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Project: Roma Ecological Assessment Report – Lot 11 on WV1759

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Document prepared by:

Aurecon Australia Pty Ltd
ABN 54 005 139 873

Level 14, 32 Turbot Street
Brisbane QLD 4000

Locked Bag 331
Brisbane QLD 4001
Australia

T +61 7 3173 8000
F +61 7 3173 8001
E brisbane@aurecongroup.com
w aurecongroup.com

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Aurecon Australia Pty Ltd
ABN 54 005 139 873
Level 14, 32 Turbot Street
Brisbane QLD 4000
Locked Bag 331
Brisbane QLD 4001
Australia

T +61 7 3173 8000
F +61 7 3173 8001
E brisbane@aurecongroup.com
W aurecongroup.com

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1 Background

1.1 Project description

Santos Ltd (Santos) has commissioned Aurecon Australia Pty Ltd (Aurecon) to undertake ecological investigations of proposed areas of development for the 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, R8, R22, R30, R67, R78, T1
- Geotechnical survey locations situated within the above corridors and shown in Figure 1.1
- Powerline easement (along Blythdale North Road)

These areas are collectively referred to as the 'proposed development area', and are located entirely within Lot 11 on WV1759. Note that the subject of this report is solely related to Lot 11 on WV1759. 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 within Lot 11 on WV1759 (Figure 1.1), and to identify areas and species of notable ecological or conservation value. This report does not make any recommendations regarding the development in relation to any Santos environmental authorities or other approvals.

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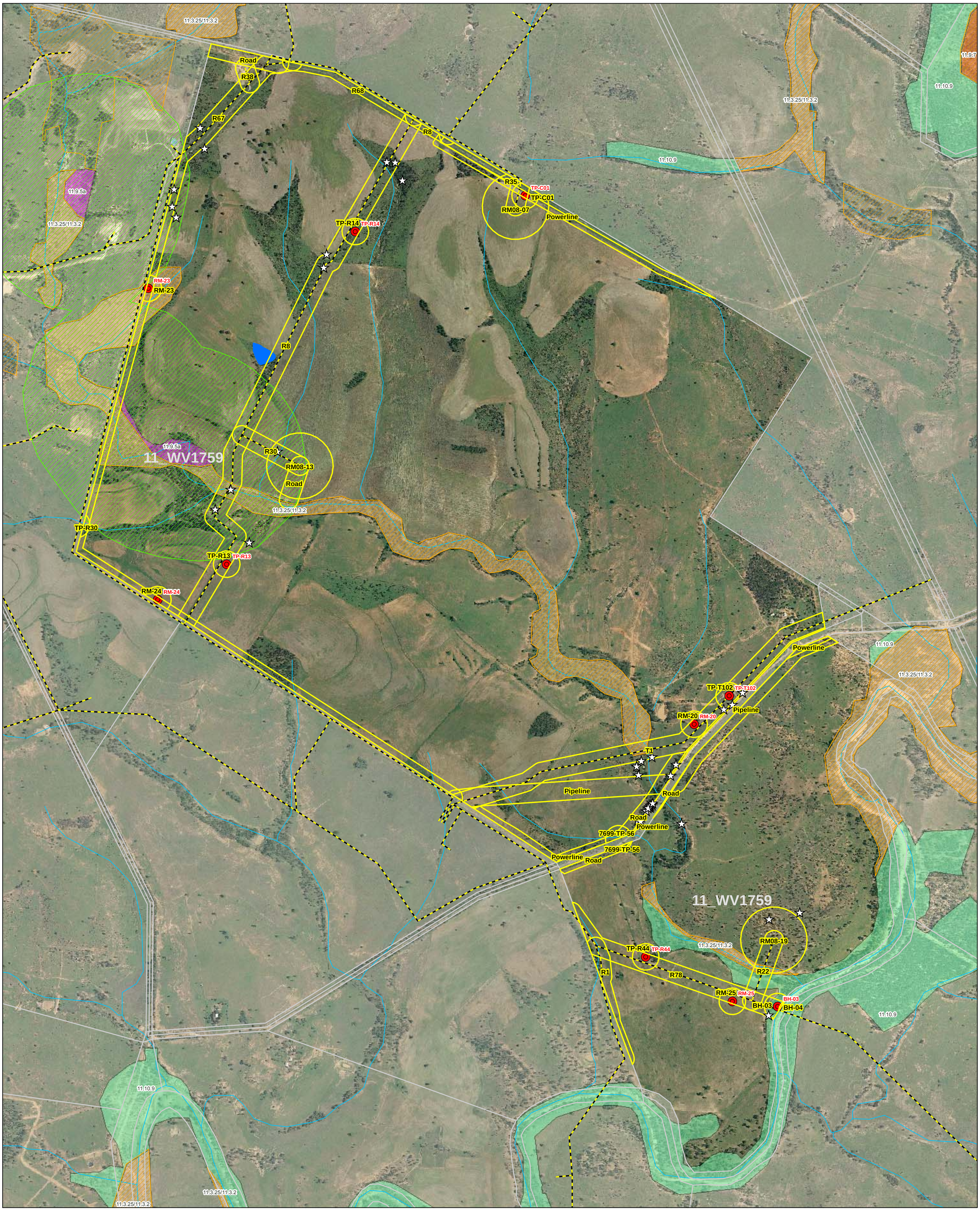

Map by: PIC P:\GIS\Projects\215648_Fairview_Eco_Assessment\215648_Fairview_051.mxd 04/08/2011 10:34

Legend

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

ESA Mapping (Including Buffer Areas)

- Category A
- Category B
- Category C

Regional Ecosystem

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

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

A1 scale: 1:10,000

0 100 200 400 600 800 Meters

Date: 04/08/2011 Version: 1 Job No: 215648

Coordinate system: GDA_1994_MGA_Zone_55

Santos Upstream Ecological Assessment

Figure 1-1: Location of Proposed Pipeline Corridors Investigated

2 Methodology

2.1 Desktop methodology

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 referred to in this report are based on the 'biodiversity status' of the vegetation and not the '*Vegetation Management Act 1999* (VM Act) status' of the vegetation. Note that the official DERM mapping (based on the VM Act status) is used to generate the figures within this report.

2.2 Field methodology

The proposed development areas were assessed by four (4) Aurecon ecologists (H Poole, S Glauert, S Schulz and S Stone) between 27-28 June 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 100m 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 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 R1

General

The Corridor R1 proposed development area straddles the Lot 11 on WV1759 and Lot 94 on WV456 property boundaries (Figure 3.1). As discussed earlier, this report is specific to the ecology of Lot 11 on WV1759. For additional information on Corridor R1, refer to the appropriate report for Lot 94 on WV456.

Corridor R1 proposed development area does not include any well pads or geotechnical sites. This area extends approximately 600 m along the Lot 11 boundary, within the southern region of the site (Figure 3.2).

