



**Roma Ecological Assessment
Report - Lots 22, 23 and 24 on
WV432
Santos Ltd**

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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.

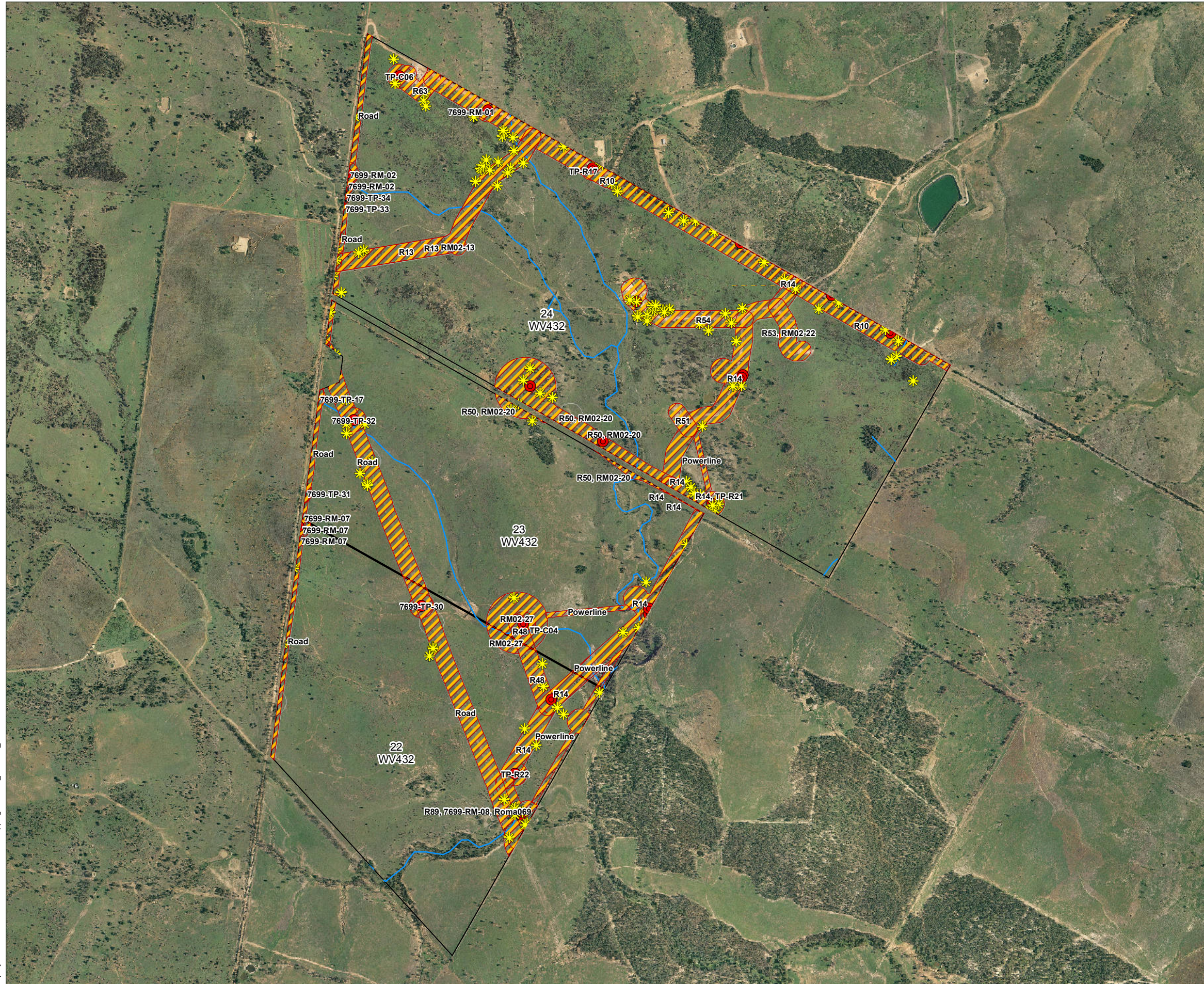
This report is specific to the proposed development areas listed below and shown in Figure 1.1:

- Pipeline corridors R10, R13, R14, R48, R50, R51, R53 R54, R63,
- Geotechnical survey locations situated within the above corridors
- Powerline easement on Lots 22, 23 and 24
- Road corridor on Lots 22 and 23
- Road corridor traversing Lots 22, 23 and 24

These areas are collectively referred to as the 'proposed development area', and are located entirely within Lots 22, 23 and 24 on WV432. Note that the subject of this report is solely related to these lots. 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 Lots 22, 23 and 24 on WV432 (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
- LOT 22, 23 & 24 WV432 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:

Date: 08/06/2011 Version: 1

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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 Vanessa Boettcher on 11-16 May 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. Well pads located at the end of some corridors were circular with a 400 m diameter. Geotechnical survey locations were also assessed as part of the survey areas (a 50 m 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 R10

The proposed pipeline corridor R10 is located on Lot 24 WV432 (Figure 3-1). The proposed development area is situated on gently undulating land with a range of overlying geologies including black soils, silty-clays, and silty-sand soils. Three (3) geotechnical survey locations were assessed as part of this corridor, namely TP-R18, TP-R17 and 7699-RM-01.

The proposed development area has been previously disturbed due to heavy stock grazing, and clearing of vegetation for property boundary fences, access roads and existing well pads. Although the area has been largely cleared of vegetation, a narrow corridor of mature trees persists between the road reserve and the boundary fences, extending for almost the full length of the proposed corridor.

The proposed development area is currently mapped as non-remnant on the DERM RE mapping, and does not occur within any areas identified as ESA's (the nearest ESA is located approximately 1.8 km to the south of the corridor).

The proposed development area traverses three (3) mapped watercourses – two (2) in the south-west section (both stream order 1), and one (1) in the north-western section (stream order 2). Only slow-flowing water was observed in the watercourse with stream order 2.

Floristics

The proposed development area is largely cleared or disturbed and is characterised by a dense ground layer dominated by *Pennisetum ciliare* (Buffel Grass), non-native pasture species and associated native grasses. The shrub layer is generally mid-dense (approximately 25% cover over the total area on this Lot) to 2 m in height, and is dominated by *Eremophila mitchellii* (False sandalwood), with other species including *Carissa ovata* (Currant bush), *Alstonia constricta* (Bitter Bark), Acacia species and juvenile Eucalypts.

Eucalyptus populnea (Poplar box) and *E. mitchellii* are the co-dominant species in the sparse sub-canopy layer (height range of 2.5-8 m), and the very sparse canopy layer (height range 8-20 m) includes *Acacia harpophylla* (Brigalow), Eucalyptus species (*Eucalyptus orgadophila*, *E. orgadophila x populnea*, *E. populnea*, *E. camaldulensis*) Bull oak (*Allocasuarina luehmannii*) and Brachychiton species.

The narrow corridor of vegetation between the road reserve and the boundary fence on Lot 87 WV763 contained similar dominant species to those mentioned above; however the structure of the vegetation community differed compared to the cleared/disturbed areas. The ground layer and shrub layers were typically not as dense, and the sub-canopy and canopy layer ranged from mid-dense to very dense (canopies touching – canopies overlap), and were typically. The species diversity within this vegetation corridor was also far greater than that of the disturbed areas.

A total of 14 Type A restricted plant species (under the NC Act) were recorded within the proposed development area - the location of these species is provided in Table 3.1

No species protected under the provisions of the EPBC Act were observed within the proposed corridor.

