

UNIDEL
ENERGY AND INFRASTRUCTURE

QUEENSLAND CURTIS LNG PROJECT (PIPELINE COMPONENT)

Terrestrial and Freshwater Flora and Fauna Assessment

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EXECUTIVE SUMMARY

Queensland Gas Company (QGC), a British Gas (BG) Group business, is proposing to expand its coal seam gas (CSG) extraction activities in the Surat Basin to supply CSG for export, via a gas export pipeline and a liquefied natural gas (LNG) processing facility on Curtis Island, near Gladstone.

This terrestrial and freshwater flora and fauna report is concerned with the Pipeline Component of the Project. Through desktop and initial field investigations of parts of the pipeline corridors this report identifies and describes the existing terrestrial and freshwater features and values that could be potentially impacted by the development and operation of the proposed pipelines. It is expected that the proposed corridors will be subject to further field surveys prior to alignment finalisation and commencement of construction activities. In the absence of this detailed survey, this report adopts a precautionary approach where all values likely to occur in each area have been assumed to occur. Values and impacts associated with the CSG Field, LNG facilities and marine matters are considered in separate reports.

Proposed Activities

The pipeline corridors assessed in this report include:

- The Export Pipeline - a gas pipeline that extends approximately 380km from the QGC Coal Seam Gas (CSG) Field near Miles to the Queensland Curtis LNG (QC LNG) Plant Facility on Curtis Island near Gladstone. The Export Pipeline will be cleared to its full 40 m width
- The Lateral - a gas pipeline that originates from Fairview and/or Sunshine tenements and runs approximately 200km to join the Export Pipeline near Wandoan. The Lateral will be cleared to its full 40 m width, and
- The Upstream Infrastructure Corridor (UIC) - a collection of gas and water pipelines approximately 200km in length extending across the CSG Field from East of Tara to West of Wandoan. The UIC is 80m wide.

At present there are two different alignments proposed for the Export Pipeline corridor. These are referred to throughout the report as the Option 1 Export Pipeline and the Option 2 Export Pipeline (**Figure 1**). The Export Pipeline splits into the two alternative alignments at approximately Kilometre Point (KP) 45 when the Option 1 Export Pipeline continues to travel north and the Option 2 Export Pipeline diverges in a north easterly direction. The two alignments then continue to run almost parallel until the alignments adjoin again at approximate KP 238. Both pipeline corridors have been assessed, however, due to the Option 2 Export Pipeline being the preferred alignment all totals calculated are based on the Option 2 Export Pipeline (and are exclusive of Option 1 Export Pipeline areas).

Where possible the alignments have been placed away from environmentally sensitive areas and remnant vegetation.

Existing Environment

The pipeline corridors fall vegetated and cleared grazing lands, cropping lands, roadside and travelling stock reserves, Council lands, State Forests and Resource Reserves.

The proposed pipeline corridors traverse predominantly cleared areas. Based on the Queensland Herbarium Regional Ecosystem (RE) mapping the approximate area of remnant vegetation within each pipeline corridor is as follows:

- 96 km of the 382 km Option 1 Export Pipeline
- 112 km of the 383 km Option 2 Export Pipeline
- 24 km of the 152 km Lateral, and
- 78 km of the 191 km UIC.

As there will be requirements for clearing widths to exceed 40 m (Export Pipeline and Lateral) and 80 m (UIC) in some locations (e.g. steep slopes), the areas proposed for clearing in this report are based on 50 m and 100 m wide corridors respectively.

Remnant vegetation in the proposed corridors, excluding the Option1 Export Pipeline, is estimated at 1,462 ha and consists of the following:

- 1333 ha of Eucalypt woodlands
- 21 ha of Acacia woodlands
- 14 ha of Brigalow / Belah woodland
- 47 ha of Riparian Eucalypt woodland
- 28 ha of Shrubland Community
- 2 ha of Semi-evergreen Vine Thicket
- 1 ha of Freshwater Wetlands, and
- 15 ha of Estuarine Wetlands.

Based on Queensland Herbarium RE mapping, the pipeline corridors (excluding Option 1 for the Export Pipeline) transects two Threatened Ecological Communities that are listed under the Commonwealth *Environmental Protection and Biodiversity Conservation Act 1999* (EPBC Act). These are:

- Brigalow woodland / open forest communities – Represented by REs 11.3.1, 11.4.3, 11.9.1, 11.9.5, 11.12.21, and
- Semi-evergreen Vine Thicket (SEVT) communities – Represented by REs 11.9.4 and 11.11.18.

An additional Threatened Ecological Community which may also be transected by the pipeline corridors is the Endangered Weeping Myall Open Woodland community. This Community is not mapped by the Queensland Herbarium RE mapping and was not detected in the initial field survey but is described as occurring within the Brigalow South Bioregion, generally in small patches in alluvial soils within REs 11.3.2 and 11.3.28. As such, it may potentially occur in alluvial areas transected by the pipeline corridors.

The seven REs which are part of the EPBC Act Threatened Ecological Communities that occur along the pipeline corridors are also listed as Endangered under the Queensland *Vegetation Management Act 1999* (VM Act). Two additional REs listed as Endangered under the VM Act only are

- RE 11.12.17 (*Eucalyptus populnea* woodland on igneous rocks), and
- RE 12.3.3 (*Eucalyptus tereticornis* woodland to open forest on alluvial plains).

According to existing Queensland Herbarium Mapping, nine REs listed as Of Concern under the VM Act occur within at least one of the Project's three pipeline corridors. These are:

- Eight Eucalypt woodland communities – REs 11.3.2, 11.3.3, 11.3.4, 11.3.17, 11.5.13, 11.9.7, 12.3.11 and 12.11.14, and
- One Acacia woodland community – RE 11.9.10.

Desktop studies and field survey results revealed 37 REs listed as Not of Concern, under the VM Act, occurring within the pipeline corridors. These consisted of 30 Eucalypt woodland communities, one Shrubland community, one Acacia woodland community, one freshwater riparian woodland community, two freshwater wetland communities and two estuarine wetland communities.

Review of the Queensland Herbarium HERBRECS, WildNet and the EPBC Act Protected Matters databases for the study area identified 119 Endangered, Vulnerable and Rare (EVR) plant species that have ranges that occur within and/or in the vicinity of the pipeline corridors. These include:

- 111 species listed under the provisions of the Queensland *Nature Conservation Act 1992* (NC Act), including 14 Endangered, 42 Vulnerable, and 55 Rare species, and
- 48 species listed under the provisions of the EPBC Act including 9 Endangered, and 39 Vulnerable species.

Based on available ecological information, 83 of these 119 EVR flora species have potential habitat within the pipeline alignments. These species and their preferred habitats were targeted during initial field survey work and will be targeted during planned detailed alignment surveys that will be conducted before alignment finalisation and commencement of construction activities.

The field surveys observed two EVR species within or in the close proximity of the Export Pipeline alignments. These were:

- *Cadellia pentastylis* (Ooline) at approximate KP 227 (Site M36) along the Option 1 Export Pipeline, and
- A small population of *Cycas megacarpa* (Large-fruited Zamia) between KPs 296.5-298.5 (Sites M58 and M59) and two additional plants at approximate KPs 301 and 305 along the Option 1 and Option 2 Export Pipeline corridors.

The initial field surveys recorded five EVR flora species within the general vicinity of the UIC. These are:

- *Acacia curranii*
- *Acacia wardellii*
- *Calytrix gurulmundensis*

- *Micromyrtus carinata*, and
- *Philothea sporadica*.

Note that as it was not as yet possible to undertake detailed flora surveys of the entire length of the pipeline corridors, it is anticipated that additional EVR flora species will be found.

Habitat for freshwater aquatic flora within the pipeline corridors is limited to ephemeral watercourses. A small number of common aquatic plants including *Cyperus spp.* and *Juncus spp.* were observed on the margins of these features.

Although there are no records of EVR aquatic flora species within any of the pipeline corridors, three (*Aponogeton queenslandicus*, *Eleocharis blakeana* and *Fimbristylis vagans*) are known to occur in the vicinity. Under the right seasonal conditions, there is potential for these three EVR species to occur in freshwater pools in watercourses, farm dams and weirs along and downstream of the pipeline corridors.

The database searches also identified two artesian spring EVR flora species as occurring in the vicinity, namely,

- Artesian Milfoil (*Myriophyllum artesium*), and
- Salt Pipewort (*Eriocaulon carsonii* subsp. *orientale*).

These species are found within artesian mound springs and associated bore drains. No such springs or drains are crossed by the pipeline corridors, although the Lateral is within 1-2 km of a mound spring reported to contain these species at KP 8.

The field survey detected the following declared weeds within or in the vicinity of the Pipeline corridors:

- Mother of Millions (*Bryophyllum delagoense*)
- Rubber Vine (*Cryptostegia grandiflora*)
- Prickly Pear (*Opuntia spp.*)
- Parthenium Weed (*Parthenium hysterophorus*)
- Sicklepod (*Senna obtusifolia*)
- Cats Claw Creeper (*Macfadyena unguis-cati*)
- Lantana (*Lantana camara*), and
- Creeping Lantana (*Lantana montevidensis*).

Declared weeds are those species listed as noxious under the Queensland *Land Protection (Pest and Stock Route Management) Act 2002* (LP Act).

Numerous environment weeds were also recorded during field surveys.

A total of 306 common fauna species were identified as potentially present by the database searches (excluding EVR and regionally significant fauna). These comprised 53 fish, 13 crustaceans, 16 amphibians, 65 reptiles, 138 birds (including the 3 species listed as Migratory and / or Marine Protected Species under the

EPBC Act) and 21 mammals. During the field assessment 211 fauna species were recorded, comprised of 13 amphibians, 24 reptiles, 145 birds and 29 mammals.

Database searches identified 42 fauna species listed as EVR under the EPBC Act and / or the NC Act as previously recorded from the pipeline corridors (2 fish, 1 mollusc, 1 insect, 1 frog, 12 reptiles, 17 birds and 8 mammals). Of these species, 8 are listed under both the EPBC Act and NC Act, while 22 are listed under the EPBC Act only, and 8 are listed under the NC Act only. Based on desktop and field assessment of available habitat, 38 of these listed EVR species could potentially utilise habitats within the 10 km wide study area of the pipeline alignments.

EPBC Listed species identified by the EPBC MNES Database as potentially occurring within the region include the Murray Cod (*Maccullochella peelii peelii*), the Australian Lung Fish (*Neoceratodus forsteri*) and the Fitzroy River Turtle (*Rheodytes leukops*). The southern portion of the Export Pipeline and the UIC are located in the Condamine River catchment which is part of the Murray-Darling system and Murray Cod have been recorded in this area. The Fitzroy River Turtle is found in the Fitzroy River catchment which is predominantly to the north of the pipeline corridors, however the Dawson River and its tributaries are part of this system and their catchments are transected by the Export Pipeline.

Field surveys conducted as part of the CSG Field study identified eight EVR fauna species within the vicinity of the proposed UIC corridor:

- Imperial Hairstreak Butterfly (*Jalmenus evagoras eubulus*)- Vulnerable under the NC Act
- Golden-tailed Gecko (*Strophurus taenicauda*) – Rare under NC Act
- Glossy Black-cockatoo (*Calyptorhynchus lathamii*) – Vulnerable under the NC Act
- Little Pied Bat (*Chalinolobus picatus*) - Rare under the NC Act
- Eastern Long-eared Bat (*Nyctophilus timoriensis*)- Vulnerable under the EPBC and the NC Act
- White-throated Needletail (*Hirundapus caudacutus*) – Migratory species
- Fork-tailed Swift (*Apus pacificus*) – Migratory and Marine species, and
- Large-eared Pied Bat (*Chalinolobus dwyeri*) - Vulnerable under the EPBC and the NC Act (Tentative Record at Gurulmundi SF).

One EVR fauna species, the Glossy Black-cockatoo, was recorded during the initial survey of the Option 1 Export Pipeline.

In addition, nine Priority Species listed in the Biodiversity Assessment and Methodology Mapping (BAMM) for the Brigalow Belt South (Criteria H) were identified during detailed field surveys in the CSG Field in the general vicinity of the UIC.

The UIC traverses the Condamine River and several nationally significant wetlands occur downstream, including the Ramsar-listed Narran Lake Nature

Reserve approximately 450 km to the southwest. The Export Pipeline and Lateral traverse a number of significant watercourse catchments including the Auburn, Dawson, Nogoa and Calliope.

A search of the Directory of Important Wetlands in Australia indicates that the only wetland to be transected by the pipeline corridors is the Narrows located in close proximity to the marine crossing to Curtis Island. According to this directory approximately 15 ha of this wetland is traversed by the Option 1 and Option 2 Export Pipeline corridor between KPs 373 and 376. Other important wetlands mapped as occurring in the broad vicinity of the pipeline corridors are:

- Palm Tree and Robinson Creek – approximately 25 km North of the Lateral at KP 50
- Boggomoss Springs- approximately 20 km east of Option 1 Export Pipeline at KP 150
- Gums Lagoon – 26 km south west of Tara and approximately 45km south of the UIC, and
- Lake Broadwater – 25 km south west of Kogan and approximately 10km west of KP 24 of the UIC.

None of the pipeline corridors are located within the catchment areas of any of these important wetlands.

The pipeline corridors also transect a couple of small areas mapped by the Queensland Herbarium mapping as wetlands. A small area (1 ha) of freshwater wetland (RE 11.3.27) is mapped as occurring along Option 1 and Option 2 Export Pipeline corridor between KPs 12 and 13. As a result of land access constraints it was not possible to visit this area, it is however, expected that these areas will subject to detailed field assessment prior to alignment finalisation to confirm the location and avoidability of any wetlands in this location. Estuarine wetlands (RE 11.1.2 (Samphire forbland on marine clay plains) and RE 11.1.4 (mangrove woodland on marine clay plains)) are mapped between KPs 373.2 and 374.4 along the Option 1 and Option 2 Export Pipeline corridors just before the marine crossing to Curtis Island. Due to access restrictions these areas could not be surveyed in the field and are therefore assumed to be in good condition.

Potential Impacts

It is important to note that over the longer-term, the pipeline corridors are likely to be decommissioned within several decades. Subject to landholders choosing to manage their property in a manner that inhibits natural regrowth, the impacts associated with clearing for construction and maintenance are considered to be reversible within all vegetation types.

Approximately 310 km of remnant vegetation is transected by the pipeline corridors which have a total length of 726 km.