This proposed development area is considered a highly modified environment, as a result of historical land clearing, and current agricultural practices. As a result, mature canopy cover is considered sparse (ie 15%), and the shrub layer is considered moderately sparse (ie 20%). As to be expected, the ground cover is the dominant stratum, and is considered dense (ie 90%).

No RE communities, watercourses, or known ESA's (or associated buffers) have been recorded within this proposed development area. The closest ESA mapping occurs approximately 400 m to the north-east of the proposed development area.

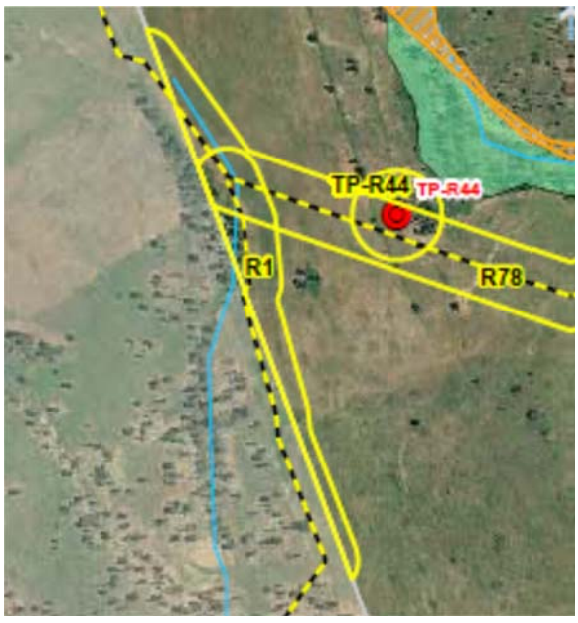

Figure 3.1 Corridor R1

Floristics

This proposed development area exhibits a sparse canopy layer which is represented by *Eucalyptus populnea* (Poplar box). Whilst *Allocasuarina luehmannii* (Bulloak) and *Callitris glaucophylla* (White cypress pine) are the representative species within the sparse sub-canopy (5 percent [%]).

The shrub layer is dominated by *Eremophila mitchelli* (False sandalwood), with occurrences of *Geijera parviflora* (Wilga), *Alstonia constricta* (Bitterbark), *Bursaria spinsosa* and Bulloak.

The ground layer is represented by exotic pasture grasses and weeds (90%). *Pennisetum ciliare* (Buffel grass) dominates this stratum, whilst additional indicative species include *Themeda quadrivalvis* (Grader grass), *Heteropogon contortus* (Black spear grass), *Melinis repens* (Red natal grass), and *Brachyscome dentata.*

No Type A restricted species (under the provisions of the NC Act) or conservation significant species (under the provisions of the EPBC Act and/or NC Act) were detected during field investigations.

A species list for this proposed development area is provided in Appendix A.

Habitat values

Four (4) incidental fauna species were recorded within the proposed development area, namely Galah (*Eolophus roseicapilla*), Noisy miner (*Manorina melanocephala*), Apostlebird (*Struthidea cinerea*), and Emu (*Dromaius novaehollandiae*). All of these species are listed as Least Concern under the provisions of the NC Act and are not listed under the provisions of the EPBC Act.

No conservation significant species (under the provisions of the EPBC Act and/or NC Act) were detected during field investigations.

The proposed development area contains limited woody vegetation and has been extensively disturbed by grazing stock, historical clearing, and the invasion of exotic pasture species. Habitat features associated with the proposed development are therefore typically limited to dense groundcover vegetation (ie grassy tussocks) and woody debris (ie fallen/felled timber). As a result, the habitat value of this survey area is considered low, overall.

Accordingly, the species utilising resources in these regions of the survey area are most likely to be limited to common, generalist species that are able to adapt to significant habitat disturbances (ie House mouse [*Mus musculus*], macropods etc). Common birds of prey known from the area (ie Wedge-tailed eagle [*Aquila audax*] and Nankeen kestrel [*Falco cenchroides*]) would also be expected to utilise this site and the surrounding areas for foraging purposes.

3.2 Corridor R8 and R30

General

The Corridor R8 and R30 proposed development area extends approximately three km bisecting the western region of Lot 11 on WV1759 in a north-north-east to south-south-west direction, and branching out approximately 100 m in an east-west direction, to the north of the DERM mapped stream order 3 watercourse (Figure 3.2). This proposed development area includes the geotechnical sites TP-R13 and TP-R14, and a proposed well site location RM08-13 at the terminus of R30 (Figure 3.2)

This proposed development area is considered a highly modified environment, as a result of historical land clearing, and current agricultural practices. As a result, canopy, sub-canopy and shrub strata are considered sparse (ie 10% - 15%). The proposed development area infringes on large areas of crops (ie Oats) and pasture grasses, thus the ground layer represents the dominant stratum, with approximately 95% cover.

One RE community (11.3.25/11.3.2; Of Concern) associated with a stream order 3 watercourse is mapped by DERM within the southern region of the Corridor R8 proposed development area. The proposed development area infringes on this mapped RE community, which is also considered a Category C ESA. Furthermore, as a result of its proximity (ie 60 m) from a mapped Endangered RE, this proposed development area also occurs within a Category B ESA buffer. No other ESA's or associated buffer zones have been mapped within the proposed development area.

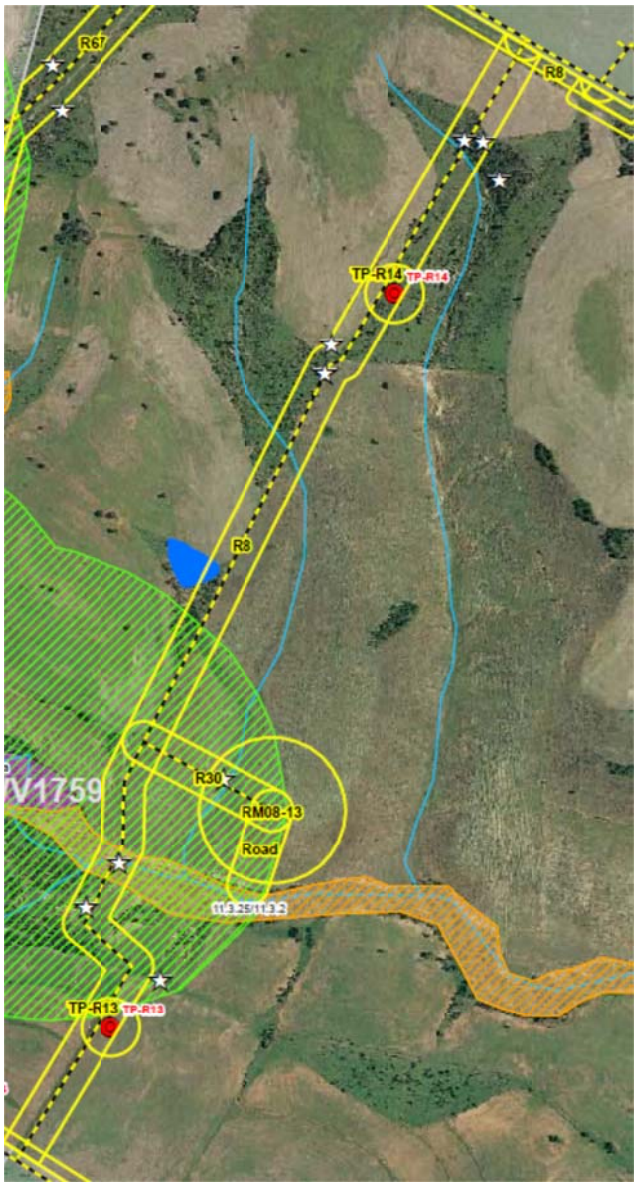

Figure 3.2 Corridor R8 and R30

Floristics

Ground-truthing of the mapped RE communities along the stream order 3 watercouse in the south has confirmed that the mapping is accurate with regards to the floristic composition and the extent.

