Santos
GLNG Project

GLNG
Gas Transmission Pipeline

Pre-Clearance Survey Report
for
KP130 to KP312

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Contents

Abbreviations

CAMBA	China-Australia Migratory Bird Agreement
cm	Centimetre
CSG	Coal Seam Gas
Cwlth	Commonwealth
DBH	Diameter Breast Height
DEHP	Department of Environment and Heritage Protection
DERM	Department of Environment and Resource Management
DEWHA	Department of Water, Heritage and the Arts
E	Endangered
EA	Environmental Authority
EIS	Environmental Impact Statement
EP Act	*Environmental Protection Act 1994*
EPBC Act	*Environment Protection and Biodiversity Conservation Act 1999*
ESA	Environmentally Sensitive Areas
EVNT	Endangered, Vulnerable and Near Threatened species
GIS	Geographical Information System
GLNG	Gladstone Liquefied Natural Gas
GTP	Gas Transmission Pipeline
GTP RoW	Gas Transmission Pipeline Right of Way
ha	Hectares
HERBRECS	Queensland Herbarium database
HVR	High Value Regrowth
JAMBA	Japan-Australia Migratory Bird Agreement
KP	Kilometre Point
LC	Least Concern
LNG	Liquefied Natural Gas
LP Act	*Land Protection (Pest and Stock Route Management) Act 2002*
m	Metre
Mi	Migratory
mm	Millimetres
MNES	Matters of National Environmental Significance
NC Act	*Nature Conservation Act 1992*
NT	Near Threatened
PESS	Pre-Clearance Ecological Survey Sheet
PWMP	Pest and Weed Management Plan
QLD	Queensland
RE	Regional Ecosystem
REDD	Regional Ecosystem Description Database
ROKAMBA	Republic of Korea-Australia Migratory Bird Agreement

RoW	Right of Way
SEIS	Supplementary Environmental Impact Statement
SEQ	South East Queensland
SEVT	Semi-evergreen Vine Thicket
SEWPaC	Department of Sustainability, Environment, Water, Population and Communities
SMP	Species Management Plan
SO	Stream Order
SSMP	Significant Species and Ecological Communities Management Plan
TEC	Threatened Ecological Communities
The Project	The GLNG GTP Project
V	Vulnerable
VM Act	*Vegetation Management Act 1999*
WONS	Weeds of National Significance

Definitions

In this pre-clearance survey report, the following definitions apply:

Glossary

Term	Meaning
Ancillary work areas	All areas outside of the Marine Crossing Early Works footprint required to develop and operate the GTP. This includes laydown sites, stockpile areas, construction areas, camps, low hazard dams and pump areas, and access tracks (permanent and temporary)
Approximately	Used throughout the document as a way to quantify impacts, particularly when working with decimal places. Use of this term should not be interpreted that the impacts are greater than those provided. For the purposes of this document, quantities have been rounded up and therefore actual impacts are slightly less than indicated in the SSMP
Bioregion	A geographic area characterised by a combination of physical and biological characteristics, for example, terrain, climate and ecological communities
Breeding places	An animal breeding place is a place being used by a protected animal to incubate or rear the animal's offspring if: • The animal is preparing, or has prepared, the place for incubating or rearing the animal's offspring • The animal is breeding, or is about to breed, and is physically occupying the place; or the animal and the animal's offspring are physically occupying the place, even if the occupation is only periodical • The animal has used the place to incubate or rear the animal's offspring and is of a species generally known to return to the space place to incubate or rear offspring in each breeding season for the animal
Core habitat	'Core habitat' consists of 'essential habitat' in which the species is known and the habitat is recognised under relevant recovery plans or other relevant plans/policies/regulations. Also included within this category are populations that are limited geographically within the region
Directly adjacent to the RoW	Within 100 m of the RoW
Disturbance	Any activity that has an impact on the environment. This may include clearance of trees, movement of soil, blasting of rock, construction of man-made structures, and also extends to human activities resulting in noise, light, pollution or rubbish
Disturbance limit	Proposed extent of potential habitat to be cleared within the Marine Crossing Early Works footprint, Ancillary work areas and the associated Access Road areas
Ecological community	An assemblage of native species that: a. inhabits a particular area in nature b. meets the additional criteria specified in the regulations (if any) made for the purposes of this definition Ecological communities include all the species of plants, animals and micro-organisms that naturally occur together in a particular area or environmental domain in nature in assemblages which can change over time
Endangered (EPBC Act)	When a native species that is not critically endangered and is facing a very high-risk of extinction in the wild in the near future as determined in accordance with the prescribed criteria
Essential habitat	'Essential habitat' is an area containing resources that are considered essential for the maintenance of populations of the species (eg potential habitat for breeding, roosting, foraging, shelter, for either migratory or non-migratory species). 'Essential habitat' is defined from known records and/or expert advice (including the findings of pre-clearance surveys)

Term	Meaning
General habitat	'General habitat' consists of areas or locations that are used by transient individuals or where species may have been recorded but where there is insufficient information to assess the area as essential/core habitat. 'General habitat' also includes areas defined from known records or habitat that is considered to potentially support a species according to expert knowledge of habitat relationships, despite the absence of specimen backed records. 'General habitat' may include areas of suboptimal habitat for species
Gilgai	Gentle mounds and depressions associated with swelling and cracking clay soils on alluvial floodplains
High value regrowth	High-value regrowth vegetation is mature native vegetation that hasn't been cleared since 31 December 1989
Microhabitat	A small, specialized habitat that provides a unique habitat for certain species. Microhabitats may include rocky outcrops, piles of woody debris, leaf litter
Migratory species	Those animals that migrate to Australia and its external territories, or pass through or over Australian waters during their annual migrations
Nocturnal	Active by night
Population	Of a species or ecological community relating to an occurrence of the species or community in a particular area
Pre-clearance survey	An ecological survey undertaken by an approved ecologist in accordance with relevant Commonwealth Survey guidelines and/or industry practices
Regional Ecosystems (REs)	Vegetation communities that are consistently associated with a particular combination of geology, land form and soil in a bioregion
Remnant vegetation	Remnant woody vegetation is defined as vegetation where the dominant canopy has >70% of the height and >50% of the cover relative to the undisturbed height and cover of that stratum and is dominated by species characteristic of the vegetation's undisturbed canopy
Roost habitat	Where a bat spends its day
RoW	Right of Way – GTP alignment including ancillary works areas
Sensitive area	An area known or potentially providing habitat for threatened species
Significant fauna species	A fauna species listed as threatened pursuant to the EPBC Act or the NC Act.
Targeted survey	A survey specifically targeting a key ecological feature, including habitat features such as hollow-bearing trees, burrows and nests
Threatened ecological community	An ecological community listed under the EPBC Act as Critically Endangered, Endangered or Vulnerable
Threatened species	A plant or animal assigned a conservation status (Vulnerable, Endangered or Critically Endangered) under the EPBC Act
Translocation	The term translocation for the purposes of this management plan will follow the guidelines for translocation of threatened plants in Australia (Vallee *et al* 2004) which includes the following: seed collection and propagation; propagation via cuttings or tissue culture; direct seeding; transplantation of seedlings or mature plants; and the transfer of soil, leaf litter or brush
Unavoidable impacts	Impacts as a result of the construction activities within the Marine Crossing Early Works footprint and Ancillary work areas on core, essential (known and potential) and general habitat for threatened fauna, including migratory species. Unavoidable impacts also include direct impacts on threatened flora populations and threatened ecological communities
Unlikely habitat	'Unlikely habitat' areas are those areas that do not contain records of the particular species and contain no habitat values to support the presence or existence of resident or migratory individuals or populations of the species
Vulnerable (EPBC Act)	A native species that is not critically endangered or endangered and is facing a high-risk of extinction in the wild in the medium term future as determined in accordance with the prescribed criteria

1 Introduction

1.1 Background

Santos GLNG has awarded Saipem Australia (Saipem) the detailed design, procurement and construction of the 420 km long gas transmission pipeline (GTP), a joint venture between Santos GLNG Pty Ltd (Santos), PAPL (Downstream) Pty Ltd (Petronas) and Total GLNG Australia (TOTAL). This pipeline will transport the extracted and compressed Coal Seam Gas (CSG) from the gas fields between Roma and the Arcadia Valley to the LNG processing facility at Curtis Island, off Gladstone.

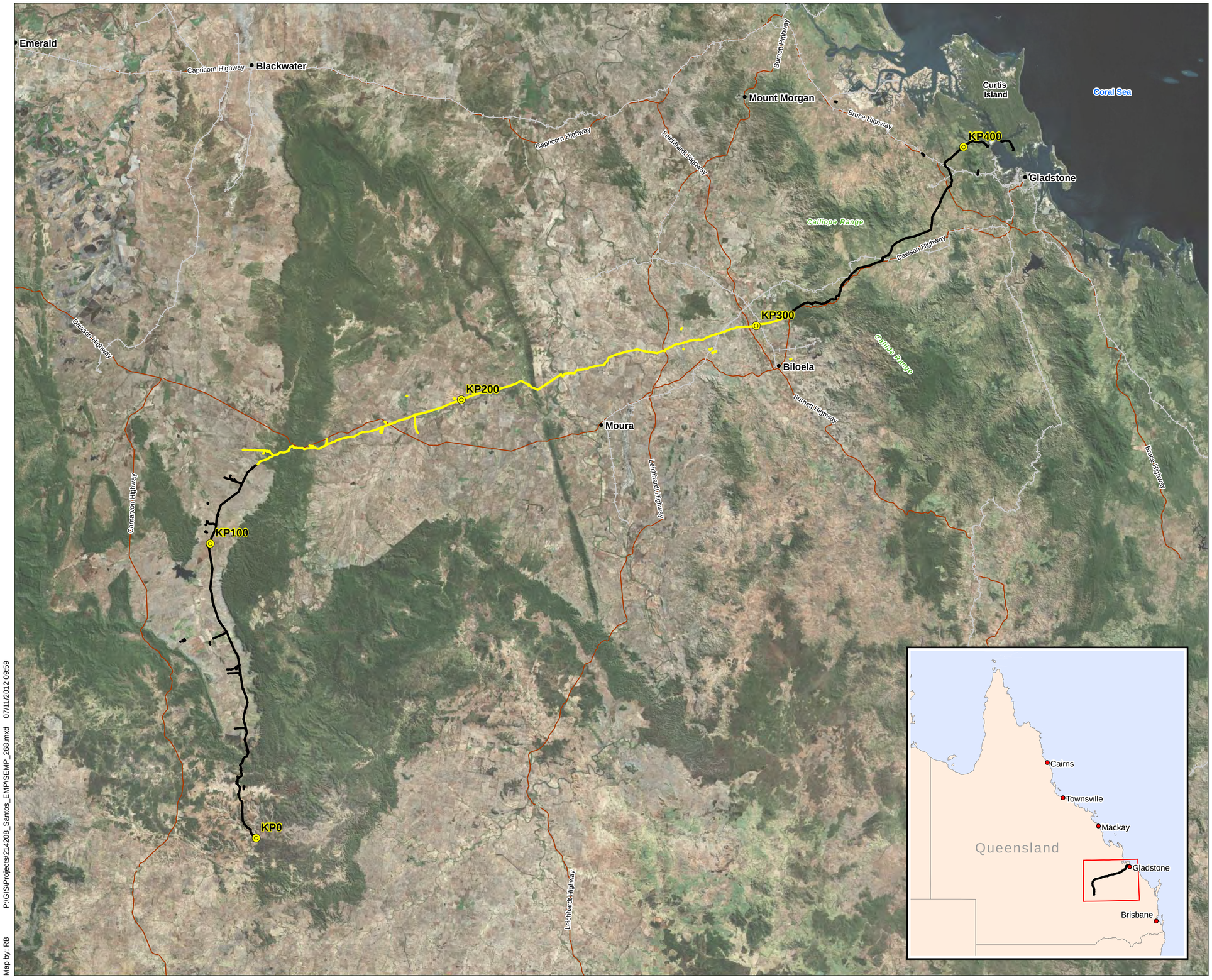
In order to meet the *Environmental Protection and Biodiversity Act 1999 (EPBC Act)* approval (Referral 2008/4096) Conditions 5, 6 and 7, pre-clearance surveys have to be undertaken. In addition, these surveys are also undertaken to support clearing permit applications under the Queensland *Nature Conservation Act 1992* (NC Act) and associated regulations. In addition, the surveys were undertaken to meet the conditions in Schedule F of the DERM Environmental Authority PEN102664411 dated 15 December 2011, which specifically requires identification of 'endangered', 'vulnerable' or 'near-threatened' fauna species and identification and marking of hollow-bearing trees.

This report details the methodology and results of three ecological surveys conducted by Ausecology and Aurecon for a 182 km section of the 420 km GTP RoW (Alignment A8 with minor amended alignment changes) between KP130 and KP312 (refer Figure 1). The results include identification of habitat features, particularly with respect to threatened flora and fauna species, ground-thruthing of Regional Ecosystem (RE) mapping and Threatened Ecological Communities (TEC) in addition to general landscape, habitat modifications and occurrence of weeds and pests.

1.2 Scope of works

In accordance with the requirements of conditions 5, 6 and 7 of the EPBC Act controlled action approval, the scope of the ecological investigations for the pre-clearance surveys included:

- Threatened flora and fauna species under both the EPBC Act and NC Act
- TEC and migratory species pursuant to the EPBC Act
- Verification of 'endangered' and 'of concern' Regional Ecosystems (RE's) and 'endangered' and 'of concern' high value regrowth (HVR)
- Ground-truthing of category A, B and C ESA under the *Environmental Protection Act 1994*
- Assessment of the type and ecological value of vegetation not classified as being remnant or high value regrowth vegetation by DEHP (ie standalone paddock trees, stands of apparently intact vegetation)
- Opportunistic observations of fauna or evidence of fauna activity (eg droppings, recent scratch marks etc)
- Detailed assessment of fauna habitat features (eg logs, hollows or rocky outcrops etc)
- Observations of areas of disturbance or habitat modification (eg fire, clearing or thinning of vegetation)
- Wetlands, springs, watercourses and ephemeral creeks
- Pest species (including both flora and fauna)



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A1 scale:1:600,000

0 20 40 60 km

GLNG No: XXXX-XX-XXXX

Coordinate system: GCS_GDA_1994

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GLNG Gas Transmission Pipeline Corridor

- Kilometre Post Distance Marker (km)
- GLNG GTP ROW and Ancillary Work Areas
- KP130-312 Survey Area

Source:
Gas Transmission Pipeline (GTP): Santos, Apr 2012.
Aerial: BING, Feb 2011.

Figure 1
GLNG GTP RoW and Pre-Clearance Ecology Survey Project Area KP130-312

Date: 07/11/2012 Version: a

1.3 Clearance surveys

This Pre-Clearance Survey Report includes the relevant information and data collected from the series of pre-clearance surveys for the GTP project that have been undertaken by Ausecology and Aurecon in 2012. The surveys included:

- Pre-clearance ecological survey for KP130 to KP234 undertaken by the Ausecology team Jason Halford (Senior Ecologist), Ralf Regeer (Senior Ecologist) and Lainie Grigg (Ecologist)
- Pre-clearance ecological survey for KP234 to KP312 undertaken by the Ausecology team of Robbie Kristenson (Ecologist), Lainie Grigg (Ecologist) and Ralf Regeer (Senior Ecologist)
- Pre-clearance ecological survey for significant fauna species within KP130 to KP312 undertaken by Aurecon team members: Leesa Leathbridge (Ecologist), Emma Joss (Environmental Scientist), Sarah Glauert (Ecologist), John Lynn (Ecologist), Kellie Butler (Ecologist) and Grant Paterson (Senior Ecologist)

It should be noted that SEWPaC approved GLNG pipeline ecologist Dr Chris Schell, reviewed and endorsed the methodology and works associated with this pre-clearance report.

2 Survey methodology

2.1 Introduction

The pre-clearance surveys for this section of the GTP alignment were undertaken in three stages between 14 May 2012 and 12 October 2012.

In order to assess the ecological values of the site, the following activities were conducted:

- Initial desktop-based review of existing information on the vegetation communities, flora species and fauna species of the study area
- Baseline botanical surveys and broad habitat assessment to confirm and enhance information collated during the desktop review

A targeted threatened fauna species habitat assessment within areas determined to be conducive to the occurrence of significant species as identified from the desk-top assessments, reviews of the baseline botanical surveys and vegetation habitat assessments.

Detailed methods for each of these components are provided in the below sections.

2.2 Desktop review

A desktop study was undertaken before conducting the KP130 to KP312 pre-clearance ecological surveys. The following databases were interrogated:

- HERBRECS data encompassing the entire Leichhardt (LE) pastoral district and the Moura to Gladstone area to account for previously unmapped outlying populations/individuals
- Regrowth Vegetation Map (DEHP) v2.1
- Property Map of Assessable Vegetation (DEHP)
- VM Act Regional Ecosystem and Remnant Map v6.1 (DEHP)
- VM Act Essential Habitat Map v3.1 (DEHP)
- Environmentally Sensitive Areas mapping (DEHP)
- Wildlife Online database search (DEHP)
- Referable Wetlands mapping (Queensland wetland data Version 3) (DEHP)
- EPBC Act Protected Matters Search (SEWPaC)

A number of Commonwealth guidelines and recommendations listed in existing **Error! Reference source not found.** reports and approvals were also used as references for the pre-clearance surveys and this report. These existing reports and guidelines are presented in Table 2.1. This information assisted the development of the survey methodology and provided supporting information for the findings associated with this report.

Table 2.1 Document reference list

Document title	Source
Coordinator-General's evaluation report for an environmental impact statement - Gladstone Liquefied Natural Gas—GLNG project	QLD Government 2010
EPBC Act Approval #2008/4096	DSEWPaC 2010
Fauna Handling Procedure (3380-SAIP-4-1.3-1965)	Saipem 2012
FEED Specification for EPC Contractor Environmental Requirements (#3380-GLNG-3-1.3-008)	GLNG 2010
GLNG Significant Species Management Plan (3380-GLNG-3.1.3-0031)	GLNG 2012
GLNG Species Management Plan (SMP) (3380-GLNG-3-1.3-0036)	GLNG 2012
Level 1 Environmental Authority #PEN102664411	DERM 2011
Pest and Weed Management Plan (PWMP) (3380-SAIP-4-1.3-1842)	Saipem 2012
Preclearance Ecological Survey Method (3380-SAIP-4-1.3-1997)	Saipem 2012
Pre-Clearance Survey Report for KP0-KP130 of the GLNG Pipeline Project (2010001_01)	Ecologica Consulting
Significant Species Management Plan (SSMP) (3380-SAIP-4-1.3-1962)	Saipem 2012
Species Management Plan (SMP) (3380-SAIP-4-1.3-1963)	Saipem 2012
Type A Restricted Plant Salvage Management Plan for the Gas Transmission Pipeline (3380-SAIP-4-1.3-7008)	Saipem 2012
Pre clearance survey data	Aurecon 2012
Aurecon Queensland Fauna Survey Manual	Aurecon 2012

2.3 Field surveys

2.3.1 Flora field survey

The 182 km section (ie KP130 to KP312) of the 420 km GTP RoW running from the northern end of the Arcadia Valley to the western edge of the Callide Ranges at the Anglo American coal haul road, was surveyed on foot (where access was permitted by land holders) with emphasis placed on the following ecological features:

- Locations of Type A species listed under the provisions of the Queensland NC Act as these require translocation prior to construction. Type A Restricted Plants as defined in the *Nature Conservation Act (Regulation) 2006* include the families *Cycadaceae*, *Orchidaceae*, and *Zamiaceae*; and species in the genera *Brachychiton, Hydnophytum, Huperzia, Livistona, Myrmecodia, Platycerium* and *Xanthorrhoea*
- Locations of Class 2 declared weeds as listed under the provisions of the Queensland *Land Protection (Pest and Stock Route) Management Act 2002* (LP Act) and weeds of national significance (WONS) as these require treatment prior to construction
- Verification of high value regrowth or remnant vegetation mapped as 'endangered' or 'of concern' under the provisions of the Queensland VM Act, as these need to be reported to DEHP prior to construction
- Locations of EVNT flora species as listed under the provisions of the NC Act and/or the EPBC Act, that require a clearing permit before construction can commence. The presence of potential fauna habitat (hollow-bearing trees, scats, rocky outcrops, etc)
- Targeted habitat areas associated with threatened fauna species listed under the provision of the EPBC Act and/or the NC Act within and adjacent to the Mainland GTP

RoW (GLNG Gas Transmission Pipeline - EPBC Environmental Management Plan Mainland GTP, 2011), potentially occurring within the RoW

- Assessment of the type and ecological value of vegetation not classified as being remnant or high value regrowth vegetation under the provisions of the VM Act (ie standalone paddock trees, stands of apparently intact vegetation)
- Wetlands, gilgai/melon holes, springs, watercourses and ephemeral creeks
- Observations of areas of disturbance (eg fire or thinning of vegetation)

Survey quality spatial data of the Ausecology vegetation and habitat field observations were recorded using two Trimble GEOXH6000 GPS units. Data was optimised using the GPS Pathfinder office program using the Ultimate Positioning base station in Brisbane. Data obtained from the desktop study was used to prepare the Trimble data dictionary, which was then reviewed and approved by the Saipem environmental and GIS teams prior to all field assessments.

Data collected during the Aurecon field surveys was recorded using three toughbooks (C5 mobile clinical assistant CFT-001 – Motion computing) with an integrated GPS. The toughbooks were uploaded with GIS environmental constraints layers (eg RE Mapping, ESA mapping etc) and high resolution aerial photography. Handheld Garmin GPS units (GPS map 78s) 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.

2.3.2 Fauna field survey

Fauna was recorded by two methods as detailed below:

- Opportunistically in association with the vegetation surveys conducted by Aurecon and Ausecology. Fauna was identified by direct observation and/or via characteristic vocalisations (eg bird and frog calls)
- Targeted active searches for rare and threatened species

Ground searches were undertaken throughout the site at targeted locations using the following methods:

- Active searches for cryptic fauna (such as reptiles and amphibians) via methods such as turning over logs, disturbing woodpiles, lifting loose bark on trees, investigating hollow logs and disturbing leaf litter
- Tracks, scats, animal remains, movement pathways, feeding signs and any other traces of animal presence were recorded when observed
- Trees were closely observed for scratch marks, nests and hollows to determine their potential value as habitat
- Dawn and dusk bird and frog surveys (in addition to incidental bird and frog sightings/call identifications during the active ground fauna searches)
- Ultrasonic bat detection using a Anabat^{TM} device to record the species specific echolocation calls of micro bat species
- Spotlighting using hand-held 50W spotlights to identify nocturnal mammals and birds

- Call playback using pre-recorded calls of nocturnal birds species to elicit a response from any target species present

Elliot, cage, pitfall and funnel traps were utilised at two trap sites; KP148.8 and KP184

In addition, the targeted fauna survey focused on detailed habitat assessments to verify the habitat values throughout the section of GTP RoW from KP130 to KP312. Habitat verification focused on assessing the areas viability of feeding and/or nesting attributes for potentially occurring significant species.