The majority of the area to be cleared consists of eucalypt woodlands and forests. Very minor clearing will also be required to cross fragmented stands of Brigalow which often occur on roadside verges or as wind breaks along the margins of pasture or cropping paddocks. Mostly, this will involve transecting relatively narrow, linear corridors. The Queensland Herbarium mapping also indicates a

small number of locations where the alignments may impinge on SEVT, Native Bluegrass Grassland and freshwater wetland communities. The detailed field assessment will confirm the extent and locality of these features and it is considered likely that these will be largely, if not totally avoidable.

The proposed pipeline corridors will require clearing of up to 1,462ha of remnant vegetation, which represents approximately 0.56% of the amount of remnant vegetation estimated to occur within 5 km of either side of the pipeline corridors. The estimated clearing extent by Conservation Status is shown in the following table.

Estimated Clearing Extent by Conservation Status

RE Status	Clearing extents (Ha)	Extent within 5 km (Ha)	% of that within 5 km to be cleared (Ha)	Extent in Bioregion	% of that within Bioregion to be cleared
EPBC Listed*	17	6843	0.25	428,884	<0.01
Endangered	18	7200	0.25	475,891	<0.01
Of Concern	105	14,746	0.71	1,435,429	<0.01
Not of Concern	1339	240,519	0.56	8,294,793	0.02
TOTAL	1,462	262,465	0.56	10,206,113	0.01

* EPBC listed Communities are overlapping (and not additional to) VM Act REs

The actual area of clearing for the proposed pipeline is likely to be lower than this estimate, as:

- The Right of Way (ROW) may be able to utilise existing cleared infrastructure corridors through remnant vegetation (at least in part)
- Pipeline construction will not require clearing of the full 50 m corridor (100 m for the UIC) width used in these calculations, and
- Disturbance of remnant vegetation adjacent to the Narrows may be avoided by the use of Horizontal Directional Drilling (HDD).

The estimated clearing footprint within each EPBC Act Listed Vegetation Community is set out in the following Table.

Estimated Clearing Footprint within EPBC Listed Ecological Communities

EPBC Listed Vegetation Community	Total clearing footprint using Option 1 (ha)*	Total clearing footprint using Option 2 (ha)*
Brigalow	21.59	14.42
SEVT	3.17	2.47
Grassland	2.21	0
Weeping Myall	0	0
Total	26.97	16.89

* Offset initiatives not accounted for the purposes of this table

The VM Act Endangered REs (EREs) transected by the pipelines are the same as the EPBC Listed Ecological Communities above, with the exception of two additional EREs which are not EPBC Listed. These are:

- RE 12.3.3, of which the proposed Export Pipeline corridor would require an estimated clearing extent of 1 ha at its most north-eastern point (on Curtis Island), and
- RE 11.12.17, of which approximately 0.2 ha would be required to be cleared if the Option 1 Export Pipeline is used (If the Option 2 Export Pipeline is used it would require no clearing within this RE).

Based on use of the Option 2 Export Pipeline a total of, approximately:

- 18 ha of VM Act EREs,
- 105 ha of Of Concern REs, and
- 1,339 ha of Not of Concern REs may be required to be cleared.

According to existing Queensland Herbarium mapping the area of remnant vegetation that would require clearing by each Export Pipeline Option is estimated to be:

- 1,382 ha for the Option 1 Export Pipeline, and
- 1,462 ha for the Option 2 Export Pipeline.

It is important to note that although the Option 2 Export Pipeline alignment passes through more remnant vegetation it transects significantly less areas of EPBC Act Listed Ecological Communities and VM Act Endangered and Of Concern REs.

Other (non-clearing) potential impacts on Ecological Communities include:

- The movement of machinery and vehicles between areas, which has the potential to spread weeds including a number of environmental and declared noxious species, such as Parthenium Weed and Giant Rat's-tail Grass.

- Contamination, sedimentation and nutrification of waterways affecting aquatic ecological communities, and
- The activities of machinery and construction operations may increase the likelihood of wildfires.

It is anticipated that EVR flora species recorded during the detailed alignment survey will generally be able to be avoided by alignment refinement and narrowing for short lengths. There may however be some populations which are unavoidable. Generally this would relate to species with restricted habitat niches from which a pipeline may not be able to deviate. For example, the rare Large-fruited *Zamia* (*Cycas megacarpa*) populations which occur on range spurs at KP 296.5-298.5, KP 301 and KP 305 which the Export Pipeline will need to follow for constructability purposes.

The analysis identifies that in the absence of appropriate mitigation measures there is a moderate to high potential to impact on EVR flora species. There is high potential to impact on species which are known to have restricted distributions and spatial extents. Assuming the successful implementation of appropriate mitigation measures, the potential to impact all EVR flora species is low with the exception of:

- Large-fruited *Zamia* (*Cycas megacarpa*)
- *Micromyrtus patula*, and
- *Philothea sporadica*.

For each of these species, which have populations which could potentially be dense within constrained alignment locations, the potential for impacts associated with clearing for construction may be moderate due to a possible inability to avoid. Where such circumstances are identified, an EVR species conservation plan would be developed and approval sort from both the Department of Environment, Water, Heritage and the Arts (DEWHA) (for EPBC Act listed species) and the Environmental Protection Agency (EPA) (for NC Act EVRs) prior to finalisation and construction of the alignment.

Although it is possible that isolated individuals or populations of EVR species may be present (especially in sections not visited during surveys), field survey results have indicated that there is limited potential for the pipeline to have adverse impacts on EVR flora species generally.

Likewise, no significant indirect impacts on any freshwater aquatic flora are considered likely provided that appropriate mitigation measures are employed

In terms of fauna, the pipeline routes have been selected to avoid as many large and connected areas of vegetation habitat as possible. With a pipeline approximately 726 km in length, however, it is not possible to avoid all areas that may provide fauna habitat. With successful implementation of appropriate environmental management controls, any potential impacts on fauna species (including the 38 EVR species that have the potential to be impacted) are likely to be limited to direct impacts associated with construction of the proposed pipeline. The pipeline construction will require some clearing of vegetation and this generally equates to a loss of fauna habitat. However this is unlikely to result in a

significant long-term impact, as similar habitats are available in areas adjacent to the proposed pipeline route. Nevertheless, potential impacts on fauna include the following:

- Removal of habitat such as mature vegetation, hollow-bearing trees and fallen logs, and therefore loss of nesting, shelter and foraging resources
- Fragmentation of habitat due to pipeline construction. These features may act as movement barriers, particularly to fossorial species, and alter movement patterns. They may also limit access to dry season fauna refuges associated with riverine environments
- Disturbance to fauna movement corridors and dry season fauna refuges (predominantly associated with rivers and creeks)
- The establishment of environmental weeds, particularly Buffel Grass, has the potential to fundamentally destroy natural fauna habitats through altered fire regimes and removal of fauna food resources
- Noise and increased human activity, particularly during site development may restrict species movements, limit access to food or other resources
- The potential for trenchfall in which the fauna fall into and become trapped in the open pipeline trench during construction, and
- The elevated risk of wildfires as a result of construction activities including welding and machinery emissions.

A number of the EVR fauna species identified as potentially occurring within the proposed pipeline route are nomadic, highly mobile or occupy very large home ranges. These include the Red Goshawk (*Erythrorhynchus radiates*), Squatter Pigeon (*Geophaps scripta scripta*), Glossy-Black Cockatoo (*Calyptorhynchus lathamii*), Cotton Pygmy-goose (*Nettapus coromandelianus*), Grey Falcon (*Falco hypoleucos*), Black-necked Stork (*Ephippiorhynchus asiaticus*) and Black-chinned Honeyeater (*Melithreptus gularis*). Given the small amount of remnant habitat to be cleared by construction of the pipeline corridors, compared to the area over which individuals of these species range, no significant impact upon these species is likely.

Several other EVR fauna species have the potential to be directly impacted if they are present along the pipeline route in woodland and Brigalow habitats, but also have preferred habitat types that are well represented in the immediate vicinity of the alignment. These include Imperial Hairstreak (*Jalmenus evagoras eubulus*), Brigalow Scaly-foot (*Paradelma orientalis*), Yakka Skink (*Egernia rugosa*), Golden-tailed Gecko (*Strophurus taenicauda*), Northern Quoll (*Dasyurus hallucatus*) and Little Pied Bat (*Chalinolobus picatus*). Although there is potential for some direct impact on these species, the small amount of habitat to be cleared combined with the implementation of appropriate mitigation recommendations should result in minimal potential for the proposed pipeline construction to significantly impact these EVR fauna species.

A number of EVR fauna species that are potentially present may be susceptible to entrapment in the open pipeline trench, comprising one frog, eight reptiles and one mammal. These are Tusked Frog (*Adelotus brevis*), Collared Delma (*Delma*

torquata), Brigalow Scaly-foot (*Paradelma orientalis*), Yakka Skink (*Egernia rugosa*), Short-Necked Worm-Skink (*Anomalopus brevicollis*), Ornamental Snake (*Denisonia maculata*), Dunmall's Snake (*Furina dunmalli*), Grey Snake (*Hemiaspis damelii*), Yellow-naped Snake (*Furina barnardi*) and Northern Quoll (*Dasyurus hallucatus*).

The detailed distributions of several of the EVR fauna species identified are poorly known, as they are particularly secretive or cryptic in their habits. As such, the likely presence of these species is difficult to assess. These include Yellow-naped Snake, Dunmall's Snake, Ornamental Snake and Grey Snake. In the absence of adequate data the precautionary principle should apply, and it should be assumed that these reptile species are present, particularly in remnant Woodland and Brigalow habitats on cracking clay soils. These habitats were only recorded in several small areas along the alignment, so significant impacts on these species are unlikely, provided appropriate mitigation measures are implemented.

Mitigation and Rehabilitation Recommendations

From an ecological perspective, Option 2 is considered to be the most desirable option of the two Export Pipeline alignments. Although Option 2 Export Pipeline passes through more remnant vegetation, it is ecologically preferable as it transects significantly smaller areas of EPBC Act Listed Ecological Communities (**Table 14**) and VM Act (Qld) Endangered and Of Concern REs (**Attachment 10**).

Other minor realignment recommendations are identified in this report and additional alignment preferences will be identified during the detailed surveys that will be undertaken prior to alignment finalisation.

The following mitigation measures are recommended to help ensure that significant impacts on flora and fauna are avoided:

- Detailed field investigations be undertaken of the preferred alignments prior to finalisation
- The corridor impacted for pipeline construction within all areas of remnant vegetation should be minimised. Clearing widths should be minimised wherever possible. It is recognised that it will not be possible to reduce the width to less than 40 m at even the most easily constructed locations (except possibly to a minor degree for very short distances)
- Clearing width should be minimised (e.g. 40 m where possible) in beds and banks of watercourses and in areas with Endangered and Of Concern vegetation
- Clearing of remnant vegetation areas should be avoided for the purposes of siting construction camps and where possible, vehicle access tracks
- Existing roads and tracks should be utilised for access where practicable
- Clearing boundaries within remnant vegetation areas should be clearly marked in the field
- Vegetated creeklines, fencelines and road reserves should be crossed at 90 degrees whenever possible to limit the extent of clearing

- The EMP should include appropriate requirements in relation to management of waste and potential contaminants
- A fire extinguisher and personnel trained in fire fighting should be on-hand during welding operations to minimise damage caused by accidental fires
- Topsoil should be removed and re-spread across rehabilitation areas as soon as possible following disturbance (preferably within 12 months)
- Care should be taken to ensure hydrological characteristics are not altered and appropriate soil and erosion management is implemented in and adjacent to riparian areas
- Drainage should be reinstated at watercourse crossings immediately following completion of construction
- Ensure no permanent barrier to fish movement at any stage of the Project
- Design, install and maintain effective erosion and sediment control structures during construction and operation (especially near wetlands, watercourses, steep areas and areas of erodible / dispersive soils)
- The treatment and disposal of hydrotest water should be in accordance with the recommendations made in the CSIRO Manufacturing and Infrastructure Technology report (2005)
- Monitoring of weed infestations within disturbed areas should occur at least monthly during construction and then quarterly for a period of two years following construction. Appropriate weed control measures should be applied. Following the two year period, the frequency of monitoring should be reconsidered dependent on the success of control measures and the level of infestations
- A Weed Management Plan that addresses the construction, rehabilitation and operation phases of the project should be prepared prior to construction. This Plan should include hygiene protocols to minimise the likelihood of introduction and spread of environmental, agricultural and declared weeds
- All vehicles and plant should have certification that they are weed-free prior to their initial commencement of works and when moving from weed infested to weed free sections of the pipeline route
- All vehicles should remain on designated access roads and tracks and within defined pipeline construction area and associated work / camp sites
- Fauna handlers should be present to survey for, and as necessary relocate wildlife immediately prior to and during clearing activities
- Trenching should occur progressively to minimise the period of time the trench is open and the length of open trench. The length of open trench at any one time should be the minimum practicable. Ramps and trench plugs with slopes of no greater than 50% (APIA, 2005) should be located at least every 500 m to assist escape for some species. Where possible, trench plugs should coincide with stock and wildlife trails. Some form of cool

insulated cover should be provided. Branches, ramped gangplanks or similar should also be used to create 'ladders' at regular intervals to assist small fauna to exit the trench (APIA, 2005)

- Qualified fauna spotters and handlers should be employed to survey the open trench, record and remove any trapped fauna species. Such surveillance should occur along the entire length of the trench and not merely those areas described as fauna habitats or sensitive areas, as trench fall can entrap significant numbers of fauna along any part of the trench
- Fauna spotters and handlers should be qualified or appropriately trained to assess and handle any injuries to native fauna that may occur due to trenchfall. Qualified veterinarian staff should be available to assess and treat or euthanize (as necessary) any large native vertebrates
- Consideration should be given to the use of temporary fencing to exclude access to the trench by livestock and larger native wildlife (APIA, 2005). Fauna searches should be conducted at least daily
- Vegetative waste as a result of clearing should be mulched or distributed across adjacent areas where it may provide refuge for terrestrial species. It should not be mulched unless explicitly required by a non-Project landholder. It should not be burnt
- Vegetative wastes resulting from clearing should, where practicable, be re-spread over the easement following construction. This will further encourage regrowth and minimise weed infestations
- Subject to easement requirements and landholder preferences, trees and shrubs should be allowed to naturally regenerate on those parts of the cleared pipeline corridor that are not required to be kept tree free for pipeline protection and maintenance purposes
- Linear features such as roads and pipelines should be built to a standard sufficient to allow for their intended purpose but should be allowed to revegetate as much as possible so as to minimise their impact on terrestrial fauna movements
- It is understood that construction will be year round but where practicable, time construction in the coolest and driest months (e.g. April to September), when reptiles and amphibians are least active and when conditions are most favourable for minimising mortality in the trench
- Vehicle movements should be minimised at night as far as practicable
- Vehicles should travel along the ROW at appropriate speeds that minimise environmental risks
- A seeding plan should be developed. The plan should be implemented using native groundcover species (or in existing pasture areas the dominant pasture species) at completion or reinstatement of each section of the pipeline

- In areas where initial seeding and natural regeneration is not successful (i.e. has not achieved 50% of the desirable species cover on adjoining undisturbed areas within 24 months) should be reseeded with native groundcover species (or in existing pasture areas with dominant pasture species)
- Rehabilitation of lands should be negotiated with landholders where applicable. Unless infrastructure is to be retained for other use (roads), areas should be ripped and allowed to naturally revegetate. Hardened road surfaces should be removed or regraded to restore the original land surface as much as possible
- Bare vehicle tracks should be minimised following the rehabilitation of the corridor post-construction
- Where possible, native shrubs should be allowed to regenerate to reduce the barrier to fauna movement, especially for small ground-dwelling fauna, and
- Offsets should be established where impacts to native vegetation and fauna habitats are unavoidable. These areas should be managed with a strong conservation focus and aim to provide vital protection for flora and fauna in this region where other protected areas (Conservation Parks and National Parks) are absent. It is proposed that such areas should have conservation plans developed for them and active conservation management should be undertaken. This would include flora and fauna monitoring to assess the efficacy of conservation practices and to feedback into the development of improved future practices.