The majority of the canopy cover within this proposed development area is restricted to the RE community (11.3.25/11.3.2) in the south. This RE community is represented by canopy species including *Eucalyptus tereticornis* (Queensland blue gum), *Eucalyptus populnea* (Poplar box) and *Eucalyptus melanophloia* (Silver-leaved ironbark). Whilst *Callitris glaucophylla* (White cypress pine) and *Acacia excelsa* (Ironwood) are present within the sub-canopy layers.

Small stands of mature canopy species occur sporadically throughout the proposed development area, and are typically represented by *E. populnea* and *E. melanophloia*. A small patch of Brigalow (approximately 0.8 ha) exists to the north of the R30 corridor east-west branch (Figure 3.2). This vegetation measures approximately 8-15 m in height.

Indicative shrub species recorded within this proposed development area include *Geijera parviflora* (Wilga), *Acacia decora* (Pretty wattle), *Carissa ovata* (Currant bush), *Bursaria spinosa*, *Eremophila mitchelli* (False sandalwood), and *Callitris glaucophylla* (White cypress pine).

The dense (95%) ground layer is dominated by *Pennisetum ciliare* (Buffel grass), with occurrences of *Maireana microphulla*, *Verbena tenuisecta* (Mayne's pest), *Cymbopogon refractus* (Barbed wire grass), and *Cheilanthes sieberi* (Mulga fern).

Five (5) Type A restricted plants (under the provisions of the NC Act) have been recorded within this corridor, namely *Brachychiton populneus* (Kurrajong). Table 3.1 and Figure 3.2 indicate the location of these individuals.

Table 3.1 Location of Type A Restricted Plants (*Nature Conservation Act 1992*)

Species	Easting (GDA 94, Zone 55J)	Northing (GDA 94, Zone 55J)
Brachychiton populneus	701059.1133	7073893.4159
Brachychiton populneus	701632.2407	7075168.486
Brachychiton populneus	701646.7039	7075238.0751
Brachychiton populneus	701964.3647	7075725.0082
Brachychiton populneus	702008.4295	7075722.6525

An additional two (2) *B. populneus* were recorded, however these are outside of the proposed development area (E701238.83 / N7073718.27 and E702046.55 / N7075627.96)

No conservation significant flora species (under the provisions of the EPBC Act and/or NC Act) were detected during field investigations.

A species list for this proposed development area is provided in Appendix A.

Habitat values

Six (6) incidental fauna species were recorded within the proposed development area, namely Galah (*Eolophus roseicapilla*), Magpie (*Gymnorhina tibicen*), Magpie lark (*Grallina cyanoleuca*), Willie wagtail (*Rhipidura leucophrys*), Torresian crow (*Corvus orru*), Striated pardalote (*Pardalotus striatus*). All of these species are listed as Least Concern under the provisions of the NC Act and are not listed under the provisions of the EPBC Act.

No conservation significant species (under the provisions of the EPBC Act and/or NC Act) were detected during field investigations.

Habitat features associated with the entire survey area include:

- Canopy cover suitable for shelter, foraging and perching
- Hollow-bearing trees and stags
- Fissured tree bark
- Dense groundcover vegetation (ie grassy tussocks)
- Woody debris (ie fallen/felled timber, including hollow-bearing logs)
- Watercourse habitat (including banks and ephemeral water)

The habitat value of this proposed development area is considered low to moderate, overall. The highest habitat value was typically recorded within the remnant vegetation and riparian zones within the proposed development area. These areas typically provide structural elements that fulfil various functional roles for native fauna species, and generally exhibit important habitat features such as hollow-bearing trees and stags, fissured bark, and fallen woody debris (including hollow-bearing logs). The watercourse offers suitable habitat values for species whose life cycles are closely linked with ephemeral habitats and provides available drinking water for other fauna, at least after prolonged periods of rainfall.

Cropping paddocks and cleared regions of the proposed development area contain limited woody vegetation. Accordingly, the species utilising resources in these regions are most likely to be limited to common, generalist species that are able to adapt to significant habitat disturbances (ie House mouse [*Mus musculus*], macropods etc). Common birds of prey known from the area (ie Wedge-tailed eagle [*Aquila audax*] and Nankeen kestrel [*Falco cenchroides*]) would also be expected to utilise this site and the surrounding areas for foraging purposes.

3.3 Corridor R22 and R78

General

The Corridor R22 and R78 proposed development area straddles the Lot 11 on WV1759 and Lot 94 on WV456 property boundaries (Figure 3.3). As discussed earlier, this report is specific to the ecology of Lot 11 on WV1759. For additional information on the Corridor R22 and R78 proposed development area, refer to the appropriate report for Lot 94 on WV456.

This proposed development area extends approximately 1.4 km, within the southern region of the site (Figure 3.3), and incorporates one proposed well site location (RM08-19 at the terminus of corridor R22), and three geotechnical sites (TP-R44, RM-25, BH-03).

This proposed development area is considered a highly modified environment, as a result of historical land clearing, and current agricultural practices. As a result, mature canopy cover is considered sparse (ie 15%), and the shrub layer is considered moderately sparse (ie 20%). As to be expected, the ground cover is the dominant stratum, and is considered dense (ie 90%).

Two RE communities (11.3.25/11.3.2 [Of Concern]; 11.10.9 [No Concern at Present]) associated with a stream order 3 watercourse are mapped by DERM as occurring within the proposed development area. The proposed development area infringes on these mapped RE communities, of which RE11.3.25/11.3.2 is considered a Category C ESA. No other ESA's or associated buffer zones have been mapped within the proposed development area.