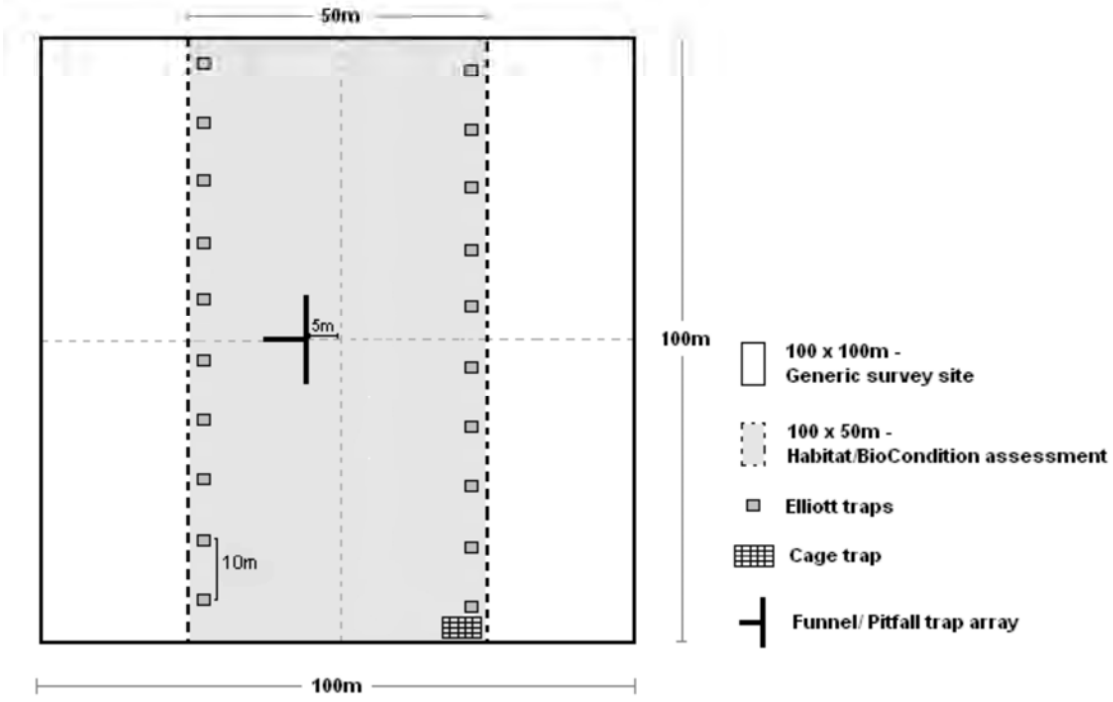

Figure 2.1 Trap configuration

2.4 Weeds

Declared plants under the provisions of the Queensland LP Act are those species that have or could potentially cause serious economic, environmental or social impacts.

"A **Class 1** pest is one that has the **potential** to become a very serious pest in Queensland in the future. By law, all landholders are required to keep their land free of Class 1 pests.

A **Class 2** pest is one that has already **spread over** substantial areas of Queensland. However, its impact is so serious that control is needed to avoid further spread onto properties that are still free of the pest. By law, all landholders must try to keep their land free of Class 2 pests and it is an offence to possess, sell or release these pests without a permit.

A **Class 3** pest is one that is commonly **established** in parts of Queensland but its control by landowners is not deemed to be warranted unless the plant is impacting, or has the potential to impact, on a nearby 'environmentally significant area' (eg a national park)" (DPI, 2011),

Furthermore, weeds that warrant a nationally strategic approach are listed on the Weeds of National Significance (WoNS) list. This list was established in 1999 and was recently reviewed in April 2012. The assessment of WONS is based on four major criteria:

- Invasiveness
- Impacts
- Potential for spread
- Socio-economic and environmental values

Although both LP Act declared weeds and WONS were the focus of the survey, the presence of other environmental weeds was noted during site assessments. Environmental weeds were considered to be those species that may have a high invasive capacity or non-native flora species that are considered to be undesirable for cropping and grazing practices.

2.5 Watercourses and drainage features

All water features encountered during the pre-clearance ecological surveys were recorded, and mapped watercourses were verified. Water features were assessed to determine if they meet the definition of a watercourse under the provisions of the Queensland *Water Act 2000* or a waterway under the provisions of the Queensland *Fisheries Act 1994*.

The following data was recorded (where applicable) for each water feature as per the requirements identified in the GLNG Aquatic Values Management Plan:

- Riparian zone condition (eg weeds, erosion, vegetation present)
- Presence of trailing vegetation (local and catchment)
- Physical features such as undercut banks, timber in stream and deep pools
- Aquatic breeding places and animal breeding places such as nests (where applicable)
- Habitat for conservation significant species such as the Fitzroy river turtle (*Rheodytes leukops*), Tusked frog (*Adelotus brevis*), White throated snapping turtle (*Elseya albagula*) and the Platypus (*Ornithorhynchus anatinus*) (where applicable)

Although these areas were assessed from an overall potential habitat perspective, precedence on the aquatic values is to be given to the project GLNG Aquatic Values Assessment Reports.

3 Pre-clearance survey results – Flora

3.1 Desktop Analysis

3.1.1 Referable wetlands

The flora surveys undertaken by Ausecology determined that there were no wetland protection areas under the referable wetlands mapping are mapped as intersecting with the KP130 to KP312 RoW. However, various wetland management areas are mapped as intersecting the RoW; these are primarily associated with some of the major creeks and rivers, and related tributaries and overflow areas.

Table 3.1**Error! Reference source not found.** summarises the Wetland Management Areas mapped to intersect the RoW in the section KP130 to KP312.

Table 3.1 Mapped wetland areas intersecting the RoW in section KP130 to KP312

KP location	Wetland Protection Area (WPA) or Wetland Management Area (WMA)
KP133.9	WMA
KP177.30	WMA
KP177.70	WMA
KP184.10	WMA
KP187.60	WMA
KP207.40	WMA
KP214.80	WMA
KP220.10	WMA
KP231.10	WMA
KP233.90	WMA
KP234.30	WMA
KP239.70	WMA
KP252.40	WMA
KP252.60	WMA
KP263.60	WMA
KP269.60	WMA
KP272.40	WMA
KP285.80	WMA
KP295.60	WMA
KP296.60	WMA
KP296.80	WMA
KP298.90	WMA
KP300.30	WMA
KP305.50	WMA

3.1.2 Regional ecosystems and High Value Regrowth

Seventeen Regional Ecosystems (REs) have been identified as occurring within the KP130 to KP312 section of the GTP RoW. These REs, together with a description and their management status is presented in Table 3.2.

Table 3.2 Desktop review of mapped Regional Ecosystems intersecting with the RoW in section KP130 to KP312

Regional Ecosystem	Short description (REDD Version 6.1)	Vegetation Management Act class (November 2009)	Biodiversity status*
11.3.1	*Acacia harpophylla* and/or *Casuarina cristata* open forest on Cainozoic alluvial plains	Endangered	Endangered
11.3.2	*Eucalyptus populnea* woodland on alluvial plains	Of concern	Of concern
11.3.3	*Eucalyptus coolabah* woodland on alluvial plains	Of concern	Of concern
11.3.4	*Eucalyptus tereticornis* and/or Eucalyptus spp. tall woodland on alluvial plains	Of concern	Of concern
11.3.25	*Eucalyptus tereticornis* or *E. camaldulensis* woodland fringing drainage lines	Least concern	Of concern
11.4.8	*Eucalyptus cambageana* woodland to open forest with *Acacia harpophylla* or *A. argyrodendron* on Cainozoic clay plains	Endangered	Endangered
11.4.9	*Acacia harpophylla* shrubby open forest to woodland with *Terminalia oblongata* on Cainozoic clay plains	Endangered	Endangered
11.5.2	*Eucalyptus crebra*, *Corymbia spp*., with *E. moluccana* on lower slopes of Cainozoic sand plains/remnant surfaces	Least concern	No concern at present
11.5.5	*Eucalyptus melanophloia*, *Callitris glaucophylla* woodland on Cainozoic sand plains/remnant surfaces. Deep red sands	Least concern	No concern at present
11.8.4	*Eucalyptus melanophloia* woodland on Cainozoic igneous rocks. Hillsides	Least concern	No concern at present
11.9.1	*Acacia harpophylla-Eucalyptus cambageana* open forest to woodland on fine-grained sedimentary rocks	Endangered	Endangered
11.9.5	*Acacia harpophylla* and/or *Casuarina cristata* open forest on fine-grained sedimentary rocks	Endangered	Endangered
11.9.9	*Eucalyptus crebra* grassy woodland on Cainozoic to Proterozoic consolidated, fine-grained sediments	Least concern	No concern
11.10.1	*Corymbia citriodora* open forest on coarse-grained sedimentary rocks	Least concern	No concern at present
11.10.3	*Acacia catenulata* or *A. shirleyi* open forest on coarse-grained sedimentary rocks. Crests and scarps	Least concern	No concern at present
11.10.7	*Eucalyptus crebra* woodland on coarse-grained sedimentary rocks	Least concern	No concern at present
11.10.13	Eucalyptus spp. and/or Corymbia spp. open forest on scarps and sandstone tablelands	Least concern	No concern at present

Table notes: ***** EA PEN102664411 conditions the project on biodiversity status

3.1.3 Threatened Ecological Communities

Five EPBC Act listed Threatened Ecological Communities (TECs) occur within the region. These TECs include:

- Coolibah - Black Box Woodlands of the Darling Riverine Plains and the Brigalow Belt South Bioregions, RE 11.3.3. This vegetation community is listed as 'endangered' under the EPBC Act (Please note that the Coolibah – Black Box TEC was listed under the EPBC Act on 01 March 2012, being after the Santos GLNG GTP Project received approval on 22 October 2012 (EPBC Approval No. 2008/4096))
- Brigalow (*Acacia harpophylla* dominant and co-dominant), RE 11.3.1, RE11.4.8, RE11.4.9, RE 11.4.9a, RE11.9.1 and RE11.9.5. This vegetation community is listed as 'endangered' under the EPBC Act
- Weeping Myall Woodland associated with RE 11.3.2 *Eucalyptus populnea* woodland on alluvial plains. This vegetation community is listed as 'endangered' under the EPBC Act
- Semi-evergreen Vine Thicket - RE 11.3.11 Semi evergreen vine thicket or semi-deciduous notophyll rainforest on Cainozoic alluvial plains
- Natural grasslands of the Queensland Central Highlands and the northern Fitzroy Basin (RE 11.3.21 is mapped as present north of the GTP RoW at KP184.2: *Dichanthium sericeum* and/or *Astrebla spp*. grassland on alluvial plains - Cracking clay soils). This vegetation community is listed as 'endangered' under the EPBC Act

The Ausecology desktop assessment identified the following two EPBC Act listed TECs within, or in close proximity to (<500 m), the GTP RoW:

- Coolibah - Black Box Woodlands of the Darling Riverine Plains and the Brigalow Belt South Bioregions
- Brigalow (*Acacia harpophylla* dominant and co-dominant)

3.1.4 Environmentally Sensitive Areas (ESA)

The Ausecology desktop assessments identified two ESA categories (Category B and Category C) were mapped (DEHP) for the GTP RoW within section KP130-KP312 of the RoW. A summary of the features that have resulted in the Category B and Category C areas is presented in Table 3.4.

Table 3.3 Mapped ESA categories

ESA	Presence (mapped) in GTP RoW section KP130-312
Category A	No Category A ESA features were mapped in the KP130-KP312 section
Category B	Endangered vegetation community RE11.9.1/11.9.5 at KP130.89-KP130.98 Endangered vegetation community RE 11.4.8 & RE 11.4.9 at ~KP202.5 Endangered vegetation community RE 11.9.1 at ~KP218.3 Endangered vegetation community RE 11.9.5 at KP224.5 Endangered vegetation community RE 11.3.1 at KP234.21-KP234.41
Category C	Expedition Range State Forest with Essential Habitat Of Concern vegetation community RE 11.3.4 at ~KP145 Of Concern vegetation community RE 11.3.4/11.3.3 at ~KP190 Of Concern vegetation community RE 11.3.25 at ~KP207 Of Concern vegetation community RE 11.3.2/11.3.4/11.3.25 at ~KP220.2 Of Concern vegetation community RE 11.3.2/11.3.25 at ~KP233.9

ESA	Presence (mapped) in GTP RoW section KP130-312
	Of concern vegetation community RE 11.3.2 at KP234 – KP234.21 Of concern vegetation community RE 11.3.2 at KP234.21 – KP234.41 Of concern vegetation community RE 11.3.25 at KP234 – KP234.21 Of concern vegetation community RE 11.3.25 at KP252.7 Of concern vegetation community RE 11.3.25 at KP295.64 – KP295.76 Of Concern vegetation community RE 11.3.4 at KP252.7 Of Concern vegetation community RE11.3.4 at KP295.64 – KP295.76 Wetland management areas as listed

3.1.5 Type A species

Type A restricted plants are listed and protected under the NC Act and its provisions. These plants include native plants such as orchids, bottle trees, grass trees and other popular horticultural species that are not considered sufficiently rare to be classified as near threatened or threatened plants, but are harvested and traded to the extent that a potential threat to the species might exist. Hence, these plants are protected to ensure populations are not depleted to the point where they become threatened. Table 3.5 contains a list of Type A listed species mapped as being possibly present in the KP130 to KP312 section as extracted from HERBRECS database and other reports reviewed during the Ausecology survey.

Table 3.4 Type A listed species expected in GTP RoW KP130 to KP312 section

Botanical Name	Common Name
Brachychiton australis	Broad-leaved bottle tree
Brachychiton bidwillii	Little kurrajong
Brachychiton populneus	Kurrajong
Brachychiton rupestris	Queensland bottle tree or narrow-leaved bottle tree
Cymbidium canaliculatum	Black orchid
Dockrillia bowmanii	Scrub pencil orchid
Macrozamia moorei	Cycad
Platycerium veitchii	Elkhorn
Xanthorrhoea johnsonii	Grass tree

3.1.6 Commonwealth and State Government EVNT species

Under the provisions of the EPBC Act native flora and fauna species are categorised in one of the following classes:

- Extinct
- Extinct in the wild
- 'Critically endangered' (CE)
- 'Endangered'[1] (E)
- 'Vulnerable'[1] (V)
- Conservation dependent

1 This report will refer to EVNT species in the context of both the QLD NC Act and the Commonwealth EPBC Act as highlighted

Under the provisions of the NC Act native wildlife (ie flora and fauna) is categorised in one of the following classes:

- Extinct in the wild
- 'Endangered'[1] (E)
- 'Vulnerable'[1] (V)
- Near threatened[1] (NT)
- 'Least concern' wildlife (LC)
- Special lease-concern (SLC)

Some of the species previously recorded as EVNT species, have been delisted to 'least concern'. Species can be delisted if their population sizes have increased (or are increased due to increased survey efforts in a particular area), their threats have been abated or reduced, with the result that it is then considered that their population sizes are now deemed sufficiently large enough to be delisted to a 'least concern' status.

Table 3.6 lists the EVNT species as recorded in the HERBRECS database and Wildlife Online database supplemented with data records of previous surveys undertaken by GLNG.

Table 3.5 EVNT species recorded in the HERBRECS database as occurring in the Moura to Gladstone section, which contains the GTP RoW KP130 to KP312 region

Scientific name	Common name	NCA	EPBC Act
Acacia grandifolia	NCN		Vulnerable
Acacia pedleyi	Pedley's wattle	Vulnerable	
Acacia pubicosta	NCN	Near threatened	
Acacia spania	NCN	Near threatened	
Acacia storyi	Story's wattle	Near threatened	
Acacia tingoorensis	NCN	Vulnerable	
Actephila sessilifolia	Scrub daphne	Near threatened	
Alyxia sharpei	Rough alyxia	Near threatened	
Apatophyllum teretifolium	NCN	Near threatened	
Atalaya collina	Yarwan whitewood	Endangered	Endangered
Bertya pedicellata	NCN	Near threatened	
Cadellia pentastylis	Ooline	Vulnerable	Vulnerable
Capparis humistrata	NCN	Endangered	
Cerbera dumicola	NCN	Near threatened	
Cossinia australiana	Cossinia	Endangered	Endangered
Cupaniopsis shirleyana	Wedge-leaf tuckeroo	Vulnerable	Vulnerable
Cycas megacarpa	NCN	Endangered	Endangered
Cymbonotus maidenii	NCN	Endangered	
Cyperus clarus	NCN	Vulnerable	
Desmodium macrocarpum	NCN	Near threatened	
Dichanthium queenslandicum	King blue grass	Vulnerable	Vulnerable

Scientific name	Common name	NCA	EPBC Act
Dichanthium setosum	NCN	Near threatened	Vulnerable
Digitaria porrecta	Finger panic grass	Near threatened	Endangered
Eleocharis blakeana	Blake's spikerush	Near threatened	
Eriocaulon carsonii	Salt pipewort,button grass	Endangered	Endangered
Eucalyptus rubiginosa	NCN	Delisted	
Graptophyllum excelsum	Scarlet fushia	Near threatened	
Gonocarpus urceolatus	Raspwort	Delisted[#]	
Gossypium sturtianum	NCN	Delisted	
Grevillea hockingsii	Hocking's wattle	Vulnerable	
Hernandia bivalvis	Grease nut	Near threatened	
Homoranthus decasetus	NCN	Near threatened	
Leucopogon grandiflorus	NCN	Near threatened	
Livistona nitida	Carnarvon fan palm	Near threatened	
Lysiana filifolia	NCN	Near threatened	
Macropteranthes leiocaulis	Southern bonewood	Near threatened	
Macrozamia fearnsidei	NCN		Vulnerable
Macrozamia platyrhachis	NCN	Endangered	Endangered
Marsdenia hemiptera	Rusty vine	Near threatened	
Melaleuca groveana	Grove's paperbark	Near threatened	
Melaleuca irbyana	Bush house paperbark, swamp teatree, weeping paperbark	Endangered	
Ochrosperma obovatum	NCN	Vulnerable	
Parsonsia larcomensis	Mt Larcom silk pod	Vulnerable	
Paspalidium scabrifolium	NCN	Near threatened	
Polianthion minutiflorum	NCN	Vulnerable	Vulnerable
Rhaponticum australe	Austral cornflower	Vulnerable	Vulnerable
Rutidosis crispata	NCN	Vulnerable	
Rutidosis glandulosa	NCN	Near threatened	
Rutidosis lanata	NCN	Endangered	
Samadera bidwillii	Quassia	Vulnerable	Vulnerable
Senna acclinus	Brush senna	Near threatened	
Solanum adenophorum	NCN	Endangered	
Solanum dissectum	NCN	Endangered	
Solanum elachophyllum	NCN	Endangered	
Solanum johnsonianum	NCN	Endangered	
Wahlenbergia islensis	Cliff bluebell	Near threatened	
Xerothamnella herbacea	NCN	Endangered	Endangered
Zieria actites	NCN	Endangered	

Table notes: NCN = No common name

3.2 Survey Results

3.2.1 Regional Ecosystems

Fourteen REs have been identified as occurring within the KP130 to KP312 section of the GTP RoW during pre-clearance surveys. These REs, together with a description and their management status is presented in Tables 3.7 and 3.8. Verification of the HVR mapping indicated that mapping errors associated with the DEHP HVR layer were present. A summary of the findings associated with the mapped HVR areas ground-truthed is provided in Table 3.9.

Table 3.6 Regional Ecosystems mapped and confirmed within the GTP RoW between KP130 and KP312

Regional Ecosystem	Short description	VM Act class (November 2009)	Biodiversity status	Survey result: presence in GTP RoW KP130-312
11.3.1	*Acacia harpophylla* and/or *Casuarina cristata* open forest on Cainozoic alluvial plains	Endangered	Endangered	Not present
11.3.2*	*Eucalyptus populnea* woodland on alluvial plains	Of concern	Of concern	Present
11.3.3*	*Eucalyptus coolabah* woodland on alluvial plains	Of concern	Of concern	Present
11.3.4*	*Eucalyptus tereticornis* and/or *Eucalyptus* spp. tall woodland on alluvial plains	Of concern	Of concern	Present
11.3.11	Semi-evergreen vine thicket on Cainozoic alluvial plains	Endangered	Endangered	Not present
11.3.17	*Eucalyptus populnea* woodland with *Casuarina cristata* and/or *Acacia harpophylla* on Quaternary alluvial deposits	Of concern	Endangered	Not present
11.3.25*	*Eucalyptus tereticornis* or *E. camaldulensis* woodland fringing drainage lines	Least concern	Of concern	Present
11.4.8*	*Eucalyptus cambageana* woodland to open forest with *Acacia harpophylla* or *A. argyrodendron* on Cainozoic clay plains	Endangered	Endangered	Present
11.4.9	*Acacia harpophylla* shrubby open forest to woodland with *Terminalia oblongata* on Cainozoic clay plains	Endangered	Endangered	Not present
11.4.9a	*Acacia harpophylla, Lysiphyllum carronii +/- Casuarina cristata* open-forest to woodland on gently undulating Cainozoic plains, including weathered basalt	Endangered	Endangered	Not present
11.5.2*	*Eucalyptus crebra*, *Corymbia spp*., with *E. moluccana* on lower slopes of Cainozoic sand plains/remnant surfaces	Least concern	No concern at present	Present
11.5.5	*Eucalyptus melanophloia*, *Callitris glaucophylla* woodland on Cainozoic sand plains/remnant surfaces. Deep red sands	Least concern	No concern at present	Not present
11.8.5*	*Eucalyptus orgadophila* open woodland on Cainozoic igneous rocks	Least concern	No concern at present	Present
11.9.1	*Acacia harpophylla-Eucalyptus cambageana* open forest to woodland on fine-grained sedimentary rocks	Endangered	Endangered	Not present
11.9.5	*Acacia harpophylla* and/or *Casuarina cristata* open forest on fine-grained sedimentary rocks	Endangered	Endangered	Not present

Regional Ecosystem	Short description	VM Act class (November 2009)	Biodiversity status	Survey result: presence in GTP RoW KP130-312
11.9.9*	*Eucalyptus crebra* grassy woodland on Cainozoic to Proterozoic consolidated, fine-grained sediments	Least concern	No concern	Present
11.10.1*	*Corymbia citriodora* open forest on coarse-grained sedimentary rocks	Least concern	No concern at present	Present
11.10.3*	*Acacia catenulata* or *A. shirleyi* open forest on coarse-grained sedimentary rocks. Crests and scarps	Least concern	No concern at present	Present
11.10.7*	*Eucalyptus crebra* woodland on coarse-grained sedimentary rocks	Least concern	No concern at present	Present
11.10.13*	*Eucalyptus spp.* and/or *Corymbia spp.* open forest on scarps and sandstone tablelands	Least concern	No concern at present	Present

Table notes: * RE present within the GTP RoW.