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

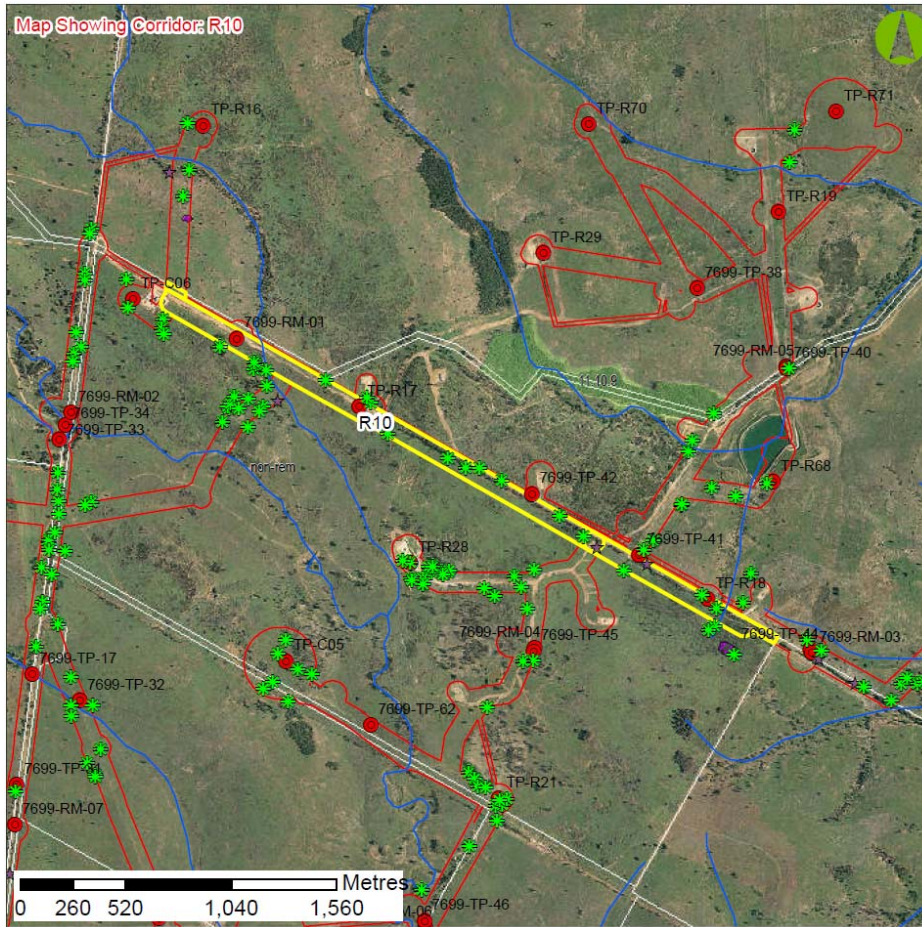


Figure 3.1 Aerial photograph of proposed corridor R10 * - denotes the location of Type A species

Table 3.1 Species of conservation significance for Corridor R10

Species	Easting (GDA 94, Zone 55J)	Northing (GDA 94, Zone 55J)
<i>Brachychiton populneus</i> (2 individuals)	704018	7082935
<i>Brachychiton populneus</i>	703945	7082999
<i>Cymbidium canaliculatum</i>	703674	7083153
<i>Cymbidium canaliculatum</i>	703426	7083236
<i>Brachychiton populneus</i>	703362	7083287
<i>Brachychiton populneus</i>	703244	7083389
<i>Brachychiton populneus</i>	702956	7083564
<i>Brachychiton rupestris</i>	702848	7083626
<i>Brachychiton populneus</i>	702781	7083628
<i>Brachychiton rupestris</i>	702692	7083673
<i>Brachychiton populneus</i>	702397	7083798

Species	Easting (GDA 94, Zone 55J)	Northing (GDA 94, Zone 55J)
<i>Brachychiton populneus</i>	702364	7083842
<i>Brachychiton populneus</i>	702089	7084057

Habitat values

Thirteen (13) incidental fauna species were recorded within the proposed disturbance area, namely Willy wagtail (*Rhipidura leucophrys*), Torresian crow (*Corvus orru*), Magpie lark (*Grallina cyanoleuca*), Noisy miner (*Manorina melanocephala*), Pretty-face wallaby (*Macropus parryi*), Apostlebird (*Struthidea cinerea*), Wedge-tailed eagle (*Aquila audax*), Crested pigeon (*Ocyphaps lophotes*), Pale-headed rosella (*Platycercus adscitus*), Striated pardalote (*Pardalotus striatus*), Red-backed fairy-wren (*Malurus melanocephalus*), Golden-headed Cisticola (*Cisticola exilis*) 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
- Fissured tree bark
- Dense groundcover vegetation (ie grassy tussocks)
- Woody debris (ie fallen/felled timber, including hollow-bearing logs)
- Watercourse habitat (including banks)

The habitat values of the proposed development area are low to moderate overall. The area contains limited woody vegetation and has been extensively disturbed by grazing stock, previous vegetation clearing and the invasion of exotic pasture species. The narrow corridor of vegetation that persists between the road reserve and property boundary is likely to provide habitat for a range of native avian fauna.

3.2 Corridor R13

General

The proposed pipeline corridor R13 is located on Lot 24 WV432 (Note: section of corridor R13 on Lot 2 WV432 was not assessed due to land access restrictions). The proposed development area is located on gently undulating land with silty-sand soils. The area has been extensively disturbed previously as a result of heavy grazing by stock. There is one (1) existing cleared well pad (Hermitage 15), and an existing access road within the corridor. No geotechnical survey locations are proposed within this corridor at the time of assessment.

The proposed development area is currently mapped as non remnant on the DERM RE mapping. The area does not occur within any areas identified as ESA's, with the nearest ESA approximately 3 km to the west of the area.

Two (2) watercourses bisect the north-eastern section of the corridor and are mapped as stream order 2 and a stream order 3 (Figure 3.2). Neither watercourse was recorded as in flow at the time of the survey, however the northern-most watercourse contained a series of disconnected pools.

A cleared strip of approximately 20 m width occurs along the majority of the proposed corridor length, which appears to have been recently cleared/maintained which may be associated within an existing water pipeline however this was unable to be confirmed on site.

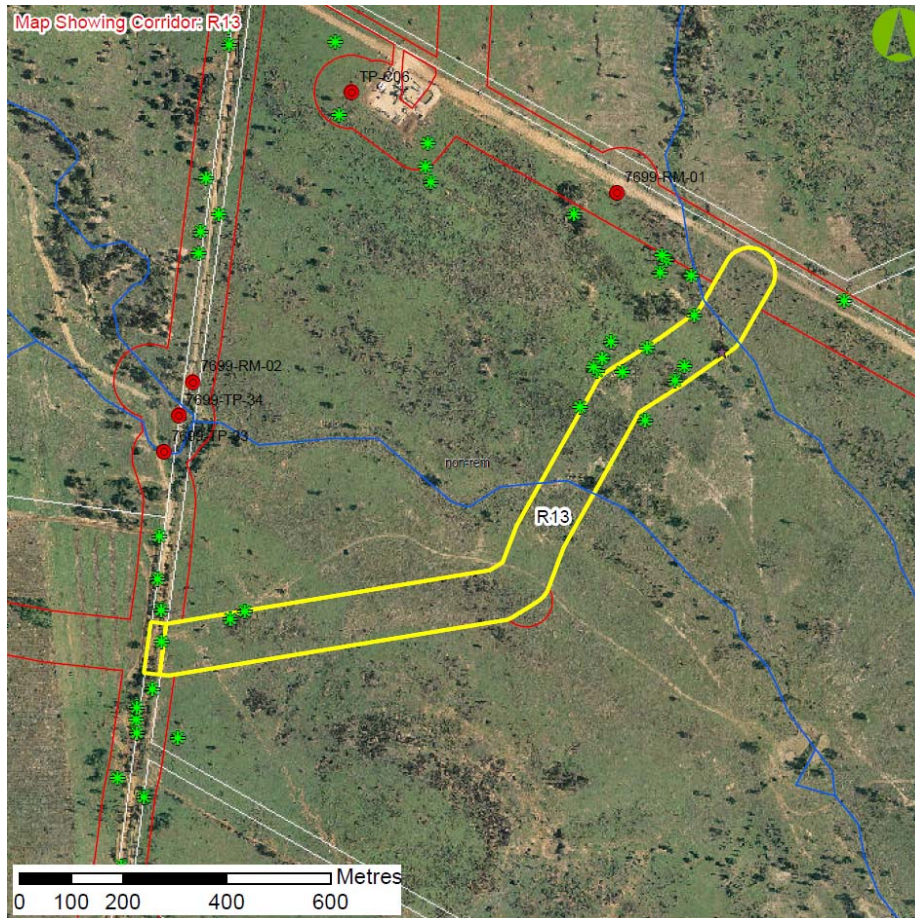


Figure 3.2 Aerial photograph of proposed corridor R13 * - denotes the location of Type A species

Floristics

The vegetation within the proposed corridor has been previously cleared, and a cleared strip within the north-eastern section of the corridor (approximately 20 m wide) appears to have been recently cleared/maintained. The woody vegetation within the corridor is characterised by a mid-dense regrowth layer, with only small patches of mature/canopy trees associated with the watercourses.

The regrowth layer is dominated by *E. mitchellii* and *Grevillea striata* (Beefwood) (up to 3 m tall). The site has a dense ground layer which is dominated by *P. ciliare* with *Themeda triandra* (Kangaroo grass) (sub-dominant) and a range of other native grasses and herbs covering approximately 90% of the total corridor area.

The canopy layer within the site is very sparse, (less than 5% of the total corridor area) and is associated with the riparian areas associated with the two watercourses. Species present include *A. harpophylla*, *E. populnea* and *Eucalyptus melanophloia* (Silver-leaved ironbark), with a height range of 7-14 m.

A total of eight (8) Brachychiton species and one (1) *Cymbidium canaliculatum* (Black orchid) were recorded within the corridor – the locations of these species are outlined in Table 3-2 and in Figure 3-2. All of the species in 2 are Type A restricted plants under the NC Act. No species protected under the provisions of the EPBC Act were observed within the proposed corridor.

A list of flora species observed within corridor R13 is presented in Appendix A.

