other agricultural practices. The vegetation within these parts of the corridor is predominantly grassland dominated by *Pennisetum ciliare* (Buffel Grass). There are some isolated of native species such as *Eucalyptus populnea* (Poplar Box), *Allocasuarina leuhmannii* (Bull Oak), *Acacia harpophylla* (Brigalow) and *Acacia salicina* (Sally Wattle). Areas of the proposed corridor have also been cultivated, these areas are dominated by the sown grass crops and possess very little diversity.

The remnant vegetation associated with the watercourse in the north west of the corridor is very high quality riparian vegetation that contains low numbers of exotic species and does not possess signs of recent disturbance. This area is dominated by *Eucalyptus tereticornis* (Queensland Blue Gum) and *Angophora floribunda* (Rough-barked Apple) in the canopy layer and *Imperata cylindrica* (Blady Grass) dominates the ground cover. This area was mapped is mapped as RE 11.10.9, which is described as *Callitris glaucophylla* woodland on coarse-grained sedimentary rocks. The June survey found the vegetation to be similar to mapping 11.3.25 'least concern' vegetation, which is described as *Eucalyptus tereticornis* or *Eucalyptus camaldulensis* woodland fringing drainage lines.

Three Plants of two Type A species was found within the proposed disturbance area, *Brachychiton populneus* (Kurrajong) and *Brachychiton rupestris* (Narrow Leaved Bottle Tree). Table 3.5 contains the locations of the plants.

Table 3.5 Location of Type A Restricted Plants (*Nature Conservation Act 1992*)

Species	Easting (GDA 94, Zone 55J)	Northing (GDA 94, Zone 55J)
<i>Brachychiton populneus</i>	704479	7071073
<i>Brachychiton populneus</i>	704555	7070998
<i>Brachychiton rupestris</i>	706375	7069481

No other species of conservation significance under the EPBC Act or NC Act were observed. A species list is provided in Appendix A.

Habitat values

The non-remnant areas of the corridor possess low habitat values for native fauna. These areas have limited mature vegetation, few fissured bark trees, some woody debris, no leaf litter, low species richness and a dominance of *Pennisetum ciliare* (Buffel grass). The area has been extensively disturbed by stock grazing, invasion of exotic pasture species and cropping.

The remnant area within the corridor contains good quality riparian vegetation with possess high habitat values as it provides canopy cover suitable for shelter, foraging and perching, woody debris and other habitat features likely to provide habitat for native fauna species.

Kangaroo scats were seen and monitor track were found in the sand. Incidental fauna observations which were recorded during investigations of the proposed corridor included Australian King Parrots (*Alisterus scapularis*), a Brown Quail (*Coturnix ypsilophora*), Crested Pigeons (*Ocyphaps lophotes*), an Eastern Grey Kangaroo (*Macropus giganteus*), a Golden-headed Cisticola (*Cisticola exilis*), a Magpie-lark (*Grallina cyanoleuca*), Noisy Miners (*Manorina melanocephala*), Pale Headed Rosellas (*Platycercus adscitus*), a Pretty Faced Wallaby (*Macropus parryi*), a Red Necked Wallaby (*Macropus rufogriseus*), Sulphur-crested Cockatoos (*Cacatua galerita*), a Torresian Crow (*Corvus orru*) and a Willie Wagtail (*Rhipidura leucophrys*).

No fauna species of conservation significance under the EPBC Act or NC Act were observed.

3.8 Powerline easements

General

The powerline easements not yet discussed in this report are located in the north of lot 586 WV394, there are no geo-tech sites associated with the easements.

The majority of the area that the easements occur is mapped as non-remnant and has been extensively disturbed due to land clearing, grazing and other agricultural activities. In the north west end of the disturbance area there is an vegetation associated with a watercourse that is mapped as RE 11.10.9 'least concern' vegetation. This mapping was confirmed during the surveys, the nearest ESA is over 1 km from the proposed disturbance area.

The easements occur predominantly within grasslands and cultivated areas, and follow fence lines and access tracks. The proposed corridor intersects three watercourses, one stream order 1 and the others both stream order 3, all were dry at the time of the survey. The riparian vegetation associated with the watercourses has been heavily disturbed and fragmented. There is a watercourse (stream order 5) just outside the lot boundary that a powerline easement bisects, it is associated with high quality riparian vegetation that is within lot 586 WV394. The powerline easements are illustrated in Figure 3.29.