Table 3.7 Additional Regional Ecosystems mapped and confirmed within the GTP RoW between KP130 and KP312

Regional Ecosystem	Short description	VM Act class (November 2009)	Biodiversity status	Survey result: presence in GTP RoW KP130-312
11.10.1	*Corymbia citriodora* open forest on coarse-grained sedimentary rocks	Least concern	No concern at present	Present
11.10.4	*Eucalyptus decorticans*, *Lysicarpus angustifolius* +/- *Eucalyptus spp., Corymbia spp., Acacia spp*. woodland on coarse-grained sedimentary rocks. Crests and scarps	Least concern	No concern at present	Present
11.8.4	*Eucalyptus melanophloia* woodland on Cainozoic igneous rocks. Hillsides	Least concern	No concern at present	Present

Table 3.8 Detailed HVR delineation for areas contained within the GTP RoW between KP130 and KP312

Mapped KP reference	Status	Surveyed KP reference	Comments	Biodiversity status	RE Resemblance
145.78-146.08	Least concern	145.78-146.08	HVR	Least concern	11.8.4/11.10.13
146.08-146.87	Of concern	146.08-146.87	HVR	Least concern	11.8.4/11.10.13
146.92-147.04	Least concern	146.92-147.04	HVR	Least concern	11.8.4/11.10.13
147.04-147.09	Of concern	147.04-147.09	HVR	Least concern	11.8.4/11.10.13
147.09-147.12	Least concern	147.09-147.12	HVR	Least concern	11.8.4/11.10.13
147.26-148.38	Least concern	147.26-148.38	HVR	Least concern	11.8.4/11.10.13
148.38-148.51	Of concern	148.38-148.51	HVR	Least concern	11.8.4/11.10.13
150.00-153.18	Least concern	150.00-153.18	HVR	Least concern	11.10.1/11.8.4
		153.18-154.71	HVR	Least concern	11.10.1
156.42-156.53	Of concern	156.42-156.53	Not HVR (too narrow, limited coverage of *M. bracteata* along creek)		

Mapped KP reference	Status	Surveyed KP reference	Comments	Biodiversity status	RE Resemblance
157.01-157.10	Of concern	157.01-157.10	Not HVR (too narrow, limited coverage of *M. bracteata* along creek)		
158.11-158.18	Of concern	158.11-158.18	Not HVR (too narrow, limited coverage of *M. bracteata & A. harpophylla*)		
158.41-158.84	Least concern	158.41-158.84	Not HVR		
159.37-159.63	Least concern	159.37-159.63	Not HVR		
161.86-163.84	Least concern		Not HVR		
163.84 - 163.97	Endangered		Not HVR		
164.67-164.74	Endangered	164.67-164.74	Not HVR		
164.74-167.05	Of concern	164.74-167.05	Not HVR		
167.05-167.13	Endangered	167.05-167.13	HVR	Endangered	
167.98-168.11	Endangered	167.98-168.11	Not HVR (too narrow, limited coverage of *M. bracteata* along creek)		
177.10-177.18	Endangered	177.10-177.18	HVR	Of concern	11.3.3
177.50-178.00	Endangered	177.50-178.00	HVR	Of concern	11.3.3
178.15-178.42	Endangered	178.15-178.42	Not HVR		
179.65-180.02	Endangered	179.86-179.92	Endangered		
184.00	Of concern	184	No HVR in RoW; Remnant at creek (RE11.3.3)		
185.33-185.88	Endangered	185.33-185.88	Not HVR		
185.88-186.14	Least concern	185.88-186.14	Not HVR		
		188.18-188.38	HVR	Endangered	11.9.5/11.3.3
		190.02-190.40	Not HVR		
205.60-206.65	Endangered	205.60-206.65	Not HVR		
207.76-207.80	Least concern	207.76-207.80	Not HVR (remnant to the edge of vegetation)		
212.09-212.38	Endangered	212.09-212.38	Not HVR		
212.87-213.30	Endangered	212.87-213.30	Not HVR		
213.44-213.55	Endangered	213.44-213.55	Not HVR		
213.91-214.16	Endangered	213.91-214.16	Not HVR		
214.43-215.29	Endangered	214.43-215.29	Not HVR		
		215.41-215.54[##]	See footnote	Endangered	11.4.8[##]
216.38-218.32	Endangered	216.38-217.30	HVR	Least concern	11.5.9

Mapped KP reference	Status	Surveyed KP reference	Comments	Biodiversity status	RE Resemblance
219.71-220.00	Of concern		Not HVR		
221.33-221.46	Of concern	221.33-221.43	Not HVR		
		221.43-221.46	Not HVR		
222.23-222.42	Least concern	222.23-222.42	HVR	Least concern	11.5.2
224.59-224.71	Endangered	224.59-224.71	Not HVR in RoW		
225.01-225.36	Endangered	225.01-225.36	Not HVR in RoW		
231.17-231.27	Endangered	231.17-231.27	Not HVR		
239.67 -239.77	Endangered	239.71-239.78	HVR	Of Concern	11.3.3
	Non-remnant	246.19-246.31	Not HVR, RE 11.4.8 (See RE Table)		
252.50-252.61	Endangered	252.42-252.62	HVR	Endangered	11.4.9
252.61-252.93	Of concern	252.70-252.77	HVR	Endangered	11.4.9
		252.84-253.30	HVR	Endangered	11.4.9
		258.84-258.91	HVR	Endangered	
263.57-263.72	Of concern		Not HVR, RE 11.3.25/11.3.4		
265.46-265.56	Of concern	265.46-265.56	Not HVR#		
265.56-265.58	Least concern	265.56-265.58	Not HVR#		
278.74-279.00	Least concern	278.74-279.00	Not HVR		
280.19-280-27	Endangered	280.20-280.22	Not HVR, RE 11.3.25		
		284.35-284.42	HVR	Endangered	11.4.9
285.73-285.83	Of concern	285.78-285.85^	HVR^	Of Concern	11.3.2/11.3.25
286.63	Endangered	286.63	Not HVR		
287	Endangered	287.01-287.15	HVR	Endangered	11.4.9
288.55-288.90	Endangered	288.55-288.90	HVR	Endangered	11.4.9
295.60-295.81	Of concern	295.60-295.81	Not HVR, RE 11.3.3 (See RE Table)		
296.59-296.67	Of concern	296.59-296.67	Not HVR, RE 11.3.25 (See RE Table)		
296.16-296.86	Of concern	296.16-296.86	Not HVR, RE 11.3.25 (See RE Table)		
297.57-297.74	Of concern	297.57-297.74	Not HVR, RE 11.3.2 (See RE Table)		
298.90-298.98	Of concern	298.90-298.98	Not HVR, RE 11.3.25 (See RE Table)		
303.56-303.65	Of concern	303.78-303.80	HVR	Of Concern	11.3.25

Mapped KP reference	Status	Surveyed KP reference	Comments	Biodiversity status	RE Resemblance
305.36-305.48	Of concern	305.45-305.52	Not HVR, RE 11.3.25/11.3.4		
306.63-306.86	Endangered	306.70-306.85	HVR	Least Concern	11.9.9(b)
309.95-310.28	Least concern	309.95-310.20	HVR	Least Concern	11.9.9(b)
310.34-310.69	Least concern	310.37-310.65	HVR	Least Concern	11.9.9
311.35-311.63	Least concern	311.39-311.68	HVR	Least Concern	11.9.9

Table notes: # Not HVR due to the very limited patch size and lack of connectivity
Isolated patch of *Eucalyptus cambageana* and *Acacia harpophylla.* Based on small area and lack of connectivity, this patch has not been regarded as HVR
^ Vegetation resembling RE 11.3.2 to the west of the creek; Vegetation resembling RE11.3.25 with some *Acacia harpophylla* lining the creek.

3.2.2 Environmentally Sensitive Areas

One ESA Category C (State forest) was confirmed, as described in Table 3.10.

Table 3.9 Confirmed ESA Categories contained within the GTP RoW between KP130 and KP312

ESA	Survey result: presence in GTP RoW KP130-312
Category B	No category B ESA present in RoW
Category C	Expedition Range State Forest with Essential Habitat Of concern vegetation community RE 11.3.4 at KP: 220.10-220.23 Of concern vegetation community RE 11.3.25 at KP: 133.92-134.11 207.44-207.75 220.10-220.23 233.87-233.97 231.17-231.27 Of concern vegetation community RE 11.3.3(c) at KP: 184.06-184.18 189.62-190.00 218.50-220.00 Of concern vegetation community present in RoW at KP: 234-234.25 234.30-234.39 252.62-252.68 252.7 263.65-263.70 272.58-272.47 280.2-280.22 295.60-295.81 296.63-296.69 295.82-295.86 297.64-297.73 298.93-298.99 300.27-300.33 305.45-305.52

3.2.3 Threatened Ecological Communities

Two TECs were identified as occurring within the GTP RoW between KP130 andKP312. Table 3.11 provides information associated with the observed TECs and their location within the GTP RoW during the Ausecology pre-clearance ecological survey.

Table 3.10 TECs present within the GTP RoW between KP130 and KP312, their location, status and condition

TEC	Survey result: presence in GTP RoW KP130-312	Location (s) (KP)	Status: non-remnant, remnant or HVR	Condition#
Natural grasslands of the Queensland Central Highlands and the northern Fitzroy Basin (RE 11.3.21 is mapped as present north of the GTP RoW at KP184.2: *Dichanthium sericeum* and/or *Astrebla spp*. grassland on alluvial plains - Cracking clay soils)	Not present^	-	-	-
Coolibah-Black Box Woodlands of the Darling Riverine Plains and the Brigalow Belt South Regions, RE 11.3. 3 (Please note that the Coolibah – Black Box TEC was listed under the EPBC Act on 01 March 2012, being after the Santos GLNG GTP Project received approval on 22 October 2012 (EPBC Approval No. 2008/4096))	Confirmed	177.10-177.18 177.50-178.00 184.06-184.18 188.18-188.38 234.30-234.39 239.67-239.78 295.60-295.81	HVR HVR Remnant HVR Remnant HVR Remnant	Good Good Fair Good Fair Fair Fair
Brigalow (*Acacia harpophylla* dominant and co-dominant), RE11.4.8, RE11.4.9, RE11.9.1 or RE11.9.5	Confirmed	188.18-188.38 246.19-246.31 252.42-252.62	HVR Non-remnant HVR	Good Good Good
Weeping Myall Woodland associated with RE 11.3.2 *Eucalyptus populnea* woodland on alluvial plains	Not present*	-	-	-
Semi-evergreen Vine Thicket - RE 11.3.11 Semi evergreen vine thicket or semi-deciduous notophyll rainforest on Cainozoic alluvial plains	Not present	-	-	-

Table notes: # Condition is expressed as good, fair or poor. This is based on a visual interpretation of the vegetation community taking in to account species diversity, coverage, presence/abundance of weed species, height of vegetation. However a full biocondition assessment was not undertaken.

* No RE11.3.2 vegetation was identified directly within the GTP RoW nor either weeping myall vegetation within the RoW

^Various grass species (such as *Themeda triandra, Heteropogon contortus, Dichanthium sericeum, Aristida spp* and *Bothriochloa ewartiana)* were present at KP184.26 and around KP186. These areas were regarded as RE 11.8.5 and non-remnant respectively (most likely used to be RE 11.8.5 before vegetation clearing), not RE 11.8.11 (*Dichanthium sericeum* grassland on Cainozoic igneous rocks).

3.2.4 Type A Species mapped in GTP RoW KP130-KP312

Seven Type A species were mapped at various locations along the GTP RoW as described in Table 3.12. For further information refer to the Saipem Type A Restricted Plant Salvage Management Plan for the Gas Transmission Pipeline (Doc. No: 3380-SAIP-4-1.3-7008).

Table 3.11 Type A species mapped within the GTP RoW between KP130 and KP312

Scientific name	Significance of species	Action	Photograph
Brachychiton australis	Type A Restricted species under the NC Act, to prevent commercial overharvesting of species. Found associated with Brigalow and SEVT communities	Avoid or salvage for relocation and possible use for on-site revegetation purposes by a qualified organisation	
Brachychiton rupestris	Type A Restricted species under the NC Act, to prevent commercial overharvesting of species. Found associated with Brigalow and SEVT communities	Avoid or salvage for relocation and possible use for on-site revegetation purposes by a qualified organisation	
Brachychiton bidwillii	Type A Restricted species under the NC Act, to prevent commercial overharvesting of species. Found associated with Brigalow and SEVT communities	Avoid or salvage for relocation and possible use for on-site revegetation purposes by a qualified organisation	
Brachychiton populneus	Type A Restricted species under the NC Act, to prevent commercial overharvesting of species. Found associated with Brigalow and SEVT communities	Avoid or salvage for relocation and possible use for on-site revegetation purposes by a qualified organisation	
Cymbidium canaliculatum	Type A Restricted species under the NC Act, to prevent commercial overharvesting of species. Found associated with large habitat and paddock trees and often in riparian zones	Avoid or salvage for relocation and possible use for on-site revegetation purposes by a qualified organisation	

Scientific name	Significance of species	Action	Photograph
Macrozamia moorei	Type A Restricted species under the NC Act, to prevent commercial overharvesting of species. Found associated with large habitat and paddock trees and often in riparian zones	Avoid or salvage for relocation and possible use for on-site revegetation purposes by a qualified organisation	
Xanthorrhoea johnsonii	Type A Restricted species under the NC Act, to prevent commercial overharvesting of species. Found associated with large habitat and paddock trees and often in riparian zones	Avoid or salvage for relocation and possible use for on-site revegetation purposes by a qualified organisation	

3.2.5 EVNT Species mapped in GTP RoW KP130-KP312

Five EVNT species are present and mapped within the GTP RoW as described in Table 3.13.

Table 3.12 EVNT Species mapped within the GTP RoW between KP130 and KP312

Scientific name	Significance of species	Action	Photograph
Apotophyllum teretifolium	Listed as Near Threatened under the provisions of the NC Act	Avoid or if unavoidable, translocation is recommended, preferably just off the GTP RoW on similar soil, slope and aspect	
Desmodium macrocarpum	Listed as Near Threatened under the provisions of the NC Act	Avoid or if unavoidable, translocation is recommended, preferably just off the GTP RoW on similar soil, slope and aspect. Propagation from seed is recommended to be undertaken in addition to the species translocation. Seeding from March-April	

Scientific name	Significance of species	Action	Photograph
Eleocharis blakeana	Listed as Near Threatened under the provisions of the NC Act	Avoid or if unavoidable, translocation is recommended, preferable just of the GTP RoW on similar soil and slope in gilgai which are abundantly present in the vicinity. Alternatively, seed can be collected for direct seeding and/or propagation from February-May (seasonal variation can influence seeding timeline)	
Homoranthus decasetus	Listed as Near Threatened under the provisions of the NC Act	Avoid or if unavoidable, translocation is recommended, preferably just off the GTP RoW on similar soil, slope and aspect	
Solanum johnsonianum	Listed as Endangered under the provisions of the NC Act	Avoid or if unavoidable, translocation is recommended, preferable just of the GTP RoW on similar soil, slope and geographical location Alternatively, collect seed (2012 season seeding season predicted from August – October) for direct seeding purposes as rehabilitation of the GTP RoW by a qualified organisation	

4 Pre-clearance survey results – fauna

4.1 Desktop Analysis

Tables 4.1 and 4.2 identify the fauna species that were the focus of opportunistic fauna sightings within the GTP RoW. Species identified in Tables 4.1 and 4.2 were deemed significant either under the provisions of the EPBC Act, NC Act, JAMBA and/or ROKAMBA and/or CAMBA. The notes contained within Tables 4.1 and 4.2 refer to their preferred habitat and their potential to occur (or existing record) within the GTP RoW.

Table 4.1 Potential conservation significant fauna species within the GTP RoW between KP130 and KP312

Scientific name	Common name	EPBC/NC Act listing	Notes
Reptiles			
Delma torquata	Collared delma	V / V	Ground-dwelling. The Collared delma is associated with westerly facing ridgelines which support dry open Eucalypt and Acacia dominated woodlands. These areas generally have an open mid-storey and ground layer defined by native grasses (Curtis and Dennis, 2012). **Potentially in GTP RoW**
Denisonia maculata	Ornamental snake	V / V	Ground-dwelling. "Lower-lying subtropical areas with deep-cracking clay soils and adjacent slightly elevated ground of clayey and sandy loams, is the preferred habitat for this species. The species is also found in vegetation of woodland and shrub land, including some Brigalow (*Acacia harpophylla)*, and also riverside woodland and open forest, particularly on natural levees. Restricted to the Dawson and Fitzroy Rivers drainage system" (DEHP, 2010). **Potentially in GTP RoW**
Furina dunmalli	Dunmall's snake	V / V	Ground-dwelling. "Open forest and woodland, particularly Brigalow (*Acacia harpophylla*) forest and woodland growing on floodplains of deep-cracking black clay and clay loam soils, provide habitat for this species. Most of the habitat supporting this species has been extensively modified for agriculture and grazing." (DEHP, 2010). **Potentially in GTP RoW**
Paradelma orientalis	Brigalow scaly foot	V / V	Ground-dwelling. "The Brigalow scaly-foot is found on sandstone ridges in woodlands and vine thickets, and in open forests and woodlands, especially ironbark, Cypress pine, Brigalow, Bull oak, Spotted gum and vine scrubs." (DEHP, 2010). The species is found in a wide variety of remnant and non-remnant open forest to woodland habitats. The species is known to persist in highly disturbed vegetation types, for example those areas invaded by Buffel grass (*Pennisetum ciliaris*), Parthenium (*Parthenium hysterophorus*) and other weeds (Brigalow Belt Reptiles Workshop, 2010). **Potentially in GTP RoW**
Strophurus taenicauda	Golden tailed gecko	- / NT	Arboreal. "The golden-tailed gecko lives in open woodland and open forest where it shelters under loose bark and hollow limbs." (DEHP, 2010). **Potentially in GTP RoW**
Mammals			
Chalinolobus dwyeri	Large-eared pied bat		The species requires a combination of sandstone cliff/escarpment to provide roosting habitat that is adjacent to higher fertility sites, particularly box gum woodlands or river/rainforest corridors that are used for foraging. **Previously recorded in the GTP RoW** (Ecologica, 2012)
Chalinolobus picatus	Little pied bat	NT / NT	Occupies Mulga woodlands, chenopod shrub lands, Cypress-pine forest, Mallee, Brigalow, Brimble box, Eucalypt woodlands and open forests. Roosting sites include caves, rock outcrops, tunnels, tree hollows, buildings and mine shafts. **Potentially in GTP RoW**

Scientific name	Common name	EPBC/NC Act listing	Notes
Dasyurus hallucatus	Northern quoll	E / LC	Preferred habitat consists of rocky escarpment, open forest and open woodland. Daytime den sites include rocky outcrops, rock piles, caves, tree hollows, hollow logs, termite mounds, goanna burrows, wood piles and in human dwellings. **Potentially in GTP RoW**
Nyctophilus corbeni	Eastern long-eared bat	V / V	Occurs in a range of inland woodland vegetation types, including box, ironbark and cypress pine woodlands. Known to roost in exfoliated bark and in the crevices on trees. During maternity, females are believed to form roosting colonies in larger tree cavities. **Potentially in GTP RoW**
Ornithorhynchus anatinus	Platypus	- / SLC	Found in freshwater lakes and streams. When out of water they occupy burrows just above the waterline in stream and riverbanks or under a gathering of tree roots. **Potentially in GTP RoW** in larger creek systems
Phascolarctos cinereus	Koala	V / SLC	They are found in a range of habitats, from coastal islands and tall Eucalypt forests to low woodlands inland. Reliant on particular Eucalypt species for food trees but will use a variety of trees for shelter. **Unlikely in most of the RoW** due to habitat fragmentation
Tachyglossus aculeatus	Echidna	- / SLC	Ranges from disturbed to undisturbed habitats, including forests, woodlands, shrublands and grasslands, rocky outcrops and agricultural lands. Usually found among rocks in hollow logs, under vegetation or piles of debris, under tree roots and sometimes in wombat and rabbit burrows. **Likely in GTP RoW**

Table 4.2 Potential conservation significant bird species within the GTP RoW between KP130 and KP312

Scientific name	Common name	EPBC/NC Act listing	JAMBA/ CAMBA/ ROKAMBA	Notes
Ardea alba	Eastern great egret	Migratory / -	✓	Associated with water (Dawson River and other major creeks and wetland areas). Inhabits shallow points of rivers, estuaries, mudflats, freshwater wetlands, irrigated pastures, dams and sewerage ponds. **Likely in GTP RoW**
Ardea ibis	Cattle egret	Migratory / -	✓	Associated with water (Dawson River and other major creeks and wetland areas); grasslands and woodlands. Often observed in moist, low-lying poorly drained pastures with an abundance of high grass; avoiding low grass pastures. **Likely within GTP RoW**, potentially as foraging amongst cattle
Calyptorhynchus lathami	Glossy black cockatoo	- / V		Highly dependent on the distribution of Allocasuarina species and is found in woodland dominated by Allocasuarina and in open forests where it forms a substantial middle layer. Often confined to remnant Allocasuarina patches surrounded by cleared farmlands. Requires large tree hollows for breeding. **Potentially in GTP RoW**
Ephippiorhynchus asiaticus	Black-necked stork	- / NT/	N/A	Associated with fresh water and wetland habitats, strongly territorial when feeding and least abundant in locations with a high diversity of other waterbird species. **Potentially in GTP RoW**