Table 3.2 Species of conservation significance for Corridor R13

Species	Easting (GDA 94, Zone 55J)	Northing (GDA 94, Zone 55J)
<i>Brachychiton populneus</i>	700933	7083458
<i>Brachychiton populneus</i>	700933	7083458
<i>Brachychiton populneus</i> (2 specimens)	700905	7083443
<i>Brachychiton populneus</i>	701781	7083931
<i>Brachychiton populneus</i>	701764	7083904
<i>Cymbidium canaliculatum</i>	701853	7083960
<i>Brachychiton populneus</i>	701800	7084030
<i>Brachychiton populneus</i>	701709	7083967

Habitat values

10 incidental fauna species were recorded within the proposed disturbance area, namely Willy wagtail, Torresian crow, Magpie lark, Noisy miner, Pretty-face wallaby, Common kestrel (*Falco tinnunculus*), Black-faced cuckoo-shrike, Apostlebird, Australian magpie (*Gymnorhina tibicen*), and Pied butcherbird. 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:

- Limited canopy cover suitable for shelter, foraging and perching
- Fissured tree bark
- Dense groundcover vegetation (ie grassy tussocks)
- Woody debris (ie fallen/felled timber, including hollow-bearing logs)
- Ephemeral watercourse habitat (including banks)

The habitat value of corridor R13 is low to moderate overall, as it contains limited woody vegetation and has been disturbed by grazing stock, previous vegetation clearing and the invasion of exotic pasture species.

Although the watercourses that bisect the corridor have been largely cleared of mature woody vegetation and are highly disturbed, the remaining riparian habitat provides structural elements (ie mature riparian vegetation, stags and bank habitat) which may be utilised by a range of native fauna, particularly avian fauna. These watercourses may also provide habitat for riparian-dependent species (eg amphibian species), although are unlikely to support significant populations due to their small patch size, limited connectivity and ephemeral nature.

3.3 Corridor R14

General

Corridor R14 is approximately 4.2 km in length and occurs entirely in non-remnant vegetation on the RE mapping. The corridor extends over Lots 22, 23 and 24 on WV432. It should be noted that due to access issues, the parts of R14 which occur on Lot 25 SP214993 have not yet been ground truthed. However, due to the majority of the corridor being verified, it has been included in this report. Figure 3-3 shows the entire corridor R14 and the hatched areas are those which have been ground truthed.

The corridor occurs across three (3) mapped watercourses, one of which is quite significant with a high flow channel approximately 80 m across. Two of the watercourses are of stream order 2 and one watercourse is of stream order 1.

The nearest ESA to the proposed corridor is located approximately 220 m away and is a 'Category C' ESA due to the presence of 'Of concern' remnant vegetation.

Corridor R14 includes geotechnical locations 7699-TP-45, 7699-RM-04, TP-R21, 7699-TP-46, 7699-RM-06, 7699-TP-47, TP-R22 and 7699-RM-08.

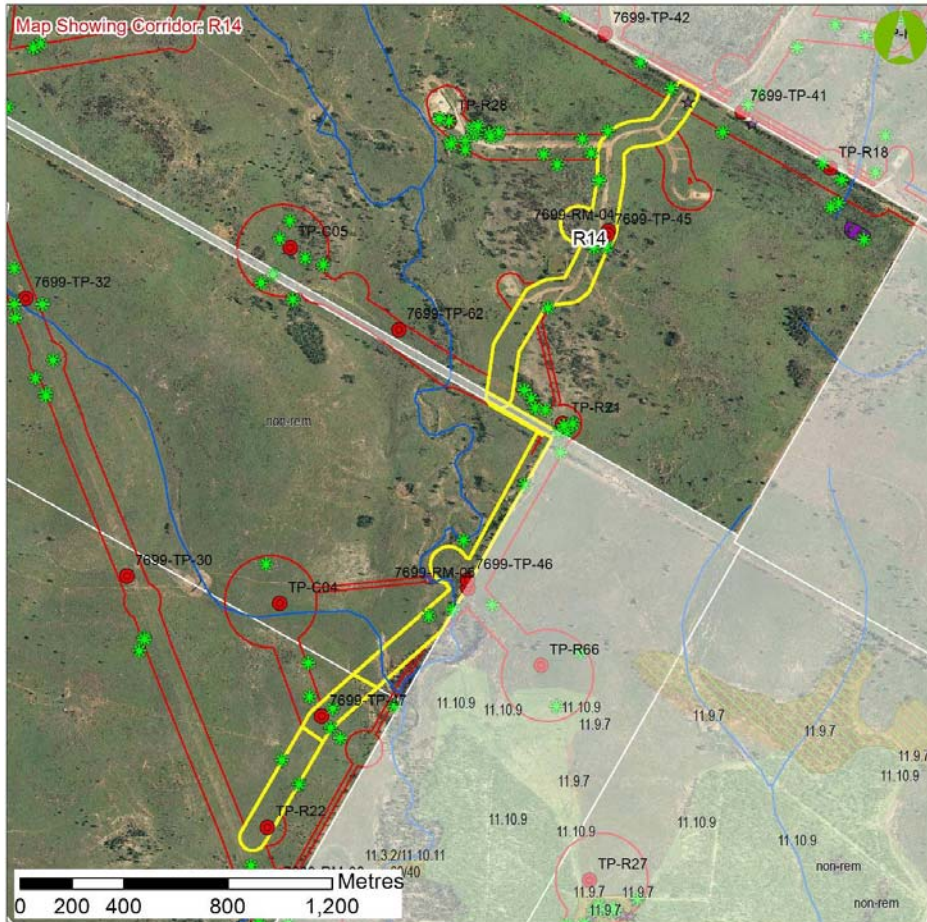


Figure 3.3 Aerial photograph of proposed corridor R14 * - denotes the location of Type A species

Floristics

The pipeline corridor occurs in non-remnant vegetation and the majority of the corridor is dominated by pasture grasses of both exotic and native origin. There are scattered mature trees along the corridor however the only area of dense mature tree cover is the drainage line at the southern end of the corridor. At this drainage line the predominant species is *E. populnea* with associated *Eucalyptus tenuipes* (Narrow-leaved mahogany) and *Callitris glaucophylla* (White cypress) and occasional *Brachychiton populneus* (Kurrajong).

The corridor contains multiple Type A restricted plants of the species *Brachychiton rupestris* (Bottle tree) and *B. populneus*. All plants of the genus *Brachychiton* are Type A restricted species under the provisions of the NC Act. The location of each individual *Brachychiton* within the ground truthed corridor and immediately adjacent has been provided in Table 3.3 and is illustrated in Figure 3.3.

No other species of conservation significance under the EPBC Act or the NC Act were observed within the ground-truthed corridor.

Table 3.3 Notable species observed in Corridor R14

Species	Easting (GDA 94, Zone 55J)	Northing (GDA 94, Zone 55J)
<i>Brachychiton populneus</i>	703119	7083123
<i>Brachychiton populneus</i>	703084	7082932
<i>Brachychiton populneus</i>	703112	7082676
<i>Brachychiton populneus</i>	703063	7082673
<i>Brachychiton populneus</i>	702794	7082118
<i>Brachychiton populneus</i>	702837	7082081
<i>Brachychiton populneus</i>	702830	7082077
<i>Brachychiton populneus</i>	702840	7082047
<i>Brachychiton rupestris</i>	702876	7082053
<i>Brachychiton populneus</i>	702979	7082003
<i>Brachychiton populneus</i>	702947	7081985
<i>Brachychiton sp. (juv)</i>	702953	7081961
<i>Brachychiton populneus</i>	702942	7081956
<i>Brachychiton populneus</i>	702934	7081884
<i>Brachychiton populneus</i>	702805	7081755
<i>Brachychiton populneus</i>	702429	7081254
<i>Brachychiton populneus</i>	702060	7080898
<i>Brachychiton populneus</i>	702050	7080821
<i>Brachychiton populneus</i>	701929	7080604
<i>Brachychiton populneus</i>	701750	7080290
<i>Brachychiton populneus</i>	701810	7080244
<i>Brachychiton populneus</i>	701794	7080232
<i>Brachychiton populneus</i>	701808	7080204
<i>Brachychiton populneus</i>	701847	7080214
<i>Brachychiton populneus</i>	701871	7080157
<i>Brachychiton populneus</i>	701773	7080072

Habitat values

The habitat values of corridor R14 are limited overall due to the lack of mature vegetation, the extent of previous disturbance and the high prevalence of exotic species. One area does have a slightly higher habitat value (low-moderate) and this is the riparian vegetation along the creek at the southern end of the corridor (refer Figure 3.3). This area provides additional cover and is likely to be utilised by avian fauna.

Many bird calls were heard in the vicinity of the creek however only Galahs (*Eolophus roseicapilla*) and Noisy miners were observed in the area. Other fauna observed along the corridor were Eastern grey kangaroos (*Macropus giganteus*), Pretty-face wallabies, Australian magpies, Wedge-tailed eagles (*Aquila audax*) (fly over only) and Brown quails (*Coturnix ypsilophora*).