Conclusion

Provided that the recommended mitigation and rehabilitation measures identified in this report are adopted and successfully implemented, the construction and operation of the pipeline infrastructure will be unlikely to have a significant impact on any of the biological features and values described.

1.0 PURPOSE

This report is prepared in accordance with the Draft Terms of Reference for the Queensland Curtis LNG Project (QC LNG) and provides specialist flora and fauna assessments of the QC LNG pipeline corridors as shown in **Figure 1**. The three pipelines to be constructed are:

- The Export Pipeline - a gas pipeline that extends approximately 380km from the QGC Coal Seam Gas (CSG) Field near Miles to the QC LNG Plant Facility on Curtis Island near Gladstone. The Export Pipeline will be cleared to its full 40 m width
- The Lateral - a gas pipeline that originates from Fairview and/or Sunshine tenements and runs approximately 200km to join the Export Pipeline near Wandoan. The lateral will be cleared to its full 40 m width, and
- The Upstream Infrastructure Corridor (UIC) - a collection of gas and water pipelines approximately 200km in length extending across the CSG Field from East of Tara to West of Wandoan. The UIC is 80 m wide.

This report examines the potential and known occurrences of protected plants, animals and communities as identified under the Australian Government's *Environment Protection and Biodiversity Conservation Act 1999* (EPBC Act), the *Queensland Nature Conservation Act 1992* (NC Act) and the *Queensland Vegetation Management Act 1999* (VM Act). The study also considers regionally significant species and areas of special biodiversity value as identified in the Queensland Government's EPA Biodiversity Assessment and Mapping Methodology for the Brigalow Belt South Bioregion (EPA 2008), and declared weed species under the *Queensland Land Protection (Pest and Stock Route Management) Act 2002* (LP Act). General biodiversity values, evaluated in terms of common flora and fauna, are also considered. Environmentally sensitive areas are mapped and described.

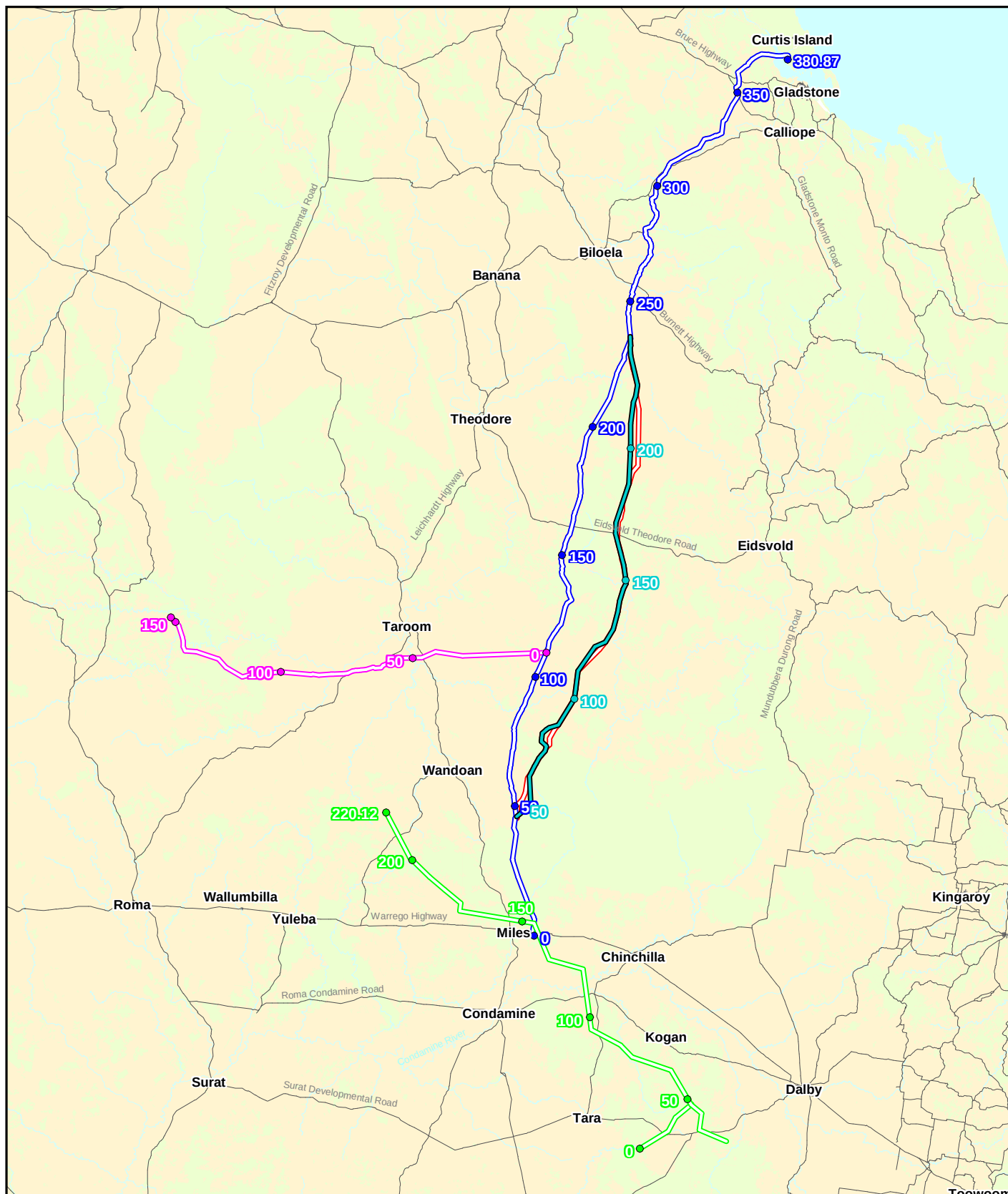
The report discusses the nature conservation values of areas likely to be affected by the Project and identifies mitigation measures to assist in avoiding or minimising impacts on areas of remnant vegetation and other areas of conservation value. Where avoidance is not possible, recommendations are made in relation to appropriate offset activities.

A stand alone report which specifically considers only those terrestrial and freshwater aquatic matters of environmental significance under the EPBC Act is provided in **Attachment 1**. A stand alone report for terrestrial and marine matters of environmental significance for the entire QC LNG Project is provided with the EIS.

2.0 BACKGROUND

2.1 Location

The majority of the Project is within the Surat Basin, a resource region in southern Queensland, while the Export Pipeline extends north through central Queensland to the Port of Gladstone (**Figure 1**). The predominant land uses are rural grazing and dry land cropping.



Legend:

- Export Pipeline (Rev C 05/12/2008)
- Lateral Pipeline (Rev C 17/11/2008)
- Upstream Infrastructure Corridor (Rev A 26/11/2008)

- Export Option 2 Pipeline (Rev A 05/12/2008)
- Export Option 2 Pipeline (Rev B 13/02/2009)

Source Note:

1:250,000 Topographic vector copyright Geoscience Australia

Projection UTM MGA Zone 56 Datum GDA 94



 A BG Group business	Project Queensland Curtis LNG Project		Title Assessed Pipeline Corridors
	Client QGC - A BG Group business		
 ERM Environmental Resources Management Australia Pty Ltd	Drawn	Mipela	Disclaimer: Maps and Figures contained in this Report may be based on Third Party Data, may not be to scale and are intended as Guides only. ERM does not warrant the accuracy of any such Maps and Figures.
	Approved	CDP	
	Date	20.05.09	
	Figure	1	
	File No	EO5-P-MA-96179	
	Revision	A	

2.2 The Export Pipeline Alignment

At present there are two different alignments proposed for the Export Pipeline corridor. These are referred to throughout the report as Option 1 Export Pipeline and Option 2 Export Pipeline (**Figure 1**). The Export Pipeline splits into the two alternative alignments at approximately KP 45 when the Option 1 Export Pipeline continues to travel north and the Option 2 Export Pipeline diverges in a north easterly direction. The two alignments then continue to run almost parallel until the alignments adjoin again at approximate KP 238. The two corridors differ in length by approximately 2 km.

Due to constructability and land access constraints the Option 2 Export Pipeline alignment is the preferred route for the Export Pipeline. However, both Options are assessed for this report. Where totals are shown for all pipeline corridors, the Option 2 Export Pipeline has been used in the calculations rather than the Option 1 Export Pipeline.

2.3 Proposed Infrastructure

The proposed infrastructure is detailed in the QC LNG EIS. In summary, the proposed infrastructure along each pipeline corridor is shown in **Table 1**.

Table 1: Proposed Infrastructure

	Export Pipeline	Lateral	UIC
High pressure gas pipeline	1050 mm	1050 mm	1050 mm
Water pipeline	-	-	525mm
Scapper stations (<1ha)	5	2	2
Meter stations (<1ha)	2	2	2
Mainline valves (<1ha)	5	3	3
Stockpile sites	undetermined	undetermined	undetermined
Construction camps	2	2	2
Communication towers	undetermined	undetermined	undetermined
Mid-line compressor station	1	-	-

2.4 Construction Requirements

2.4.1 Clearing

The indicative clearing corridor width of the Export Pipeline and Lateral used for the calculations set out in this assessment is 50 m. Generally the required easement width for the Main Pipeline and Collection Lateral will be 40 m, however this may be extended to accommodate additional areas for main line valves (MLVs) and temporary work areas and truck turn around areas for construction activities. The truck turn around areas are typically up to 50 m in width and negotiated on an as needs basis. The 40 m width may also be required to increase in areas with steep cross slopes and adjacent to water courses to provide additional room for stockpiling brush and soil outside of the watercourse. Such areas are temporary and restricted to the construction period alone.

The indicative clearing corridor width of the UIC used for the purposes of the calculations used in this assessment is 100 m. The construction easement is generally likely to be 80 m and where feasible the clearing width will be reduced in sensitive areas.

This width of clearing is important to provide sufficient space for good environmental outcomes as room is needed to accommodate:

- The stacking of cleared vegetation so that it does not impact upon the retaining/remaining living vegetation

- Stockpiling of topsoil with adequate separation from the stockpiled vegetation
- Stockpiling of spoil with adequate separation from topsoil stockpiles
- Laying out (stringing) of the pipeline
- Construction equipment that is in use, and
- Other traffic (e.g. pipe trucks, construction workers vehicles) to pass the working equipment without going off the ROW.

Clear and grade of the pipelines is required to provide a safe construction ROW for vehicular movement, trenching and other construction activities. The ROW is cleared of heavy vegetation; however, root stock is left in the ground where practicable to stabilise the area and reduce erosion. In scrubby areas the vegetation is stockpiled for respreading as part of the restoration process. Breaks are left in stockpiled vegetation to allow continued access to stock, fence lines, tracks, and drainage lines. Large mature trees are preserved where practicable. The ROW is levelled to the required gradient using graders, backhoes and bulldozers. Topsoil is removed and stockpiled separately for reuse during rehabilitation. At creek crossings sediment fences (e.g. geofabric attached to wooden stakes or star pickets) are installed around the toe of the topsoil stockpiles to prevent soil loss.

The other proposed infrastructure will usually be able to be placed in existing cleared areas. Where this is not possible, approximate clearing footprints are shown in **Table 2**.

Table 2: Worse Case Clearing Footprints for Proposed Infrastructure

	Area (ha)
Scapper station	<1
Meter station	<1
Mainline valve	<1
Stockpile site	Within cleared areas only
Construction camp	Within cleared areas only
Communication tower	<1
Mid-line compressor station	<5

2.4.2 Trenching

The trench will need to be excavated to a minimum depth of approximately 2.3 m and a width of 1.4 m. The minimal practicable distance of trench is left open, depending on the land use, ground conditions and the rate of construction progress achieved at a given area.

Breaks in the trench are left to facilitate stock and wildlife crossing, agricultural vehicle movements, and at fences and drainage lines. In addition, methods to prevent fauna entrapment (e.g. trench breakers, ramped ends of trench, fauna ladders) are implemented. These methods ensure that fauna egress points in the trench are no more than 500 m apart.

2.4.3 Watercourse Crossings

Pipeline construction methods proposed for the crossing of watercourses fall into two main categories:

- Open cut, and
- Trenchless.

Open cut crossings are used for dry or shallow water crossings. The technique may involve cutting the stream banks back to create a gentler slope for the construction equipment to traverse. The trench is then constructed in the same manner as the rest of the pipeline.

Trenchless techniques may involve drilling, tunnelling or boring under the watercourse.

In selecting an appropriate pipeline watercourse crossing method, many factors must be taken into consideration. These include (but are not limited to):

- Pipeline diameter
- Watercourse width, depth and flow
- Environmental sensitivity
- Geotechnical concerns
- Substrate composition
- Hydrological data
- Cost
- Navigation
- Need for access across watercourse during construction
- Regulatory constraints
- Equipment availability
- Contractor expertise
- Downstream water users
- Landowner and community issues
- Engineering constraints
- Timing (i.e. season), and
- Amount of working space.

Preferred methods for major watercourse crossings will be finalised during the engineering design phase of the Project. At this stage it is anticipated that all watercourse crossing will be open cut (i.e. trenched).

2.4.4 Crossing the Narrows

The technique for crossing the Narrows is not yet finalised but the preferred method is Horizontal Directional Drilling (HDD). The feasibility of using HDD is strongly limited by site conditions such as soil stability, slope, access, available workspace and nature of subsurface rock and the pipe diameter.

The installation of the pipeline by HDD involves drilling a hole at a shallow angle beneath the surface through which the pipe is threaded. Drilling is conducted by a specially designed drill rig, operated by a specialist contractor. A variety of associated equipment and infrastructure is required. It should be noted that the work area (equipment layout) is typically about 50 m wide.