Scientific name	Common name	EPBC/NC Act listing	JAMBA/ CAMBA/ ROKAMBA	Notes
Erythrotriorchis radiatus	Red goshawk	V / E	N/A	The Red goshawk nests in large trees, frequently the tallest and most massive in a tall stand, and nest trees are invariably within 1 km of permanent water. "Red goshawks occupy a range of habitats, often at ecotones, including coastal and sub-coastal tall open forest, tropical savannahs crossed by wooded or forested watercourses, woodlands, the edges of rainforest and gallery forests along watercourses, and wetlands that include Melaleuca and Casuarina species." (EPA, 2006). **Unlikely in GTP RoW**
Geophaps scripta scripta	Squatter pigeon	V / V	N/A	Ground dwelling. "Occurs mainly in grassy woodlands and open forests that are dominated by eucalypts. It has also been recorded in sown grasslands with scattered remnant trees, disturbed habitats (ie around stockyards, along roads and railways, and around settlements). The species is commonly observed in habitats that are located close to bodies of water" (SEWPaC, 2012). Likely in GTP RoW. **Previously recorded in the GTP RoW** (Ecologica, 2012)
Grantiella picta	Painted honey-eater	- / V	N/A	"Prefers dry open forests and woodlands, and is strongly associated with mistletoe. It may also be found along rivers, on plains with scattered trees and on farmland with remnant vegetation." (Birdlife Australia, 2012). **Potentially in GTP RoW**
Haliaeetus leucogaster	White bellied sea eagle		✓	Known to inhabit coastal areas, islands, estuaries, large rivers, inland lakes and reservoirs. Terrestrial habitats include coastal dunes, tidal flats, grassland, heathland, woodland forest and even urban areas. Builds very large nest of sticks generally in a tall, live tree near water. **Potentially in GTP RoW**
Hirundapus caudacutus	White throated needle tail	Migratory / -	✓	Spend the non-breeding season in Australasia, mainly in Australia. **Unlikely to be found directly in GTP RoW**; if found it will be flying overhead
Lophoictinia isura	Square-tailed kite	- / NT	N/A	"Forages over coastal and sub-coastal, eucalypt-dominated open forests and woodlands, and inland riparian woodland. It particularly favours productive forests on the coastal plain, box-ironbark-gum woodlands on the inland slopes, and Coolibah / River red gum on the inland plains" (NSW Scientific Committee, 2009) **Potentially within GTP RoW**
Melithreptus gularis	Black-chinned honeyeater	- / NT	N/A	Occupies dry Eucalypt forest in areas with annual rainfall range of between 400-700 mm. Favours forest containing Ironbark and Box. **Potentially in GTP RoW**

Scientific name	Common name	EPBC/NC Act listing	JAMBA/ CAMBA/ ROKAMBA	Notes
Merops ornatus	Rainbow bee-eater	Migratory / -	✓	"Occurs mainly in open forests and woodlands, shrub lands, and in various cleared or semi-cleared habitats, including farmland and areas of human habitation Uses stream banks for nesting; the breeding season extends from August to January." (SEWPaC, 2012). **Likely in GTP RoW**
Neochmia ruficauda ruficauda	Star finch	E / E	N/A	Mainly occurs in grasslands and grassy woodlands, often in close proximity to fresh water (SEWPaC, 2011). **Potentially in GTP RoW**
Ninox strenua	Powerful owl	- / V		Found in open woodlands and forests, especially along watercourses. Requires old growth trees to nest. Mainly found east of the Great Dividing Range but has been recorded in the Central Highlands. **Potentially in RoW**
Poephila cincta	Black-throated finch	E / E	N/A	Found in grassy, open woodlands and forests, typically dominated by Eucalyptus, Corymbia and Melaleuca, and occasionally in tussock grasslands or other habitats (for example freshwater wetlands), often along or near watercourses, or in the vicinity of water (SEWPaC, 2011). **Potentially within GTP RoW**
Rostratula australis	Australian painted snipe	V (Migratory) / V	✓	Usually found in either freshwater or brackish shallow inland wetlands, which are either permanently or temporarily filled (SEWPaC, 2011). **Unlikely in GTP RoW**
Turnix melanogaster	Black breasted button quail	V / V	N/A	Ground dwelling. "Restricted to rainforests and forests, mostly in areas with 770-1200 mm rainfall per annum. Prefers drier low closed forests, particularly semi-evergreen vine thicket. Many reports are from dry forest described as bottle tree scrub, comprising Brigalow (*Acacia harpophylla*), Belah (*Casuarina cristata*) and Narrow leaved bottle tree (*Brachychiton rupestris*), with or without emergent Hoop pine (*Araucaria cunninghamii*), with a shrub understorey and thick litter layer. Much of this vegetation type, especially in the Fitzroy and Dawson valleys has been grossly depleted." (SEWPaC, 2012). **Unlikely in GTP RoW**

Further details for the species identified in Tables 4.1 and 4.2 can be obtained from the GLNG Species Management Plan (SMP) 2011 and the GLNG Significant Species Management Plan (SSMP) (GLNG 2012b).

4.2 Survey results

Six fauna species of significance (listed under the provisions of the NC Act and/or the EPBC Act) were opportunistically identified in, or in close proximity (<500 m) to the GTP RoW (refer Table 4.3).

Table 4.3 Fauna species observed within the GTP ROW between KP130 and KP312

Scientific name	Common name	EPBC/NC Act listing/ JAMBA/CAMBA	KP location	Within GTP RoW
Ardea alba	Eastern great egret	Migratory / - / Jamba / Camba	184 218.5 261.96 288.14	#
Geophaps scripta scripta	Squatter pigeon	V / V / - / -	280.42	✓
Lophoictinia isura	Square-tailed kite	- / NT / -	207.6	✓
Merops ornatus	Rainbow bee-eater	- / - / Jamba / -	184 207.4* 295.63 298.94	✓
Strophurus taenicauda	Golden tailed gecko	- / NT / -	223.5	✓
Tachyglossus aculeatus	Echidna	- / Special LC / - / -	152.3 266.53	✓

Table notes: # Species identified just out of the RoW
*Flying directly above GTP RoW

5 Declared weeds and feral pests

5.1 Declared weeds

A total of eleven declared weed species as listed under the provisions of the LP Act were identified as occurring within the GTP RoW. These species are presented in Tables 5.1 and 5.2. Seven of the eleven species are also listed as weeds of national significance (WONS).

Table 5.1 WONS and LP Act listed weeds observed within the GTP RoW between KP130 to KP312

Scientific name	Common name	WONS listed	LP Act Class
Bryophyllum delagoense	Mother-of-millions		2
Cardiospermum grandiflorum	Balloon vine		3
Cryptostegia grandiflora	Rubber vine	✓	2
Harrisia martinii	Harrisia cactus		2
Lantana camara	Lantana	✓	3
Lantana montevidensis	Creeping lantana		2
Macfadyena unguis-cati	Cats claw creeper	✓	2
Opuntia aurantiaca	Tiger pear	✓	2
Opuntia stricta	Prickly pear	✓	2
Opuntia tomentosa	Velvet tree pear	✓	2
Parthenium hysterophorus	Parthenium	✓	2

The Ausecology surveys indicate that *Parthenium hysterophorus* (Parthenium) was mapped starting at KP133.97 and KP136.68 in Expedition Range and throughout the grazing and cropping land from KP150 onwards.

Opuntia aurantiaca (Tiger pear) was also observed by Ausecology. However, this species was relatively uncommon and was primarily observed within the GTP RoW between KP37and KP47. *Opuntia stricta* (Prickly pear) and *Opuntia tomentosa* (Velvet tree-pear) were observed to be relatively common and evenly distributed throughout the GTP RoW. All *Opuntia* species will either require chemical control or removal in their entirety prior to commencement of pipeline construction. Such actions will minimise the spread of this plant by vegetative reproduction.

Table 5.2 WONS and LP Act listed weeds found within the GTP RoW between KP130 and KP312

Description	Significance of species	Action[1]	Photograph
Bryophyllum delagoense (mother-of-millions)	Class 2 declared weed under the LP Act. Poisonous to livestock	Careful weed mitigation methods required to avoid spreading this species on or off the GTP RoW. Control weeds prior to clearing and construction (foliar spray)	

Description	Significance of species	Action[1]	Photograph
Cardiospermum grandiflorus (balloon vine)	Class 3 declared weed under the LP Act	Careful weed mitigation methods required to avoid spreading this species on or off the GTP RoW. Control weeds prior to clearing and construction (cut stump or foliar spray)	
Cryptostegia grandiflora (rubber vine)	WONS listed this is a Class 2 declared weed under the LP Act	Careful weed mitigation methods required to avoid spreading this species on or off the GTP RoW. Control weeds prior to clearing and construction (basal bark, cut stump or foliar spray)	
Harrisia martinii (harrisia cactus)	Class 2 declared weed under the LP Act	Careful weed mitigation methods required to avoid spreading this species on or off the GTP RoW. Control weeds prior to clearing and construction (foliar spray) or manually remove weeds and destroy	
Lantana camara (lantana)	WONS listed, this is a Class 3 declared weed under the LP Act	Careful weed mitigation methods required to avoid spreading this species on or off the GTP RoW. Control weeds prior to clearing and construction (basal bark, cut stump, foliar spray or splatter gun) or manually remove weeds and destroy	
Lantana montevidensis (creeping lantana)	Class 3 declared weed under the LP Act	Careful weed mitigation methods required to avoid spreading this species on or off the GTP RoW. Control weeds prior to clearing and construction (foliar spray) or manually remove weeds and destroy	
Macfadyena unguis-cati (cats claw creeper)	WONS listed, this is a Class 3 declared weed under the LP Act	Careful weed mitigation methods required to avoid spreading this species on or off the GTP RoW. Control weeds prior to clearing and construction (foliar spray or cut stump)	

Description	Significance of species	Action[1]	Photograph
Opuntia aurantiaca	WONS listed, this is a Class 2 declared weed under the LP Act	Careful weed mitigation methods required to avoid spreading this species on or off the GTP RoW. Control weeds prior to clearing and construction (basal bark or foliar spray) or manually remove weeds and destroy	
Opuntia stricta (prickly pear)	WONS listed, this is a Class 2 declared weed under the LP Act	Careful weed mitigation methods required to avoid spreading this species on or off the GTP RoW. Control weeds prior to clearing and construction (foliar spray) or manually remove weeds and destroy	
Opuntia tomentosa (velvet tree pear) found throughout GTP RoW from KP234-312	WONS listed this is a Class 2 declared weed under the LP Act	Careful weed mitigation methods required to avoid spreading this species on or off the GTP RoW. Control weeds prior to clearing and construction (foliar spray) or manually remove weeds and destroy	
Parthenium hysterophorus	WONS listed, this is a Class 2 declared weed under the LP Act	Careful weed mitigation methods required to avoid spreading this species on or off the GTP RoW. Treatment prior to disturbance recommended with a broadleaf selective herbicide such as Brush Off (metsulfuron methyl) or Kamba (dicamba) so as not to destroy grass species that are likely to out-compete parthenium in the longer-term. Weed washdown when moving from infested to non-infested areas. Training for employees and contractors	

Table notes: [1]Further information pretaining to control methods for LP Act declared species can be found on the Queensland Government Department of Agriculture, Fisheries and Forestry Declared Plants of Queensland webpage: http://www.daff.qld.gov.au/4790_7005.htm

5.2 Other environmental weeds

While mapping for this pre-clearance survey focused on the WONS and LP Act listed weeds, details of other non-native flora species that have been identified as being of environmental / undesirable were noted during field investigations. These species are presented in Table 5.3.

While these weeds are a low priority and consisted primarily of annual species, they were noted as they may potentially become a nuisance as a result of population explosion following ground disturbance in areas where they currently exist. Native species occurring within their natural range have not been listed as weeds as these species can be, at worst, a

mild nuisance for agriculturalists. However species such as native chenopods can provide food and shelter for many species of native fauna.

Table 5.3 Other environmental weeds identified within the GTP RoW between KP234 and KP312

Family	Scientific name	Common name
Aizoaceae	*Trianthema portulacastrum*	Giant pigweed, black pigweed
Amaranthaceae	*Alternanthera pungens*	Khaki weed
Amaranthaceae	*Gomphrena celosioides*	Gomphrena weed, soft khaki weed
Apocynaceae	*Asclepias curassavica*	Blood-flower, scarlet milkweed, tropical milkweed
Apocynaceae	*Gomphocarpus physocarpus*	Balloon cotton bush
Asteraceae	*Bidens bipinnata*	Beggar's tick or cobbler's peg
Asteraceae	*Bidens pilosa*	Spanish needle or beggar's ticks
Asteraceae	*Cirsium vulgare*	Spear thistle
Asteraceae	*Conyza bonariensis*	Flaxleaf fleabane
Asteraceae	*Onopordum acanthium*	Scotch thistle
Asteraceae	*Tagetes minuta*	Stinking roger
Asteraceae	*Verbesina encelioides*	Wild sunflower
Asteraceae	*Xanthium occidentale*	Noogoora burr
Asteraceae	*Xanthium spinosum*	Bathurst burr
Asteraceae	*Ageratum houstonianum*	Blue billygoat weed
Euphorbiaceae	*Ricinus communis*	Castor oil
Malvaceae	*Malva parviflora*	Marshmallow, small flowered mallow
Malvaceae	*Sida cordifolia*	Bala, country mallow, flannel weed
Mimosaceae	*Leucaena leucocephala*	Leucaena, coffee bush
Papaveraceae	*Argemone spp.*	Mexican poppy
Poaceae	*Sorghum halepense*	Johnson grass
Poaceae	*Chloris gayana*	Rhodes grass
Poaceae	*Chloris virgata*	Feathertop rhodes grass
Poaceae	*Cynodon dactylon*	Couch grass, Bermuda grass
Poaceae	*Megathyrsus maximus var. pubiglumis*	Guinea grass
Poaceae	*Melinis repens*	Red natal grass
Poaceae	*Pennisetum ciliare*	Buffel grass
Poaceae	*Urochloa mosambicensis*	Sabi grass
Portulacaceae	*Portulaca oleracea*	Purslane, pigweed
Solanaceae	*Physalis lanceifolia*	Ground cherry
Verbenaceae	*Verbena aristigera*	Mayne's pest
Verbenaceae	*Verbena incompta*	Purple-top verbena

5.3 Feral pests

Five feral fauna species declared as Class 2 species under provisions of the LP Act have been observed within the GTP RoW. These species include the feral Pig (*Sus scrofa*), wild Dog (*Canis lupus dingo)*, feral Cat (*Felis catus*), Rabbit (*Oryctolagus cuniculus*) and the Red fox (*Vulpes vulpes*).

The Cane toad (*Rhinella marina),* a key threatening process listed under the EPBC Act, has also been recorded in various locations throughout the GTP RoW.

6 Habitat features

A diverse range of habitat features were present within and directly adjacent to the GTP RoW. These features have the potential to provide habitat, shelter and/or a food source for a variety of fauna species. Furthermore, some features such as rocky outcrops also provide unique environments for specific flora species.

Each of the surveys undertaken found that the habitat present throughout the GTP RoW is generally characterised by small degraded patches of woodland, individual paddock trees with or without hollows, standing dead trees or fallen logs with or without hollows, small dense thickets of stiff thorny shrubs consisting of species such as *Carissa ovata* (Current bush), *Alectryon diversifolius* (Scrub boonaree), *Citrus glauca* (Lime bush)*, Drypetes deplanchei* (Yellow tulipwood) and *Capparis spp*., as well as watercourses and melon holes in varying condition.

Numerous fallen logs with hollows were identified, some present within the adjacent Jemena pipeline or previously growing within the Jemena pipeline RoW. Furthermore, numerous tree hollows were identified. In some areas, tree hollows were in great abundance such as in the Mountain coolibah open woodland between KP184.18 and KP185.66 (RE11.8.5 with *Eucalyptus orgadophila* and *Eucalyptus erythrophloia* trees) and the *Eucalyptus coolabah subsp. coolabah* (Coolabah) (RE11.3.3(c)) palustrine wetlands between KP218.5 and KP219.71. These tree hollows may potentially provide habitat for the 'endangered', 'vulnerable' or 'near threatened' (EVNT) species *Chalinolobus picatus* (Little pied bat) and non-listed bird species.

In Expedition Range various (shallow) caves were mapped, some with evidence of fauna utilisation (ie scats and tracks). Furthermore, these caves may potentially provide shelter for bats. Although most of these caves are not located within the GTP RoW, a shallow cave and numerous rock cracks are contained within the GTP RoW at KP141.1.

Fauna utilisation was evident in many of the vegetation derived habitat features. In addition, it is likely that watercourses, including melon holes, provide a valuable water resource and habitat for aquatic species during wetter periods of the year. Table 6.1 provides a summary of habitat features identified within the GTP RoW, while Table 6.2 provide a summary of fauna specific habitat identified for conservation significant fauna species with the GTP RoW.

Common along this section was terrestrial termite nests with evidence of echidna disturbance. During an Ausecology survey, one termite nest contained within the GTP RoW at KP266.53 was observed to contain a sleeping echidna.

Other habitat present was generally restricted to stands of vegetation associated with riparian, fence-line or roadside remnant vegetation.

Due to extensive clearing and habitat fragmentation in sub-section KP234 to KP312 of the GTP RoW, the likelihood of EVNT species utilising tree hollows within the area is relatively low.

Table 6.1 Habitat features identified within GTP RoW between KP130 and KP312

Description	Ecological value	Action	Photograph
Fallen logs, large branches, log/timber	Habitat for reptiles (snakes, geckos etc), small mammals and birds	Avoid – or if disturbed a DEHP licensed fauna spotter required	
Trees of various sizes with loose bark – trees can be dead or alive	Habitat for reptiles (snakes, geckos etc) and bats	Avoid – or if disturbed a DEHP licensed fauna spotter required	
Dead tree	Strong value in hollow	Avoid – or if disturbed a DEHP licensed fauna spotter required. Dead trees which require removal, do not mulch, stockpile and use for rehabilitation purposes	
Wetland areas (ponds)	Habitat for aquatic flora and fauna species	Avoid – or if disturbed adhere to Land Reinstatement/Rehabilitation Management Plan for pipeline crossing through a wetland. Reinstate wetland profile and rehabilitate to the same or better condition with locally collected seed	
Gilgai (melon holes)	Important for aquatic ecology throughout the landscape; melon holes important source of water for flora and fauna	Avoid – if unavoidable, check for water in melon holes. If water is present, a licensed DEHP approved fauna spotter might be required The EVNT species *Eleocharis blakeana* was identified in some gilgai present in the GTP RoW	
Intact Birds nest in tree	Nesting sites and habitat for birds which provide important ecological functions such as pollination, insect eradication, and rodent predation	Avoid – or if disturbed a DEHP licensed fauna spotter required to check whether nest is occupied, if occupied refer to Saipem Fauna Management Plan	
Terrestrial Termite nest	A number of species live inside and feed on termites and their eggs, echidna, red-naped snake, blind snake, geckoes, spotted python etc, and goannas lay their eggs in the	Avoid if possible, if disturbed a DERM licensed fauna spotter required, Refer to Saipem Fauna Handling Procedure and Species Management Plan	

Description	Ecological value	Action	Photograph
Terrestrial Termite nest – echidna habitat	Provide shelter for echidnas	Avoid if possible, if disturbed a DERM licensed fauna spotter required, Refer to Saipem Fauna Handling Procedure and Species Management Plan	
Rocky outcrops	Provides habitat and shelter for fauna species (fauna hides in the (small) cracks of the rocks)	Avoid if possible. If disturbed, a DEHP licensed fauna spotter required; refer to Saipem Fauna Handling Procedure and Species Management Plan. Use best practice techniques and reinstate the structure in the RoW rehabilitation phase where practical	

Table 6.2 Surveyed habitat presence within the GTP RoW between KP234 and KP312 for EPBC Act EVNT fauna species

Scientific name	Common name	Notes
Reptiles		
Delma torquata	Collared delma	Suitable habitat limited to areas of regrowth Eucalypt woodland and remnant Eucalypt woodland between KP310 to KP312
Denisonia maculata	Ornamental snake	Suitable habitat limited to the creek systems (mainly Dawson River) and the Brigalow vegetation community around Banana Creek (KP252 to KP253)
Furina dunmalli	Dunmall's snake	Limited suitable habitat present in the GTP RoW due to land use and associated habitat fragmentation. Potential habitat in the Brigalow vegetation community around Banana Creek (KP252 to KP253)
Paradelma orientalis	Brigalow scaly foot	Limited potential habitat associated with creek lines, remnant vegetation and HVR, in particular the Banana Creek area (KP252 to KP253) with Brigalow regrowth and watercourses with fallen logs. In addition, the logs piles, dead trees and loose bark between KP258.7 to KP259.2 could provide shelter for this species
Mammals		
Chalinolobus picatus	Little pied bat	Feeding 'general' habitat present mainly along creek lines and the HVR/remnant vegetation between KP310 and KP312. Shelter habitat limited throughout the RoW due to, in general, a lack of hollow-bearing trees and habitat trees with loose bark
Nyctophilus corbeni	Eastern long-eared bat	Feeding 'general' habitat present mainly along creek lines and the HVR/remnant vegetation between KP310 and KP312. Shelter habitat limited throughout the RoW due to, in general, a lack of hollow-bearing trees and habitat trees with loose bark
Ornithorhynchus anatinus	Platypus	Limited suitable habitat present in the GTP RoW due to ephemeral nature of the (major) creeks in the area and the often lack of suitable shelter habitat (burrows in creek banks)
Phascolarctos cinereus	Koala	Limited suitable habitat present due to significant fragmentation of Eucalyptus forests. Suitable habitat restricted to the KP310 to KP312 area, due to presence of koala food trees and connectivity to Callide Range