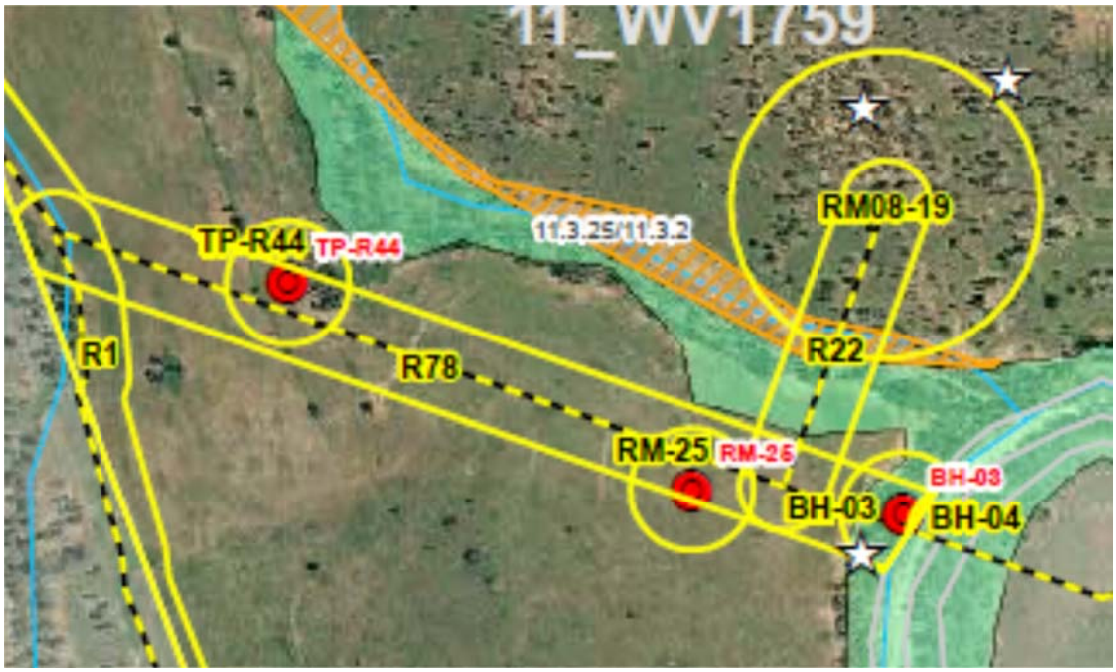

Figure 3.3 **Corridor R22 and R78**

Floristics

Ground-truthing of the mapped RE communities along the stream order 3 watercourse has confirmed that the mapping is inaccurate with regards to the land zone, floristic composition and extent of RE 11.10.9. As a result of the presence of alluvium substrate, this community is analogous to landzone 3. Furthermore, the species composition within this mapped community is analogous the adjoining RE community 11.3.25/11.3.2 (Of Concern). The extent of the RE mapping is inaccurate surrounding Corridor R22, where a canopy stratum is absent.

RE 11.3.25/11.3.2 present within this proposed development area is typically represented by *Eucalyptus tereticornis* (Queensland blue gum), *Eucalyptus populnea* (Poplar box) and *Eucalyptus melanophloia* (Silver-leaved ironbark). Dominate species within the sub-canopy stratum include *Callitris glaucophylla* (White cypress pine) and *Acacia excelsa* (Ironwood).

Canopy species are largely restricted to the RE community, however, small stands of trees typically represented by *E. populnea* and *E. melanophloia* were recorded sporadically throughout the proposed development area.

Indicative shrub species recorded throughout the proposed development area include *Acacia decora* (Pretty wattle), *Callitris glaucophylla* (White cypress pine), *Eremophila mitchelli* (False sandalwood), *Grevillea striata* (Beefwood), and *Acacia excelsa* (Ironwood).

The ground cover is dominated by *Pennisetum ciliare* (Buffel grass), with occurrences of *Heteropogon contortus* (Black spear grass), *Themeda triandra* (Kangaroo grass), *Chloris pectinata* (Comb windmill grass), and *Dichanthium sericeum* (Queensland blue grass).

Four (4) Type A restricted plants (under the provisions of the NC Act) have been recorded within this corridor, namely *Brachychiton populneus* (Kurrajong). Table 3.2 and Figure 3.3 indicate the location of these individuals.

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

Species	Easting (GDA 94, Zone 55J)	Northing (GDA 94, Zone 55J)
Brachychiton populneus	703977.1669	7071226.1854
Brachychiton populneus	704052.8351	7071280.1697
Brachychiton populneus	704055.9767	7071277.0167
Brachychiton populneus	703979.2388	7071732.2754

An additional *B. populneus* were recorded, however this is just outside of the proposed development, adjacent to the RM08-19 proposed well site (E704141.08/N7071766.82)

No conservation significant flora species (under the provisions of the EPBC Act and/or NC Act) were detected during field investigations.

A species list for this proposed development area is provided in Appendix A.

Habitat values

Nine (9) native fauna species were recorded within the proposed development area, namely Pied butcherbird (*Cracticus nigrogularis*), Laughing kookaburra (*Dacelo novaeguineae*), Eastern grey kangaroo (*Macropus giganteus*), Striated pardalote (*Pardalotus striatus*), Pretty-face wallaby (*Macropus parryi*), Pied cormorant (*Phalacrocorax varius*), Australian magpie (*Gymnorhina tibicen*), Sulphur-crested cockatoo (*Cacatua galerita*), Brown quail (*Coturnix ypsilophora*), European rabbit (*Oryctolagus cuniculus*). All of these species are listed as Least Concern under the provisions of the NC Act and are not listed under the provisions of the EPBC Act.

A number of exotic fauna species were recorded within this proposed development area. A European rabbit was observed foraging within a clearing, and is considered a Class 2 pest under the provisions of the *Land Protection (Pest and Stock Route Management) Act 2002* (LP Act). Furthermore, traces (ie footprints) of Feral pig (*Sus scrofa*), and Feral dog (*Canis familiaris*) or European red fox (*Vulpes vulpes*), were detected along the banks of the watercourse. These species are also considered Class 2 pests under the provisions of the LP Act. Under the provisions of the EPBC Act, Threat Abatement Plans have been prepared for the European rabbit, European red fox and Feral pigs.

No conservation significant species (under the provisions of the EPBC Act and/or NC Act) were detected during field investigations.

Habitat features associated with the entire survey area include:

- Canopy cover suitable for shelter, foraging and perching
- Hollow-bearing trees and stags
- Fissured tree bark
- Dense groundcover vegetation (ie grassy tussocks)
- Woody debris (ie fallen/felled timber, including hollow-bearing logs)
- Watercourse habitat (including banks and ephemeral water)

The habitat value of this proposed development area is considered low to moderate, overall. The highest habitat value was typically recorded within the remnant vegetation and riparian zones. These areas typically provide structural elements that fulfil various functional roles for native fauna species, and generally exhibit important habitat features such as hollow-bearing trees and stags, fissured bark, and fallen woody debris (including hollow-bearing logs). The watercourse offers suitable habitat values for species whose life cycles are closely linked with ephemeral habitats and provides available drinking water for other fauna, at least after prolonged periods of rainfall.