Although directional drilling reduces impacts to the bed and banks of watercourses, the technique introduces additional environmental considerations. These include

clearing of an area for the set up of the equipment and pipe string, drill site sediment control, drill mud (water based bentonite) management, potential for drill mud seepage through alluvial materials and waste management.

The environmental impacts associated with the proposed crossing of the Narrows are described in detail in **Volume 5, Chapter 7** of the EIS.

2.4.5 Hydrotest Water

Hydrotesting typically requires a length of pipe to be filled with water. This equates to around 865 kL/km for the 1050 mm pipeline. Hydrotest water will not be discharged directly to natural water bodies on land. It is often not practicable for the water to be used for beneficial use due to timing and quality constraints. Any disposal to land will typically be through a settling and filtration structure with erosion and scour controls in place. The treatment and disposal of hydrotest water will be in accordance with the recommendations made in CMIT (2005).

2.4.6 Rehabilitation

All disturbed areas, including pipe lay-down areas and camp sites will be rehabilitated at the conclusion of works. This will include removing foreign material (e.g. construction material and waste), ripping compacted soil areas, contouring if required, re-spreading topsoil and cleared vegetation and reseeded if necessary.

2.4.7 Duration and Interruption to Land Use

Generally each crew works at the rate of about 1-2 km per day depending on the terrain (i.e. if there are more trees or the ground is very rocky progress may be slower). To enable the crews to work safely and efficiently there is often a delay between the arrival dates of each crew. Typically it will take about 12-16 weeks for all the crews (i.e. the spread) to pass through an area and complete their tasks.

Several work sites may operate at any one time. Pipeline construction will generally involve three separate spreads (each comprised of several work crews). Construction of the pipelines is anticipated to take approximately 18 months from establishment of the first camp to final clean-up, reinstatement and commissioning. Construction activities will commence in the field once all permits, authorities and permissions have been granted and when mobilisation activities have been completed.

3.0 SCOPE

The scope of this terrestrial and freshwater flora and fauna assessment was to:

- Assess the existing flora and fauna assemblages of the pipeline corridors through both desktop and field studies, including identification and description of the following key values:
 - o Native vegetation communities with reference to the Australian Government's EPBC Act and Queensland Government's Regional Ecosystem classification
 - o Observed or potentially present taxa listed as rare or threatened under the EPBC Act and the Queensland NC Act (EVR species)
 - o Observed or potentially present taxa listed as priority taxa under the EPA Biodiversity Mapping Methodology for the Brigalow Belt South and South East Queensland Bioregions
 - o General flora and fauna values
 - o Freshwater aquatic flora and fauna
 - o Pest flora and fauna, and
 - o Sensitive Environmental Areas.
- Identify potential impacts to flora and fauna that may occur as a result of the construction and operation of the pipelines and evaluate the scope and nature of these impacts, and
- Identify appropriate mitigation measures to help avoid and minimise potential impacts on the ecological features and values.

The pipeline corridors that were assessed were those shown in **Figure 1**:

- Option 1 Export Pipeline – Rev C (dated 5 December 2008)
- Option 2 Export Pipeline – RE and vegetation clearing calculations were based on Rev A (dated 5 December 2008), desktop assessment of environmentally sensitive areas and preferred habitats was updated based on Rev B (dated 13 February 2009))
- Lateral – Rev C (dated 17 November 2008), and
- UIC – Rev A (dated 26 November 2008).

The KPs used throughout this report are based on a pipeline alignment revision dated 5th December

This assessment does not consider marine ecology, which is the subject of a separate study.

4.0 ASSUMPTIONS AND LIMITATIONS

The assessed pipeline alignments were indicative only and have been modified during the assessment process. Unfortunately this has meant that the assessment is primarily based on a desktop assessment. Field work was limited to a rapid assessment along parts of the Option 1 Export Pipeline and the UIC. Additionally, landholder access constraints prevented field inspection of significant portions of the pipelines at the time of the survey work. At the time of writing this technical report, no comprehensive detailed field surveys had been undertaken along any of the pipelines.

Due to constructability and land access constraints the Option 2 Export Pipeline alignment has been confirmed as the preferred route of the Export Pipeline. As a result of the identification of the preferred route, and developments in landholder access approvals, it will be possible to undertake a final detailed assessment of the entire alignment prior to the commencement of construction activities. This fieldwork will quantify areas and provide details of ecological features and values within the disturbance footprint. In the meantime the Queensland Herbarium RE mapping of these areas is assumed to be correct.

Scale-dependant inaccuracies can occur with Queensland Herbarium RE mapping; for example, small remnants along creeks and road reserves may not be detected and small scale variation within larger remnants may not be recognised. Fauna habitat mapping has been derived from the same sources and is subject to similar assumptions and limitations.

The presence of a particular flora or fauna species within the pipeline corridors can only be confirmed by detailed targeted field surveys, so the precautionary approach has been adopted throughout this assessment. A species is assumed to occur in the study area if it was recorded in database searches for the region and RE mapping and / or the rapid field surveys indicated suitable habitat for the species, based on existing knowledge of the species' ecological requirements.

In the meantime a combination of RE mapping, field observations and satellite imagery was used to estimate the areas of each RE type which occur or potentially occur within the pipeline corridors and the wider study area. Fauna habitat mapping has been derived from the same sources and is subject to similar assumptions and limitations.

Whilst a significant proportion of the study area is cleared and is likely to be suitable for locating infrastructure which will be required for the construction and operation of the pipelines, the specific locations for access roads, compressor stations, construction camps and other support infrastructure were not known at the time of the assessment.

Estimated clearing footprints have been calculated using GIS based Queensland Herbarium RE mapping. Areas for individual REs are shown to two decimal points in order to better reflect the extent of the smaller remnant areas (e.g. <1 ha). Total areas are rounded to whole hectares where this rounding has no material affect on comparisons to better reflect the degree of accuracy of the estimations. Where totals have been rounded, they may not equal the sum of the component areas due to rounding areas.

This assessment considers only terrestrial and freshwater aquatic ecological features and values. Marine ecology is the subject of a separate study (refer to **Volume 5, Chapter 7** of the EIS).

5.0 ASSESSMENT METHODOLOGY

5.1 Flora Assessment

5.1.1 Determination of Significance Level

REs defined under the VM Act are assigned a status based on their current geographical extent, compared to the extent that existed pre-clearing. Remnants are classified as Endangered, Of Concern and Not of Concern. RE "Biodiversity Status" is defined by the EPA and considers the condition of remnant vegetation in addition to the clearing and remnant extent of the RE. This status also classifies remnants as Endangered, Of Concern and Not of Concern. Threatened Ecological Communities are defined under the EPBC Act. In many cases the Threatened Ecological Community descriptions identify a number of REs which are representative of Threatened Ecological Communities.

Listed EVR flora is defined as those taxa listed:

- 1) In the EPBC Act as Extinct, Extinct in the Wild, Critically Endangered, Endangered, Vulnerable or Conservation Dependant. Taxa can also be listed as Migratory or Marine.
- 2) In the NC Act as Endangered, Vulnerable or Rare.

Regionally Significant flora is defined as those taxa that have not been listed under the EPBC Act or NC Act, but have been identified by the Environmental Protection Agencies Biodiversity Assessment and Mapping Methodology (EPA 2008b) as priority taxa for the Brigalow Belt Bioregion.

All other native flora is considered Least Concern.

5.1.2 Flora Desktop Assessment

The flora desktop assessment included:

- Review of Queensland Herbarium HERBRECS data and DEWHA Protected Matters flora data which was sourced 2 February 2009 (EPA 2007). The data search areas were rectangular polygons and covered an area at least 5 km either side of the pipeline route. The search areas are:
 - o Export Pipeline: 23.5333° S to 23.8622° S and 151.35° E to 150.0333° E
 - o Lateral: 25.5333° S to 25.9° S and 150.3666° E to 148.85° E
 - o UIC: 25.8166° S to 27.4333° S and 149.45° E to 151.1666° E.
- Review of Queensland Herbarium RE mapping (Version 5.0, 2005) for 10 km wide corridor centred on the pipeline route to establish those vegetation communities mapped by the EPA at a scale of 1:100 000
- Examination of satellite imagery to gain an appreciation of the project's proximity to sensitive areas, assess vegetation patterns and identify target areas for the rapid field investigations
- Review of the EPA Brigalow Belt South Biodiversity Planning Assessments (EPA 2008a), EPA Biodiversity Planning Assessment Brigalow Belt South Flora Expert Panel Report (EPA 2008b) and the Biodiversity Planning

Assessment Brigalow Belt South Fauna Expert Panel Reports (EPA 2008c) to identify species and areas that are recognised as State, Regional or Local Biodiversity Significant or are flagged as important for their integrated biodiversity values within close proximity to the project area, and

- Review of DERM Environmentally Sensitive Areas Mapping
- Review of DERM Essential Habitat Mapping, and
- Review of the Draft Maranoa and Districts Regional Plan to identify areas recognised as having higher conservation values in relation to the protection of the region's biodiversity and ecological processes (DIP 2008).

It is recognised that the information gained from these databases has caveats attached to it regarding the robustness or completeness of the information.

HERBRECS data is based almost exclusively on plant specimens that have been recorded as present in the given locations. The absence of any specimen records for a particular species from an area does not imply that that species does not occur in that area.

Data from the DEWHA EPBC Act website is based on a combination of actual records, primarily from State Government databases, combined with modelled distributions of species according to their ecological characteristics. The mapping of a particular species in a search area does not guarantee that the species actually occurs in that area.

5.1.1 Flora Field Assessment

Rapid flora field surveys were conducted for the Option 1 Export Pipeline and UIC between the 29 of September and the 3 of December 2008 by Unidel Botanists, Ann Moran and Martin Bennett (CVs provided in **Attachment 2**). Additional assessments of the Export Pipeline alignments were undertaken from the 1-3 April 2009 by Ann Moran. Where land access was available, representative portions of the pipeline corridors were traversed by vehicle and / or foot. The survey focussed on a 100 m wide corridor, but also assessed surrounding areas where relevant (e.g. to identify options for avoiding ecological constraints on the proposed route).

The field surveys included:

- Investigation of the presence / absence or likely presence / absence of EVR flora species and communities
- Ground truthing of 184 sites along the Option 1 Export Pipeline and the UIC. Of these, 66 sites were detailed Tertiary level assessments and the remainder were assessed to Quaternary level. Quaternary assessments recorded dominant canopy species. Tertiary assessments, however, recorded an inventory of all woody flora species, their average height and their approximate abundance (including native and exotic flora species). Tertiary assessments also included targeted searches for potential EVR flora species and regionally significant species. As a result of alignment changes, time and access constraints it was not possible to locate a Tertiary site in each type of RE encountered along the pipeline corridors. It is expected that detailed surveys will be undertaken prior to alignment finalisation and the commencement of construction activities.

Comprehensive flora species lists and detailed abundance data were also not collected nor considered necessary for the purposes of this assessment,

- Observations on the wider environment of the pipeline alignments so that the potential impacts associated with proposed clearing could be discussed in a local, regional and State context, and
- Detailed flora surveys were conducted on Curtis Island for the LNG facilities as part of a separate report. However, these findings have also been included in this report.

The flora site surveys were in accordance with the Queensland Herbarium vegetation survey methodology described in Neldner *et.al.* (2005). The following data was collected for the Tertiary sites:

- Confirmation of mapped RE
- General description of vegetation
- Structural characteristics of vegetation (based on life forms, approximate height and relative dominance)
- Groundcover characteristics
- Vegetation condition (integrity) as either pristine, excellent, very good, good, average, degraded or completely degraded
- Occurrence of weed species
- Dominant species in each structural component of the vegetation
- Patch size and shape
- Landscape characteristics
- Soil characteristics, and
- Notes on particular sensitivities to the proposed impacts.

GPS coordinates were taken using hand held GPS (accuracy +/- 10m) to identify survey site locations and to assist in validating the existing Queensland Herbarium RE mapping. The general distributions of declared and other significant pest plants within the corridors were also noted.

5.2 Fauna Assessment

5.2.1 Determination of Significance Level

Listed EVR fauna are defined as those taxa listed in the EPBC Act as Critically Endangered, Endangered, Vulnerable or Conservation Dependant, and in the Queensland NC Act (1992) as Endangered, Vulnerable or Rare.

Regionally Significant fauna are defined as those species identified by the EPA (2008b) as non-EVR priority taxa for the Brigalow Belt South Bioregion. Also included as Regionally Significant fauna are those taxa that have not been listed as EVR fauna under the EPBC Act or NC Act, but have been listed in the relevant Action Plans for their respective taxonomic group as Vulnerable, Rare, Near Threatened, Insufficiently Known or Data Deficient. Relevant Action Plans consulted to determine status were: Sands and New (2000) for butterflies, Wager and Jackson (1993) for freshwater fishes, Tyler (1997) for frogs, Cogger *et al.* (1993) for reptiles, Garnett and Crowley (2000) for birds, Maxwell *et al.* (1996) for monotremes and marsupials, Duncan *et al.* (1999) for bats and Lee (1995) for rodents.

All other native fauna have been designated as Least Concern. This includes those species that have been given extra protection as Migratory and / or Marine Protected Species under the EPBC Act, but which are not EVR or Regionally Significant fauna.

The significance of impacts was determined in accordance with the EPBC Significant Impact Guidelines, Policy Statement 1.1.

5.2.2 Fauna Desktop Assessment

The desktop study involved a review of published material and searches of relevant databases and archives. This assessment was used to document known records for the study area, identify the potential presence of significant fauna species and assist in targeting areas for field assessment. The desktop components undertaken included:

- Collection and review of existing EPA WildNet data, Birds Australia data, Queensland Museum data and EPBC Protected Matters Search. The data search areas were rectangular polygons and covered an area at least 5 km either side of the pipeline route. The search areas were:
 - Export Pipeline: 23.5333° S to 23.8622° S and 151.35° E to 150.0333° E
 - Lateral: 25.5333° S to 25.9° S and 150.3666° E to 148.85° E, and
 - UIC: 25.8166° S to 27.4333° S and 149.45° E to 151.1666° E.
- Review of the Brigalow Belt (North and South) Biodiversity Planning Assessment (EPA 2008a) to identify areas that are recognised as State, Regional or Local Biodiversity Significant or flagged as important for their integrated biodiversity values that are within close proximity to the project area

- Review of Queensland Herbarium RE mapping for the corridor to establish those vegetation communities mapped by the EPA at a scale of 1:100 000 as well as satellite imagery to gain an appreciation of potential fauna habitats and of the project's proximity to sensitive areas
- Review of DERM Essential Habitat Mapping, and
- Search of the Directory of Important Wetlands database.