No EVNT fauna species under the NC Act or the EPBC Act were observed along the corridor.

3.4 Corridor R48

General

Corridor R48 is approximately 635 m in length and occurs entirely in mapped non-remnant vegetation over Lots 22 and 23 on WV432 (refer Figure 3.4). The area is not located in or within 500 m of any areas mapped as ESA's. The nearest ESA to the development area is approximately 600m to the south and is an area of 'Of concern' remnant vegetation which is a 'Category C' ESA. This corridor includes a geotechnical test pit TP-C04.

The development area for corridor R48 occurs over a mapped stream order 1 watercourse. The watercourse was evident during the field inspection however was not fringed by any significant riparian vegetation.

The area is currently used for grazing domestic livestock and has been cleared and stick raked.

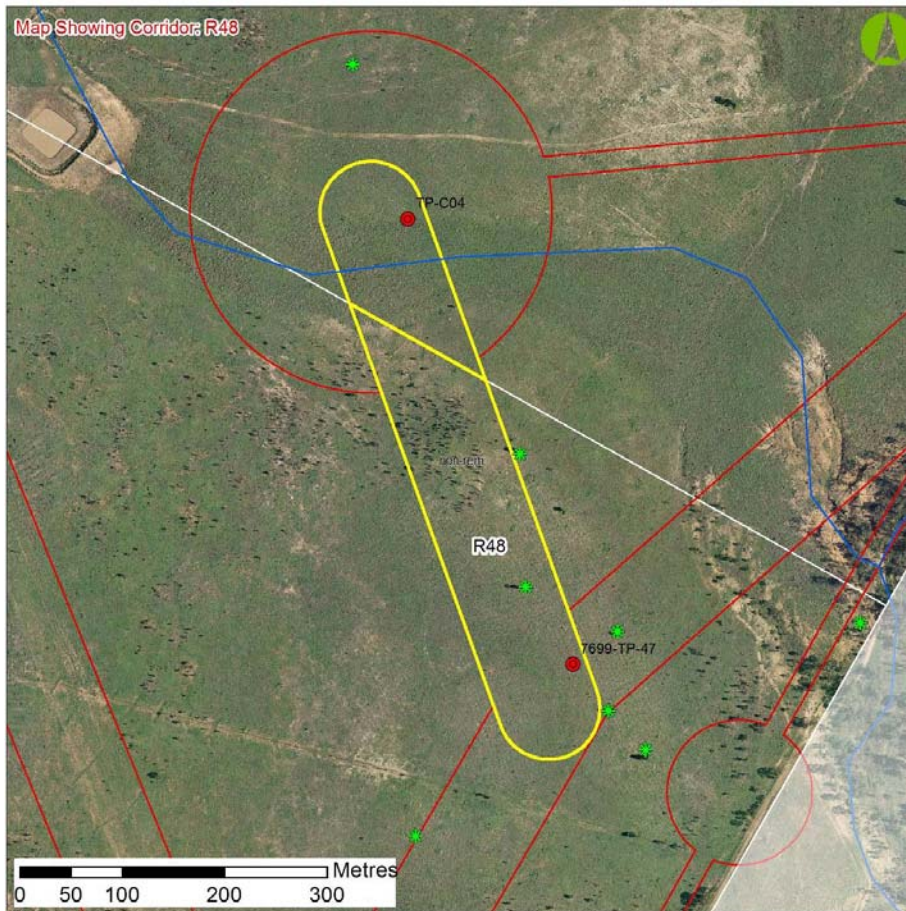


Figure 3.4 Aerial photograph of proposed corridor R48 * - denotes the location of Type A species

Floristics

The proposed corridor R48 is located in an area which is not mapped as remnant vegetation. Ground truthing of the area verified this. The area has been cleared and is mainly vegetated with native and exotic grass species, dominated by *Melinis repens* (Red natal) and *T. triandra*. A patch of scattered regrowth *C. glaucophylla* and *Eucalyptus orgadophila* (Mountain coolabah) is present within the corridor but very little woody vegetation occurs elsewhere other than isolated trees.

One (1) isolated mature *B. populneus* and one (1) isolated juvenile *B. populneus* occur within the corridor. An additional *B. populneus* occurs approximately 6 m outside the corridor footprint. All species in the genus *Brachychiton* are Type A restricted plants under the provisions of the NC Act. The location of these plants is outlined in the table below.

Table 3.4 Notable species within/adjacent to Corridor R48

Species	Easting (GDA 94, Zone 55J)	Northing (GDA 94, Zone 55J)
<i>Brachychiton populneus</i>	701970	7080942
<i>Brachychiton populneus</i>	701801	7081453
<i>Brachychiton populneus</i>	701960	7081078

No other species of conservation significance under the NC Act or the EPBC Act were observed within the corridor.

Habitat values

The habitat value of corridor R48 is low. The area is nearly devoid of any mature woody vegetation and is predominantly pasture land. As the area has been stick raked, there was also very little woody debris on the ground. The ground is currently grazing domestic livestock and would be subject significant livestock movement due to the location of a farm dam adjacent to the corridor well pad. The area is unlikely to be used as a primary foraging or breeding habitat. No fauna were observed while traversing the corridor except for livestock.

3.5 Corridor R50

General

Proposed corridor R50 is approximately 1.1 km in length and is located entirely in non-remnant vegetation on the RE mapping. The corridor is not located in or within 1 km of any ESA's. The nearest mapped ESA is located approximately 1.2 km to the south and is an area of remnant 'Of concern' vegetation which is a 'Category C' ESA (refer Figure 3.5). This corridor includes geotechnical locations 7699-TP-62 and TP-C05.

The corridor occurs across a mapped watercourse with a stream order of 3 which was evident during the field inspection.

The area is currently used for grazing domestic livestock and contained an existing access track.

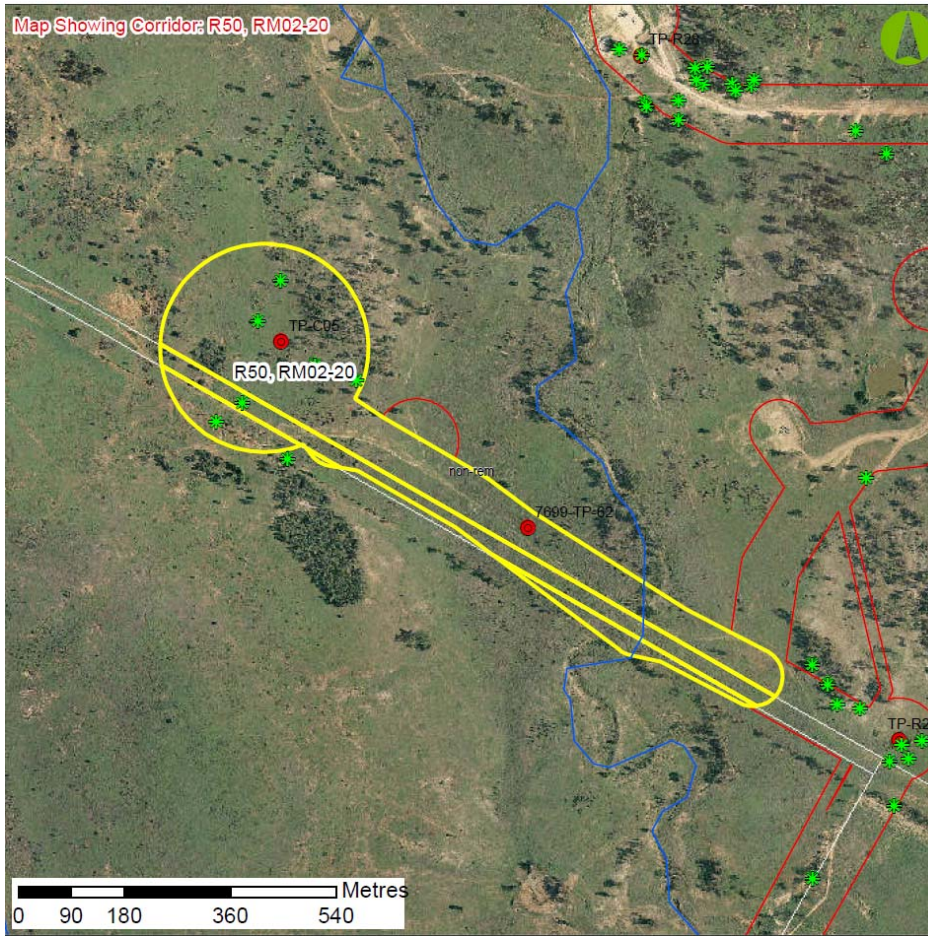


Figure 3.5 Aerial photograph of proposed corridor R50 * - denotes the location of Type A species

Floristics

Corridor R50 is located on Lots 23 and 24 on WV432 in an area which is not mapped as remnant vegetation. Ground truthing of the area verified that the vegetation is not remnant. The corridor contained very little woody vegetation except in the well pad area at the northern end. The majority of the corridor was dominated by both exotic and native pasture grasses with only scattered, isolated trees. The well pad area located at the end of the corridor contained more significant vegetation including a patch of un-mapped (too small) remnant *Corymbia tessellaris* (Moreton Bay ash) woodland. The area also contained a high density of regrowth *C. glaucophylla* and scattered *B. populneus*.