Cleared regions of the proposed development area contain limited woody vegetation. Accordingly, the species utilising resources in these regions are most likely to be limited to common, generalist species that are able to adapt to significant habitat disturbances (ie House mouse [*Mus musculus*], macropods etc). Common birds of prey known from the area (ie Wedge-tailed eagle [*Aquila audax*] and Nankeen kestrel [*Falco cenchroides*]) would also be expected to utilise this site and the surrounding areas for foraging purposes.

3.4 Corridor R35

General

The Corridor R35 proposed development area straddles the Lot 11 on WV1759 and Lot 10 on WV1759 property boundaries (Figure 3.4). As discussed earlier, this report is specific to the ecology of Lot 11 on WV1759. For additional information on Corridor R35, refer to the appropriate report for Lot 10 on WV1759.

The Corridor R35 proposed development area partially includes three (3) geotechnical sites, namely RM-08-07, 7699-TP-52 and TP-C01. This area extends approximately 1.5 km along the Lot 11 boundary, within the northern region of the site (Figure 3.4).

This proposed development area is considered a highly modified environment, as a result of historical land clearing, and current agricultural practices. As a result, limited mature canopy cover is present, and the ground-layer is considered the dominant stratum.

No RE communities, watercourses, or known ESA's (or associated buffers) have been recorded within this proposed development area. The closest ESA mapping occurs approximately 800 m to the north of the proposed development area (within Lot 10 on WV1759).

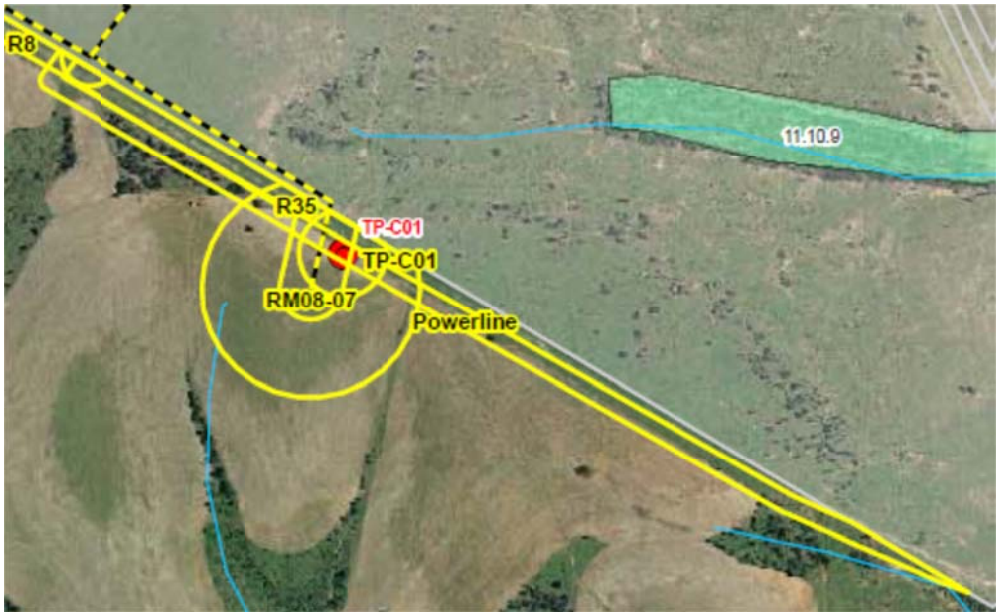

Figure 3.4 Coridor R35

Floristics

Canopy cover within this proposed development area is largely devoid. Indicative sub-canopy species recorded within this proposed development area include *Acacia excelsa* (Ironwood), *Acacia harpophylla* (Brigalow), and *Allocasuarina luehmannii (Bulloak*).

Species recorded within the shrub layer include *Alstonia constricta* (Bitter bark), *Apophyllum anomalum* (Broom bush), *Atalaya hemiglauca* (White wood), *Carissa ovata* (Currant bush), *Eremophila mitchelli* (False sandalwood), *Geijera parviflora* (*Wilga*), and *Hakea lorea* (Bootlace oak), and *Alectryon diversifolius* (Scrub boonaree),

Outside of the cropping areas, *Pennisetum ciliare* (Buffel grass) dominates the proposed development area, with occurrences of *Aristida jerichoensis* (Jerico wire grass), *Bidens pilosa* (Cobbler's pegs), *Bothriochloa decipiens* (Pitted bluegrass), *Cheilanthes aspera* (Bristly cloak fern), *Chloris virgata* (Feathertop rhodes grass) and *Cymbopogon refractus* (Barbed wire grass).

No Type A restricted species (under the provisions of the NC Act) or conservation significant species (under the provisions of the EPBC Act and/or NC Act) were detected during field investigations.

A species list for this proposed development area is provided in Appendix A.

Habitat values

The proposed development area contains limited woody vegetation and has been extensively disturbed by historical clearing, grazing stock, cropping, and the invasion of exotic pasture species. Habitat features associated with the proposed development are therefore typically limited to dense groundcover vegetation (ie grassy tussocks) and woody debris (ie fallen/felled timber, including hollow-bearing logs). As a result, the habitat value of this survey area is considered low, overall.

Accordingly, the species utilising resources in these regions of the survey area are most likely to be limited to common, generalist species that are able to adapt to significant habitat disturbances (ie House mouse [*Mus musculus*], macropods etc). Common birds of prey known from the area (ie Wedge-tailed eagle [*Aquila audax*] and Nankeen kestrel [*Falco cenchroides*]) would also be expected to utilise this site and the surrounding areas for foraging purposes.

3.5 Corridor R67

General

The Corridor R67 proposed development area extends approximately five km, straddling the western and southern Lot 11 on WV1759 property boundaries (Figure 3.5). As discussed earlier, this report is specific to the ecology of Lot 11 on WV1759. For additional information on the Corridor R67 proposed development area, refer to the appropriate reports for Lot 1 on CP848049 and Lot 96 on WV457.

This proposed development area includes the geotechnical sites RM-23, TP-R30, and RM-24 (Figure 3.5).

This proposed development area is considered a highly modified environment, as a result of historical land clearing, and current agricultural practices. As a result, canopy, sub-canopy and shrub strata are considered sparse (ie 10% - 15%). The proposed development area infringes on large areas of crops (ie Oats) and pasture grasses, thus the ground layer represents the dominant stratum, with approximately 95% cover.

The western segment of the proposed development area intercepts two mapped RE communities (11.3.25/11.3.2 [Of Concern] and 11.9.5a [Endangered]), mapped in association with stream order 3 and 1 watercourses (Figure 3.5). As a result, this proposed development area is mapped as occurring within a Category B and C ESA buffer. No other ESA's or associated buffer zones have been mapped within the proposed development area.

There are four (4) watercourses mapped within the proposed corridor (one stream order 3, and three stream order 1 watercourses). These watercourses are considered ephemeral, and were not observed in flow at the time of the investigation.