The following texts were also reviewed: Barker *et al.* (1995), Cogger (2000), Duncan *et al.* (1999), Ehmann (1992), Garnett and Crowley (2002), Greer (2005), Menkhorst and Knight (2004), Morcombe (2003), Robinson (1998), Strahan (1995), Wilson (2005), Wilson and Swan (2003) and Wilson and Knowles (1988).

5.2.3 Fauna Habitat Mapping

All REs identified as present within the project area were stratified into broad Faunal Habitats, based on the classification of Major Vegetation Groups and Subgroups identified by the National Vegetation Information System (NVIS) framework, developed for the National Land and Water Resources Audit (NLWRA 2001). Information used to categorise REs into Habitats was drawn from the RE descriptions (including landforms) in Sattler and Williams (1999) and in version five of the Regional Ecosystem Description Database (EPA 2007), along with data from the Australian Terrestrial Biodiversity Assessment 2002 (NLWRA 2002).

5.2.4 Fauna Field Assessment

Rapid field assessment of the UIC was conducted by Bruce Thomson from 27 October to 2 November, the 12-18 November and 3-9 December 2008. The Option 1 Export Pipeline was surveyed by Rebecca Goodwin-Pettit and Rebecca Gibson from the 24 November to the 3 December. KP250-300 and 350-370 of the Option 2 Export Pipeline was surveyed by Bruce Thomson from 1-3 April 2009. Detailed field assessments of the Curtis Island portion and the mainland shoreline were undertaken from 6 to 16 October 2008 by Bruce Thomson (reptiles and amphibians), David Rohweder and David Charley (birds) and Will Introna, Melissa Starling, Fiona Donohue and Tim Simpson (mammals) (CVs in **Attachment 2**).

Accessible portions of the UIC and Option 1 Export Pipeline were traversed by vehicle and / or foot during the assessment. The survey focussed on a 100 m wide corridor, but also assessed surrounding areas where relevant (e.g. to identify options for avoiding ecological constraints on the proposed route).

Pit fall trapping and harp trapping, spot-lighting and transect methodologies were used during the detailed survey of the CSG fields which is generally relevant to the UIC corridor. However, the majority of the field surveys involved walk-through assessments of representative habitats along the alignments. The selection of these sites was based on the following:

- Occurrence of forested patches and other fauna habitats (such as riparian corridors and wetlands) determined from satellite imagery, combined with review of the Brigalow Belt (South) Biodiversity Planning Assessment (EPA 2008a), and

- Preferred habitat for EVR and regionally significant fauna identified from the database searches, determined from Queensland Herbarium RE mapping combined with satellite imagery.

A total of 66 sites were visited and assessed along the UIC and Option 1 Export Pipeline in conjunction with the flora assessment. Tertiary assessments were carried out to evaluate:

- Habitat types / features;
- Habitat integrity;
- Habitat connectivity; and
- Significance of habitats.

Fauna trapping methods such as Elliot trapping, pit fall trapping, hair tube sampling and harp trapping were all employed on Curtis Island and the mainland shoreline.

The methods used in the fauna work on Curtis Island and adjoining mainland areas are those described in ERM (2009).

Assessments of the above attributes were supplemented by opportunistic observations of fauna at each site.

6.0 EXISTING ENVIRONMENT

The pipeline corridors all occur within the Brigalow Belt Bioregion, with the exception of the north eastern-most 4 km of the Export Pipeline (on Curtis Island), which is within the South East Queensland Bioregion.

6.1 Floral Environment

This description of vegetation communities within the pipeline corridors is based primarily on the existing Queensland Herbarium RE mapping. A rapid flora assessment has been undertaken where access was available based on the Option 1 Export Pipeline. The locations of Tertiary sites are shown in **Figures 2**.

The Tertiary assessment data sheets are included in **Attachment 3**. A complete flora list is provided in **Attachment 4**.

It is recommended that detailed field investigations be undertaken of the preferred alignments prior to finalisation of the alignments and the commencement of construction activities.

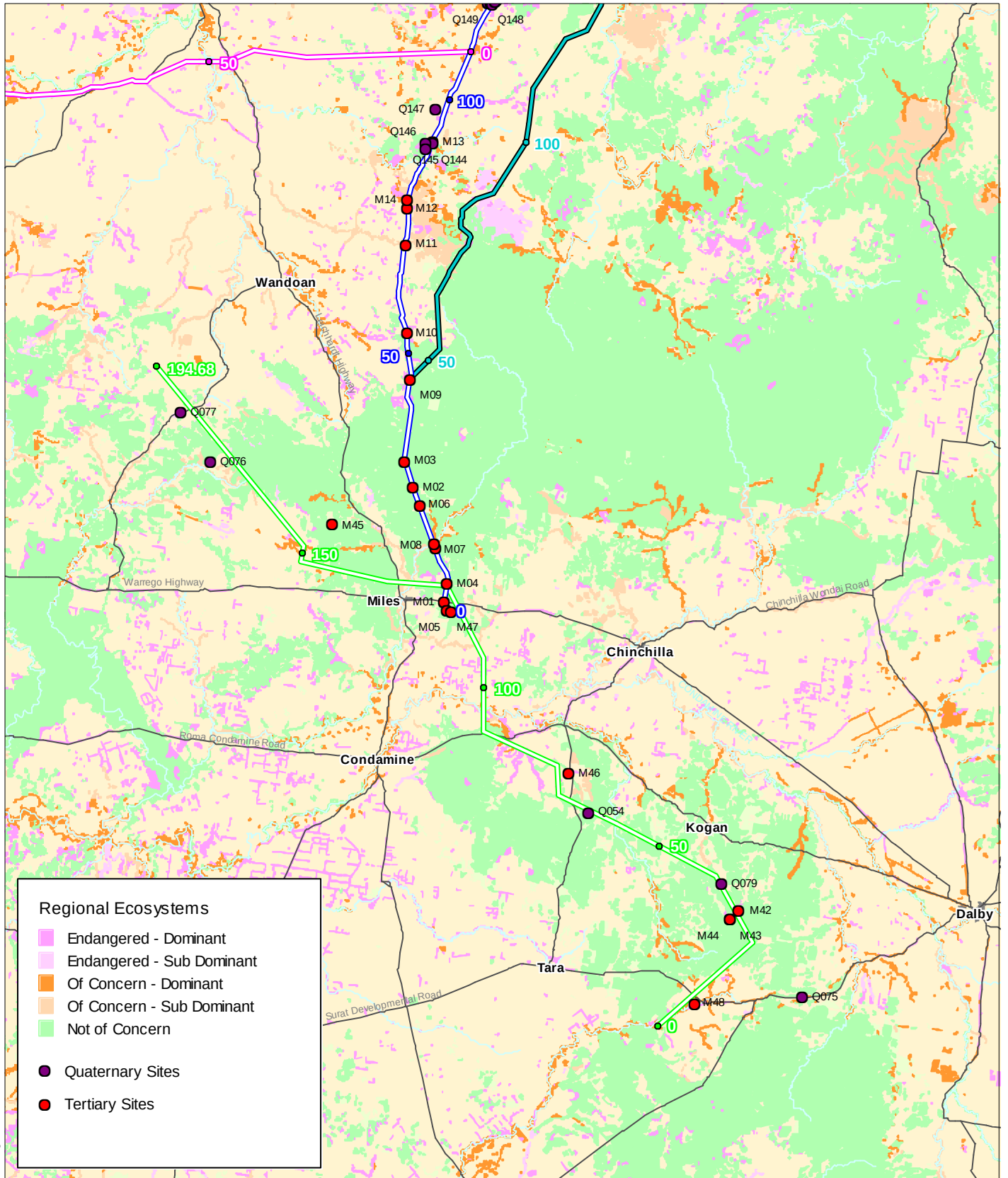
6.1.1 Broad Vegetation Types

The pipeline corridors fall within vegetated and cleared grazing and cropping lands, roadside and travelling stock reserves, Council lands, State Forests and Resource Reserves.

The proposed pipeline corridors traverse predominantly cleared areas. Based on the Queensland Herbarium RE mapping the approximate area of remnant vegetation within each pipeline corridor is as follows:

- 96 km of the 382 km Option 1 Export Pipeline
- 112 km of the 383 km Option 2 Export Pipeline
- 24 km of the 152 km Lateral, and
- 78 km of the 191 km UIC.

The area of each broad vegetation type that is identified by the Queensland Herbarium RE mapping as being transected by the proposed pipeline corridors is set out in **Table 3**.



Legend:

- Export Pipeline & Kilometre Point
- Export Pipeline Option 2 & Kilometre Point
- Lateral Pipeline & Kilometre Point
- Upstream Infrastructure Corridor & Kilometre Point

Regional Ecosystems

- Endangered - Dominant
- Endangered - Sub Dominant
- Of Concern - Dominant
- Of Concern - Sub Dominant
- Not of Concern

- Quaternary Sites
- Tertiary Sites

Source Note:

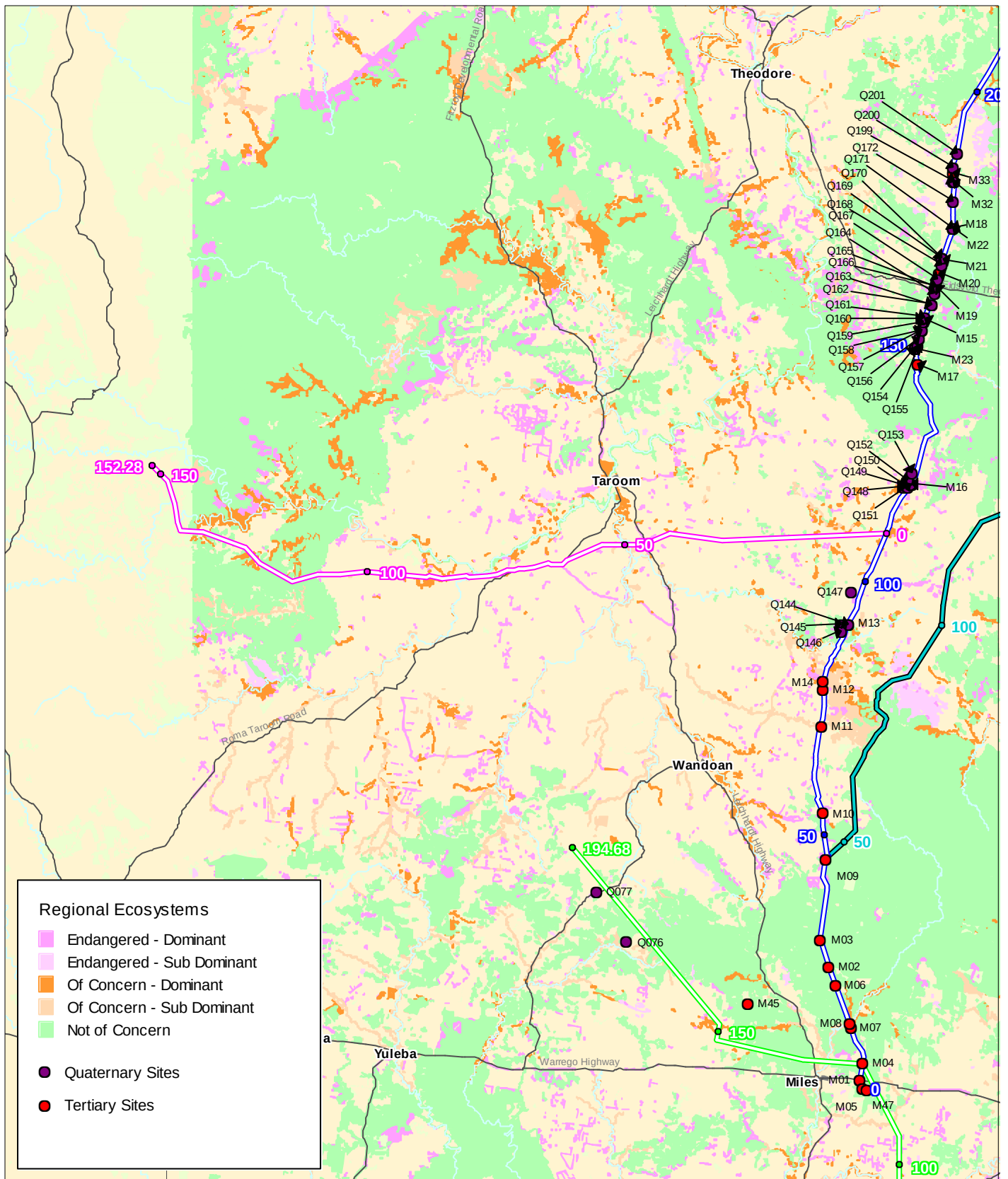
1:250,000 Topographic vector copyright Geoscience Australia
Regional Ecosystems v5.0 copyright QLD Herbarium
Quaternary and Tertiary Sites data captured and documented by Ann Moran

Projection UTM MGA Zone 56 Datum GDA 94

0 10 20 30 40

Kilometres

 Queensland Gas Corporation	Project Queensland Curtis LNG Project		Title Flora Survey Sites and Mapped Regional Ecosystems
	Client QGC - A BG Group business		
 Environmental Resources Management Australia Pty Ltd	Drawn Mipela	Figure 2	Disclaimer: Maps and Figures contained in this Report may be based on Third Party Data, may not be to scale and are intended as Guides only. ERM does not warrant the accuracy of any such Maps and Figures.
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Project **Queensland Curtis LNG Project**