All plants of the genus *Brachychiton* are Type A restricted plants under the provisions of the NC Act. Corridor R48 contains multiple *Brachychiton* plants and their locations are outlined in the table below and illustrated in Figure 3.5.

Table 3.5 Notable species within corridor R50

Species	Easting (GDA 94, Zone 55J)	Northing (GDA 94, Zone 55J)
<i>Brachychiton populneus</i>	701897	7082776
<i>Brachychiton populneus</i>	701856	7082710
<i>Brachychiton populneus</i>	701957	7082634

Species	Easting (GDA 94, Zone 55J)	Northing (GDA 94, Zone 55J)
<i>Brachychiton populneus</i>	702022	7082610
<i>Brachychiton populneus</i>	701829	7082570
<i>Brachychiton populneus</i>	701791	7082542

No other species of conservation significance under the NC Act or the EPBC Act were observed within the proposed corridor.

Habitat Values

The habitat values of corridor R50 are limited along the pipeline corridor section but are low-moderate within the *C. tessellaris* woodland area in the well pad. The majority of the pipeline corridor lacks any significant mature vegetation, has been heavily disturbed, is currently grazing cattle and has a high prevalence of exotic species. Macropod scats were observed along the corridor but no macropod species were observed.

The area of the *C. tessellaris* woodland in the well pad has a higher habitat value (low-moderate) due to the density and age of the woody vegetation present. This area is likely to be suitable habitat for native avian fauna and many bird calls were heard in this location during the inspection.

Immediately in front of the woodland area is a small patch of scattered shrubby regrowth *C. glaucophylla* which was being used by Pretty-face wallabies as a resting location. At least three (3) individuals were present during the time of inspection.

3.6 Corridor R51

Corridor R51 is located on Lot 24 WV432 and is an existing well pad clearance of approximately 100 m in width and 115 m in length and lies adjacent to Corridor R14 on the western side of the corridor (refer Figure 3.6). Corridor R51 is almost devoid of vegetation except for native and exotic pasture grasses. There are no geotechnical investigation sites proposed within this corridor nor are there any watercourse crossings within this corridor.

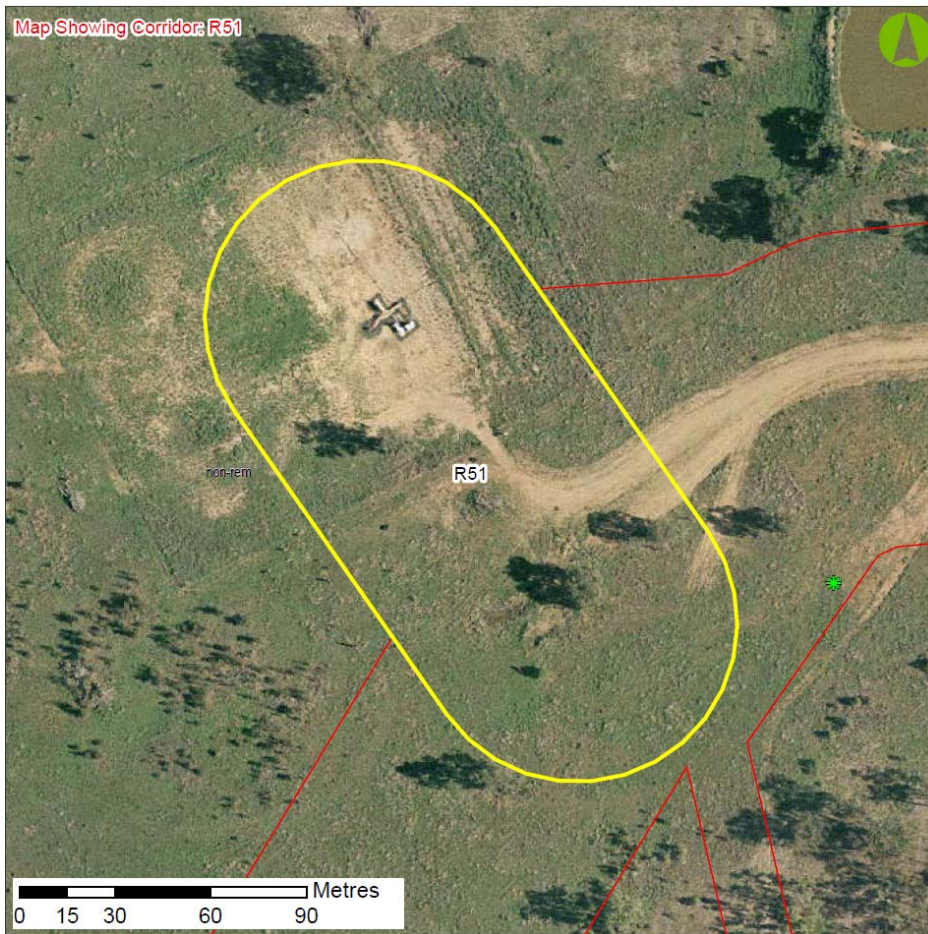


Figure 3-6 Aerial photograph of proposed corridor R51

Floristics

Corridor R51 is cleared land dominated by pasture grasses and only three (3) trees. There are no EVNT species or Type A species within this area.

Habitat Value

Given the fact this area is so small, is predominantly cleared of vegetation and consists of pasture grasses, the habitat value for this area is considered to be very low. No fauna species were observed within this area.

3.7 Corridor R53

General

The proposed pipeline corridor R53 is located on Lot 24 WV432 (Figure 3-7). The proposed corridor is situated on gently undulating land with red clay soils. The area has been extensively disturbed due to heavy grazing by stock and for the development of a well pad (Hermitage 7). An existing access road and above-ground water pipeline also traverse the corridor. No geotechnical survey locations were assessed as part of this corridor.

The proposed development area is currently mapped as non remnant on the DERM RE mapping. The area does not occur within any areas identified as ESA's, with the nearest mapped ESA located more than 1.8 km to the south of the corridor.

The corridor does not intersect any watercourses, with the nearest watercourse located approximately 500 m to the east.

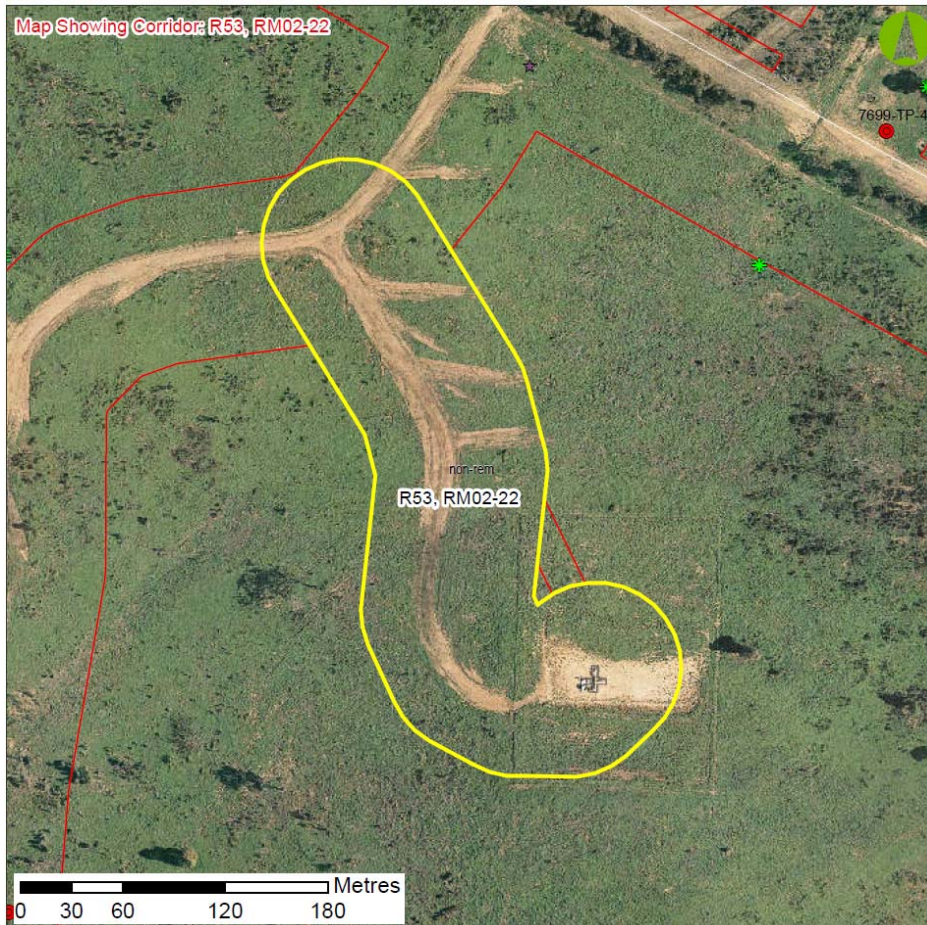


Figure 3-7 Aerial photograph of proposed corridor R53

Floristics

The proposed development area has been extensively cleared for stock grazing purposes, the existing well pad for Hermitage 7 and an access road that runs the length of the corridor. As a result, the corridor is heavily invaded by *P. ciliare*, and contains only a sparse regrowth/shrub layer (less than 15% cover of the total corridor area) with no canopy layer present.