Scientific name	Common name	Notes
Tachyglossus aculeatus	Echidna	In general, suitable habitat present throughout RoW, in particular areas with terrestrial termite mounds a lot of which contained evidence of the presence of echidnas in the area. One echidna was identified at KP266.53 and echidna diggings were seen at KP311
Birds		
Ephippiorhynchus asiaticus	Black necked stork	Suitable (feeding) habitat in general restricted to wetland area at KP237 and some of the dams/ponds along the RoW
Ardea alba	Eastern great egret	Suitable (feeding) habitat in general restricted to wetland area at KP237 and some of the dams/ponds along the RoW
Ardea ibis	Cattle egret	Suitable (feeding) habitat in general restricted to wetland area at KP237 and some of the dams/ponds along the RoW
Merops ornatus	Rainbow bee-eater	Suitable habitat limited to the vegetation lining the major creeks. Nesting habitat restricted within RoW, with potential nesting sites at the Callide Creek based on exposed sandy banks. In addition, the creek banks of the RoW at KP305 and Sellheim Creek could provide nesting habitat
Hirundapus caudacutus	White throated needle tail	No impact expected. Potentially flying overhead
Erythrotriorchis radiates	Red goshawk	Due to the significant vegetation fragmentation, unlikely to occur in the RoW. No nests observed
Grantiella picta	Painted honey-eater	Very limited presence of mistletoes as food habitat. Limited habitat potential at the Dawson River
Melithreptus gularis	Black-chinned honeyeater	Potential habitat limited from KP310 to KP312 due to presence of HVR and/or remnant vegetation with ironbarks
Turnix melanogaster	Black breasted button quail	Due to no suitable habitat being present in the GTP RoW, unlikely to occur
Geophaps scripta scripta	Squatter pigeon	General habitat throughout RoW, in particular along access tracks in proximity to water (dams and creeks)
Rostratula australis	Australian painted snipe	Limited habitat present in RoW, restricted to KP237 where the RoW encroaches on the northern end of a wetland system
Neochmia ruficauda ruficauda	Star finch	Although the RoW contains large tracks of grassy areas, most of these are pasture grasses. Potential grassy areas containing suitable (feeding) habitat is found in the undulating hilly areas from KP277 to KP280
Poephila cincta	Black-throated finch	Although the RoW contains large tracks of grassy areas, most of these are pasture grasses. Potential grassy areas containing suitable (feeding) habitat is found in the undulating hilly areas from KP277 to KP280
Lophoictinia isura	Square-tailed kite	Due to the vegetation in the RoW being highly fragmented, limited habitat is present in the RoW. Suitable habitat was found at the Dawson River and the creek systems (Sellheim Creek, Callide Creek, Police Camp Creek etc)

7 Isolated Trees

Isolated trees contained within paddocks were prominent features within this section of the GTP RoW. Species that commonly occurred as isolated trees are presented in Table 7.1. At the local scale, ecological functions of isolated trees contained within paddocks may include:

- Provision of a distinct microclimate
- Increased soil nutrients
- Increased plant species richness
- Habitat for animals

At the landscape scale, ecological roles include:

- Landscape-scale tree cover
- Limited connectivity for animals
- Genetic connectivity for tree populations
- Provision of genetic material and focal points for potential future large-scale ecosystem restoration

Table 7.1 Common paddock trees within the GTP RoW between KP130 and KP312

Scientific Name	Common Name	Value	Action
Acacia harpophylla	Brigalow	Mature plants provide shelter and habitat for small bird species	Avoid if possible – or if disturbed a DEHP licensed fauna spotter required
Eucalyptus cambageana	Dawson River blackbutt	Medium value in hollows in mature trees	Avoid if possible – or if disturbed a DEHP licensed fauna spotter required
Eucalyptus camaldulensis	River red gum	Strong value in hollows in mature trees, particularly old specimens	Avoid if possible – or if disturbed a DEHP licensed fauna spotter required
Eucalyptus coolabah	Coolibah	Strong value in hollows in mature trees, particularly old specimens	Avoid if possible – or if disturbed a DEHP licensed fauna spotter required
Eucalyptus tereticornis	Forest red gum	Strong value in hollows in mature trees, particularly old specimens	Avoid if possible – or if disturbed a DEHP licensed fauna spotter required
Eucalyptus melanophloia	Silver leaved ironbark	Medium value in hollows	Avoid if possible – or if disturbed a DEHP licensed fauna spotter required
Eucalyptus orgadophila	Mountain coolibah	Strong value in hollows in mature trees, particularly old specimens	Avoid if possible – or if disturbed a DEHP licensed fauna spotter required
Eucalyptus populnea	Poplar box	Medium value in hollows in mature trees; strong value in hollows in old specimens	Avoid if possible – or if disturbed a DEHP licensed fauna spotter required

Scientific Name	Common Name	Value	Action
Corymbia tessellaris	Moreton Bay ash	Low to medium value in hollows	Avoid if possible – or if disturbed a DEHP licensed fauna spotter required
Lysiphyllum carronii	Bean tree	Shrub to medium tree providing habitat for small bird species	Avoid if possible – or if disturbed a DEHP licensed fauna spotter required

8 Water Feature Assessments

A total of 23 major watercourse crossingswere identified between KP130 and KP312 of the GTP RoW. These areas and their respective location along the GTP RoW are provided in Table 8.1. Water features were assessed to verify that they are consistent with the definition of a watercourse as per the *Water Act 2000* or a drainage feature under the *Water Act 2000*. It should be noted however that dedicated Aquatic Values Assessments have also been undertaken for the GTP RoW alignment and the findings of the specialised assessments with respect to aquatic values should take precedence over the findings of the flora and fauna ecological surveys that contribute to this report.

Table 8.1 Major watercourse crossings along the GTP RoW between KP130 and KP312

Watercourse name	KP	SO	Vegetation Status
Unnamed Watercourse 4	133.90	3	Remnant
Unnamed Palustrine Wetland	177.30		Remnant
Prospect Creek	177.70	4	Non-remnant
Unnamed Watercourse 5	184.10	3	Non-remnant
Unnamed Watercourse 6	187.60	3	Non-remnant
Conciliation Creek	207.40	5	Non-remnant
Brolga gully	214.80	3	Non-remnant
Mimosa Creek	220.10	6	Non-remnant
Denby Creek	231.10	3	Remnant
Dawson River	233.90	8	Remnant
Back creek	234.30	3	Remnant
Kianga Creek	239.70	4	Remnant
Banana creek	252.40	5	Non-remnant
Banana creek	252.60	3	Non-remnant
Police camp creek	263.60	4	Non-remnant
Police camp creek	269.60	3	Non-remnant
Spring Creek	272.40	3	Non-remnant
Neville creek	285.80	3	Non-remnant
Unnamed Watercourse 7	295.60	4	Non-remnant
Orange Creek	296.60	6	Non-remnant
Kroombit Creek	296.80	5	Non-remnant

Watercourse name	KP	SO	Vegetation Status
Callide Creek	298.90	5	Non-remnant
Callide Creek (Old Channel)	300.30	3	Non-remnant
Unnamed Watercourse 8	305.50	3	Non-remnant

9 Erosion

In general, current erosion issues within the GTP RoW between KP130 and KP312 were observed to be generally low to moderate in magnitude. Although the Expedition Range is hilly, vegetation cover is dense and coarse-grained sedimentary rock ground surface is held in place. Some instances of erosion are present in the open woodland and pastures, mainly associated with pastoral uses and watercourses and drainage lines. In some instances (eg Denby Creek) erosion issues were extensive. Such erosion is likely to have occurred during the significant weather events experienced over the last several years. It is also likely that this has been compounded by a general lack of quality riparian vegetation in all habitat structural levels (ie herbs, shrubs and trees) and stream bank stabilisers such as logs etc.

Tunnel erosion was recorded on the periphery of some watercourses and drainage features. However, in comparison to the erosion identified in the Arcadia Valley, the tunnel erosion within the GTP RoW between KP130 and KP234 is deemed to be low to moderate in severity

Some severe erosion was present at KP292.45 and between KP307.71 and KP307.97. Further details related to this area are provided in Section 11 of this report.

10 Ponds and dams

One man-made farm dam was located within the GTP RoW between KP130 and KP312. Several billabongs (waterholes) associated with river overflows or drainage features were identified. The location of these areas along the GPT RoW is provided in Table 10.1.

In addition to the dams and waterholes, some gilgai (melon holes) were noted in the GTP RoW at KP204.3 to KP205.6 and KP233.5 to KP233.9.

Table 10.1 Ponds and dams present in the GTP RoW between KP130 and 312

KP	Status
150.41	Waterhole associated with water feature at KP150.41
177.8	Billabong at Prospect Creek, holding water at the time of the survey, encroaching into the southern end of the RoW
190.35	Two billabongs associated with a drainage channel holding water
206.8	Billabong (wetland) with standing water
218.5	Billabong at the start of RE11.3.3c *Eucalyptus coolabah subsp.* coolabah wetland/floodplain
234.3	Natural pond
239.27	Man-made dam in RoW
244.85	Dam
287.9	Dam
292.45	Dam – poor condition with no water

11 Specific Survey Results

11.1 KP130 to KP130.8: Arcadia Valley Pastures

The vegetation structure between KP130 and KP130.8 consisted predominantly of open *Pennisetum ciliare* (Buffel grass) pasture (70% cover) with sparsely scattered bushes consisting of *Citrus glauca* (Lime bush), *Alectryon diversifolius* (Scrub boonaree), *Capparis lasiantha* (Native orange) and *Capparis mitchellii* (Bumble fruit) (Photo 1 and Photo 2). Towards the end of this section a stand of *Owenia acidula* (Emu apple) was identified. Several *Opuntia tomentosa* (Velvet tree pear) were located in this section. The Ausecology field team did not observe any EVNT or Type A species in this section and no other environmental concerns were identified.

Photo 1 ***Eucalyptus orgadophila*** **(Mountain coolibah) south of KP130**

Photo 2 **Characteristic open pastures for KP130 to KP130.8**

11.2 KP130.8 to KP150: Expedition Range

An alternative route through the Expedition Range from approximately KP141 to KP144 was surveyed.

The Expedition Range crossing is characterised by hilly country, mainly on landzone 10 (plateaus, scarps and ledges with shallow soils on more or less horizontally bedded medium to coarse-grained sedimentary rocks). The vegetation mapped by DEHP as a 'least concern' RE polygon was dominated by various *Eucalyptus* and *Corymbia* species, with some dominant stands of *Acacia shirleyi* (Lancewood). The RE in general is mapped correctly as summarised in Table 3.7

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During the surveys, Ausecology ecologists identified one small area of unmapped vegetation analogous to the 'of Concern' RE 11.3.25 at the creek crossing at KP133.97. Also an unmapped stand of vegetation with characteristics of RE 11.10.4 (*Eucalyptus decorticans*) was observed at KP137.5. A large area resembling RE 11.10.13, is located between approximately KP139 to KP148. This includes the area at KP144.60 within the GTP RoW that when ground truthed during the Ausecology survey was found to be incorrectly mapped as RE11.8.4/11.3.4. Flora species and soil type recorded at this KP (*Corymbia citriodora* (Spotted gum), *Eucalyptus crebra* (Narrow-leaved ironbark) and *Corymbia hendersonii* (Henderson's bloodwood), occurring on coarse-grained sedimentary rocks) are representative of 'least concern' RE 11.10.1 (Photo 6). The vegetation changes to more open woodland with grassy understorey (intermittently switching between RE 11.8.4 with some RE 11.10.13; HVR and/or remnant) from approximately KP146, dominated by

Eucalyptus melanophloia (Silver-leaved ironbark) and *Corymbia erythrophloia* (Variable-barked bloodwood) in the open woodland sections (Photo 71).

Photo 3 ***Acacia shirleyi* with *Corymbia citriodora* emergents (RE 11.10.3/ 11.10.1)**

Photo 4 ***Eucalyptus decorticans* dominated vegetation on slope at approximately KP137.2**

Photo 5 **Eucalyptus and Corymbia species with Acacia understorey**

Photo 6 **Creek at KP144.60 dominated by *Corymbia citriodora***

Photo 7 ***Eucalyptus crebra* (RE11.10.7) dominated vegetation**

Photo 8 ***Eucalyptus melanophloia* and *Corymbia erythrophloia* open woodland between KP145 and KP150 (RE 11.8.4)**

Parts of the vegetation in the Expedition Range have been affected by fire events over three years ago (2009), from KP135.5 to KP143.5. This has resulted in the presence of a dense understorey dominated by *Seringia corollata* and *Acacia* spp, with large numbers of dead standing timber and/or (*Lysicarpus angustifolius* (Budgeroo trees) and coppicing *Eucalyptus*/*Corymbia* species (Photo 9 and Photo 10).

Photo 9 **Fire affected area at KP135.7 with *Seringia corollata* understorey**

Photo 10 **Fire affected area at approximately KP138 with *Seringia corollata* understorey, and *Acacia bancroftiorum* and *Acacia julifera* shrubs**

Photo 11 **Fire affected area at approximately KP140.5**

Photo 12 **Fire affected area at approximately KP142**

Three EVNT species were identified with their key locations listed in Table 11.1.

Table 11.1 EVNT species identified within the GTP Row between KP130 and KP150

EVNT species	KP location	Comments
Apatophyllum teretifolium	135 - 143	Sparsely scattered throughout
Desmodium macrocarpum	131.8 - 136.4	Sparsely scattered throughout
Homoranthus decasetus	130 - 150	Sparsely scattered throughout

Table notes: EVNT species are state listed under the NC Act

Four Type A species were identified in the KP130 to KP150 section, including *Brachychiton populneus* (Kurrajong), *Cymbidium canaliculatum* (Black orchid), *Macrozamia moorei* (Carnarvon Gorge Macrozamia) and *Xanthorrhoea johnsonii* (Grass tree).

Various water features were crossed within the Expedition Range with a more significant one at KP133.90 (stream order three (SO3)..

Declared weeds in this section included sparsely scattered *Opuntia stricta* (Prickly pear) and *Opuntia tomentosa* (Velvet tree pear) throughout the GTP RoW. In addition, *Parthenium hysterophorus* (Parthenium) was found at the creek at KP133.97 (significant infestation) and at KP137.2.

Ausecology surveys described Expedition Range has being heavily forested and therefore providing suitable habitat for native fauna, in particular, due to the presence of hollows able to support arboreal mammals (eg bats, possums and gliders), reptiles and birds. Furthermore, many large fallen hollow logs are present providing refuge and structure at the ground layer as well. This is supported by the Aurecon targeted fauna searches which also identified large amounts of fallen timber and reasonable ground cover which may provide habitat for some small birds and reptiles such as the Squatter pigeon (*Geophaps scripta scripta*), Brigalow scaly-foot (*Paradelma orientalis*) and the Collared delma (*Delma torquata*).

Large hollow logs are present as rehabilitation features in the Jemena pipeline, some of which encroach into the GTP RoW. Various *Corymbia citriodora* (Spotted gum) trees showed signs of scratch marks as shown in Photo 14, in particular around KP133 and KP148. Various nesting sites were identified, either as nests in trees or as burrows in a creek bank (KP133.97).

Photo 13 **Burrow nesting site in creek bank at KP133.97. Most likely a striated pardalote burrow (*Pardalotus striatus*)**

Photo 14 **Scratch marks as identified on *Corymbia citriodora* trees (KP133) most likely from possums**

Photo 15 **Fauna hollow identified in GTP RoW KP130 to KP150**

Photo 16 **Fauna hollow identified in GTP RoW KP130 to KP150**

Some sites such as KP135.3 and KP148.9 also provided rocky crevices due to scattered rocks which may also provide opportunities for similar species. KP135.3 and KP135.5 also supported species of *E. crebra* and *A. shirleyi* which has the potential to provide habitat for these small reptile species.

A significant rocky outcrop (with shallow caves) was identified in the GTP RoW at approximately KP137.5 (in *Eucalyptus decorticans* dominant vegetation on ridgeline) (Photo 17 and Photo 18) and at KP141.1 (Photo 19 and Photo 20). Although not visually confirmed during this survey, these caves have the potential to provide shelter for various micro bat species, including EVNT species such as the Little pied bat (*Chalinolobus picatus*) and the

South-eastern long-eared bat (*Nyctophilus corbeni*). Caves off the GTP RoW were confirmed to contain bats (auditory confirmation only). As well as providing shelter for bats, these caves also provide shelter for various macropod species. Exposed rocks were identified within the GTP RoW at KP136.3, KP139.1 and KP139.5 which can all be avoided through design.

Photo 17 **Rocky outcrop at KP137.5 with shallow caves**

Photo 18 **KP137.5: potential shelter habitat for macropods**

Photo 19 **Shallow caves and rock crevices located at KP141.1**

Photo 20 **Scats found in caves at KP141.1**

Targeted EVNT searches conducted by Aurecon also located a number of areas which supported stags and tree hollows at the following location within the GTP RoW: KP135.5, KP142.0, KP146.8 and KP150 (stag and ground hollows only at KP150).

All of the sites investigated as part of the targeted fauna searches provided relatively good canopy cover, which has the potential to provide good foraging and perching opportunities for small birds, which may include the Rainbow bee-eater (*Merops ornatus*).

Disturbance associated with historic clearing and/or fire was evident at many of the sites assessed. This has resulted in a limited shrub layer in many areas, therefore creating numerous grassed areas. Such areas may provide suitable habitat opportunities to Squatter pigeons (*Geophaps scripta scripta*) and Cattle egrets (*Ardea ibis*).

Many of the areas investigated during the fauna targeted searches had good connectivity with surrounding areas such as Expedition Range which may improve connectivity with the wider area.

11.3 KP150 to KP155: Open woodland pastures

This section is mainly characterised by open woodland vegetation with a grassy understorey (dominated by *Heteropogon contortus* (Black spear grass)) (Photo 22 and Photo 23) from KP150 to a drainage channel at KP152.66. From the drainage channel (KP152.66 to

approximately KP154.7 the GTP RoW is located in HVR with a ‘least concern’ status, located to the south of remnant RE 11.10.1.

A waterhole was present at the creek at KP150.41, which at the time of the survey was holding water (Photo 21). The riparian vegetation at the crossing of the drainage channel (KP152.66) was dense (with all strata present) and highly diverse, particularly in comparison to that of the greater landscape (Photo 24 and Photo 25). The existing waterholes, along with the vegetation they support and the microclimate they create, provide valuable habitat, food and water sources for the fauna present in the area in context to the surrounding landscape. Most of the species identified (refer Table 11.2 for the dominant species) are dry rainforest species. Although the riparian zone is narrow with no buffer or core, the vegetation present, its coverage and height, categorise this vegetation as having high environmental value.

Photo 21 **Waterhole at KP150.41**

Photo 22 **Characteristic open woodland vegetation dominated by *Eucalyptus melanophloia***

Photo 23 **Open woodland vegetation with black speargrass groundlayer characteristic of KP150 to KP155**

Photo 24 **Rainforest species at the drainage channel**

Photo 25 Vegetation at the drainage channel

Photo 26 Echidna (*Tachyglossus aculeatus*) as seen at KP152.3

Table 11.2 Key flora species identified at the drainage channel (KP152.6

Name	*Common Name*
Arytera divaricata	Arytera
Brachychiton australis	Large-leaved bottle tree
Brachychiton bidwillii	Little kurrajong
Brachychiton populneus	Kurrajong
Brachychiton rupestris	Narrow leaved bottle tree
Bridelia leichhardtii	Bridelia
Cyclophyllum coprosmoides	Canthium
Diospyros humilis	Scrub ebony
Diospyros geminata	Ebony
Eucalyptus melanophloia	Silver leaved ironbark
Erythrina vespertilio	Bat winged coral tree
Ficus opposite	Sandpaper fig
Ficus rubiginosa	Rock fig
Hibiscus vitifolius	Hibiscus
Melaleuca bracteata	Black tea tree
Myrsine variabilis	Mutton wood
Oplismenus aemulus	Creeping beard grass
Pittosporum spinescens	Wallaby apple
Psydrax oleifolia	Psydrax
Trophis scandens	Burney vine

One EVNT species was identified within the GTP RoW between KP150 and KP155 as summarised in Table 11.3. Four Type A species, all from the genus *Brachychiton*, were also identified:

- *Brachychiton australis* (Broad leaf bottle tree)
- *Brachychiton bidwillii* (Little kurrajong)

- *Brachychiton populneus* (Kurrajong)
- *Brachychiton rupestris* (Narrow leaved bottle tree)

Table 11.3 EVNT species identified in KP150 to KP155 of the GTP RoW

EVNT species	KP location	Number of specimens	Comments
Desmodium macrocarpum	150.65 152.90	6	Scattered

Table notes: EVNT species are state listed under the NC Act

This section of the RoW crosses five water features, with the drainage channel being the most significant due to the presence of a high diversity of rainforest associated species.

Declared weeds in this section include sparsely scattered *Opuntia tomentosa* (Velvet tree pear) and *Opuntia stricta* (Prickly pear) throughout the GTP RoW. In addition, *Parthenium hysterophorus* (Parthenium) was identified as sparsely present.

A Short-beaked echidna (*Tachyglossus aculeatus*) was seen at KP152.3 (Photo 26). Furthermore, based on vegetation present, this area could provide habitat for EVNT fauna species, in particular birds as summarised in Section 6.

11.4 KP155 to KP176

KP155 to KP176 was characterised by grazing pastures (*Pennisetum ciliare* (Buffello grass) and Black spear grass (Heteropogon contortus)) with sparsely scattered vegetation mainly present as riparian zone fringing vegetation (dominated by *Melaleuca bracteata* (Black tea tree)).

At KP165 a large *Eucalyptus orgadophila* (Mountain coolibah) was mapped containing large hollows with which Red-tailed black cockatoos (*Calyptorhynchus banksii*) were associating. This tree, which was located in the northern part of the RoW, also contained a *Ficus rubiginosa* (Rusty fig) which was growing as an epiphyte. This species is also an important food source for potentially occurring native fauna species within this area given the surrounding environment is lacking in structure and foraging resources due to the present and historical pastoral uses. Weeds included *Parthenium hysterophorus* (Parthenium) throughout the GTP RoW, with limited occurrences of *Opuntia tomentosa* (Velvet tree pear) and *Opuntia stricta* (Prickly pear). Occasional *Brachychiton* species were mapped within KP167 to KP172 of the GTP RoW.

Photo 27 Open pastures characteristic of KP155 to KP176

Photo 28 Open pastures, in places dominated by black speargrass

Photo 29 ***Melaleuca bracteata*** **regrowth (non-HVR), characteristic of the riparian zone vegetation community in the KP155 to KP176 section**

Photo 30 **Small stands of trees and lone paddock trees were identified in the GTP RoW**

No EVNT species were recorded within this section of the GTP RoW during the Ausecology vegetation surveys.

Between KP155 to KP176 of the GTP RoW, four species of *Brachychiton* (primarily juvenile specimens) were identified and mapped with only a few large specimens present. These included:

- *Brachychiton australis* (Broad leaf bottle tree)
- *Brachychiton bidwillii* (Little kurrajong)
- *Brachychiton populneus* (Kurrajong)
- *Brachychiton rupestris* (Narrow leaved bottle tree)

One very large specimen of *Brachychiton rupestris* with a Diameter at Breast Height (DBH) of >1.5 m was located at approximately KP158 within the GTP RoW.