Client **QGC - A BG Group business**

Title **Flora Survey Sites and Mapped Regional Ecosystems**

Map 2 of 3



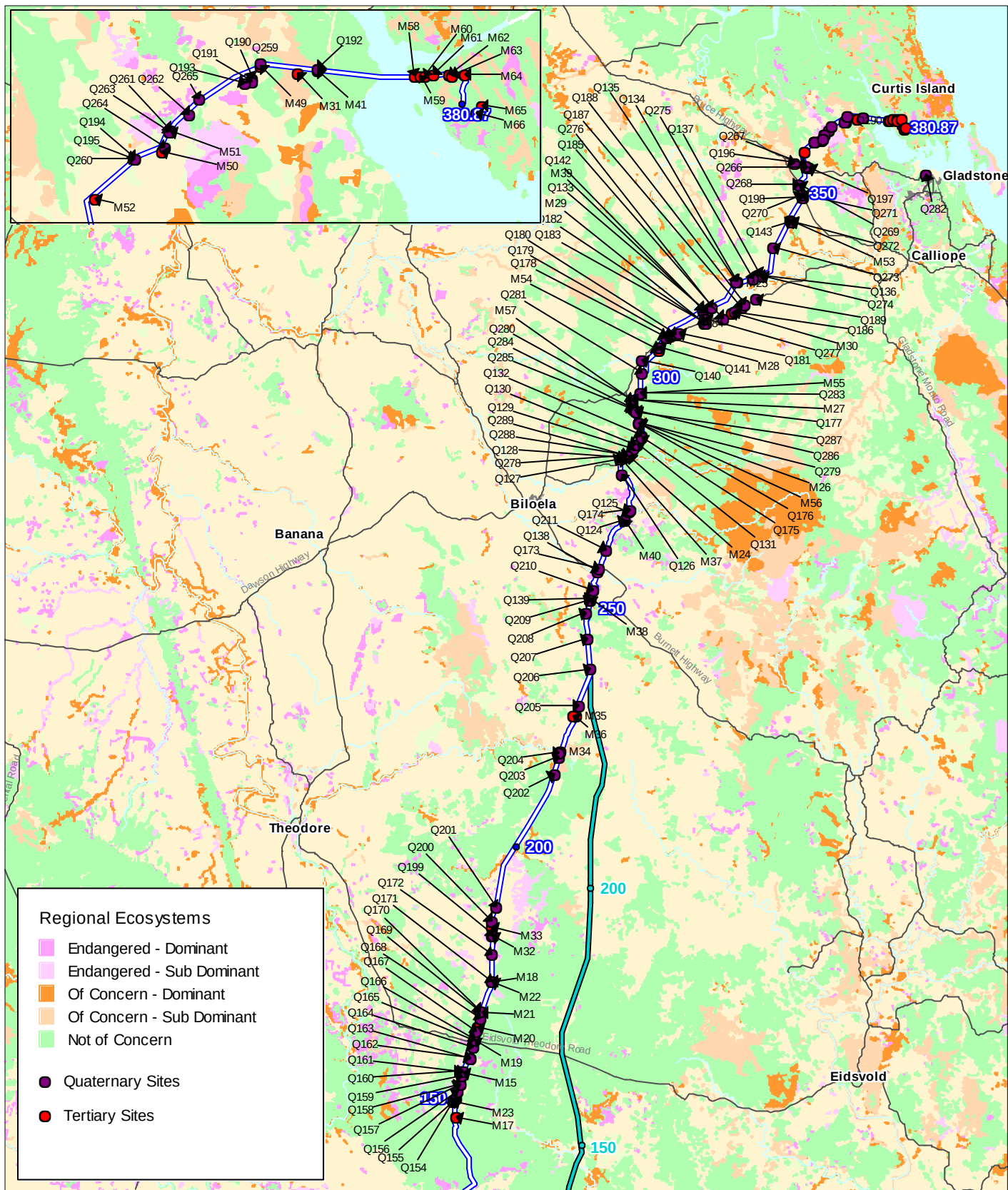
Environmental Resources Management Australia Pty Ltd

Drawn Mipela **Figure 2**

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Table 3: Broad Ecological Communities Transected by the Proposed Pipeline Alignments

Vegetation Type	Area within Option 1 Export Pipeline (ha)	Area within Option 2 Export Pipeline (ha)	Area within Lateral (ha)	Area within UIC (ha)	Total (excluding Option 1) (ha)
Eucalypt woodlands	409.54	494.06	116.44	722.97	1333
Acacia woodlands	14.68	17.07	0.53	3.28	21
Brigalow / Belah woodland	13.77	6.60	0.89	6.92	14
Riparian Eucalypt woodland	13.25	11.03	2.12	33.48	47
Shrubland Community	7.78	12.69	nil	15.46	28
Semi-evergreen Vine Thicket	0.93	0.23	2.24	nil	2.5
Native Bluegrass Grasslands	2.21	nil	nil	nil	nil
Freshwater Wetlands	1.09	1.09	nil	nil	1
Estuarine Wetlands	14.88	14.88	nil	nil	15
Total Remnant Vegetation	478	558	122	782	1462

6.1.2 Ecological Communities and Regional Ecosystems

According to Queensland Herbarium RE mapping, 57 REs are transected by the pipeline alignments (**Figure 2**). **Attachment 5** presents the area of each RE that is located within:

- The Option 1 and Option 2 Export Pipeline and Lateral, based on 50m wide corridors, and
- The UIC, based on a 100m wide clearing corridor.

The field inspection of the Option 1 Export Pipeline and parts of the UIC generally agreed with RE mapping, with some minor discrepancies that could be attributed mostly to mapping scale. As the field survey concentrated on assessment of vegetation within the study corridors, it was capable of detecting much smaller scale vegetation patterns than the Queensland Herbarium's regional 1:100 000 RE mapping. These descriptions are shown in the Tertiary assessment data sheets provided in **Attachment 3**.

EPBC Act Threatened Ecological Communities

Based on Queensland Herbarium RE mapping, the pipeline corridors (including Option 1) transect three Threatened Ecological Communities as listed under the EPBC Act (**Figure 3**). These are represented on the Queensland Herbarium RE mapping by 9 REs, including:

- Brigalow woodland / open forest communities - REs 11.3.1, 11.4.3, 11.9.1, 11.9.5, 11.9.6, 11.12.21
- Native Bluegrass grassland community (Option 1 only)– RE 11.9.12, and
- Semi-evergreen Vine Thicket (SEVT) communities– RE 11.9.4 and 11.11.18.

Table 4 sets out each Threatened Community mapped as being present along the pipeline corridors and the corresponding Queensland RE code.

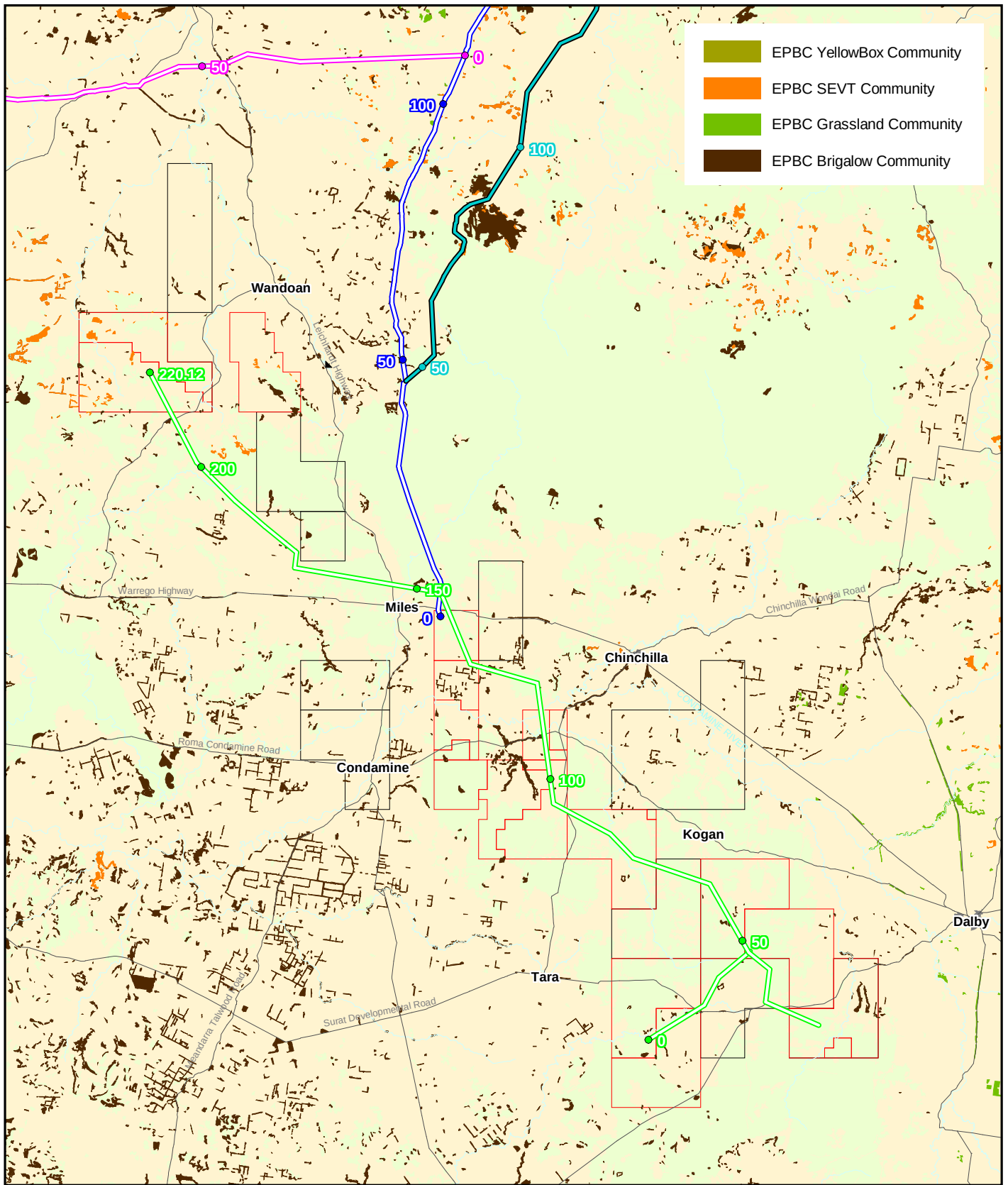
An additional Threatened Ecological Community which may also be transected by the pipeline corridors is the Endangered Weeping Myall Open Woodland Community. This Community is not mapped by the Queensland Herbarium RE mapping nor was it detected by the initial field studies. However, it is described as occurring within the Brigalow South Bioregion, generally in small patches of alluvial soils within REs 11.3.2 and 11.3.28. As such, it may potentially occur in alluvial areas transected by the pipeline corridors, in particular, the UIC which transects approximately 30 ha of the RE 11.3.2.

Table 4: The EPBC Threatened Ecological Communities Mapped as Present along the Pipeline Corridors and Corresponding QLD RE Codes

Communities	Option 1 Export Pipeline	Option 2 Export Pipeline	Lateral	UIC
Brigalow	11.4.3 11.9.1 11.9.5 11.9.6 11.12.21	11.4.3 11.9.5 11.12.21	11.9.5	11.3.1 11.4.3 11.9.5
Native Bluegrass Grassland Communities	11.9.12			
Semi- Evergreen Vine Thicket	11.9.4 11.11.18	11.9.4 11.11.18	11.9.4	

Existing Queensland Herbarium RE mapping indicates that the six Endangered Brigalow communities almost always occur in small and narrow fragments which have been left along fencelines, creeks and roadsides (**Figure 3**). One exception is the larger patches of the mixed community RE 11.9.5/11.9.6 that is crossed by the Option 1 Export Pipeline corridor at KPs 54.1-55 and 65.1-65.5. A complete list

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Legend:

- Export Pipeline & Kilometre Point
- Export Pipeline Option 2 & Kilometre Point
- Lateral Pipeline & Kilometre Point
- Upstream Infrastructure Corridor & Kilometre Point

- CSG Fields - PL & PLA
- CSG Fields - ATP

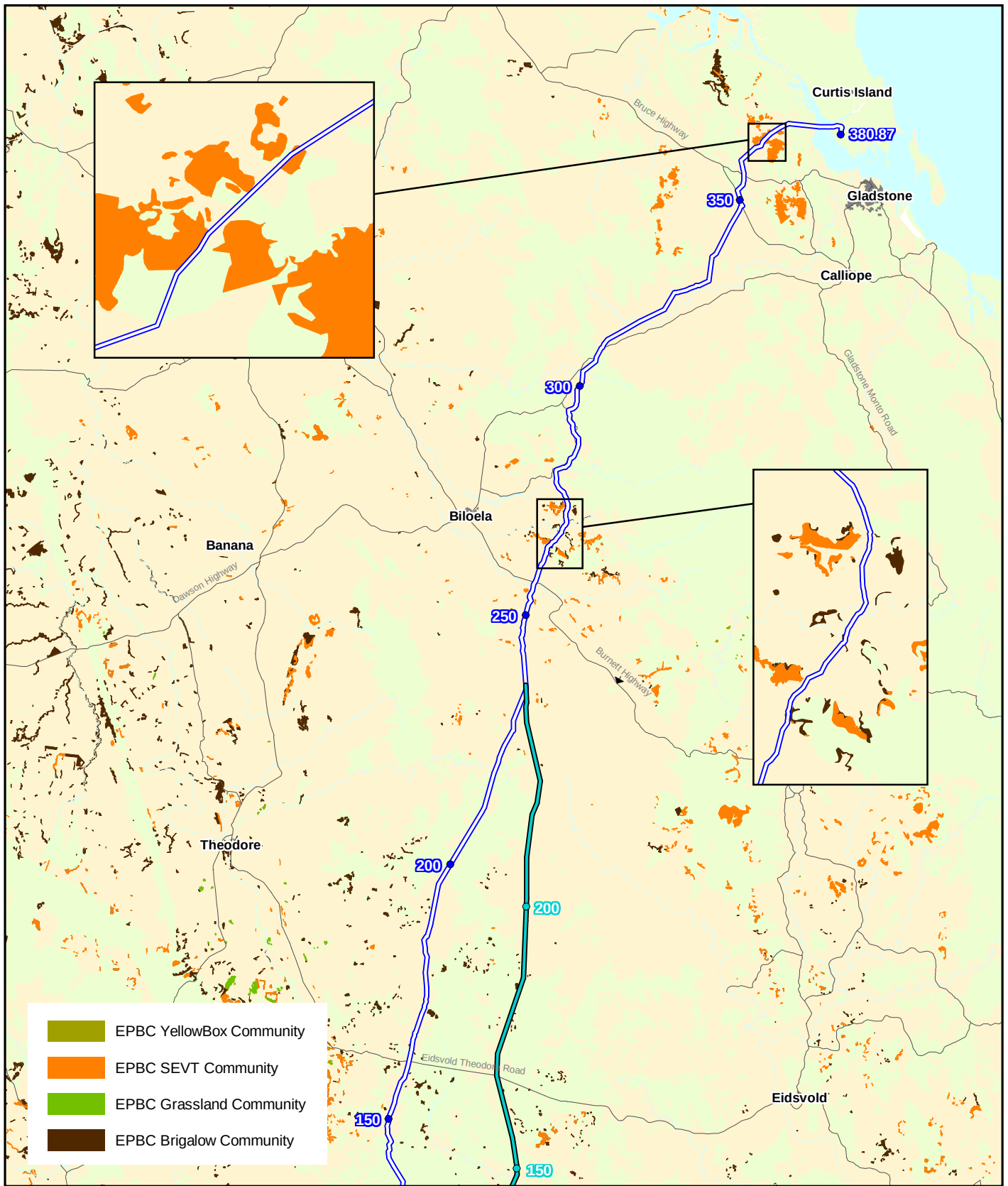
Source Note:

1:250,000 Topographic vector copyright Geoscience Australia
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Projection UTM MGA Zone 56 Datum GDA 94
0 10 20 30 40
Kilometres



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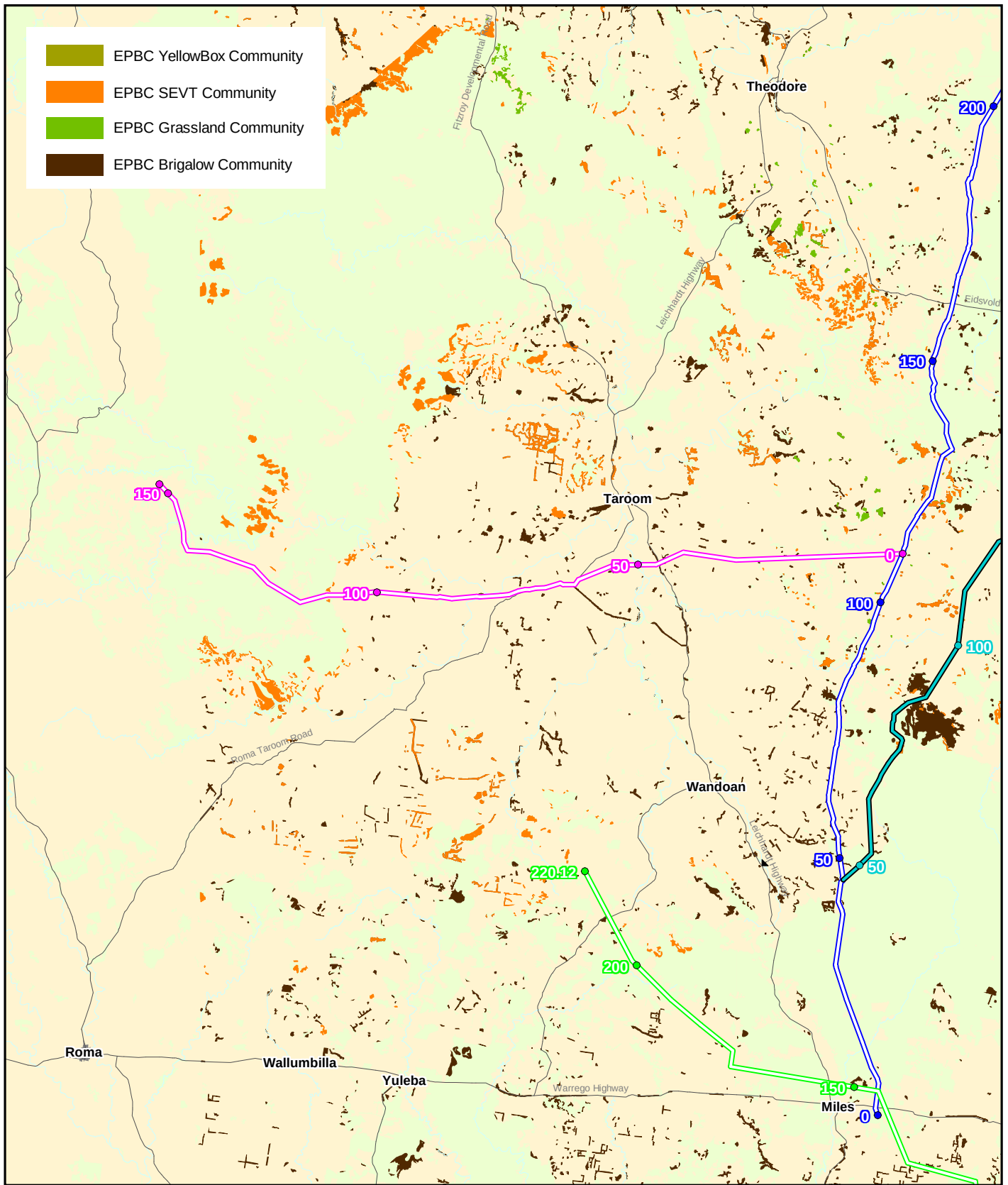
- Export Pipeline & Kilometre Point
- Export Pipeline Option 2 & Kilometre Point
- Lateral Pipeline & Kilometre Point
- Upstream Infrastructure Corridor & Kilometre Point

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	Figure	3	
	File No:	EO5-P-MA-96141	
	Revision	A	

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Legend:

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- Export Pipeline Option 2 & Kilometre Point
- Lateral Pipeline & Kilometre Point
- Upstream Infrastructure Corridor & Kilometre Point

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0 10 20 30 40
Kilometres



 A BG Group business	Project Queensland Curtis LNG Project		Title EPBC Communities
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	Date 13.03.09	Revision A	

of the position and approximate size of the Brigalow Communities mapped by the Queensland Herbarium as being transected by the Pipeline corridors is set out in **Table 5**.

Field surveys of a RE 11.9.5 remnant recorded in the vicinity of the pipeline at approximately KP 50.6 of Option 1 Export Pipeline (Site M10) found this area to be in an average condition due to grazing and weed invasion. The declared Class 2 weed *Opuntia tomentosa* was also found present within this site.

Ground truthing of a mapped RE 11.4.3 remnant in the vicinity of Option 1 and Option 2 Export Pipeline (Site M40) found the area to be a degraded non-remnant. This remnant was considered to be degraded due to high weed densities and recent fire damage.

The total area of Endangered Brigalow Community that is located within the pipeline corridors is estimated to be 14 ha. However, if the Export Pipeline Option 1 corridor was utilised this area would increase to 22 ha.

RE mapping indicates the presence of one small fragment of Native Bluegrass Grassland community (RE 11.9.12) on the Option 1 Export Pipeline. The RE 11.9.12 occurs in a thin remnant at KP 95.9-96.2. Approximately 2 ha of the RE are transected by the Option 1 Export Pipeline corridor. If Option 1 is selected, detailed field investigations will confirm the precise location and avoidability of this remnant. No Native Bluegrass Grassland communities are mapped as present along the Option 2 Export Pipeline corridor.

Desktop studies also indicate the presence of the two SEVT communities REs 11.9.4 and 11.11.18 along the pipeline corridors. A small fragment (<0.1 ha) of SEVT community RE 11.9.4 is mapped as occurring along the Option 2 Export Pipeline at KP 83 and a larger area (0.8 ha) along the Option 1 Export Pipeline at KP 129.8-130.1. Mapping also indicates the occurrence of one RE 11.9.4 community along the Lateral at KPs 145.8-146 and 147.4-147.6. The RE 11.11.18 makes up approximately 5% of the mixed community RE 11.11.15/11.11.18 mapped at KP 364-365 along Option 1 and Option 2 Export Pipeline. Groundtruthing of this area indicated that this was not a mixed community, but rather a community solely made up of RE 11.11.18. This area was found to be in a degraded condition.

It is estimated that the total area of SEVT communities that occur within the pipeline corridors (excluding the Option 1 Export Pipeline) is approximately 2 ha. The desktop mapping indicates that use of the Option 1 Export Pipeline would require clearing of an additional 0.7 ha.

A complete list of the mapped position and approximate size of the all EPBC listed communities transected by the Pipeline corridors is set out in **Table 5**. These communities are shown in **Figure 3**.

Table 5: Location of EPBC Listed REs along the Proposed Pipeline Corridors

EPBC Listed Community	RE	Approximate KP*				Survey Sites
		Option 1 Export Pipeline	Option 2 Export Pipeline	Lateral	UIC	
Brigalow (<i>Acacia harpophylla</i> dominant and co-dominant)	11.3.1(dominant RE in mosaic)				119.3-119.4	
	11.4.3(dominant RE in mosaic)	4.5-57.9	4.5-57.9		91.9-92.1 118.4-118.5	M4, M40
	11.9.1(dominant RE in mosaic)	85.6				
	11.9.5 (dominant RE in mosaic)	40.1-40.5 49.2 54.2-55 65.1-65.5 262.7-262.9 263.5	40.1-40.5 262.7-262.9 263.5	43.8-44	112.6 167.6-167.9	M10
	11.9.5 (sub-dominant RE in mosaic)	80.1-81.3 81.6-82.2 129.8-130.1	73.9		140.1-140.2	
	11.9.6 (sub-dominant RE in mosaic)	49.2 54.2-55 65.1-65.5				
	11.12.21 (dominant RE in mosaic)	177.4-177.6				
Natural grasslands on basalt and fine-textured alluvial plains of northern New South Wales and southern Queensland	11.9.12 (dominant RE in mosaic)	95.9-96.2				
Semi-evergreen vine thickets of the Brigalow Belt (North and South) and Nandewar	11.9.4 (dominant RE in mosaic)	129.8-130.1	73.9	145.8-146 147.4-147.6		
	11.11.18 (sub-dominant RE in mosaic)	364- 365	364- 365			M51

*Based on existing Queensland Herbarium RE Mapping

VM Act Endangered REs

The VM Act Endangered REs transected by the pipelines are the same as the EPBC Listed Ecological Communities discussed above, with the exception of two additional Endangered REs which are not EPBC Listed. These are:

- RE 11.12.17 (*Eucalyptus populnea* woodland on igneous rocks), and
- RE 12.3.3 (*Eucalyptus tereticornis* woodland to open forest on alluvial plains).

According to existing mapping the Option 1 Export Pipeline corridor passes through the mixed community of RE 11.12.1/11.12.17 (ratio of 95:5) at four locations (KPs 177-177.4, 181.5, 190.4-190.5, 196.8-197.1). The total area of this Endangered RE that is transected by this corridor is estimated to be 0.2 ha. This RE is not present along the Export Pipeline Option 2 alignment.

The Endangered RE 12.3.3 is mapped as occurring as a mixed community along the Option 1 and Option 2 Export Pipeline at KP 379.3-379.4 on Curtis Island. Field surveys of this area found the community to be in an average condition due to cattle grazing and previous fires in the region (M64). The total area of this RE that occurs along the Export Pipeline corridor is approximately 1 ha. This area will not change regardless of which Export Pipeline option is adopted.

A complete list of the mapped position and approximate size of the REs listed as Endangered under the VM Act which are transected by the Pipeline corridors is set out in **Table 6**. These communities are illustrated in **Figure 2**.

All of the REs listed as Endangered under the VM Act also have an Endangered Biodiversity status as defined by the EPA. Two additional REs 11.3.17 and 11.9.10 have a Biodiversity status of Endangered and are listed as Of Concern under the VM Act. The RE 11.3.17 is mapped as having a total area of 2.10 ha along the UIC between KPs 2-6 and 9.4-9.6. The RE 11.9.10 has an estimated area of 1.12 ha. It is mapped as present between KPs 40.1-40.5 along the Option 1 and Option 2 Export Pipeline corridors and KPs 71-71.2 and 75.2-76 along the Option 1 Export Pipeline corridor.

Table 6: Approximate Location of VM Act Endangered REs along Pipeline Corridors

RE	Approximate KP				Survey Sites
	Export Pipeline	Export Pipeline Option 2	Lateral	UIC	
11.3.1(dominant RE in mosaic)				119.3-119.4	
11.4.3(dominant RE in mosaic)	4.7-5 7.9	4-7.5 7.9		91.9-92.1 118.4-118.5	M4
11.9.1(dominant RE in mosaic)	85.6				
11.9.4(dominant RE in mosaic)	129.8-130.1	73.9	145.8-146 147.4-147.6		
11.9.5(dominant RE in mosaic)	40.1-40.5 49.2 54.1-54.2 54.2-55 65.1-65.5 262.7-262.9 263.5	40.1-40.5 262.7-262.9 263.5	43.8-44	112.6 167.6-167.9	M10
11.9.5(sub-dominant RE in mosaic)	80.1-81.3 81.6-82.2 129.8-130.1	73.9		140.1-140.2	
11.9.6 (sub-dominant RE in mosaic)	49.2 54.2-55 65.1-65.5				
11.9.12(dominant RE in mosaic)	95.1-96.3				
11.11.18 (sub-dominant RE in mosaic)	364- 365	364- 365			M51
11.12.17(sub-dominant RE in mosaic)	177-177.4 181.5 190.4-190.5 196.8-197.1				

11.12.21(dominant RE in mosaic)	177.4-177.6				
12.3.3 (dominant RE in mosaic)	379.3-379.4	379.3-379.4			M64

VM Act Of Concern REs

According to existing Queensland Herbarium Mapping, nine REs listed as Of Concern under the VM Act occur within at least one of the Project's three pipeline corridors (**Table 7**). These are:

- Eight Eucalypt woodland communities – REs 11.3.2, 11.3.3, 11.3.4, 11.3.17, 11.5.13, 11.9.7, 12.3.11 and 12.11.14, and
- One Acacia woodland community – RE 11.9.10.

According to existing RE mapping (confirmed by field surveys) the Of Concern Eucalypt Woodland communities transected by the pipeline corridors generally occur within small narrow remnants that remain along fencelines, roadsides and in creeklines. Some of the larger patches of these Of Concern communities that fall within the proposed corridors are:

- The mixed community of RE 11.3.26/11.3.4/11.11.15 (ratio of 70:20:10) present along the Export Pipeline at KP 370.3-372; and
- The mixed community of RE 11.3.2/11.3.25/11.3.17 (ratio of 60:35:5) and the RE 11.9.7 occurring between KP 2-8.2 along the UIC corridor.

Table 7 sets out the approximate KP for each pipeline which transects these communities.

Field surveys inspected Eucalypt Woodland communities present within and in the vicinity of the Export Pipeline corridor at eleven locations. These areas were generally found to be in a good to average condition due to edge effects which include grazing and weed invasion. Declared Class 2 weeds such as *Opuntia tomentosa* (Velvety Tree Pear) were found to be present at a number of these sites.

As noted above, the Eucalypt Woodland RE 11.3.2 is mapped as following a number of creeks and drainage systems in the vicinity of the UIC corridor. Field surveys verified the presence of a large remnant of the mixed community RE 11.3.2/11.3.25/11.3.17 mapped as present at KP 2-8.2. This community was found to be in a good condition.

Existing mapping indicates that the Eucalypt Woodland RE 11.5.13 only occurs within the Option 2 Export Pipeline corridor. Three small narrow fragments of this RE are transected by the corridor between KP 136-139.6 and make up an area of approximately 4 ha.

The total area of Of Concern Eucalypt Woodlands that are mapped as occurring within the pipeline corridors is approximately 104 ha. However, if the Option 1 Export Pipeline was to be used this estimated clearing area will increase to approximately 106 ha.