C. ovata was the dominant species within shrub layer, with other species including *A. constricta*, *E. mitchellii* and *A. harpophylla*.

No species of conservation significance under the provisions of the NC Act and/or the EPBC Act were observed within the proposed development.

Habitat values

Two (2) incidental fauna species were recorded within the proposed disturbance area, Australian magpie and Richard's pipit (*Anthus novaeseelandiae*). Both 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:

- Dense groundcover vegetation (ie grassy tussocks)

- Limited woody debris (ie fallen/felled timber, including hollow-bearing logs)

The habitat value of corridor R53 is very low overall due to the high level of disturbance and previous clearing (associated with stock grazing, the existing well pad and the access road). The corridor is dominated by *P. ciliare* and other exotic pasture species. There are no mature trees within the corridor, and the majority of the woody vegetation on site is less than 3 m in height. A limited amount of woody debris was observed which further limits the potential habitat value.

Species utilising resources within this area are likely to be limited to commonly occurring, generalist species that can tolerate/adapt to significant habitat disturbances.

3.8 Corridor R54

General

Corridor R54 is approximately 130 m in length and is located entirely in non-remnant vegetation on the RE mapping (refer Figure 3.8). The development area is not located in or within 1 km of any mapped ESA's. The nearest ESA to the corridor is approximately 2 km to the south and is an area of remnant 'Of concern' vegetation which is a 'Category C' ESA. Corridor R54 includes geotechnical location TP-R28.

A stream order 1 watercourse is mapped as occurring approximately 45 m from the proposed corridor and is not affected by Corridor R54.

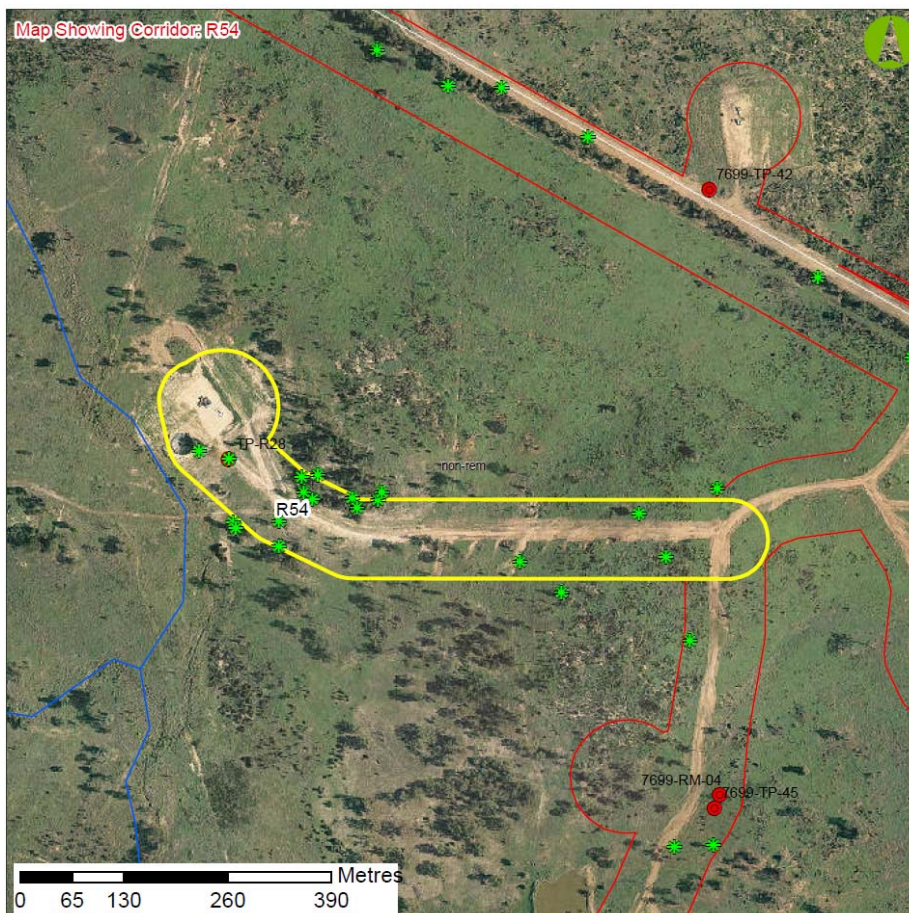


Figure 3-8 Aerial photograph of proposed corridor R54 * - denotes the location of Type A species

Floristics

The proposed corridor R54 is cleared land which is currently dominated by pasture grasses and regrowth. The eastern half of the corridor which is more elevated is dominated by *P. ciliare* and other exotic species with dense thickets of *C. ovata* scattered throughout. As the corridor descends to the watercourse at the western end of the corridor a greater number of native species, especially *Heteropogon contortus* (Black spear grass), become more prevalent and *P. ciliare* is not as dominant. The woody regrowth vegetation which occurs along the length of corridor is mainly comprised of *A. harpophylla*, *E. populnea*, and *E. melanophloia*.

Scattered mature trees occur along the corridor, including *Brachychiton* species. All *Brachychiton* species are Type A restricted plants under the provisions of the NC Act. The locations of all Type A species within the corridor and immediately adjacent are identified in Table 3-8 below.

No other species of conservation significance under the EPBC Act or the NC Act were observed in the proposed corridor.

Table 3.8 Notable species within Corridor R54

Species	Easting (GDA 94, Zone 55J)	Northing (GDA 94, Zone 55J)
<i>Brachychiton populneus</i>	703054	7083037
<i>Brachychiton rupestris</i>	703019	7083091
<i>Brachychiton populneus</i>	702922	7082993
<i>Brachychiton sp. (juv)</i>	702870	7083031
<i>Brachychiton populneus</i>	702698	7083118
<i>Brachychiton populneus</i>	702693	7083108
<i>Brachychiton sp. (juv)</i>	702667	7083099
<i>Brachychiton rupestris</i>	702661	7083111
<i>Brachychiton populneus</i>	702610	7083110
<i>Brachychiton populneus</i>	702599	7083118
<i>Brachychiton populneus</i>	702618	7083140
<i>Brachychiton populneus</i>	702597	7083138
<i>Brachychiton populneus</i>	702569	7083082
<i>Brachychiton populneus</i>	702569	7083051
<i>Brachychiton sp. (juv)</i>	702514	7083074
<i>Brachychiton populneus</i>	702512	7083080
<i>Brachychiton sp. (juv)</i>	702506	7083160
<i>Brachychiton sp. (juv)</i>	702468	7083169

Habitat Value

The habitat value of corridor R54 is low due to the lack of significant mature vegetation cover, the prevalence of exotic species and its location along a major access track through the area and existing well pad. The scattered mature vegetation along the western half of the corridor does provide some habitat for avian fauna however it is not likely to be a primary nesting or foraging habitat.

3.9 Corridor R63

General

The proposed pipeline corridor R63 is located on Lot 24 WV432 on a gently sloping rise with red silty-clay soils (Figure 3.9). The area has been previously cleared for the development of a well pad (Hermitage 14). The proposed development area has also been heavily impacted as a result of stock grazing. One (1) geotechnical survey location was assessed as part of this corridor, TP-C06.

The proposed area of disturbance is currently mapped as non remnant on the DERM RE mapping. The area does not occur within any areas identified as ESA's and the nearest ESA is located more than 2.7 km to the west of the proposed corridor.

No watercourses are mapped within the proposed corridor footprint, with the nearest watercourse located approximately 400 m to the east.