Photo 31 **Large** ***Brachychiton rupestris*** **at KP158 in the middle of the GTP RoW with two bird's nests**

Photo 32 **Large number of smaller** ***Brachychiton species*** **were identified at approximately KP158.5**

Numerous minor water features were assessed with most of them showing some riparian zone vegetation dominated by *Melaleuca bracteata* (Black tea tree) and some *Acacia harpophylla* (Brigalow). This *Melaleuca* species is recommended for rehabilitation efforts of the riparian zone due to its noted success within this environment and habitat attributes

Photo 33 **Drainage channel at KP158.06 with waterholes holding water at the time of the survey**

Photo 34 **Drainage channel at KP161.58 with standing water in ponds**

Declared weeds in this section included sparsely scattered *Opuntia stricta* (Prickly pear) and *Opuntia tomentosa* (Velvet tree-pear) throughout the GTP RoW. In addition, *Parthenium hysterophorus* (Parthenium) was found throughout this section, in particular close to water features.

Limited (EVNT) fauna habitat was observed within the GTP RoW between KP155 to KP176. This is due to the open and exposed pastures with isolated habitat areas. However, within these habitats, the presence of bird nests, as well as fallen timber was noted (Photo 35 and Photo 36). Fallen timber has the potential to provide some degree of fauna habitat within this area.

Photo 35 **Bird's nest in *Brachychiton rupestris* tree at KP158**

Photo 36 **Fallen logs were sparsely scattered in the KP155 to KP176 GTP RoW**

11.5 KP176 to KP186

From KP176 to KP177 of the GTP RoW was dominated by grazing pastures and the occasional environmental weed (eg *Acacia farnesiana*) (Photo 37). Some low regrowth (non-HVR) of various shrub species (such as *Citrus glauca* (Lime bush) and *Eremophila mitchellii* (False sandlewood)) was present on the western side of a drainage channel at KP177.24 (Photo 38), which was fringed by *Eucalyptus coolabah subsp. coolabah* (Coolibah). Between KP177.24 and Prospect Creek (SO4), a floodplain (palustrine wetland) with sparse *Eucalyptus coolabah subsp. coolabah* (Coolibah) and some stands of regrowth Brigalow existed (Photo 39). After crossing Prospect Creek, the RoW encroaches on it where the creek double backs on itself. If practicable, slight narrowing of the RoW within this area would resolve this encroachment.

After Prospect Creek the vegetation consisted of 'endangered' HVR for approximately 200 m, with several Type A *Brachychiton rupestris* (Narrow leaved bottle tree) individuals. An additional small patch of 'endangered' HVR, dominated by Brigalow (*Acacia harpophylla*), *Eucalyptus cambageana* (Dawson River blackbutt), *Casuarina cristata* (Belah) as well as two Type A *Brachychiton rupestris* (Narrow-leaved bottle tree) was located between KP179.86 and KP179.92. The creek at KP184.10 (SO3) contained a riparian zone of predominantly *Eucalyptus coolabah subsp. coolabah* (Coolibah) with some *Terminalia oblongata* (Yellow-wood). This area is currently mapped as non-remnant. However, the species diversity, height and coverage is consistent with remnant vegetation 'of concern' RE 11.3.3 (Photo 41). The GTP RoW then ascends to a ridge dominated by *Eucalyptus orgadophila* (Mountain coolibah) and *Corymbia erythrophloia* (Variable-barked bloodwood) (KP184.2 to KP185.7; Ausecology ground truthing surveys identified that this area is incorrectly mapped as RE11.8.4; confirmed RE11.8.5) (Photo 42).

Photo 37 **Low (non-HVR) regrowth east of the unnamed creek at KP177.24**

Photo 38 **Drainage channel at KP177.24**

Photo 39 **Mapped 'endangered' HVR (*Eucalyptus coolabah subsp. coolabah*) at unnamed palustrine wetland (KP177.30)**

Photo 40 **Prospect Creek**

Photo 41 **Unmapped *Eucalyptus coolabah subsp. coolabah* woodland at the creek at KP184.11**

Photo 42 ***Eucalyptus orgadophila* with *Corymbia erythrophloia* open woodland from ~KP184.2 to KP185.7**

No EVNT species were identified within the KP176 to KP186 GTP RoW section.

Three Type A species were identified in the KP176 to KP186 GTP RoW including:

- *Brachychiton rupestris* (Narrow leaved bottle tree)
- *Brachychiton australis* (Broad leaf bottle tree)
- *Cymbidium canaliculatum* (Black orchid)

Declared weeds in this section of the GTP RoW existed in the form of sparsely scattered *Opuntia tomentosa* (Velvet tree pear). In addition, *Parthenium hysterophorus* (Parthenium) was identified as being present. Around KP177.6, KP178.4 and KP184, various individuals of *Bryophyllum delagoense* (Mother-of-millions) were recorded. An additional weed species of note was *Acacia farnesiana* (Mimosa bush) growing throughout this section.

From a fauna habitat perspective, this section contained a number of habitat trees with large hollows. In particular, at section ~KP177.24 to KP178.2 (Photo 43), and the vegetation community RE11.8.5 between ~KP184.2 and KP185.7 (Photo 44), these features provide potential habitat for birds, bats and other arboreal mammals (such as EVNT listed *Chalinolobus picatus* (Little pied bat). A ploughed/grubbed rock pile was also noted at KP184 which may also offer some protection to reptiles and small mammals, including Dunmall's snake (*Furina dunmalli*) and Ornamental snake (*Denisonia maculata*).

Photo 43 ***Eucalyptus coolabah subsp. coolabah* HVR with a few trees with hollows**

Photo 44 ***Eucalyptus orgadophila* between ~KP184.2 and KP185.7 with hollows**

Photo 45 **Logs from the Jemena pipeline clearing now located in the GTP RoW**

Photo 46 **Log pile in RE11.8.5 at ~KP184.5 from previous vegetation clearing**

Brolgas (*Grus rubicunda*) and Eastern great egrets (*Ardea modesta*) were observed at the coolabah wetland. Additionally during the Aurecon targeted fauna survey the Eastern great egret (*Ardea alba*) and the Rainbow bee-eater (*Merops ornatus*) were also sighted at KP184.

The general features of KP176 to KP177 may also provide opportunities for Squatter pigeon (*Geophaps scripta scripta*), Rainbow bee-eater (*Merops ornatus*), Cattle egret (*Ardea ibis*), Star finch (*Neochmia ruficauda*) and the Black-throated finch (*Poephila cincta*).

11.6 KP186 to KP204: cropping land

From ~KP186 to KP188 the area is used for agricultural purposes (ie cropping country). At KP188.5 the RoW runs adjacent to a drainage channel with *Eucalyptus coolabah subsp. coolabah* (Coolibah) and/or *Acacia harpophylla* regrowth present (unmapped 'endangered' HVR) (Photo 47 and Photo 48).

The RoW then runs through a cleared grazing paddock before crossing a creek dominated by *Eucalyptus coolabah subsp. coolabah* (Coolibah) with *Terminalia oblongata* (Yellow-wood) (RE11.3.3). From KP190 to KP190.4 the RoW intersects HVR (incorrectly mapped as remnant) characterised by *Eucalyptus coolabah subsp*. *coolabah* (Coolibah) and *Acacia harpophylla* (Brigalow) and subdominant *Eucalyptus tereticornis* (Queensland blue gum). Other species present included *Lysiphyllum carronii* (Queensland ebony)*, Terminalia oblongata* (Yellow-wood) and *Melaleuca trichostachya* (Tea-tree) (Photo 49). A system of ponds with standing water interconnected by channels is located at KP190.3 (Photo 50).

From KP190.4 to KP204, the GTP RoW crosses predominantly cropping pasture (sorghum and wheat) with the occasional grazing paddock (Photo 51 and Photo 52). The area at the RoW is non-remnant with the RE at KP202.56 south of the RoW incorrectly mapped. It was dominated by *Eucalyptus coolabah subsp. coolabah* (Coolibah), *Lysiphyllum carronii* (Red Bauhinia) and some *Terminalia oblongata* (Yellow-wood) ('of Concern' RE 11.3.3). No 'endangered' RE 11.4.8 or 'endangered' RE 11.4.9 was present within the GTP RoW. Furthermore, the remnant vegetation of RE 11.3.3 does not encroach into the GTP RoW and is located to the south of the RoW.

Photo 47 ***Eucalyptus coolabah subsp. coolabah*** **and** ***Acacia harpophylla*** **regrowth at KP188.5**

Photo 48 ***Acacia harpophylla*** **regrowth with some** ***Eucalyptus coolabah subsp. coolabah*** **at KP188.5**

Photo 49 ***Eucalyptus coolabah subsp. coolabah*** **and** ***Acacia harpophylla*** **regrowth at KP190 to KP190.4**

Photo 50 **One of two billabongs present between KP190 to KP190.4 encroaching into the RoW. Area contains 'endangered' HVR**

Photo 51 **Cropping land use characteristic for KP186 to KPKP204**

Photo 52 **Sorghum cropping characteristic of KP186 to KP204**

No EVNT or Type A species were identified within this section of the GTP RoW.

Weeds observed within this section of the GTP RoW included *Parthenium hysterophorus* (Parthenium) (scattered throughout RoW), *Opuntia tomentosa* (Velvet tree pear) and *Bryophyllum delagoense* (Mother of millions). In addition, the environmental weed *Acacia farnesiana* (Mimosa bush) was present, with greater densities located around KP190.4.

Limited habitat features were located within this section of the GTP RoW due to the cleared, highly modified nature of the environment.

11.7 KP204 to KP218.5: grazing/cropping country

From KP204 to KP218 of the GTP RoW, the country was dominated by blade ploughed pasture paddocks, and some cropping land. Some gilgai (melon holes) were mapped in the GTP RoW between KP204.3 and KP205.6. The Ausecology ground truthed assessment of these melon holes determined that in general, they have low environmental value due to the lack of fringing vegetation (no *Acacia harpophylla*), invasion of pasture grasses and being shallow in depth. At KP206.1, a floodplain containing *Eucalyptus coolabah subsp. coolabah* (Coolibah) with some significantly large trees encroaches into the GTP RoW (Photo 53). Although predominantly grazing and cropping land, the few large trees were observed to provide some habitat with an eagle's nest identified at KP206.4 (Photo 54).

A wetland area (billabong with standing water at time of survey) is located at KP206.85 (Photo 55). This wetland is part of the overflow area of a drainage channel which runs in a northeast to southwest direction with various billabongs present throughout.

Some dense *Eucalyptus tereticornis* (Queensland blue gum) trees (RE11.3.25) are present at Conciliation Creek (Photo 56), after which the GTP RoW runs through cleared paddocks with the occasional stand of trees and the occasional isolated large tree.

An isolated patch of regrowth of *Eucalyptus cambageana* (Dawson river blackbutt) and *Acacia harpophylla* (Brigalow) is present between KP215.41 and KP215.54. However, based on the small area and lack of any connectivity to other HVR or remnant areas, this does not meet the criteria of HVR.

From KP216.5 to KP217.5, the GTP RoW passes through open *Eucalyptus* woodland before continuing for another kilometre through open cleared country.

Photo 53 **Large *Eucalyptus coolabah subsp. coolabah* at KP206.1**

Photo 54 **Eagle's nest at KP206.4**

Photo 55 **Wetland area (part of floodplain) at KP206.85**

Photo 56 **Vegetation (RE 11.3.25) at Conciliation Creek**

Photo 57 **Eucalyptus woodland between KP216.5 and KP217.5**

Photo 58 **Open paddock between KP217.5 and KP218.5**

One EVNT species and two Type A species were identified between KP217 and KP218.5 as summarised in Table 11.4 and Table 11.5 respectively.

Table 11.4 EVNT species identified in KP204 to KP218 of the GTP RoW

EVNT species	KP location	Number of specimens	Comments
Desmodium macrocarpum	217-218	20	Scattered throughout RoW

Table notes: EVNT species are state listed under the NC Act

Table 11.5 Type A species identified in KP204 to KP218 of the GTP RoW

Type A species	KP location	Number of specimens
Brachychiton rupestris	206.5 207.47	3
Cymbidium canaliculatum	206.4 207.47-207.7 216.4 217.2	7

Weeds recorded along this section of the GTP RoW included *Parthenium hysterophorus* (Parthenium) (scattered throughout RoW with some dense localised infestations such as those between KP209.6 and KP207.4), *Opuntia tomentosa* (Velvet tree pear), *Opuntia stricta* (Prickly pear) and *Lantana camara* (Lantana). Lantana was only identified at Conciliation Creek at KP207.40 within the GTP RoW.

Some fauna habitat in the form of fallen logs and tree hollows is present in this section. Such structures are most prevalent within the vegetated areas at Conciliation Creek (KP207.40) and between KP216.5 to KP217.5. The JAMBA-listed migratory Rainbow bee-eater (*Merops ornatus*) was identified at Conciliation Creek. A Square-tailed kite (*Lophoictinia isura*), listed as Near Threatened under the NC Act and Regulations, was seen flying overhead at KP207.65. Furthermore, the vegetation along this creek may provide potential habitat for other EVNT species such as bats and birds as listed in Section 6.

The Aurecon targeted fauna searches undertaken at KP207.8 confirmed that the vegetation within the vicinity of Conciliation Creek had a relatively diverse range of habitats compared to other areas between KP204 to KP218 of the GTP RoW. The following habitat features

were present: 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), leaf litter and watercourse habitat (although not at the time of inspection as adjacent creek was dry). This range of habitat features has the potential to support the following EVNT species: Eastern great egret (*Ardea alba*), Squatter pigeon (*Geophaps scripta scripta*), Red goshawk (*Erythrotriorchis radiates*), White bellied sea eagle (*Haliaeetus leucogaster*), Star finch (*Neochmia ruficauda*), Cotton pygmy goose (*Nettapus coromandelianus*), South-eastern long-eared bat (*Nyctophilus corbeni*), Australian painted snipe (*Rostratula australis*) and the Rainbow bee-eater (*Merops ornatus*) (which as noted above, was sighted during previous survey activity).

The Aurecon targeted fauna searches undertaken at KP209 and KP210 identified the area as dense ground cover vegetation (ie grassy tussocks), with some very limited canopy cover suitable for shelter, foraging and perching at KP210. This may support the EPBC Act listed Squatter pigeon (*Geophaps scripta scripta*) and Star finch (*Neochmia ruficauda*). Additionally this area could provide foraging opportunities for the Red goshawk (*Erythrotriorchis radiates*) and the Rainbow bee-eater (*Merops ornatus*) due to nearby areas of open eucalypt and riverine woodland.

11.8 KP218.5 to KP223.35: Eucalyptus woodlands and Mimosa Creek crossing

Between KP217.4 and KP223.35 a realignment of the GTP RoW has occured. The realignment, RCR-82-B6, is situated on Lot 4 KM74 and was investigated by two Aurecon ecologists on the 10 October 2012 to ascertain the ecological values of the area. The ecological findings associated with this investigation are summarised below. However, it should be noted that the chainage locations referenced in this section of the report are approximate measurements extrapolated from the current GTP RoW alignment.

Between KP 217.4 and KP221.15, most of the RoW is currently mapped by DEHP as ‘endangered’ RE 11.9.1/11.5.2a. However, this mapping is considered to be incorrect with vegetation analogous to the not ‘of concern’ RE 11.5.3 (*Eucalyptus populnea* and/or *Eucalyptus melanophloia* and/or *Corymbia clarksoniana* on Cainozoic sand plains/remnant surfaces). The eastern portion of the area is currently mapped by DEHP as ‘endangered’ HVR, whilst the western portion of the area is mapped as ‘of concern’ HVR. Field investigations indicate that this mapping is correct. These areas were observed to be subject to heavy logging. KP221.15 to KP221.25 is entirely mapped as ‘of concern’ HVR on the DEHP certified regrowth vegetation mapping. Upon field investigations, this mapping is considered to be incorrect. The vegetation is analogous to regrowth ‘of concern’ RE 11.3.25 (*Eucalyptus tereticornis* or *Eucalyptus camaldulensis* woodland fringing drainage lines). Evidence of ring-barking and tordon-axing is also present in the area.

KP221.25 to 221.6 is mapped as containing non-remnant vegetation, ‘of concern’ HVR on the DEHP certified regrowth vegetation mapping and ‘of concern’ RE 11.3.2/11.3.4/11.3.25 on the DEHP certified RE mapping. Upon field investigations, this mapping is considered to be incorrect. The vegetation is analogous to regrowth ‘of concern’ RE 11.3.4 (*Eucalyptus tereticornis* and/or Eucalyptus spp. tall woodland on alluvial plains). Evidence of logging, ring-barking and attempted tordon-axing (circa 1999) is also present in the area.

KP221.6 to KP221.8 is mapped as containing ‘of concern’ HVR on the DEHP certified regrowth vegetation mapping and ‘‘of concern’’ RE 11.3.2/11.3.4/11.3.25 on the DEHP certified RE mapping. Upon field investigations, this mapping is considered to be correct. Evidence of fire disturbance is also present in the area, occurring approximately 3-5 years

ago. In addition, the area has been disturbed due to current agricultural practices (ie cattle grazing).

KP221.8 to KP222.25 is mapped as containing non-remnant vegetation, 'of concern' HVR and 'least concern' HVR on the DEHP certified regrowth vegetation mapping. Upon field investigations, this mapping is considered to be incorrect. The vegetation within the area can be classified as non-remnant vegetation. The area has been disturbed due to current agricultural practices (ie cattle grazing). KP222.25 to KP223.25 is mapped as containing non-remnant vegetation and 'least concern' HVR on the DEHP certified regrowth vegetation mapping. Upon field investigations, this mapping is considered to be correct. A quarry occurs in the eastern portion of the area.

Photo 59 **Evidence of logging (KP 217.4 to KP221.15)**

Photo 60 **Vegetation characteristic of the area (KP 221.8)**

Two 'Type A restricted' species listed under the provisions of the NC Act were observed within the realignment area. These included:

- *Brachychiton rupestris* (Narrow-leaved bottle tree)
- *Cymbidium canaliculatum* (Black orchid)

No EVNT flora species of conservation significance listed under the provisions of the NC Act and/or EPBC Act were recorded within the realignment area.

During ecological investigations of the area 54 fauna species were identified during diurnal herpetology searches, diurnal and dusk bird surveys, spotlighting and Anabat recordings. These fauna species consisted of 37 avian, five (5) mammal, nine (9) amphibian and three (3) reptiles species. Traces of four (4) additional mammals were also recorded on site.

Koala (*Phascolarctos cinereus*) scats were observed within the area underneath a Koala food tree (ie *Eucalyptus populnea*). This indicates that Koalas are most likely utilising the area. Koala is listed as 'vulnerable' under the provisions of the NC Act (south-east Queensland bioregion) and EPBC Act.

The Eastern great egret (*Ardea alba*) was observed during the field investigations along Mimosa Creek. The Eastern great egret is listed as 'Migratory' and 'Marine' under the provisions of the EPBC Act.

No other fauna species of conservation significance listed under the provisions of the NC Act and/or EPBC Act were recorded.

Habitat features are present within in this section, include canopy cover and hollow-bearing habitat trees considered suitable for arboreal mammals and birds, whilst the fissured tree bark, dense groundcover vegetation, woody debris and leaf litter may provide suitable habitat for reptiles, small mammals and birds. Mimosa Creek provides pooled water, foraging and nesting habitat, suitable for amphibians, bats and birds. The habitat value of the area is considered to be moderate in relation to the ability to support endemic fauna species.

Based on the habitat assessment, it is possible that the following EVNT species may be found within the area:

- Black-throated finch (*Poephila cincta*)
- Brigalow scaly-foot (*Paradelma orientalis*)
- Collared delma (*Delma torquate*)
- Cotton pygmy-goose (*Nettapus coromandelianus*)
- Dunmall's snake (*Furina dunmalli*)
- Great egret (*Ardea alba*)
- Large-eared pied bat (*Chalinolobus dwyeri*)
- Ornamental snake (*Denionia maculata*)
- Rainbow bee-eater (*Merops ornatus*)
- South-eastern long-eared bat (*Nyctophilus corbeni*)
- Squatter pigeon (*Geophaps scripta scripta*)
- Star finch (*Neochmia ruficauda*)
- Yakka skink (*Egernia rugosa*)

11.9 KP223.3 to KP225: Dawson Range

From KP223.3 to KP225 the GTP ROW crosses the Dawson Range characterised by Eucalyptus and Corymbia species of vegetation community RE11.5.2 and *Acacia shirleyi* of RE 11.10.3. The elevation difference is minimal in this part of the Dawson Range (approximately 50m height difference). The GTP RoW does not encroach into the mapped RE11.9.5 near to KP224.5. Furthermore, due to the significant presence of *Acacia shirleyi* in the polygon during the Ausecology survey, this RE would be better described as RE 11.10.3/11.9.5.

One EVNT species was identified as summarised in Table 11.6. No Type A species were found on the RoW in the Dawson Range.

Table 11.6 EVNT species identified in KP223.3 to KP225 of the GTP RoW

EVNT species	KP location	Number of specimens	Comments
Desmodium macrocarpum	223.2 - 225	15	Scattered throughout

Table notes: EVNT species are state listed under the NC Act

The occasional scattered *Opuntia stricta* (Prickly pear) was identified in this section of the GTP RoW.

The habitat value of this area is reasonable; the targeted fauna searches established that the ground layer is dominated by *Heteropogon contortus* (Black spear grass) which has the potential to provide habitat for the EPBC Act listed Brigalow scaly-foot (*Paradelma orientalis*) and the Squatter pigeon (*Geophaps scripta scripta*). There is also an established canopy cover which may be suitable for shelter, foraging and perching activities of various bat species, including the South-eastern long-eared bat (*Nyctophilus corbeni*) and the Large-eared pied bat (*Chalinolobus dwyeri*). Furthermore there was also a range of woody debris present (ie fallen/felled timber including hollow-bearing logs) and fissured tree bark. This may provide habitat for the Yakka skink (*Egernia rugosa*), Collared delma (*Delma torquata*) and Dunmall's snake (*Furina dunmalli*) and the NC Act listed Golden-tailed gecko (Strophurus taenicauda).