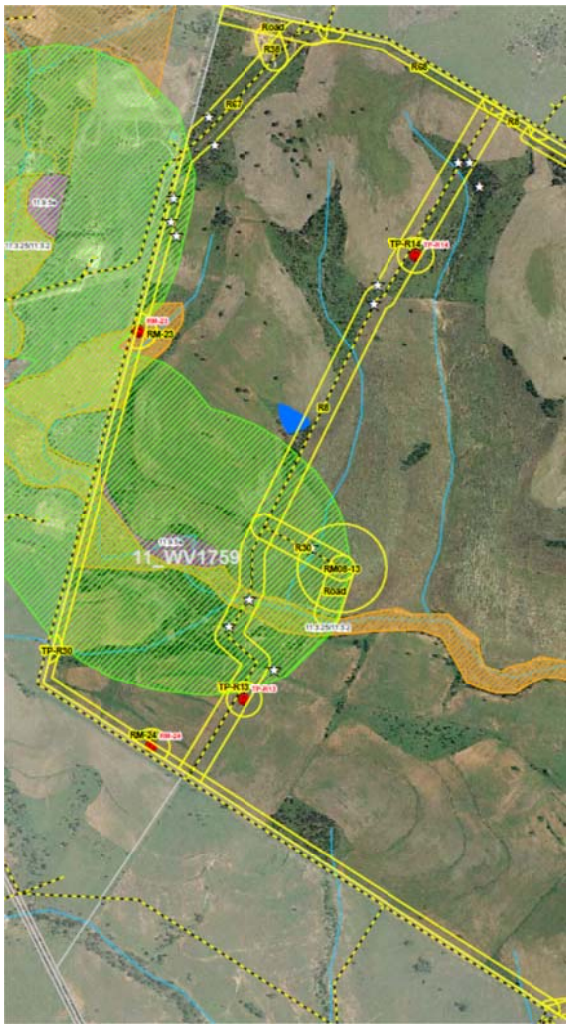

Figure 3.5 Corridor R67

Floristics

The majority of the development area is currently mapped as non-remnant vegetation on the DERM RE mapping; however two patches of remnant vegetation extend into the corridor along the western property boundary (Figure 6). Ground-truthing of these RE communities has determined that the proposed development area intercepts only one RE community, namely 11.3.25/11.3.2 (Of Concern), which is also considered a Category C ESA. The mapped Endangered RE community (11.9.5a) was not recorded within the proposed development footprint, thus it is considered that the DERM mapping is inaccurate with regard to the extent of this RE community. Despite this, as a result of its proximity to the mapped RE11.9.5a, this proposed development area remains mapped as occurring within a Category B ESA buffer.

The majority of the canopy cover within this proposed development area is restricted to the RE community (11.3.25/11.3.2). This RE community is dominated by *Eucalyptus populnea* (Poplar box) with *Callitris glaucophylla* (White cypress pine) and *Allocasuarina luehmannii* (Bull oak) dominating the sub-canopy layers. Scattered occurrences of *Acacia harpophylla* (Brigalow) were recorded within the proposed development area, measuring approximately 10-15 m.

Small stands of mature canopy species occur sporadically throughout the proposed development area, and are typically represented by *E. populnea*, *E. melanophloia, E. camaldulensis and E chloroclada*.

Indicative shrub species recorded within this proposed development area include *Geijera parviflora* (Wilga), *Acacia decora* (Pretty wattle), *Carissa ovata* (Currant bush), *Eremophila mitchelli* (False sandalwood), and *Callitris glaucophylla* (White cypress pine).

The dense (95%) ground layer is dominated by *Pennisetum ciliare* (Buffel grass), with occurrences of *Aristida jerichoensis* (Jerico wire grass), *Bidens pilosa* (Cobbler's pegs), *Themeda triandra* (Kangaroo grass), *Melinis repens* (Red natal grass), and *Cheilanthes sieberi* (Mulga fern).

Three (3) Type A restricted plants (under the provisions of the NC Act) have been recorded within this corridor, namely *Brachychiton populneus* (Kurrajong) and *Brachychiton rupestris* (Broad-leaved bottletree). Table 3.3 and Figure 3.5 indicate the location of these individuals.

Table 3.3 Location of Type A Restricted Plants (*Nature Conservation Act 1992*)

Species	Easting (GDA 94, Zone 55J)	Northing (GDA 94, Zone 55J)
Brachychiton populneus	700832.30	7075489.77
Brachychiton rupestris	700842.51	7075580.93
Brachychiton rupestris	702008.43	7075722.65

No conservation significant flora species (under the provisions of the EPBC Act and/or NC Act) were detected during field investigations.

A species list for this proposed development area is provided in Appendix A.

Habitat values

Six (6) incidental fauna species were recorded within the proposed development area, namely Galah (*Eolophus roseicapilla*), Magpie (*Gymnorhina tibicen*), Grey butcherbird (*Cracticus torquatus*), Crested pigeon (*Ocyphaps lophotes*), Noisy miner (*Manorina melanocephala*) and Eastern grey kangaroo (*Macropus giganteus).* All of these species are listed as Least Concern under the provisions of the NC Act and are not listed under the provisions of the EPBC Act.

No conservation significant species (under the provisions of the EPBC Act and/or NC Act) were detected during field investigations.

Habitat features associated with the entire survey area include:

- Canopy cover suitable for shelter, foraging and perching
- Hollow-bearing trees and stags
- Fissured tree bark
- Dense groundcover vegetation (ie grassy tussocks)
- Woody debris (ie fallen/felled timber, including hollow-bearing logs)
- Watercourse habitat (including banks and ephemeral water)

The habitat value of this proposed development area is considered low to moderate, overall. The highest habitat value was typically recorded within the remnant vegetation and riparian zones within the proposed development area. These areas typically provide structural elements that fulfil various functional roles for native fauna species, and generally exhibit important habitat features such as hollow-bearing trees and stags, fissured bark, and fallen woody debris (including hollow-bearing logs). The watercourse offers suitable habitat values for species whose life cycles are closely linked with ephemeral habitats and provides available drinking water for other fauna, at least after prolonged periods of rainfall.

Cropping paddocks and cleared regions of the proposed development area contain limited woody vegetation. Accordingly, the species utilising resources in these regions are most likely to be limited to common, generalist species that are able to adapt to significant habitat disturbances (ie House mouse [*Mus musculus*], macropods etc). Common birds of prey known from the area (ie Wedge-tailed eagle [*Aquila audax*] and Nankeen kestrel [*Falco cenchroides*]) would also be expected to utilise this site and the surrounding areas for foraging purposes.

3.6 Corridor T1

General

This proposed development area incorporates Corridor T1, the Blythdale Road powerline easement, and three geotechnical locations (TP-T102, RM-20 and 7699-TP-56). In total, this proposed development area extends approximately 3 km, two of which follow Blythdale Road in an approximate south-western direction (Figure 3.6). Corridor T1 branches away from the powerline easement to the south of RM-20, in an almost western direction to the property boundary.