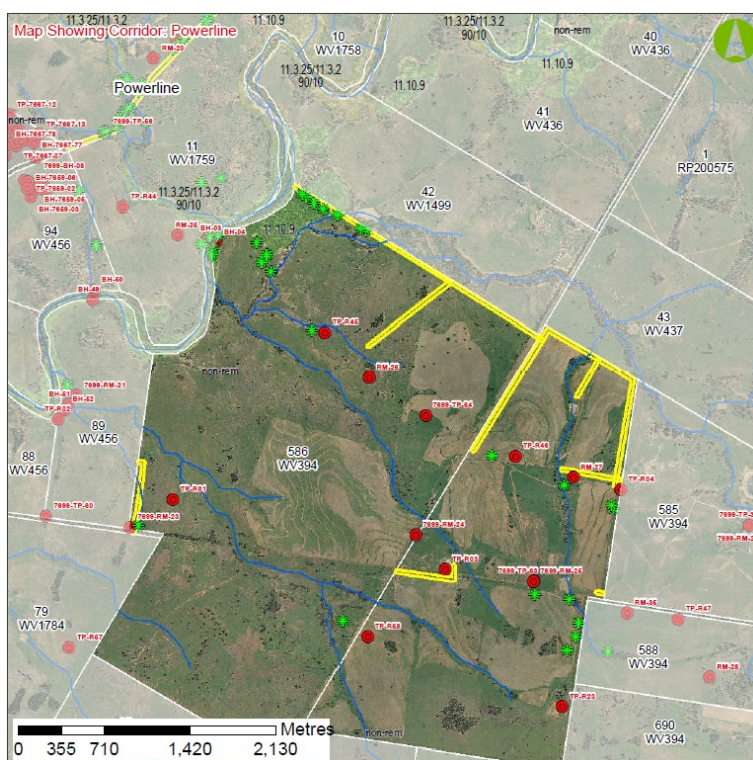


Figure 3.28 Aerial photograph and associated RE mapping of proposed powerline easements, the easements under discussion are the northern powerlines

Floristics


The non-remnant vegetation within the powerline easements has been previously cleared and disturbed as a result of grazing and other agricultural practices. The vegetation within these parts of the corridor is predominantly grassland dominated by *Pennisetum ciliare* (Buffel Grass). Isolated native species scattered through these pasture areas include *Eucalyptus populnea* (Poplar Box), *Casuarina cristata* (Belah), *Acacia harpophylla* (Brigalow) and *Eremophila mitchellii* (False sandalwood). Areas of the proposed corridor have also been cultivated, these areas are dominated by the sown grass crops and possess very little diversity.

The remnant vegetation in the north west of the corridor is very high quality vegetation that contains low numbers of exotic species and does not possess signs of recent disturbance. This area was mapped is mapped as RE 11.10.9, which is described as *Callitris glaucophylla* woodland on coarse-grained sedimentary rocks, the June survey confirmed this mapping.

One Type A species was found within the proposed disturbance area, *Brachychiton populneus* (Kurrajong). Table 3.6 contains the locations of the plant. Only one individual falls within the boundary of the powerlines, there were multiple other *Brachychiton populneus* plants just outside the boundary that were also mapped, this can be seen in Figure 3.28.

Table 3.8.6 Location of Type A Restricted Plants (*Nature Conservation Act 1992*)

Species	Easting (GDA 94, Zone 55J)	Northing (GDA 94, Zone 55J)
<i>Brachychiton populneus</i>	705330	7071339



No other species of conservation significance under the EPBC Act or NC Act were observed. A species list is provided in Appendix A.

Habitat values

The habitat value of the remnant areas of the powerline easements is considered low due to the low species richness, dominance of *Pennisetum ciliare* (Buffel grass) and lack of mature vegetation. These areas have been extensively disturbed by land clearing, invasion of exotic pasture species and grazing. The area has limited potential habitat for native fauna as it consists of exotic pasture with some scattered regrowth, little woody debris, limited fissured tree bark and rocky areas.

The remnant area within the corridor contains high quality vegetation in the north west which possess high habitat values as it provides canopy cover suitable for shelter, foraging and perching, woody debris and other habitat features likely to provide habitat for native fauna species.