KP224.2 to KP226.5 contains scattered regrowth cultivation with dense Buffel grass (*Pennisetum ciliare*) considered not to be potential habitat for any threatened species. Ground truthing found that vegetation within KP224.3 that is mapped as 'endangered' RE 11.9.5; however this is actually non-remnant vegetation.

11.10 KP225 to KP234

From KP225 to KP227.3, the GTP RoW enters environments of more open pasture paddocks with small stands of vegetation (mainly *Eucalyptus cambageana*, Dawson River gum) and the occasional paddock tree. This area is littered with large logs due to land management vegetation clearing in the past (Photo 61 and Photo 62).

From KP227.3 to KP234 (Dawson River) the GTP RoW passes through predominantly cropping and pasture paddocks (Photo 63 and Photo 64). Some small stands of vegetation, mainly *Eucalyptus cambageana* (Dawson river blackbut) and *Acacia harpophylla* (Brigalow), and individual paddock trees are present within or on the edge of the RoW. Some of these could potentially be avoided with a small reduction in the RoW width. At the RoW crossing KP231.10 of Denby Creek standing water was present in a billabong. The banks of this creek are eroded and as such these banks will require considerable rehabilitation during and post construction.

At KP233.1 the RoW enters an area characterised by gilgai (melon holes) and overflow areas (floodplain) from the Dawson River. The vegetation community on the western bank of the Dawson River is characteristic of RE 11.3.25. A water feature at KP233.1 consists of a chain of lagoons with standing water at time of the survey. Another vegetated overflow (Photo 65 and Photo 66) with standing water was present adjacent to the Dawson River's west bank to the northeast of the RoW. This overflow provides good habitat for aquatic species with incidental sightings of duck and cormorant species identified during the Ausecology flora survey of the area. The RoW crossing of the Dawson River at KP233.90 is in an area of gentle terraced banks (Photo 67 and Photo 68). However adjacent downstream, the left bank is much steeper due to a natural river diversion. The left bank contained several habitat trees of species *Eucalyptus camaldulensis* (River red gum), *Eucalyptus coolabah* (Mountain coolabah), *Melaleuca trichostachya* (Tea tree), *Pleiogynium timorense* (Burdekin plum), *Lysiphyllum carronii* (Red bauhinia) and *Cassia tomentella* (Velvet cassia) with two specimens of Type A *Cymbidium canaliculatum* (Black orchid) present.

Photo 61 Stand of *Eucalyptus cambageana* trees in GTP RoW at KP225.7

Photo 62 Numerous logs between KP225 andKP227.2

Photo 63 Looking back toward the Dawson Range from KP130

Photo 64 Cropping land at KP129, some heavily infested with *Parthenium hysterophorus*

Photo 65 Billabong at KP233.1

Photo 66 Billabong at KP233.1

Photo 67 **West bank of the Dawson River with RE11.3.25 vegetation**

Photo 68 **Dawson River**

One EVNT species was identified in this section of the GTP RoW and two Type A species belonging to the genus *Brachychiton* were identified as summarised in Table 11.7 and Table 11.8 respectively.

Table 11.7 EVNT species identified in KP225 to KP234 of the GTP RoW

EVNT species	KP location	Number of specimens	Comments
Desmodium macrocarpum	232	2	One within RoW, one on the edge

Table notes: EVNT species are state listed under the NC Act

Table 11.8 Type A species identified in KP225 to KP234 of the GTP RoW

Type A species	KP location	Number of specimens	Comments
Brachychiton australis	226.7	1	Large specimen
Brachychiton rupestris	225.5 226.6 232.9 233	4	Large specimens

Weeds recorded along this section include the declared *Parthenium hysterophorus* (scattered throughout RoW with some dense localised infestations in the cropping paddocks), *Opuntia tomentosa, Opuntia stricta* and *Opuntia aurantiaca*. The environmental weed *Acacia farnesiana* was present.

Habitat features within the pasture areas were present in the form of dead trees and fallen logs, abundant between KP225 to KP227.3, Denby Creek and the Dawson River banks.

Various waterbirds were identified from the water features between KP233.1 and KP234, such as brolgas, herons and duck species. Fauna searches undertaken at KP231.2 also indicated that there may be suitable habitat for Cattle egret and Eastern great egret species in this area.

The cleared areas within this area may also provide habitat for the EPBC Act listed Squatter pigeon. However the area between KP231.2 and the Dawson River (KP233.90) is unlikely to support any Squatter pigeons due to the heavily grazed pasture land with stalky Buffel grass

(*Pennisetum ciliare*). The habitat value of this area was noted as being generally low. The Fitzroy river turtle (*Rheodytes leukops*) may also be found at KP233.90.

The targeted fauna search also noted that the canopy cover in the area is probably suitable for shelter, foraging and perching activities for smaller species, including the South-eastern long-eared bat (*Nyctophilus corbeni*) and the large-eared pied bat and the Rainbow bee-eater (*Merops ornatus*). Additionally due to the proximity of the water bodies in this area it may also support Red goshawk species.

The area between KP232 and KP234 is paddock dominated by Buffel grass (*Pennisetum ciliare*) with minor regrowth, *Brachychiton rupestris* (Narrow leaved bottle tree) and *Brachychiton australis* (Broad leaved bottle tree). Multiple Rainbow bee-eater nests and an individual were observed in a sandy bank near KP233, approximately 230 m south-east of alignment.

Mapped vegetation at KP231 was assessed during ground truthing surveys to not be Brigalow TEC due to height structure and large percentage of weed cover.

11.11 KP234 to KP243: Dawson River to Theodore-Baralaba Road

KP234 to KP243 of the GTP RoW consisted predominantly of open Buffel grass (*Pennisetum ciliare*) pasture (40% cover) with a small area of cultivation. Scattered regrowth and paddock trees occurred throughout the GTP RoW. KP234 to KP234.25 at the Dawson River consisted of remnant vegetation RE 11.3.25 dominated by *Eucalyptus tereticornis* (Queensland blue gum) (Photo 69). A pond is present in the non-remnant area at KP234.3 just south of the GTP RoW (Photo 70). KP234.30 to KP234.39 showed a narrow strip of vegetation associated with Back Creek dominated by *Eucalyptus coolabah subsp. coolabah* (Coolabah), consistent with that of RE11.3.3 (Photo 71).

From Back Creek at KP234.30 to KP236.8, the GTP RoW is located in grazing pastures (Photo 72).

Photo 69 **Characteristic vegetation at the eastern bank of the Dawson River**

Photo 70 **Pond at KP234.25 just south of the RoW**

Photo 71 **Creek vegetation at KP234.30**

Photo 72 **Open pastures at KP235.5**

At KP236.8 the RoW passes through the northern extent of a wetland area (dominated by *Eucalyptus tereticornis* (Queensland blue gum) with *Eleocharis sp* as groundcover, and *Eucalyptus coolabah subsp coolabah* (Coolibah) on the perimeter) (Photo 73).

Photo 73 **Wetland area with *Eucalyptus coolabah* subsp. *coolabah* on the perimeter**

Photo 74 **Cleared open paddock on the left where RoW will not be impact on wetland and associated trees**

Photo 75 **Overview KP237.2 facing east**

Photo 76 **Overview at KP237.5 facing east**

The presence of regrowth of vegetation most representative of RE 11.3.3 was noted at Kianga Creek with an average tree height of 8 to 10 m. Species observed in this area included *Eucalyptus coolabah subsp. coolabah* (Coolibah), *Lysiphyllum spp*. and *Melaleuca trichostachya* (Tea-tree) (Photo 77).

The rest of the GTP RoW up to KP243 was found to be characterised by pasture paddocks and some sorghum cropping land intersected by three water features (Photo 78).

Photo 77 **Vegetation at Kianga Creek**

Photo 78 **Open pasture paddocks from Kianga Creek to KP243**

No EVNT species were identified within the GTP RoW between KP234 and KP243. Field work undertaken by Ausecology identified two (2) Type A species within the KP234 to KP243 section. Table 11.9 presents the Type A species observed within the RoW. Additional Type A species were mapped close by, but these specimens were located outside of the RoW. These individuals were mapped for reference only and have not been included in Table11.9**Error! Reference source not found.**.

Table 11.9 Type A species identified in KP234 to KP243 of the GTP RoW

Type A species	Number of specimens	Comments
Brachychiton rupestris	3	All in good condition and of similar height at 15 m
Cymbidium canaliculatum	1	Accessibility suitable for translocation

A number of melon holes were observed in the KP240 to KP242 section of the GTP RoW. Most of these have been mechanically disturbed and were in relatively poor condition and were observed to have limited ecological value (Photo 79). There was however one melon hole observed at KP240.12 that was in comparatively good condition and contained water at the time of survey. This melon hole contained an abundance of *Cyperus* sp., *Juncus usitatus* (Juncus), *Marsilea drummondii* (Nardoo) and *Typha orientalis* (Typha) and as such, provided valuable potential habitat for aquatic, amphibious and terrestrial fauna (Photo 80).

Photo 79 to **Characteristic melon hole in the KP240 KP242 section**

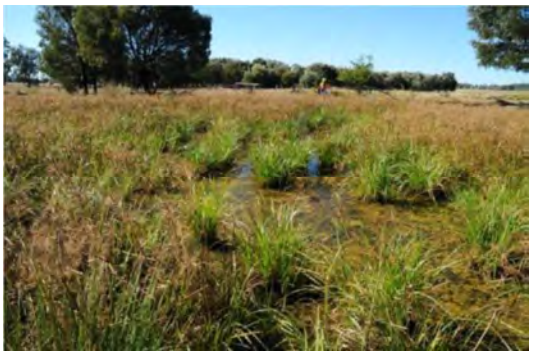

Photo 80 **Melon hole at KP240.12**

Declared weeds identified in this section included scattered *Opuntia tomentosa* (Velvet tree pear) found throughout the GTP RoW. Several infestations of *Parthenium hysterophorus* (Parthenium) were identified on the RoW with a major infestation at Back Creek (KP234.35) and minor infestations between KP237.5 and KP240.5 often associated with access tracks and fence-lines. *Cardiospermum grandiflorus* (Balloon vine*)* was observed at the Dawson River at KP234, while a moderate infestation of *Cryptostegia grandiflora* (Rubber vine) was observed at Kianga Creek at KP239.74.

A number of habitat trees were observed throughout the GTP RoW with bird nests and one potential bees or wasps nest was observed at KP234.2 (Photo 81 and Photo 82, respectively).

The sites investigated by the Aurecon targeted searches in this area included KP234, KP234.05 and KP234.3. All of these areas provided a range of habitat features, including canopy cover suitable for shelter, foraging and perching, fissured tree bark, moderate ground cover (ie grassy tussocks), woody debris (ie fallen/felled timber including hollow-bearing logs), leaf litter, watercourse habitat (including banks) and hollows. KP234.5 to KP235 provided less variety as it was primarily paddock dominated by Buffel grass (*Pennisetum ciliare*) with other exotic grasses, minor regrowth and some remnant trees. Based on the habitat assessment, it is possible that the following EVNT species may be found within the area:

- Black-throated finch (*Poephila cincta*)
- Collared delma (*Delma torquate*)
- Cotton pygmy-goose (*Nettapus coromandelianus*)
- Dunmall's snake (*Furina dunmalli*)
- Eastern great egret (*Ardea alba*)
- Rainbow bee-eater (*Merops ornatus*)
- Red goshawk (*Erythrotriorchis radiates*)
- Star finch (*Neochmia ruficauda*)
- White-bellied sea eagle (*Haliaeetus leucogaster*)

Photo 81 **Bird nest at KP237.28**

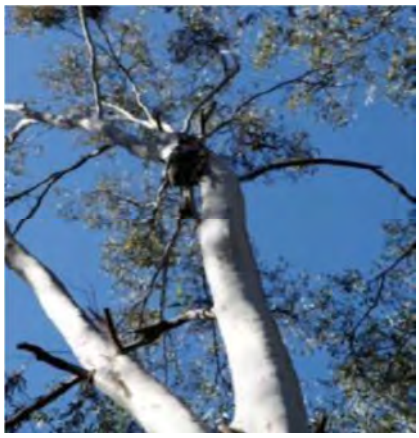

Photo 82 **Potential bees or wasps nest at KP234.2**

11.12 KP243 to KP258: Theodore-Baralaba Road to Banana Baralaba Road

The section from KP243 to KP256 consisted predominantly of open pasture (some of which was recently blade ploughed) dominated by Buffel grass (*Pennisetum ciliare*) with patches of Rhodes grass (*Chloris gayana*), Queensland blue grass (*Dichanthium sericeum*), Black speargrass (*Heteropogon contortus*) with some sparsely scattered regrowth dominated by *Acacia harpophylla*.

From KP243 to KP245 occasional *Brachychiton* spp were mapped, although most of these were located outside of the RoW. Two *Brachychiton rupestris* (Narrow leaved bottle tree) were in relatively good condition and each was over 20 m in height, and was located on the edge of the RoW at KP244.5 and another at KP246.8. It was noted that both could potentially be avoided due to the proximity to the edge of the alignment. Another *Brachychiton rupestris* tree was mapped at KP247.4 again right on the edge of the RoW, standing to approximately 15 m tall, this individual was in slightly poorer condition but again could be avoided. At KP246.28, 14 individuals of *Solanum johnsonianum* were identified in dense, but fragmented regrowth vegetation that ran for approximately 130 m along the RoW and measuring 100 m wide to the south (Photo 83 and Photo 84). This small patch was further fragmented by the Jemena pipeline but contained a good mix of regrowth, including *Eucalyptus cambageana*, *Acacia harpophylla*, *Citrus glauca*, *Alectryon diversifolius* and *Carissa ovata*.

Photo 83 **Patch of regrowth at KP246**

Photo 84 ***Solanum johnsonianum*** **mapped at KP246.28**

Habitat features in this section of the GTP RoW included hollow logs, log piles and the occasional hollow or dead tree. However, in general, the habitat opportunities were limited. A fenced man-made dam was located at KP244.84. While the larger section of the dam was located off the RoW a constructed turkey nest dam associated with the fenced dam was located directly within the RoW (Photo 86). Close to the dam and along the fence line Parthenium was noted.

Photo 85 ***Brachychiton rupestris*** **at KP244.41**

Photo 86 Constructed turkey nest dam at KP244.84

A number of melon holes were observed in the section between KP250.5 – KP251.5. The majority of these had been mechanically disturbed, were in poor condition and generally have little ecological value (Photo 88).

Photo 87 Overview of pasture at KP250

Photo 88 Degraded gilgai at KP250.7

No remnant vegetation was mapped in the GTP RoW between KP250.5 and KP251.5. However, the vegetation at KP252.60 associated with Banana Creek was confirmed as remnant RE 11.3.25/11.3.4. Areas of high value regrowth are present at the Banana Creek area (refer Table 3.9 for details). HVR vegetation composition was consistent with RE 11.4.9 and was dominated by *Acacia harpophylla* with *Eucalyptus coolabah subsp. coolabah* (Coolabah) emergents, and an understorey of *Alectryon diversifolius, Carissa ovata, Citrus glauca* and *Terminalia oblongata*.

Photo 89 **HVR at KP252.43 dominated by *Acacia harpophylla***

Photo 90 **Vegetation at Banana Creek at KP252.60**

From Banana Creek to the Banana-Baralaba Road, the GTP RoW is located in grazing pastures (Photo 91 and Photo 92).

Photo 91 **Typical vegetation between KP253 and KP258**

Photo 92 **Typical vegetation between KP253 and KP258**

One EVNT species was identified in this section of the GTP RoW. Their main locations are listed in Table 11.10. One Type A species was identified in the KP243 to KP258 section. Table 11.11 lists the Type A species and their main locations within the RoW.

Table 11.10 EVNT species identified in KP234 to KP243 of the GTP RoW

EVNT species	KP location	Number of specimens	Comments
Solanum johnsonianum	243.50	317	All specimens located in road reserve beside Theodore-Baralaba Road. Specimens are in a fair condition, most likely impacted due to the dust from the road
	246.3	14	All specimens, which are in a healthy condition, are located in a small patch of brigalow

Table notes: EVNT species are state listed under the NC Act

Table 11.11 Type A species identified in KP243 to KP258 of the GTP RoW

Type A species	Number of specimens	Comments
Brachychiton rupestris	3	All located close to edge of RoW and could be avoided. Access good for translocation if needed. Two specimens 26 m and 22 m in height were in good condition, a smaller 15 m individual was in poor condition

Declared weeds observed in this section included scattered Velvet tree pear (*Opuntia tomentosa)*. Several minor infestations of Parthenium (*Parthenium hysterophorus)* were identified throughout the section. After Banana Creek only minor infestations of Parthenium were identified between KP253.5 and KP255.5. A minor infestation of Rubber vine (*Cryptostegia grandiflora)* was observed at Banana Creek at KP252.4, and Mother-of-millions (*Bryophyllum delagoense)* were recorded at KP252.91.

One (1) small bird nest (active), belonging to a Buff-rumped thornbill (*Acanthiza reguloides*) (Photo 93) and a large *Eucalyptus coolabah subsp. coolabah* (Coolibah) habitat tree was observed at KP252 (Photo 94). Several habitat trees and habitat logs were observed at Banana Creek at KP252.60; however in general, fauna habitat potential in this section is very limited and mainly associated with the HVR and remnant vegetation of Banana Creek.

Photo 93 Active buff-rumped thornbill nest at KP252

Photo 94 Hollows in *Eucalyptus coolabah subsp. Coolabah* at KP252

The targeted fauna searches undertaken by Aurecon also confirmed that this area has a generally limited habitat potential. At KP249.5 the ground cover consisted mostly of grassy tussocks and woody debris (ie fallen/felled timber including hollow-bearing logs). This area may provide habitat for the Ornamental snake and Cattle egret. An Ornamental snake was located outside alignment RoW in this area underneath a hollow-bearing log. The area between KP249.5 to KP250.5 is primarily-ploughed paddock, which does not provide a high habitat potential, however Cattle egret and possibly Dunmall's snake may be present. KP250.5 to KP252 exhibited very sparse Brigalow and *Eucalyptus cambageana* with *Citrus glauca*. This vegetation may provide potential habitat for the Ornamental snake (*Denionia maculata*), and possibly Dunmall's snake (*Furina dunmalli*) and Cattle egret (*Ardea ibis*). However it is unlikely that this area would be suitable habitat for Squatter pigeon (*Geophaps scripta scripta*). It is also possible that the ornamental snake may be found between KP252.25 and KP253.

11.13 KP258 to KP269: Banana-Baralaba Road to Leichhardt Highway

The section of GTP RoW from KP258 to KP269 was characterised by open pasture mainly dominated by Buffel grass (*Pennisetum ciliare*) with small patches of Rhodes grass (*Chloris gayana*), Black spear grass (*Heteropogon contortus*) and Kangaroo grass (*Themeda*

triandra). Scattered regrowth of *Acacia decora, Acacia harpophylla, Capparis lasiantha, Eremophila mitchellii and Eucalyptus* spp. occurred throughout large parts of the RoW.

From KP258.85 to KP258.9 a small patch of HVR Brigalow is present with the vegetation cover gradually becoming sparser after this patch (Photo 95 and Photo 96). From KP259.2 to Police Camp Creek, the GTP RoW traverses pasture paddocks with the occasional paddock tree (mainly *Eucalyptus cambageana*) and large areas with dense grass cover (Photo 97 and Photo 98).

Photo 95 Patch of Brigalow (ground-truthed as non-TEC Brigalow) at KP258.9

Photo 96 Sparse regrowth vegetation at KP259.2 looking east

Photo 97 Typical pasture vegetation between KP259.2 and Police Camp Creek

Photo 98 Typical pasture vegetation at KP263 (with cropping to the north of the RoW)

Remnant vegetation RE 11.3.25 is present at Police Camp Creek, which is lined with large *Eucalyptus* and *Corymbia* trees.

KP265.46 to KP265.58 was characterised by open pasture dominated by Buffel grass (*Pennisetum ciliare*) with scattered shrubby regrowth of *Acacia* spp. and *Eucalyptus* spp. (Photo 99 and Photo 100) dissected by several poorly defined drainage features. One small area of mapped HVR occurred at KP265.54. This consisted of two isolated patches of mature *Acacia harpophylla* and *Eucalyptus populnea* with one large *Brachychiton rupestris* dissected by the Jemena pipeline. Ground truthing by Ausecology determined that although the mapped vegetation was mature and contained some remnant vegetation the patch size was too small and isolated to be considered HVR (Photo 101).

Photo 99 **Police Camp Creek vegetation**

Photo 100 **Overview facing east from KP263.66**

Photo 101 **Small stand of *Acacia harpophylla* (ground-truthed as non-TEC HVR) at KP265.54**

Photo 102 **Overview facing east from KP268**

One EVNT species was identified within this section of the GTP RoW (Table 11.12). Three (3) Type A species were identified in the KP258 to KP269 section (Table 11.13).

Table 11.12 EVNT species identified within the GTP RoW between KP258 and KP269

EVNT species	KP location	Number of specimens	Comments
Solanum johnsonianum	259.70	85	Specimens are in good condition, in general growing in the open with no tree canopy cover

Table notes: EVNT species are state listed under the NC Act

Table 11.13 Type A species identified within the GTP RoW between KP258 and KP269

Type A species	Number of specimens	Comments
Brachychiton populneus	1	Juvenile at KP267.1
Brachychiton rupestris	5	All were in good condition with good access for translocation
Cymbidium canaliculatum	2	Good access for translocation

Melon holes were observed throughout the section of the GTP RoW at KP260.40 to KP264.18. All melon holes had been mechanically disturbed, were dominated by exotic pasture species and were of limited ecological value.

Declared weeds observed included Prickly pear (*Opuntia stricta)* and Velvet tree pear (*Opuntia tomentosa*). These species were sparsely scattered throughout the GTP RoW.

Minor infestations of Mother-of-millions (*Bryophyllum delagoense*) occurred throughout the RoW from KP266.80 to KP269. Several small patches of Parthenium (*Parthenium hysterophorus*) were observed at KP263 and KP263.5. After Police Camp Creek, no Parthenium was identified within the RoW.

Feathertop Rhodes grass (*Chloris virgata*) was observed on the GTP RoW at KP266. This is not a declared weed species although it is a problematic agricultural weed and care should be taken to prevent its spread on and off the RoW.