This proposed development area is considered a highly modified environment, as a result of historical land clearing, the construction and operation of Blythdale Road, and current agricultural practices. As a result, canopy, sub-canopy and shrub strata are considered sparse (ie 5% - 15%). The shrub layer is also considered sparse, representing approximately 10% of the vegetative cover. The ground-layer is considered the dominant stratum, with an approximate 90% coverage.

No RE communities or known ESA's (or associated buffers) have been recorded within this proposed development area. The closest ESA mapping occurs approximately 90 m to the north of the proposed development area, in association with a stream order 3 watercourse (Figure 3.6).

Two watercourses (stream order 1 and 3) are bisected twice each, where the proposed development area splits into two branches (Figure 3.6).

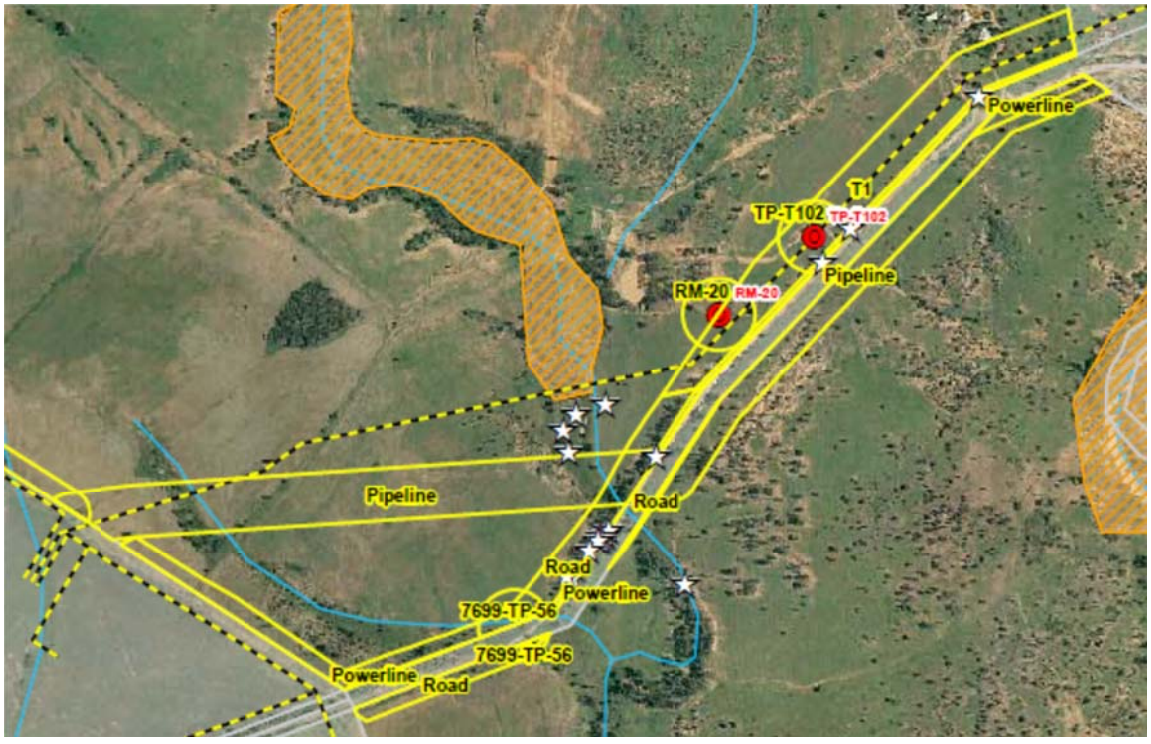

Figure 3.6 Corridor T1

Floristics

Canopy cover within this proposed development area is largely restricted to the areas surrounding the mapped watercourses, and along the road reserve.

Canopy and sub-canopy species are typically represented by *Eucalyptus populnea* (Poplar box) and *Eucalyptus melanophloia* (Silver-leaved ironbark).

Callitris glaucophylla (White cypress pine) dominates the shrub layer, with occurrences of *Eremophila mitchelli* (False sandalwood), *Acacia excelsa* (Ironwood), *Acacia decora* (Pretty wattle) and *Alstonia stricta* (Bitterbark).

Pennisetum ciliare (Buffel grass) dominates the proposed development area, with occurrences of *Melinis repens* (Red natal grass), *Themeda triandra* (Kangaroo grass), *Cymbopogon refractus* (Barbed wire grass), *Heteropogon contortus* (Black spear grass), and *Cheilanthes sieberi* (Mulga fern).

Twenty-nine (29) Type A restricted plants (under the provisions of the NC Act) have been recorded within this corridor, namely *Brachychiton rupestris* (Narrow leaved Bottle Tree). Table 3.4 and Figure 3.6 indicate the location of these individuals.

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

Species	Easting (GDA 94, Zone 55J)	Northing (GDA 94, Zone 55J)
Brachychiton rupestris x 2	703302.36	7072248.49
Brachychiton rupestris x 2	703302.36	7072248.49
Brachychiton rupestris	703297.88	7072249.33
Brachychiton rupestris	703297.88	7072249.33
Brachychiton rupestris x 3	703288.17	7072253.37
Brachychiton rupestris x 2	703331.96	7072303.32
Brachychiton rupestris	703342.06	7072317.9
Brachychiton rupestris x 4	703353.1	7072321.82
Brachychiton rupestris	703348.14	7072323.9
Brachychiton rupestris	703352.87	7072332.69
Brachychiton rupestris	703362.79	7072335.63
Brachychiton rupestris x 2	703365.62	7072343.9
Brachychiton rupestris	703460.39	7072489.01
Brachychiton rupestris	703460.39	7072489.01
Brachychiton rupestris	703488.45	7072547.41
Brachychiton rupestris	703740.98	7072839.29
Brachychiton rupestris	703786.06	7072863.84
Brachychiton rupestris	703786.06	7072863.84
Brachychiton rupestris	703786.06	7072863.84

Species	Easting (GDA 94, Zone 55J)	Northing (GDA 94, Zone 55J)
Brachychiton rupestris	703840.24	7072927.04

Habitat values

The proposed development area contains limited woody vegetation and has been extensively disturbed by historical clearing, grazing stock, cropping, and the invasion of exotic pasture species. Habitat features associated with the proposed development are therefore typically limited to dense groundcover vegetation (ie grassy tussocks) and woody debris (ie fallen/felled timber, including hollow-bearing logs). As a result, the habitat value of this survey area is considered low, overall.

Accordingly, the species utilising resources in these regions of the survey area are most likely to be limited to common, generalist species that are able to adapt to significant habitat disturbances (ie House mouse [*Mus musculus*], macropods etc). Common birds of prey known from the area (ie Wedge-tailed eagle [*Aquila audax*] and Nankeen kestrel [*Falco cenchroides*]) would also be expected to utilise this site and the surrounding areas for foraging purposes.