Incidental fauna sightings during the surveys included Apostlebird (*Struthidea cinerea*), Australian Magpie (*Gymnorhina tibicen*), Cockatiel (*Nymphicus hollandicus*), Echidna (*Tachyglossus aculeatus*), Galah (*Eolophus roseicapilla*), Grey Butcherbird (*Cracticus torquatus*), Grey Crowned Babbler (*Pomatostomus temporalis*), Noisy Miner (*Manorina melanocephala*), Pale-headed Rosella (*Platycercus adscitus*), Pied Butcherbird (*Cracticus nigrogularis*), Red Winged Parrot (*Aprosmictus erythropterus*), Red-backed Fairy-wren (*Malurus melanocephalus*), Striated Pardalote (*Pardalotus striatus*), Sulphur-crested Cockatoo (*Cacatua galerita*), Torresian Crow (*Corvus orru*), Variegated Fairy-wren (*Malurus lamberti*) and Willie Wagtail (*Rhipidura leucophrys*).

No fauna species of conservation significance under the EPBC Act or NC Act were observed.



4 Conclusion

The corridors occurring within lot 586 WV394 predominantly occur within agricultural land. The majority of the area is grazed pasture lands or cultivated areas one area in the north west containing remnant vegetation.

All the non-remnant mapping is confirmed in the disturbance area, while the RE mapping of 11.10.9 was not confirmed. It is believed to be 11.3.25 which is another 'least concern' vegetation type, this vegetation is associated with a watercourse (stream order 5) and is high quality riparian vegetation and subsequently possesses high ecological and habitat value.

Multiple other watercourses occur within, or in close proximity to, development areas. These other watercourses within the proposed development areas have limited fringing riparian vegetation, and subsequently have low to moderate ecological and habitat value.

Multiple Type A restricted plants were observed within the proposed development areas across a range of corridors.

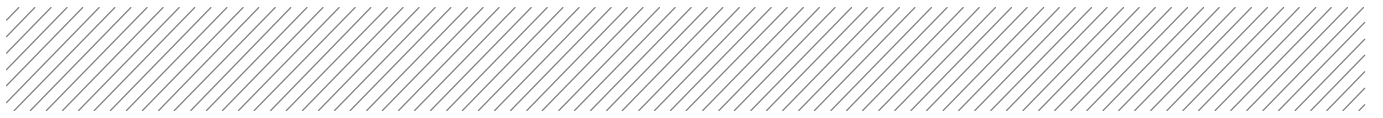
No species protected under the provisions of the EPBC Act were observed within the proposed development areas during these investigations.



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

Species	Easting (GDA 94, Zone 55J)	Northing (GDA 94, Zone 55J)	R1	R2 & R16	R3	R17	R19	R24	R78	Powerline Easements
Adiantaceae	<i>Cheilanthes aspera</i>	Bristly cloak fern	x					x		x
Adiantaceae	<i>Cheilanthes sieberi</i>	Mulga Fern					x		x	x
Amaranthaceae	<i>Gomphrena celosioides</i>	Gomphrena Weed		x						
Anthericaceae	<i>Laxmannia gracilis</i>	Slender Wire Lilly								x
Apiaceae	<i>Hydrocotyle laxiflora</i>	Pennywort	x					x		
Apocynaceae	<i>Alstonia constricta</i>	Bitter Bark	x	x		x		x	x	
Apocynaceae	<i>Carissa ovata</i>	Currant Bush		x						x
Asteraceae	<i>Bidens pilosa</i>	Cobblers Pegs					x		x	x
Asteraceae	<i>Brachycome dentata</i>	Lobe-seed Daisy		x	x				x	
Asteraceae	<i>Bracteantha bracteata</i>	Everlasting Daisy		x	x				x	
Asteraceae	<i>Calocephalus platycephalus</i>	Billy Buttons					x		x	x
Asteraceae	<i>Calotis cuneifolia</i>	Purple Burr Daisy	x					x	x	
Asteraceae	<i>Calotis lappulacea</i>	Yellow Burr Daisy					x			x
Asteraceae	<i>Chrysocephalum apiculatum</i>	Yellow Buttons				x	x		x	x
Asteraceae	<i>Cirsium vulgare</i>	Spear Thistle, Black Thistle		x	x		x		x	x