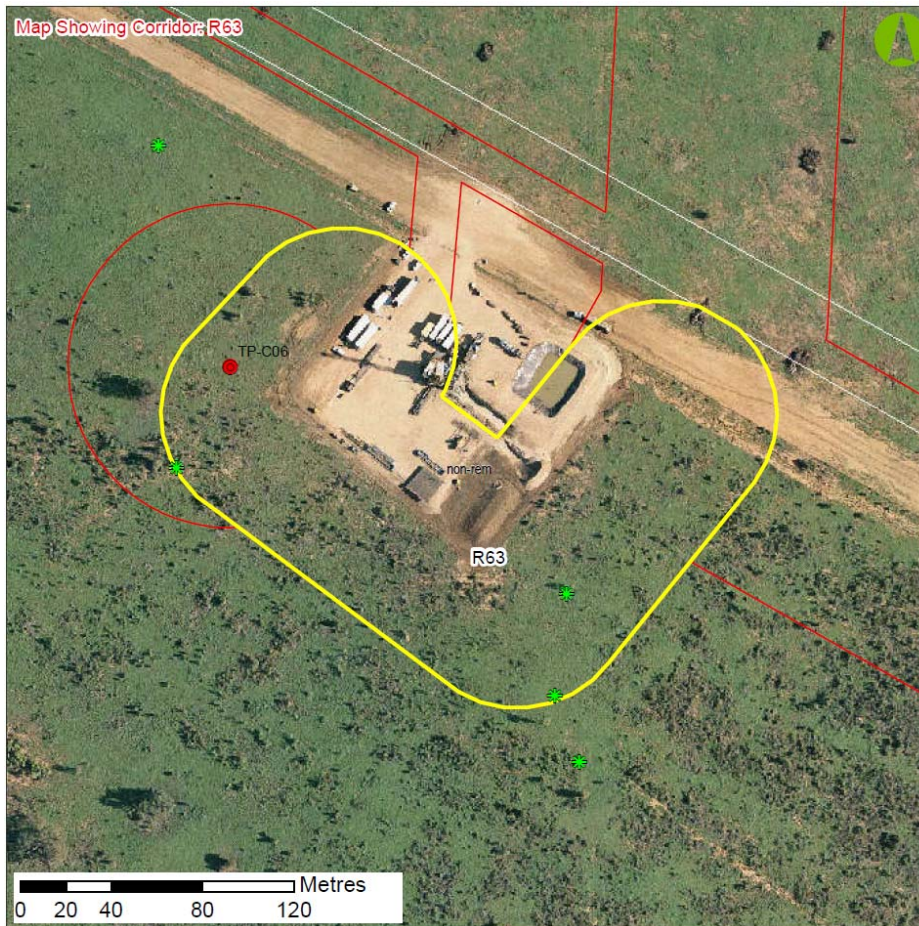


Figure 3-9 Aerial photograph of proposed corridor R63 * - denotes the location of Type A species

Floristics

The proposed development area has been previously disturbed for the construction of the adjacent well pad (Hermitage 14) and for agricultural purposes (stock grazing). The vegetation community is dominated by exotic pasture species and a low, sparse native shrub layer.

The ground layer is dense (approximately 80% cover of the total development area), with the dominant species being *P. ciliare*. The sparse shrub layer (approximately 20% cover of the total

development area) largely consists of native species (*G. striata*, *Acacia spp.*, *E. mitchellii*, *A. constricta* and juvenile *Eucalyptus* species).

The canopy stratum is low (height range of 3-8 m) and very sparse (less than 5% cover of the total area). Species recorded within the canopy layer include *B. populneus*, *B. rupestris*, *E. populnea*, *G. striata* and *Owenia acidula* (Emu apple).

A total of five (5) *Brachychiton* species were recorded within or directly adjacent to the corridor – the locations of these species are outlined in Table 3.9. All of the species in Table 3.9 are Type A restricted plants under the NC Act.

No species protected under the provisions of the EPBC Act were observed within the proposed corridor.

Table 3.9 Species of conservation significance for Corridor R63

Species	Easting (GDA 94, Zone 55J)	Northing (GDA 94, Zone 55J)
<i>Brachychiton populneus</i>	701287	7084361
<i>Brachychiton rupestris</i>	701281	7084316
<i>Brachychiton populneus</i>	701115	7084416

Habitat values

No incidental fauna species were recorded within the proposed corridor R63 disturbance area. Habitat features associated with the proposed disturbance area include:

- Dense groundcover vegetation (ie grassy tussocks)
- Limited woody debris (ie fallen/felled timber, including hollow-bearing logs)
- Limited canopy cover suitable for shelter, foraging and perching

The habitat values of corridor R63 are low overall. The area has been previously cleared for stock grazing and the development of the adjacent well pad (Hermitage 14). The site has low structural diversity and is dominated by non-native pasture species (including *P. ciliare*) and a mid-dense shrub layer (up to 3 m tall) of mostly native species. The corridor contains a limited number of mature trees (to 8 m tall) which may provide habitat for native avian fauna (eg foraging, roosting, perching).

The corridor generally lacks important habitat features such as fissured bark, hollow-bearing trees and logs, and leaf litter. Species utilising resources in this area are most likely to be limited to commonly occurring, generalist species that are able to adapt to significant habitat disturbances.

3.10 Powerline

General

There are three (3) powerline corridors within this development area, with one traversing Lot 22 and 23 on WV432, one solely on Lot 23 and another on Lot 24 (refer Figure 3.10). All three corridors are generally heavily disturbed areas, occurring largely in paddocks affected by grazing. None of the three corridors are associated with any geotechnical survey locations. The powerline corridor that traverses Lots 22 and 23 does intercept a watercourse with a stream order of 1 towards the north of the corridor.

The proposed area of disturbance is currently mapped as non remnant on the DERM RE mapping. The area does not occur within any areas identified as ESA's however there is an area mapped as 'Of concern' RE approximately 300 m to the east of the most southern powerline.

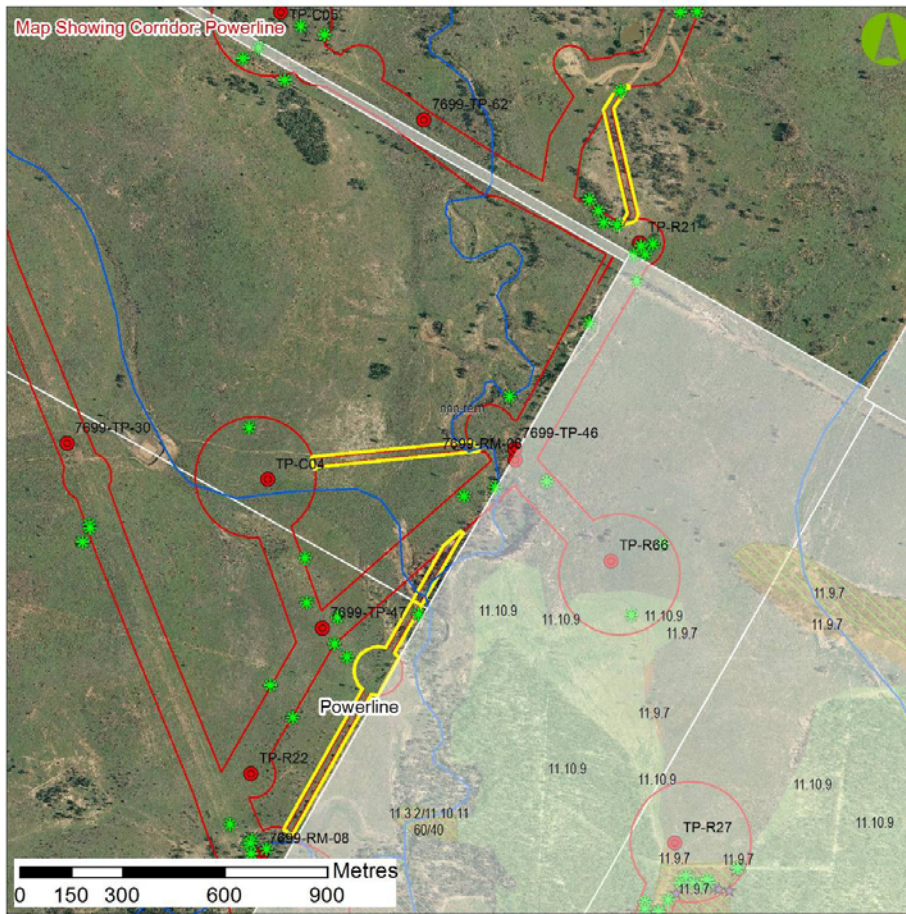


Figure 3-10 Aerial photograph of proposed powerline corridors * - denotes the location of Type A species

Floristics

All three corridors are predominantly cleared, heavily disturbed paddocks dominated by *P. ciliare* and *C. glaucophylla* regrowth. The southern corridor contained some canopy trees, namely *E. populnea*, *E. melanophloia* and *E. tereticornis* which are associated mainly with the watercourse crossing toward the northern extent and form the edge of a large patch of mapped remnant vegetation to the east of Lots 22 and 23. The shrub layer is dominated by *Geijera parviflora* (Wilga), *Opuntia tomentosa* (Pear tree), *E. mitchellii*, *G. striata*, and juvenile *C. glaucophylla*.

Two (2) Type A restricted species under the NC Act were recorded from within the powerline corridors within this development area. These are listed in Table 3.10 below.

No species protected under the provisions of the EPBC Act were observed within the proposed corridor.