One (1) echidna (*Tachyglossus aculeatus*) sheltering in a burrow inside a termite mound was observed at KP266.50 (Photo 103 and Photo 104). Several terrestrial termite mounds with evidence of echidna diggings were observed in the area surrounding KP266.50. A large number of logs destined as future fenceposts were observed at KP259.80 (Photo 105 and Photo 106). A variety of reptiles, although listed as 'least concern' under the NC Act were observed during the Ausecolgy vegetation survey, including Red-napped snake (*Furina diadema*) *(*Photo 107), Bynoe's gecko (*Heteronotia binoei*) (Photo 108) and Open-litter rainbow skink (*Carlia pectoralis*).

Photo 103 **Termite mound with signs of echidna diggings**

Photo 104 **Echidna (*Tachyglossus aculeatus*) inside termite mound at KP266.5**

Photo 105 **Piles of logs at KP259.8 providing potential habitat for reptiles**

Photo 106 **Piles of logs at KP259.8 providing potential habitat for reptiles**

Photo 107 **Red-naped snake (*Furina diadema*) underneath logs**

Photo 108 **Bynoe's gecko (*Heteronotia binoei*)**

Two areas of minor gully erosion were observed on the GTP RoW at KP266.50 and KP268.50 (Photo 109 and Photo 110).

Photo 109 **Erosion on existing track at KP266.50**

Photo 110 **Gully erosion at KP268.50**

11.14 KP269 to KP285.8: Leichhardt Highway to Belldeen-Greycliffe Road

The section KP269 to KP285.8 is characterised by open pasture with scattered shrubby regrowth and the occasional isolated tree. Many areas of pasture included native pasture species such as Queensland blue grass (*Dichanthium sericeum*), Black spear grass (*Heteropogon contortus*) and Kangaroo grass (*Themeda triandra*).

The Leichardt Highway – Belldeen Defence Road section of the GTP RoW between KP269 and KP285 was characterised by an undulating landscape with several moderately steep gullies. The vegetation contained within this area was predominantly pasture grass with some sections dominated by native pasture. Scattered regrowth and several isolated trees also occurred in this section (Photo 111 and Photo 112).

Photo 111 **Overview facing east from KP270**

Photo 112 **Overview facing east from KP274**

The Belldeen-Defence Road to KP280 section of the GTP RoW consisted mostly of undulating hills with a variety of grass species and occasional patches of *Acacia* sp. regrowth and isolated trees (mainly *Eucalyptus crebra* and some *Flindersia australis* and *Pleiogynium timorense*). The Aurecon targeted fauna habitat searches observed that this open land type continued in the form of cropping land (Buffel grass (*Pennisetum ciliare*) with scattered regrowth) in the areas between and around KP281 to KP282.

Photo 113 **View to the east from KP277**

Photo 114 **View to the east from KP277.71**

Photo 115 **Sparse *Eucalyptus crebra* at KP278**

Photo 116 **Characteristic open pastures at KP279**

The GTP RoW crosses a drainage channel, with vegetation resembling that of RE11.3.25. The area where the RoW crosses the creek is very sparsely vegetated with the main species *Eucalyptus tereticornis* (Queensland blue gum) and *Melaleuca* along the creek and a few *Eucalyptus cambageana* on the alluvium flats (Photo 115). After thisdrainage channel the GTP RoW traverses pasture paddocks (Photo 116 and Photo 117), some Leucaena

(*Leucaena leucocephala*) fodder crops (Photo 118) and pasture paddocks through to the Belldeen-Greycliffe Road. At KP284.35 to KP284.42 some Brigalow (*Acacia harpophylla*) HVR vegetation is present (Photo122). This area may provide habitat for Yakka skink (*Egernia rugosa*), Dunmall's snake (*Furina dunmalli*), Large-eared pied bat (*Chalinolobus dwyeri*), South-eastern long-eared bat (*Nyctophilus corbeni*), Cattle egret (*Ardea ibis*), Eastern great egret (*Ardea alba*), Rainbow bee-eater (*Merops ornatus*), Star finch (*Neochmia ruficauda*), Black-throated finch (*Poephila cincta*) and Ornamental snake (*Denisonia maculate*).

Photo 117 **Drainage channel**

Photo 118 **Typical open pasture after Sellheim Creek**

Photo 119 **Open pastures with leucaena fodder crop in the distance at KP281.5**

Photo 120 and **Leucaena fodder crop between KP282 KP283.3**

Photo 121 **Regrowth vegetation at KP284**

Photo122 **Dense Brigalow regrowth at KP284.35 to KP284.42**

No EVNT species as listed under the provisions of the NC Act and/or the EPBC Act were identified in this section of the GTP RoW. Four Type A species were identified in the KP269 to KP285.80 section of the GTP RoW. Table 11.14 provides a summary of the Type A species identified within the RoW.

Table 11.14 Type A species identified in KP269 to KP285.8 of the GTP RoW

Type A species	Number of specimens	Comments
Brachychiton australis	2	5 m and 8 m in height, good condition and good access for translocation
Brachychiton populneus	12	Three juveniles less than 1 m in height, the rest are all in good condition with three located close to KP278.9 which have steep access for translocation. Access is good for all others in this section
Brachychiton rupestris	2	4 m and 6 m in height, good condition and good access for translocation
Cymbidium canaliculatum	2	Growing in *B. populneus*, very small

Declared weeds in this section of the GTP RoW included sparsely scattered Velvet tree pear (*Opuntia tomentosa*) and the occasional Prickly pear (*Opuntia stricta*). A significant mother-of-millions (*Bryophyllum delagoense*) infestation was identified within the Brigalow regrowth at KP284.4.

Limited fauna habitat was present between KP269 and KP285.80 of the GTP RoW. Notwithstanding the limited habitat, three Squatter pigeons (*Geophaps scripta scripta*) were seen flying away at KP280.42 (Photo 123). In addition, numerous Whiptail wallabies were seen at KP277 with a large mob of Whiptail wallabies observed in the vicinity of KP274 (Photo 124).

Photo 123 Squatter pigeon (*Geophaps scripta scripta*) at KP280.42

Photo 124 Whiptail wallaby at KP274

Several gullies occurred in the section of the GTP RoW between KP270.80 to KP271.05, KP273.50 and KP274.50. These areas represent the upper reaches of the drainage gullies and watercourses further down slope. Minor to moderate erosion was observed in the three gullies from KP271 to KP271.05 (Photo 125). Other erosion areas were observed at KP272.43 and KP275 (Photo 126).

Photo 125 **Gully with minor erosion as observed throughout KP270 to KP274**

Photo 126 **Indicative erosion point as observed throughout this section of RoW**

Mapped vegetation at approximately KP284, KP287 and KP288 is not consistent with Brigalow TEC because the vegetation is sparse, there are insufficient structural elements and the ground cover is dominated by Buffel grass (*Pennisetum ciliare*).

11.15 KP285.8 to KP297.5: Belldeen-Greycliffe Road to Burnett Highway

The section of the GTP RoW between KP285.8 and KP297.5 is characterised by open pasture land dominated by Buffel grass (*Pennisetum ciliare*) and small areas of cropping with sparsely scattered shrubby regrowth and isolated trees.

A number of melon holes occur in the section between KP286.6 and KP289.5 (Figure 127). These were generally in poor condition, however a number of these supported good populations of EVNT listed species Blake's spike rush (*Eleocharis blakeana*) (Figure 128).

Two man made dams also occur in this section of the GTP RoW. The dam at KP288 contained water at the time of survey and was in relatively good condition (Photo 129). The dam at KP292.45 was dry at the time of survey and was in relatively poor condition with severe erosion of the overflow/spillway evident (Photo 130).

Photo 127 **Large and deep (1.5 to 2 m) gilgai at KP289.5**

Photo 128 **Shallow gilgai with *Eleocharis blakeana***

Photo 129 **Dam at KP288**

Photo 130 **Poor condition dam at KP292.5**

The section from KP288 to KP293 was characterised by open pasture, with a small section of a Leucaena fodder crop. Several large *Brachychiton* spp. and one Crows ash (*Flindersia australis*) tree was mapped in this section. A section of mapped HVR occurs between KP288.55 and KP288.90 of the GTP RoW (Photo 131). Vegetation in this area was dominated by Brigalow (*Acacia harpophylla*) regrowth ranging from 1 to 6 m tall. Emergent Scarce Thozet's gum (*Eucalyptus thozetiana*) was present within this regrowth and an understorey of mixed pasture species dominated by Buffel grass (*Pennisetum ciliare*). The vegetation in this area was relatively sparse and patchy as a result of the numerous gilgai contained within the area.

Photo 131 **Mapped HVR brigalow with eucalypt emergent at KP288.55 to KP288.9**

Photo 132 **Overview facing east from KP292**

The section of the GTP RoW between KP295.65 to KP297 was dominated by three areas of mapped 'of concern' HVR and a section of mapped remnant vegetation (RE11.3.25/11.3.4). The areas of HVR associated with Orange Creek at KP296.60 and Koombit Creek at KP296.80 was of sufficient height, structure and diversity to be remapped as remnant vegetation. Vegetation was mostly confined to the streambank and was consistent with RE 11.3.25 dominated by *Eucalyptus coolabah subsp. coolabah* (Coolibah) and *Eucalyptus tereticornis* from 18 to 25 m tall with an understorey of *Acacia salicina, Casuarina cunninghamiana, Ficus opposita and Lysiphyllum hookerii* (Photo 133 and Photo 134).

The targeted fauna survey at KP295.6 (Unnamed Watercourse 7) identified that vegetation associated with the creek contained the following habitat resources; canopy cover suitable for shelter, foraging and perching, fissured tree bark, dense ground cover (ie grassy tussocks), woody debris (ie fallen/felled timber including hollow-bearing logs), leaf litter and some limited hollows. These features and the proximity to the watercourse may provide habitat for the following EVNT species; South-eastern long-eared bat (*Nyctophilus corbeni*), Large-eared pied bat (*Chalinolobus dwyeri*), Ornamental snake (*Denisonia maculate*) and sandy banks which would facilitate nesting for the Rainbow bee-eater (*Merops ornatus*).

Photo 133 Riparian vegetation at Koombit Creek KP296.80

Photo 134 Riparian vegetation at KP296.80

Vegetation associated with Unnamed Watercourse 7 at KP295.60 is mapped as a section of remnant vegetation (RE11.3.25/11.3.4) surrounded by an area of HVR. The delineation between the mapped HVR and remnant vegetation was not apparent and the entire area of vegetation was assessed to be of sufficient height, structure and diversity to be classified remnant vegetation during the Ausecology survey. Vegetation in this area was consistent with RE11.3.3 dominated by *Eucalyptus coolabah subsp*. *coolabah* (Coolibah) up to 25 m tall with a mid-storey dominated by *Acacia salicina* and *Lysiphyllum hookeri.* The ground layer was a mixture of grasses with patches of the reed *Eleocharis* sp.

Photo 135 RE11.3.3 at Unnamed Watercourse 7 KP295.60

Photo 136 RE11.3.3 at Unnamed Watercourse 7KP295.60

One EVNT species was identified in this section of the GTP RoW. Their main locations are listed in Table 11.15.

Table 11.15 EVNT species identified in KP285.8 to KP297.5 of the GTP RoW

EVNT species	KP location	Number of specimens	Comments
Eleocharis blakeana	KP287.2-288.6	213 individuals plus one large gilgai (200 m^2 in RoW) with 9/m^2, totalling 1,800 specimens in the RoW	Total count: 2,013 directly in RoW

Table notes: EVNT species are state listed under the NC Act

Two Type A species were identified in the KP285.8 to KP297.5 section of the GTP RoW. Table 11.16 lists the Type A species identified within the RoW.

Table 11.16 Type A species identified in KP285.8 to KP297.5 of the GTP RoW

Type A species	Number of specimens	Comments
Brachychiton australis	1	To 12 m in height, good condition and with good access for translocation purposes
Brachychiton spp.	1	Juvenile to 1.5 m growing in fork of *Eucalyptus camabageana* tree. Healthy condition

Declared weeds contained within this section of the GTP RoW include sparsely scattered Velvet tree pear (*Opuntia tomentosa*). In addition, Harrisia cactus (*Harrisia martini*) was observed at KP288.7. An infestation of Cat's claw creeper (*Macfadyena unguis-cati*) was observed at KP296.66 and again at KP296.83. A large infestation of rubber vine (*Cryptostegia grandiflorum*) was observed at Orange Creek (KP295.65).

Numerous habitat trees and habitat logs were observed throughout the GTP RoW in this section of the GTP RoW. Striated pardalote (*Pardalotus striatus*) nests were observed at KP292.5 (Photo 137). These nests were located within the banks of the erosion surrounding the dam, although at the time of the survey they appeared inactive.

Opportunistic fauna sightings during the Ausecology vegetation survey included an Eastern great egret (*Ardea modesta*) at a dam to west of the RoW at KP288.14 (Photo 138).

Photo 137 Striated pardalote nest at KP292.45

Photo 138 Eastern great egret (*Ardea modesta*) at KP288.14

Severe gully erosion was observed at the dam overflow at KP292.5. The level of erosion indicated that the soils in this area are highly dispersive and is likely to be prone to further erosion risk (Photo 139 and Photo 140).

Photo 139 **Severe erosion of dam overflow at KP292.45**

Photo 140 **Severe erosion of dam overflow at KP292.45**

Many of the other areas investigated during the Aurecon targeted surveys (ie KP294.2 to KP294.7, KP294.7 to KP295.5, KP295.6 to 297.4, KP297.5 to KP298.95 and KP298.95 to KP300.2) were mostly cropping or pasture land with relatively limited habitat potential, for most species.

However due to the proximity of a *Eucalyptus tereticornis* (Queensland blue gum) swamp at KP 297.5 the RoW from KP297.5 to KP298.95 may provide some habitat to the following EVNT species; South-eastern long-eared bat (*Nyctophilus corbeni*), Cattle egret (*Ardea ibis*), Australian painted snipe (Rostratula australis) , Rainbow bee-eater (*Merops ornatus*), Eastern great egret (*Ardea alba*), Star finch (*Neochmia ruficauda*), Black-throated finch (*Poephila cincta*), Red goshawk (*Erythrotriorchis radiates*), Cotton pygmy-goose (*Nettapus coromandelianus*) (only in the *Eucalyptus tereticornis* (Queensland blue gum) swamp at KP 297.5), and Dunmall's snake (*Furina dunmalli*) (only in the margins of the *Eucalyptus tereticornis* (Queensland blue gum) swamp at KP 297.5 and extreme creek bed of Callide Creek at KP298.95).

The fauna investigations for Callide Creek (KP298.90) and Callide Creek 'old channel' (KP300.30) indicated that these areas may support the following EPBC Act listed species South-eastern long-eared bat (*Nyctophilus corbeni*), White bellied sea eagle (*Haliaeetus leucogaster*), Rainbow bee-eater (*Merops ornatus*), Eastern great egret (*Ardea alba*), Cattle egret (*Ardea ibis*), Star finch (*Neochmia ruficauda*), Red goshawk (*Erythrotriorchis radiates*) and the Large-eared pied bat (*Chalinolobus dwyeri*) due to the presence of canopy cover suitable for shelter, foraging and perching, fissured tree bark, dense ground cover (ie grassy tussocks), minor woody debris (ie fallen/felled timber including hollow-bearing logs), leaf litter, watercourse habitat (including banks) and numerous hollows in the creek; however no significant hollows in the RoW at KP300.30.

11.16 KP297.50 to KP312.3: Burnett Highway-Anglo American haul road

Areas located between KP297.5 and KP312.3 of the GTP RoW consisted mostly of grazing paddocks with some cropping and vegetated areas (either as HVR or water feature associated unmapped remnant vegetation). The palustrine wetland mapped at KP297.71 consists of Poplar Box (*Eucalyptus populnea*) (dominant) and Queensland Blue Gum (*Eucalyptus tereticornis*) (subdominant) vegetation (RE 11.3.2) with grassy understorey, which was ground truthed and confirmed as not being representative of a palustrine wetland (Photo 141). The GTP RoW crosses Callide Creek twice (at KP298.90 and KP300.30 (old channel)) with fringing vegetation representative of unmapped RE11.3.25 (Photo 143 and Photo 144).

Photo 141 ***Eucalyptus populnea*** **woodland at KP297.7**

Photo 142 **Drainage line at KP298**

Photo 143 **Callide Creek at KP298.90**

Photo 144 **Vegetation at Callide Creek (Old Channel) at KP300.30**

The GTP RoW crosses pasture paddocks until it crosses Unnamed Watercourse 8 at KP305.50 with vegetation resembling that of RE11.3.25/11.3.4 dominated by Queensland Blue Gum (*Eucalyptus tereticornis*) close to the creek with Moreton Bay Ash (C*orymbia tessellaris*) on the high banks (Photo 145). This creek doubles-back on itself with the RoW encroaching on the creek at KP305.5 (Photo 146). The RoW continues to pass through mainly open pasture country with some regrowth. From KP310 to KP312.3 the vegetation becomes denser with HVR and remnant vegetation changing between RE11.10.1 and RE11.9.9/9(b) (*Eucalyptus crebra* and *Corymbia citriodora* (varying dominance) and the occasional *Eucalyptus exserta* on slopes, changing to *Eucalyptus moluccana* in the lower lying areas (RE11.9.9)) with some open areas of Acacia regrowth.

Photo 145 **Creek at KP305.50 (RE 11.3.25 with RE 11.3.4 on high bank)**

Photo 146 **GTP RoW encroaches onto this stretch of the creek that continues running parallel to the RoW from KP305.50**

Photo 147 ***Corumbia citriodora* with *Eucalyptus crebra* HVR at KP310.50**

Photo 148 ***Eucalyptus crebra* with *Corymbia citriodora* at KP311.7**

No EVNT species as listed under the provisions of the NC Act and/or the EPBC Act were present within the GTP RoW between KP297.5 and KP312.3. Two Type A listed species were present in this section of the GTP RoW. These species are identified in Table 11.17.

Table 11.17 Type A listed species identified within the KP297.5 to KP312.3 of the GTP RoW

Type A species	Number of specimens	Comments
Brachychiton populneus	19	All in good condition with good access for translocation
Brachychiton rupestris	7	One juvenile at 0.6 m height

Weeds in this section of the GTP RoW included Creeping lantana *(Lantana montevidensis)*, which was identified as a small infestation at Callide Creek 'old channel' (KP300.30) before then becoming abundant in various areas from KP305 to KP312.3. Lantana (*Lantana camara*) was present at KP310.8 and 312.14 as individual plants. Rubber vine (*Cryptostegia grandiflora*) was present at Callide Creek (KP300.30) as an individual plant. Mother-of-millions (*Bryophyllum delagoense)* was present as a small infestation on the high bank at the creek at KP298.94 and again at KP305.5 associated with the watercourse. Cat's claw creeper *(Macfadyena unguis-cati*) was present as small infestations associated with the creek at KP305.50. Velvet tree pear (*Opunita tomentosa*) and prickly pear (*Opuntia stricta*) were scattered throughout this section.

A few potential habitat trees, dead trees and logs were found in the vegetated HVR and remnant vegetation areas of this RoW section. Rainbow bee-eaters (*Merops ornatus*)

associated with creeks were identified at Callide Creek (KP298.90). Potential nesting habitat was present at Callide Creek based on the presence of steep and exposed sandy banks.

The Aurecon targeted surveys also identified several areas which may provide habitat for a number of EPBC Act listed species in this section. KP311.4 to KP311.6, KP311.6 to KP311.8 and KP311.8 to KP312 provided a number of different habitat opportunities, including canopy cover suitable for shelter, foraging and perching, fissured tree bark, dense ground cover (ie grassy tussocks), woody debris (ie fallen/felled timber including hollow-bearing logs), moderate leaf litter and some hollows. These areas may therefore provide opportunities for Yakka skink (*Egernia rugosa*), South-eastern long-eared bat (*Nyctophilus corbeni*), Large-eared pied bat (*Chalinolobus dwyeri*), and the Brigalow scaly foot (*Paradelma orientalis*). Conversely areas located between KP311 and KP311.4 of the GTP RoW contain vegetation associated with a hardwood plantation and is therefore unlikely that this area provides such habitat opportunities. Some severe erosion is present in the RoW in some places to 4 m in depth with tunnel erosion noted just to the south of the RoW. The erosion was associated with the drainage feature mapped at KP307.71 and continued to the north for about 200 m. The soils in this location are extremely dispersive and the presence of high levels of salt was noted (Photo 149 and Photo 150).

Photo 149 **Severe erosion to 4 m in depth at KP307.7**

Photo 150 **Salt crystals sitting on top of soil**

12 Conclusion

The GTP RoW section located between KP130 and KP312 was surveyed by experienced ecologists between May 2012 and October 2012. Results of these surveys are presented in detail within this report. This report is to be used during planning, construction and rehabilitation phases, and is to be implemented by Saipem and GLNG Environment Officers and contribute to the SSMP as required pursuant to the EPBC Referral approval conditions.

Five EVNT flora species and seven Type A species were identified during these surveys which examined the 182 km stretch of the GTP RoW. These included *Acacia gittinsii, Acacia spania, Apatophyllum teretifolium, Desmodium macrocarpum* and *Homoranthus decasetus* and *Brachychiton rupestris* (narrow-leaved bottle tree), *Brachychiton populneus* (kurrajong), *Brachychiton australis* (broad-leaved bottle tree), *Brachychiton bidwillii* (little kurrajong), *Macrozamia moorei, Xanthorrhoea johnsonii* (forest grass tree) and *Cymbidium canaliculatum* (black orchid) respectively.

Six significant fauna species were identified within this section of the GTP RoW with suitable habitat identified for several more significant species. The six identified fauna species of significance (listed under the provisions of the NC Act and/or the EPBC Act) included, *Ardea alba* (Eastern great egret), *Geophaps scripta scripta* (Squatter pigeon), *Lophoictinia isura* (Square-tailed kite), *Merops ornatus* (Rainbow bee-eater), *Strophurus taenicauda* (Golden tailed gecko) and *Tachyglossus aculeatus* (Echidna).

In addition to the EVNT flora and fauna species, eleven declared weed species were observed.

Various patches of vegetation along the alignment, including riparian vegetation associated with creek crossings and vegetation communities and rocky outcrops present at Expedition Range, are regarded as potential habitat for EVNT and other fauna species, in particular reptiles caves associated with the sandstone ridge and cliffs.

All REs and HVR were delineated with various RE changes recommended. A total of two EPBC Act TECs were identified, these were:

- Coolibah-Black Box Woodlands of the Darling Riverine Plains and the Brigalow Belt South Regions, RE 11.3.3
- Brigalow (*Acacia harpophylla* dominant and co-dominant), RE11.4.8, RE11.4.9, RE11.9.1 or RE11.9.5

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