Species	Easting (GDA 94, Zone 55J)	Northing (GDA 94, Zone 55J)	R1	R2 & R16	R3	R17	R19	R24	R78	Powerline Easements
Asteraceae	<i>Conyza bonariensis</i>	Fleabane								x
Asteraceae	<i>Conyza canadensis</i>	Canadian fleabane					x			x
Asteraceae	<i>Epaltes australis</i>	Spreading Nutheads					x			x
Asteraceae	<i>Podolepis jaceoides</i>	Showy Copper Wire Daisy								x
Asteraceae	<i>Pterocaulon sphacelatum</i>	Apple Bush		x	x				x	x
Asteraceae	<i>Senecio lautus</i>	Fire Weed					x			x
Asteraceae	<i>Sonchus oleraceus</i>	Sow Thistle	x				x	x		x
Asteraceae	<i>Tagetes minuta</i>	Stinking Rodger								x
Asteraceae	<i>Xanthium occidentale</i>	Noogoora Burr				x	x		x	x
Asteraceae	<i>Xanthium spinosum</i>	Bathurst Burr					x			
Brassicaceae	<i>Lepidium africanum</i>	Pepper Cress					x			x
Brassicaceae	<i>Lepidium sagittulatum</i>	Pepper Cress		x	x	x				
Cactaceae	<i>Harrisia spp</i>	Harrisia cactus								x
Cactaceae	<i>Opuntia stricta</i> *	Prickly Pear	x					x	x	
Cactaceae	<i>Opuntia tomentosa</i> *	Velvety Tree Pear	x	x			x	x	x	x
Campanulaceae	<i>Wahlenbergia gracilis</i>	Sprawling Bluebell	x					x		
Capparaceae	<i>Apophyllum anomalum</i>	Warrior bush	x	x		x	x	x	x	x
Capparaceae	<i>Capparis loranthifolia</i>	Nipan, Wait a while	x	x	x	x		x	x	

Species	Easting (GDA 94, Zone 55J)	Northing (GDA 94, Zone 55J)	R1	R2 & R16	R3	R17	R19	R24	R78	Powerline Easements
Casuarinaceae	<i>Allocasuarina luehmannii</i>	Bull Oak		x		x			x	x
Casuarinaceae	<i>Casuarina cristata</i>	Belah	x				x	x		x
Chenopodiaceae	<i>Einadia nutans</i>	Climbing Saltbush				x	x			x
Chenopodiaceae	<i>Enchylaena tomentosa var. glabra</i>	Ruby Saltbush		x						
Chenopodiaceae	<i>Maireana microphylla</i>	Small-leaf Bluebush		x			x		x	x
Chenopodiaceae	<i>Maireana villosa</i>	Silky Bluebush		x						
Chenopodiaceae	<i>Salsola kali</i>	Rolly-Polly		x	x	x	x		x	x
Chenopodiaceae	<i>Sclerolaena birchii</i>	Galvanised Burr	x	x	x	x		x	x	
Chenopodiaceae	<i>Sclerolaena muricata</i>	Black Rolly-polly					x			x
Convolvulaceae	<i>Dichondra repens</i>	Kidney Weed		x						x
Cupressaceae	<i>Callitris glaucophylla</i>	White Cypress Pine							x	x
Cyperaceae	<i>Cyperus gracilis</i>	Bunchy Sedge					x			x
Cyperaceae	<i>Cyperus polystachyos</i>	Bunchy Sedge					x			x
Cyperaceae	<i>Cyperus sp.</i>	A sedge							x	
Cyperaceae	<i>Fimbristylis dichotoma</i>	Fimbristylis					x			x
Euphorbiaceae	<i>Chamaesyce drummondii</i>	Caustic Weed					x			x
Fabaceae - Caesalpinioideae	<i>Senna artemisioides</i>	Senna		x						

Species	Easting (GDA 94, Zone 55J)	Northing (GDA 94, Zone 55J)	R1	R2 & R16	R3	R17	R19	R24	R78	Powerline Easements
Fabaceae - Caesalpinioideae	<i>Senna circinnata</i>	Coiled Cassia	x					x		
Fabaceae - Faboideae	<i>Medicago polymorpha</i>	Burr Medic					x			x
Fabaceae - Faboideae	<i>Trifolium</i> sp.	Clover				x				
Fabaceae - Mimosoideae	<i>Acacia decora</i>	Pretty Wattle							x	
Fabaceae - Mimosoideae	<i>Acacia excelsa</i>	Iron wood	x	x			x	x	x	x
Fabaceae - Mimosoideae	<i>Acacia harpophylla</i>	Brigalow	x	x		x	x	x	x	
Fabaceae - Mimosoideae	<i>Acacia oswaldii</i>	Umbrella Wattle				x			x	x
Fabaceae - Mimosoideae	<i>Acacia salicina</i>	Sally Wattle							x	
Goodeniaceae	<i>Goodenia glabra</i>	Smooth Goodenia							x	
Goodeniaceae	<i>Scaevola parvibarbata</i>	Purple Flower scaevola							x	
Juncaceae	<i>Juncus usitatus</i>	Juncus	x	x		x		x	x	x
Lamiaceae	<i>Plectranthus parviflorus</i>	Native Coleus								x
Lamiaceae	<i>Spartothamnella juncea</i>	native broom	x					x		
Lamiaceae	<i>Spartothamnella puberula</i>	Spiky Bush	x					x		