Table 3.10 Species of conservation significance for Powerline corridors

Species	Easting (GDA 94, Zone 55J)	Northing (GDA 94, Zone 55J)
<i>Brachychiton populneus</i>	702297	7080906
<i>Brachychiton sp. (juv.)</i>	702887	7082441

Habitat values

The habitat value of these corridors is considered low. The canopy cover is generally minimal (less than 5 % and the ground cover is dominated by *P. ciliare*. There is limited woody debris such as hollow logs and fallen timber and leaf litter. The poor quality of the watercourse provides limited value, however this area provides the most habitat complexity within all of the corridors.

No fauna species were observed within these corridors during the field investigations.

3.11 Road

General

The road corridor within this development area traverses Lots 22 and 23 on WV432, this corridor also encompasses Corridor R89 (refer Figure 3.11). This corridor has been heavily cleared and as such is a highly disturbed corridor with limited ecological value. There are three (3) geotechnical survey locations within this corridor, 7699-RM-08, 7699-TP-30 and 7699-TP-32.

The road corridor crosses two (2) watercourses, one (in the northern section of the corridor) with a stream order of 1 and the other (part of R89) a stream order of 2. The watercourse in the northern section of the corridor is highly disturbed with no riparian zone remaining. The southern watercourse is also highly disturbed however the riparian zone is still relatively intact, despite the disturbed nature due to cattle access and the presence of exotic grass species.

The proposed area of disturbance is currently mapped as non remnant on the DERM RE mapping. The area does not occur within any areas identified as ESA's, with the closest ESA, 'Of concern' RE occurring approximately 400 m to the east of R89.

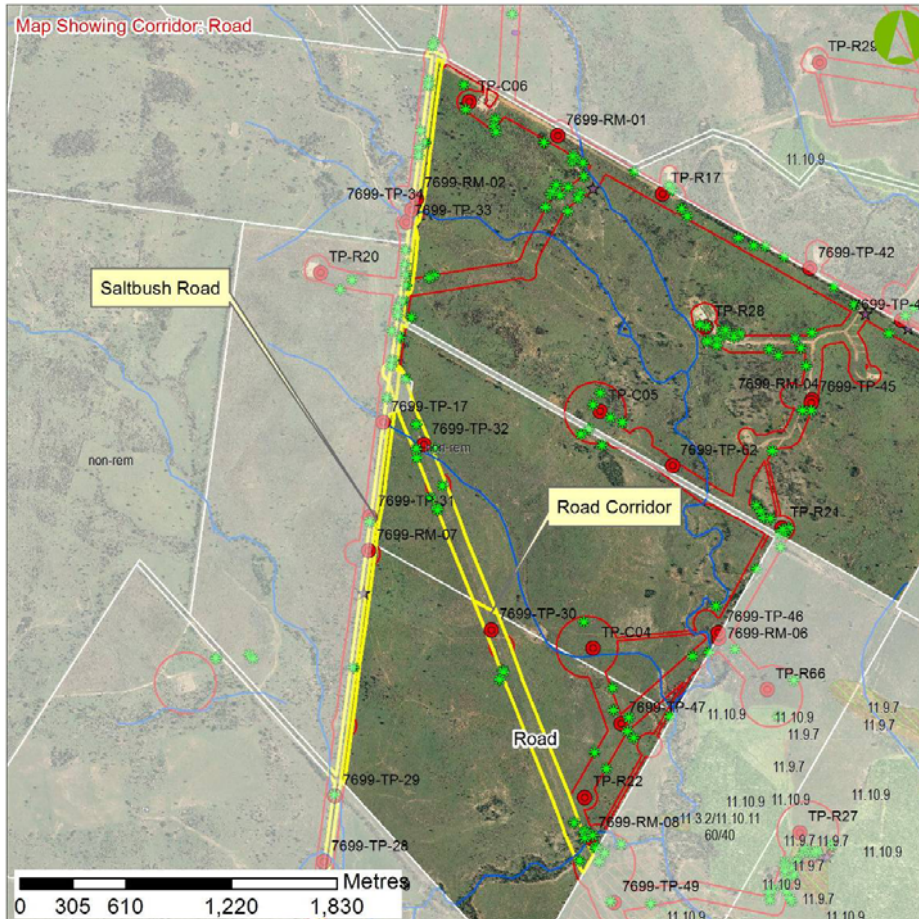


Figure 3.11 Aerial photograph of proposed road corridor * - denotes the location of Type A species

Floristics

This corridor is a heavily disturbed paddock dominated by *P. ciliare*, and *C. glaucophylla* regrowth in the north and *P. ciliare*, *Capillipedium parviflorum* (Scented-top grass) and *E. populnea*, *E. melanophloia*, and *C. tessellaris* in the south.

The riparian zone in the south of the corridor is disturbed and dominated by *C. glaucophylla*, *E. populnea* in the canopy and *P. ciliare*, *Heteropogon contortus* (Black spear grass) and *Lomandra longifolia* (Spiny-head mat-rush) in the ground layer.

Several Type A restricted species under the NC Act were recorded from within the powerline corridors within this development area. These are listed in Table 3.11 below.

No species protected under the provisions of the EPBC Act were observed within the proposed corridor.

Table 3.11 Species of conservation significance for road corridor

Species	Easting (GDA 94, Zone 55J)	Northing (GDA 94, Zone 55J)
<i>Brachychiton populneus</i>	702862	7080145
<i>Brachychiton populneus</i>	701732	7080291
<i>Brachychiton rupestris</i>	701309	708119
<i>Brachychiton rupestris</i>	701330	7081169
<i>Brachychiton rupestris</i>	701333	7081162
<i>Brachychiton populneus</i>	701855	7080220
<i>Brachychiton populneus</i>	701806	708206
<i>Brachychiton populneus</i>	701794	7080234
<i>Brachychiton populneus</i>	701802	708235
<i>Brachychiton populneus</i>	700954	7082101
<i>Brachychiton populneus</i>	700952	7082112
<i>Brachychiton populneus</i>	700913	7082170
<i>Brachychiton rupestris</i>	700981	7082239
<i>Brachychiton populneus</i>	700835	7082401
<i>Brachychiton populneus</i>	700940	7082454
<i>Brachychiton populneus</i>	700832	7082454
<i>Brachychiton populneus</i>	700831	7082593
<i>Brachychiton populneus</i>	700770	7082856

Habitat values

The habitat value of this corridor is low given the highly disturbed nature of the area and high level of exotic species. The canopy cover and ground cover is limited (less than 5%) and other habitat features such as habitat trees and woody debris is scarce. The disturbed riparian zone within the

southern aspect of the corridor provides the highest value with the greatest percentage of canopy cover.

Fauna species observed during the field investigation includes Willy wagtail, Magpie lark, Brown quail, Noisy miner, and Wedge-tailed eagle.

3.12 Saltbush Road

General

This section of the Saltbush Road corridor traverses the western extent of Lots 22, 23 and 24 on WV432 and is approximately 4.2 km in length (refer Figure 3-11). The length of the corridor is mapped as non-remnant and does not impact on any ESAs nor is it within 1 km of any mapped ESA. There are no geotechnical survey locations within this road corridor.

There are two (2) watercourse crossings within this corridor, both with a stream order of 1.

Floristics

The road corridor is highly disturbed with occasional individuals of *E. populnea*, and an understorey dominated by *P. ciliare*. Several Type A species were recorded in this corridor as highlighted below in Table 3.12.

Table 3.12 Species of conservation significance for Saltbush Road

Species	Easting (GDA 94, Zone 55J)	Northing (GDA 94, Zone 55J)
<i>Brachychiton rupestris</i>	700468	7081187
<i>Cymbidium canaliculatum</i>	700529	7081624
<i>Brachychiton populneus</i>	700694	7082965
<i>Brachychiton populneus</i>	700738	7083098
<i>Brachychiton populneus</i>	700804	7083213
<i>Brachychiton populneus</i>	700755	7083306
<i>Brachychiton rupestris</i>	700773	7083398
<i>Brachychiton populneus</i>	700882	7084224

Habitat values

The habitat value of the proposed road corridor is moderate. Mature trees bearing hollows occur sporadically along its length, and large woody debris with hollows and fissured, flaky bark is also present in limited quantities. However, as the corridor is narrow and occurs within a highly fragmented landscape, its value to ground-dwelling and arboreal mammals would be marginal. Tree hollows were observed to provide shelter for nesting birds in other parts of the road corridor on adjoining lots, and this is likely to be of greatest habitat value to local fauna species.

No fauna species of conservation significance were observed during the field investigations.

4. Conclusion

The pipeline corridors occur across a variety of landscape and vegetation types. While most the corridors occur in previously disturbed areas, species of conservation significance occur in multiple corridors (ie Type A restricted plants).

The proposed development does not traverse any areas mapped as RE nor does it impact on any ESAs.

Multiple watercourses occur within, or in close proximity to, development areas. The 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 plant species were observed within the proposed development areas.

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