4 Conclusion

The proposed development area occurs on land historically cleared for agricultural purposes, and for the construction and operation of existing un-sealed roads. The majority of the development area is currently mapped as non-remnant vegetation on the DERM RE mapping; however three different RE communities are mapped as occurring within the proposed development footprint. Ground-truthing of these RE communities has determined that the proposed development area intercepts only one RE community, namely 11.3.25/11.3.2 (Of Concern), which is also considered a Category C ESA.

The mapped Endangered RE community (11.9.5a) and Least Concern RE 11.10.9 were not recorded within the proposed development footprint, thus it is considered that the DERM mapping is inaccurate. Despite this, as a result of its proximity to the mapped RE11.9.5a (outside of the proposed development footprint), this proposed development area remains mapped as occurring within a Category B ESA buffer. Refer to Sections 3.3 and 3.5 for further information regarding RE mapping inaccuracies.

Forty-one (41) Type A restricted plants were observed within the proposed development area. No additional flora or fauna species listed under the provisions of the NC Act or EPBC Act were detected during investigations.

The habitat value of this proposed development area is considered low to moderate, overall. The highest habitat value was typically recorded within the remnant vegetation and riparian zones within the proposed development area.

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

Scientific Name	Common Name	R30	T1	R78 & R22	R1	R8	R67
Cheilanthes sieberi	Mulga Fern	■	■	■		■	
Alstonia constricta	Bitter Bark		■		■	■	■
Carissa lanceolata	Currant Bush		■				■
Carissa ovata	Currant Bush					■	■
Gomphocarpus physocarpus	Balloon Cotton Bush					■	
Parsonsia lanceolata	Monkey Rope					■	
Bidens pilosa	Cobblers Pegs	■	■	■		■	
Brachycome dentata	Lobe-seed Daisy	■	■		■	■	■
Bracteantha bracteata	Everlasting Daisy	■	■	■		■	■
Calocephalus platycephalus	Billy Buttons		■			■	
Calotis cuneifolia	Purple Burr Daisy		■	■		■	■
Calotis lappulacea	Yellow Burr Daisy			■			
Cassinia laevis	Cough Bush		■				■
Chrysocephalum apiculatum	Yellow Buttons	■	■		■	■	
Cirsium vulgare	Spear Thistle, Black Thistle	■	■	■		■	■
Conyza bonariensis	Fleabane						■
Pterocaulon sphacelatum	Apple Bush	■		■	■		
Tagetes minuta	Stinking Rodger	■	■	■	■		■
Xanthium occidentale	Noogoora Burr	■	■	■			■
Lepidium sagittulatum	Pepper Cress		■	■			
Opuntia stricta	Prickly Pear			■			■
Opuntia tomentosa	Velvety Tree Pear		■	■		■	■
Wahlenbergia communis	Large Bluebells	■	■			■	
Wahlenbergia gracilis	Sprawling Bluebell		■	■			
Apophyllum anomalum	Warrior bush					■	■

Capparis lasiantha	Native Orange						
Capparis loranthifolia	Nipan, Wait a while						
Allocasuarina luehmannii	Bull Oak						
Casuarina cristata	Belah						
Maireana microphylla	Small-leaf Bluebush						
Maireana villosa	Silky Bluebush						
Sclerolaena birchii	Galvanised Burr						
Callitris glaucophylla	White Cypress Pine						
Cyperus difformis	sedge 2 - difformis, Dirty Dora						
Gahnia aspera	Gahnia						
Glycine tabacina							
Lotus corniculatus	Lotus, Birdsfoot Trefoil						
Hovea longipes	Hovea						
Acacia decora	Pretty Wattle						
Acacia excelsa	Iron wood						
Acacia harpophylla	Brigalow						
Acacia leiocalyx	Black Wattle						
Acacia salicina	Sally Wattle						
Goodenia glabra	Smooth Goodenia						
Juncus usitatus	Juncus						
Lomandra leucocephala	Lomandra						
Lomandra hystrix	Creek Mat Rush						
Lomandra longifolia	Lomandra						
Lomandra multiflora	Lomandra						
Lomandra spicata	Lomandra						
Amyema sp.	A Mistletoe						

Sida rhombifolia	Paddy's lucerne						
Sida subspicata	Queensland Hemp						
Owenia acidula	Emu Apple						
Eremophila mitchellii	False Sandalwood						
Eremophila longifolia	Emu Bush						
Angophora floribunda	Rough-barked Apple						
Eucalyptus chloroclada	Baradine Red Gum						
Eucalyptus melanophloia	Silver Leaved Ironbark						
Eucalyptus populnea	Poplar Box						
Eucalyptus tereticornis	Queensland Blue Gum						
Dianella longifolia	Dianella						
Bursaria spinosa	Prickly Pine						
Aristida caput medusae	Many-headed Wire Grass						
Capillipedium spicigerum	Scented-top grass						
Chloris divaricata	Windmill Chloris						
Cymbopogon refractus	Barbed-wire Grass						
Cynodon dactylon	Green Couch						
Dichanthium sericeum	Queensland Blue Grass						
Enteropogon acicularis	Curly Windmill Grass						
Eragrostis brownii	Browns Lovegrass						
Heteropogon contortus	Black Spear Grass						
Imperata cylindrica	Blady Grass						
Melinis repens	Red Natal						
Pennisetum ciliare	Buffel Grass						
Perotis rara	Comet Grass						
Sorghum halepense	Johnson Grass						

Sporobolus caroli	Desert Sporobolus, Fairy Grass						
Sporobolus creber	Western Rats Tail Grass						
Themeda quadrivalvis	Grader Grass						
Themeda triandra	Kangaroo Grass						
Panicum sp.	A panic grass						
Grevillea striata	Beefwood						
Hakea lorea	Bootlace Oak						
Alphitonia excelsa	Red Ash						
Psydrax odorata forma buxifolius	Round Leaf Psydrax						
Psydrax odorata subsp. australiana	Canthium						
Richardia brasiliensis	Mexican clover						
Geijera parviflora	Wilga						
Alectryon diversifolius	Scrub Boonaree						
Atalaya hemiglauca	Whitewood						
Dodonaea viscosa	Sticky Hopbush						
Solanum brownii	Violet Nightshade						
Solanum ellipticum	Potato Bush						
Solanum nigrum	Blackberry nightshade						
Brachychiton populneus	Kurrajong						
Brachychiton rupestris	Narrow Leaved Bottle Tree						
Verbena bonariensis	Bunchy Verbena, Purpletop Verbena						
Verbena officinalis	Common Verbena, Native Verbena						
Verbena tenuisecta	Mayne's Curse						
Viola hederacea	Native Viola						
Cissus opaca	Native Grape						

Aurecon Australia Pty Ltd
ABN 54 005 139 873

Level 14, 32 Turbot Street
Brisbane QLD 4000

Locked Bag 331
Brisbane QLD 4001
Australia

T +61 7 3173 8000
F +61 7 3173 8001
E brisbane@aurecongroup.com
W aurecongroup.com