Species	Easting (GDA 94, Zone 55J)	Northing (GDA 94, Zone 55J)	R1	R2 & R16	R3	R17	R19	R24	R78	Powerline Easements
Lomandraceae	<i>Lomandra filiformis</i>	Wattle Mat Rush								x
Lomandraceae	<i>Lomandra leucocephala</i>	Woolly Mat-rush							x	
Lomandraceae	<i>Lomandra leucocephala</i>	Lomandra								x
Lomandraceae	<i>Lomandra longifolia</i>	Lomandra							x	x
Lomandraceae	<i>Lomandra multiflora</i>	Lomandra							x	
Malvaceae	<i>Abutilon</i> sp.	Chinese lantern								x
Malvaceae	<i>Malva parviflora</i>	Small-flowered Mallow		x	x					
Malvaceae	<i>Malvastrum americanum</i>	Spiny Malvastrum					x			x
Malvaceae	<i>Sida cordifolia</i>	Flannel weed		x	x					
Malvaceae	<i>Sida rhombifolia</i>	Paddy's lucerne		x	x				x	
Malvaceae	<i>Sida rohlenae</i>	Shrub Sida					x			x
Malvaceae	<i>Sida subspicata</i>	Queensland Hemp	x	x	x	x		x		x
Myoporaceae	<i>Eremophila deserti</i>	Turkey Bush					x			x
Myoporaceae	<i>Eremophila mitchellii</i>	False Sandalwood	x	x		x	x	x	x	x
Myoporaceae	<i>Myoporum acuminatum</i>	Boobialla						x		
Myrsinaceae	<i>Anagallis arvensis</i>	Scarlet Pimpernel							x	
Myrtaceae	<i>Angophora floribunda</i>	Rough-barked Apple							x	x
Myrtaceae	<i>Eucalyptus chloroclada</i>	Baradine Red Gum								x

Species	Easting (GDA 94, Zone 55J)	Northing (GDA 94, Zone 55J)	R1	R2 & R16	R3	R17	R19	R24	R78	Powerline Easements
Myrtaceae	<i>Eucalyptus melanophloia</i>	Silver Leaved Ironbark	x					x		
Myrtaceae	<i>Eucalyptus populnea</i>	Poplar Box	x	x	x	x	x	x	x	x
Myrtaceae	<i>Eucalyptus tereticornis</i>	Queensland Blue Gum							x	
Oleaceae	<i>Jasminum didymum subsp. racemosum</i>	Native Jasmine								x
Oxalidaceae	<i>Oxalis stricta</i>	Yellow Wood Sorrel								x
Phormiaceae	<i>Dianella longifolia</i>	Dianella					x		x	x
Pittosporaceae	<i>Pittosporum spinescens</i>	Wallaby Apple	x					x		
Poaceae	<i>Aristida caput medusae</i>	Many-headed Wire Grass	x					x	x	x
Poaceae	<i>Austrostipa verticillata</i>	Slender Bamboo Grass	x				x	x	x	x
Poaceae	<i>Avena sativa</i>	Common Oats					x		x	x
Poaceae	<i>Capillipedium spicigerum</i>	Scented-top grass							x	x
Poaceae	<i>Chloris divaricata</i>	Windmill Chloris		x	x	x			x	
Poaceae	<i>Chloris gayana</i>	Rhodes Grass	x					x		
Poaceae	<i>Chloris pectinata</i>	Comb Chloris					x			x
Poaceae	<i>Chloris truncata</i>	Chloris								x
Poaceae	<i>Cynodon dactylon</i>	Green Couch		x	x		x			
Poaceae	<i>Dichanthium sericeum</i>	Queensland Blue Grass	x	x	x	x		x	x	x

Species	Easting (GDA 94, Zone 55J)	Northing (GDA 94, Zone 55J)	R1	R2 & R16	R3	R17	R19	R24	R78	Powerline Easements
Poaceae	<i>Eragrostis brownii</i>	Browns Lovegrass		x	x		x		x	x
Poaceae	<i>Eragrostis cilianensis</i>	Stinkgrass		x	x		x		x	x
Poaceae	<i>Heteropogon contortus</i>	Black Spear Grass					x			x
Poaceae	<i>Imperata cylindrica</i>	Blady Grass							x	
Poaceae	<i>Melinis repens</i>	Red Natal		x	x				x	x
Poaceae	<i>Panicum effusum</i>	Inquisitive Grass								x
Poaceae	<i>Pennisetum ciliare</i>	Buffel Grass	x	x	x	x	x	x	x	x
Poaceae	<i>Perotis rara</i>	Comet Grass								x
Poaceae	<i>Sorghum halepense</i>	Johnson Grass	x					x		x
Poaceae	<i>Sporobolus actinocladius</i>	Ray Grass					x			x
Poaceae	<i>Sporobolus caroli</i>	Desert Sporobolus, Fairy Grass							x	x
Poaceae	<i>Sporobolus creber</i>	Western Rats Tail Grass	x			x	x	x	x	x
Poaceae	<i>Themeda avenacea</i>	Wild Oats Grass	x					x		
Poaceae	<i>Themeda quadrivalvis</i>	Grader Grass							x	
Poaceae	<i>Themeda triandra</i>	Kangaroo Grass	x					x		x
Poaceae	<i>Triraphis mollis</i>	Purple plume grass					x			
Portulacaceae	<i>Portulaca pilosa</i>	Hairy Pigweed					x			x

Species	Easting (GDA 94, Zone 55J)	Northing (GDA 94, Zone 55J)	R1	R2 & R16	R3	R17	R19	R24	R78	Powerline Easements
Proteaceae	<i>Grevillea striata</i>	Beefwood								x
Proteaceae	<i>Hakea lorea</i>	Bootlace Oak							x	
Ranunculaceae	<i>Ranunculus lappaceus</i>	Australian Buttercup								x
Rubiaceae	<i>Psydrax odorata subsp. australiana</i>	Canthium		x					x	
Rubiaceae	<i>Psydrax oleifolia</i>	Canthium	x					x		x
Rubiaceae	<i>Richardia brasiliensis</i>	Mexican clover		x	x					
Rutaceae	<i>Citrus glauca</i>	Lime bush					x			x
Rutaceae	<i>Geijera parviflora</i>	Wilga	x	x				x	x	x
Santalaceae	<i>Santalum lanceolatum</i>	Sandalwood								x
Sapindaceae	<i>Alectryon diversifolius</i>	Scrub Boonaree				x			x	x
Sapindaceae	<i>Alectryon oleifolius</i>	Boonaree					x			
Sapindaceae	<i>Atalaya hemiglauca</i>	Whitewood	x	x			x	x	x	x
Sapindaceae	<i>Dodonaea viscosa</i>	Sticky Hopbush	x	x			x	x	x	x
Scrophulariaceae	<i>Verbascum virgatum</i>	Twiggy Mullein								x
Solanaceae	<i>Lycium ferocissimum</i>	African Box Thorne					x			x
Solanaceae	<i>Solanum americanum</i>	American Nightshade								x
Solanaceae	<i>Solanum ellipticum</i>	Potato Bush					x			x

Species	Easting (GDA 94, Zone 55J)	Northing (GDA 94, Zone 55J)	R1	R2 & R16	R3	R17	R19	R24	R78	Powerline Easements
Solanaceae	<i>Solanum nigrum</i>	Blackberry nightshade		x	x					
Solanaceae	<i>Solanum</i> sp.						x			x
Sterculiaceae	<i>Brachychiton populneus</i> [#]	Kurrajong	x	x		x			x	x
Sterculiaceae	<i>Brachychiton rupestris</i> [#]	Narrow Leaved Bottle Tree			x	x			x	
Thymelaeaceae	<i>Pimelea</i> sp.		x					x		
Verbenaceae	<i>Verbena litoralis</i>	Tall Verbena		x	x					
Verbenaceae	<i>Verbena officinalis</i>	Common Verbena, Native Verbena				x			x	
Verbenaceae	<i>Verbena tenuisecta</i>	Mayne's Curse	x	x	x	x	x	x	x	x
Violaceae	<i>Viola hederacea</i>	Native Viola							x	

* Class 2 declared species under the *Land Protection (Pest and Stock Route Management) Act 2002* (Qld)

NC Act Type A restricted species



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