Herbarium mapping also indicates the presence of four small remnants of the Acacia Woodland RE 11.9.10 along the Lateral and the Export Pipeline. This RE is mapped along the Option 1 and Option 2 Export Pipelines at approximately KP 40.1-40.5 and the Lateral at KP 46. The remaining two remnants are mapped within the Option 1 Export Pipeline corridor at KPs 71-71 and 275.2-76. The total area of this RE which occurs within the pipeline corridors is approximately 1 ha. This area would increase to 2 ha if the Option 1 Export Pipeline is selected.

A complete list of the mapped position and approximate size of the REs listed as Of Concern under the VM Act which are transected by the Pipeline corridors is set out in **Table 7**. These communities are illustrated in **Figure 2**.

Table 7: Approximate Location of VM Act Of Concern REs Along Pipeline Corridors

RE	Approximate KP				Survey Sites
	Option 1 Export Pipeline	Option 2 Export Pipeline	Lateral	UIC	
11.3.2 (dominant RE in mosaic)	198-198.3 204-206		113-113.2 122.2-122.5 123-123.3	2-6 6-8.5 9.4-9.6 163.9-164 165.1-166	
11.3.2 (sub-dominant RE in mosaic)	256	67.7-67.9 68.5-69 69.8-71 256	49-49.7 51.7	103.2-103.3 127.2-127.4 143.4-143.7 144-144.1 184.1-185.5 187.4-187.8	
11.3.3 (dominant RE in mosaic)			80.3-80.4 84-84.2 113-113.2		
11.3.3 (sub-dominant RE in mosaic)			49-49.7 51.7	107.3-107.5	
11.3.4(dominant RE in mosaic)	269.4 280.2- 280.5 281.8- 282.2 282.8-284 284.3- 284.5 285.5- 286.6 286.8- 286.9 287.8-288 288.5- 288.9 289.1- 289.8 343.8- 343.9	269.4 280.2-280.5 281.8-282.2 282.8-284 284.3-284.5 285.5-286.6 286.8-286.9 287.8-288 288.5-288.9 289.1-289.8 343.8-343.9		103.2-103.3	M8, M24, M26, M37 M56
11.3.4 (sub-dominant RE in mosaic)	77.9-78.5 79.3-79.4 80-80.1 82.2-82.5 216.6- 217.5 219.9-220 256	77.5-79.1 220.8-220.9 256 370.3-372		107.3-107.5 127.2-127.4 143.4-143.7 144-144.1	M12, M14

RE	Approximate KP				Survey Sites
	Option 1 Export Pipeline	Option 2 Export Pipeline	Lateral	UIC	
	370.3-372				
11.3.17(sub-dominant RE in mosaic)				2-6 9.4-9.6	
11.5.13 (dominant RE in mosaic)		136.9-137.4 138.3-138.5 139.3-139.6			
11.9.7 (dominant RE in mosaic)	77.9-78.5 79.3-79.4 80-80.1 82.2-82.5 107.5-107.7 112.1-112.2 120.7	77.5-79.1	13.4-13.6	6-6.5	M11, M12, M16, M14, M16
11.9.7 (sub-dominant RE in mosaic)	71-71.2 75.2-76 80.1-81.3 81.6-82.2 112.1-112.2 262.7-262.9 263.5	262.7-262.9 263.5		112.6	M11, M12
11.9.10 (dominant RE in mosaic)			46-46.1		
11.9.10 (sub-dominant RE in mosaic)	40.1-40.5 71-71.2 75.2-76	40.1-40.5			
12.3.11 (sub-dominant RE in mosaic)	378.4-378.6	378.4-378.6			
12.11.14 (sub-dominant RE in mosaic)	376.9-377 380.5-380.9	376.9-377 380.5-380.9			

VM Act Not Of Concern REs

Desktop study results show 37 REs listed as Not of Concern under the VM Act occur within the Project's proposed pipeline corridors. These are:

- 30 Eucalypt woodland communities – REs 11.3.6, 11.3.14, 11.3.18, 11.3.26, 11.3.39, 11.5.1, 11.5.4, 11.5.5, 11.5.20, 11.5.21, 11.7.4, 11.7.6, 11.7.7, 11.8.4, 11.9.2, 11.10.1, 11.10.4, 11.10.7, 11.10.9, 11.10.13, 11.11.3, 11.11.4, 11.11.9, 11.11.15, 11.12.1, 11.12.2, 11.12.3, 11.12.4, 11.12.6 and 12.11.6
- One Shrubland community – RE 11.7.5
- One Acacia woodland community – RE 11.7.2
- One Freshwater Riparian woodland community – RE 11.3.25
- Two Freshwater wetland communities – RE 11.3.27 and 12.3.7, and
- Two Estuarine wetland communities – REs 11.1.2 and 11.1.4.

A complete list of the mapped position and approximate size of the REs listed as Not of Concern under the VM Act which are transected by the Pipeline corridors is set out in **Attachment 6**. These communities are illustrated in **Figure 2**.

The initial field survey confirmed the presence of 9 of these Eucalypt Woodland REs. They varied from degraded to very good condition. An area of RE 11.12.2 in close proximity to Option 1 and Option 2 Export Pipelines (KP 15) was found to be in a very good condition. The REs 11.12.6 (Site M22, KP 173.2 of Option 1 Export Pipeline) and RE 11.3.6 (Site M26, KP 289.4 of Option 1 and Option 2 Export Pipelines) were considered to be in a degraded state due to past fires and cattle grazing. Weed densities on the sites were also very high, with both declared and environmental weeds present.

Field surveys generally found existing mapping to be accurate, noting that some sites mapped as mixed communities were found to only show characteristics of one RE at the location of the corridor transect.

The total area of Not of Concern Eucalypt Woodland that is mapped as occurring within the pipeline corridors is approximately 1229 ha. This amount would decrease to approximately 1,145 ha if the Option 1 Export Pipeline was selected.

The Shrubland community RE 11.7.5 is mapped as occurring as a subdominant community along all pipeline corridors, with the exception of the Lateral. Of the three mapped remnants of this community that were surveyed (M1, M3 and M5) only one was found to show characteristics of this RE. This remnant of RE 11.7.5 (M3 at KP 29.3 of Option 1 and Option 2 Export Pipelines) was found to be in a very good condition and was considered to provide potential habitat for the EVR species *Philothea sporadica*.

The total area of RE 11.7.5 that is mapped as occurring within the pipeline corridors is approximately 28 ha. This area would decrease to 23 ha if Option 1 Export Pipeline was used.

According to existing mapping the Acacia Woodland community (RE 11.7.2) generally occurs in small patches as a sub-dominant community along the Option 1 and Option 2 Export Pipelines and the UIC. Discrepancies in Herbarium mapping were encountered when the groundtruthing of four mapped mixed communities of this RE showed no areas characteristic of this community (Sites M1, M5, M7 and M9). As a result, no areas of RE 11.7.2 were visited.

The total area of RE 11.7.2 mapped as present within the pipeline corridors is approximately 19.7 ha (16.7 ha for Option 1 Export Pipeline alignment).

The riparian woodland community RE 11.3.25 is mapped as occurring in long thin patches along all pipeline corridors with the exception of the Lateral. Field surveys of four mapped remnants found that only two showed characteristics of this community. Surveys of these two sites at KP 24 and 29 of Option 1 and Option 2 Export Pipelines (Sites M24 and M29) were found to be in an average condition. The declared weed species, Prickly Pear (*Opuntia tomentosa*), and the environmental weed, Para Grass (*Urochloa mutica*) were observed on these sites.

The total area of RE 11.3.25 that is mapped as occurring within the pipeline corridors is approximately 47 ha. In the event that the alternative Option 1 Export Pipeline was utilised this area would increase to 49 ha. The size of this area can be largely attributed to the transection of a large mixed community made up of REs 11.3.2/11.3.25/11.3.17 by the UIC. Mitigation measures to avoid this area have been discussed in **Section 8.2**.

The two freshwater wetland communities REs 11.3.27 and 12.3.7 are mapped as occurring along the Export Pipeline.

The area of RE 11.3.27 mapped as occurring within the Option 1 and Option 2 Export Pipelines is approximately 1 ha (between KP 12-13).

The RE 12.3.7 is mapped as occurring as a dominant RE in community RE 12.3.7/12.3.11 between KP 379.4-379.6 just before the marine crossing to Curtis Island (Site M41). This RE is also mapped as the subdominant RE in the mixed community 12.3.3/12.3.7 at KPs 380.5-380.7 and 382.4-382.72 on Curtis Island (Site M64 and M66). In both cases, however, field surveys found this to be a mapping error as these remnants only showed characteristics of REs 12.3.11 and 12.3.3.

According to existing mapping the two estuarine wetland communities REs 11.1.2 and 11.1.4 occur in large patches along the Export Pipeline just to the west of the marine crossing to Curtis Island (between KPs 372-375). Due to access restrictions (i.e. waterlogging and cultural restrictions) these areas could not be inspected in the field. As such they are assumed to be in good condition.

The total area of estuarine wetland communities that are mapped as occurring within the pipeline corridors is estimated to be 15 ha. This area is the same regardless of which Export Pipeline option is used.

6.1.3 EVR Flora Species

Review of the Queensland Herbarium HERBRECS, WildNet and the EPBC Act Protected Matters databases for the study area identified 119 EVR plant species that have ranges that occur within and/ or in the vicinity of the pipeline corridors (**Attachment 7**). These include:

- 111 species are listed under the provisions of the NC Act, including 14 Endangered, 42 Vulnerable, and 55 Rare species, and
- 48 species are listed under the provisions of the EPBC Act including 9 Endangered, and 39 Vulnerable species.

Based on available ecological information, 83 of these 119 EVR flora species have potential habitat within the pipeline alignments (**Attachment 7**). These species and their preferred habitats were targeted during initial field survey work and will be targeted during ongoing detailed alignment surveys.

The field surveys observed two EVR species within or in the close proximity of the Export Pipeline alignments. These include:

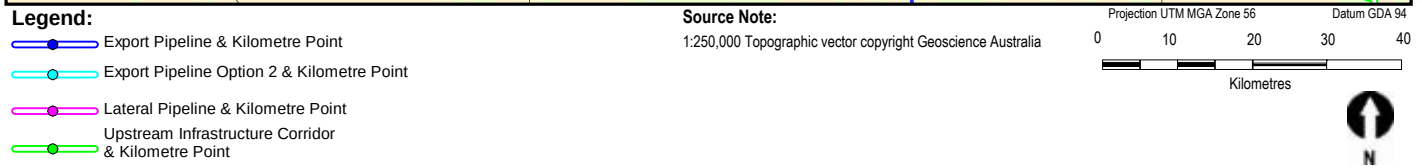
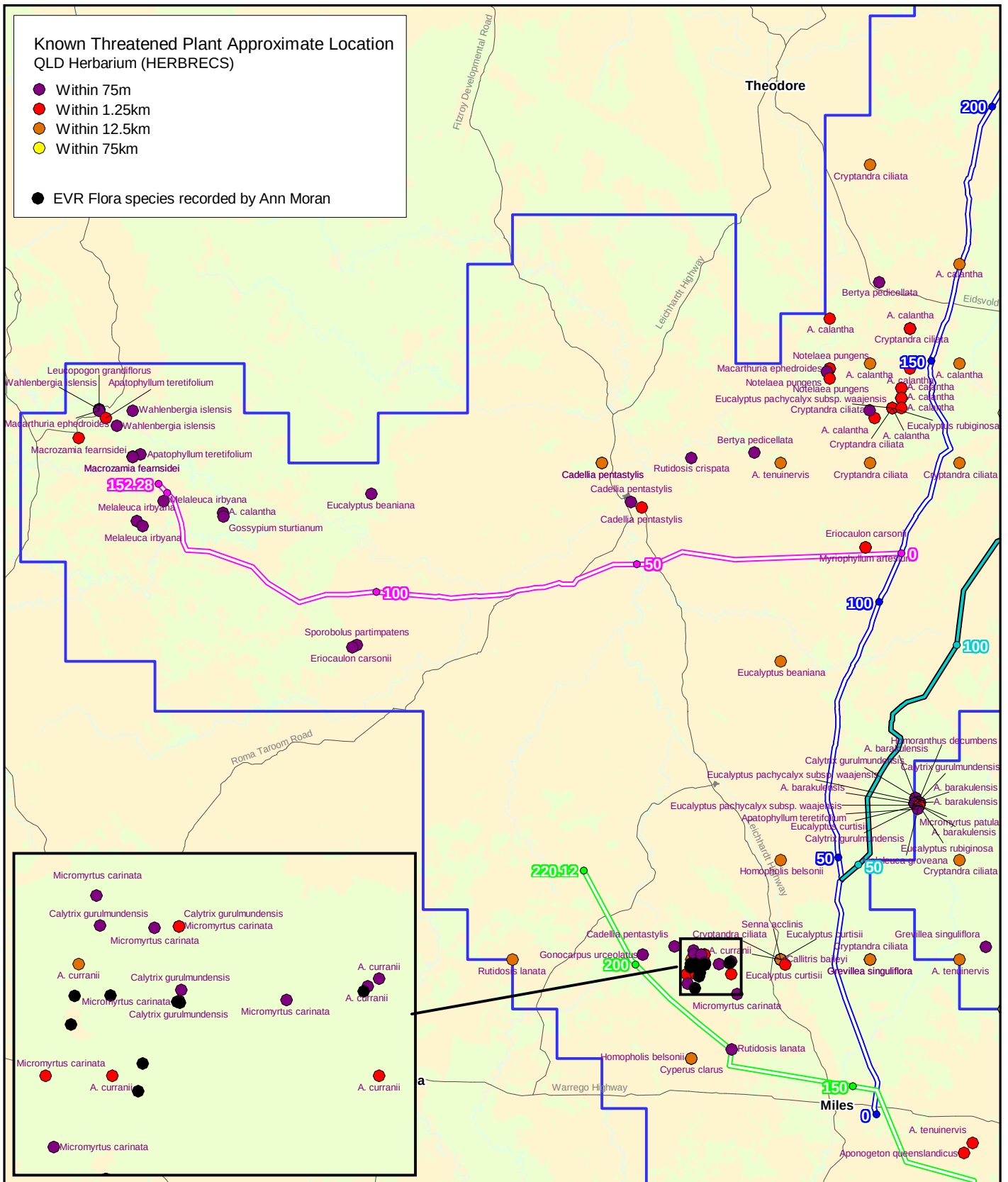
- *Cadellia pentastylis* (Ooline) at approximate KP 227 (Site M36) along the Option 1 Export Pipeline
- A small population of *Cycas megacarpa* (Large-fruited Zamia) between KPs 296.5-298.5 (Sites M56 and M57) and two additional plants at approximate KPs 301 and 305 along the Option 1 and Option 2 Export Pipeline corridors.

The initial field surveys recorded five EVR species within the general vicinity of the UIC. These are:

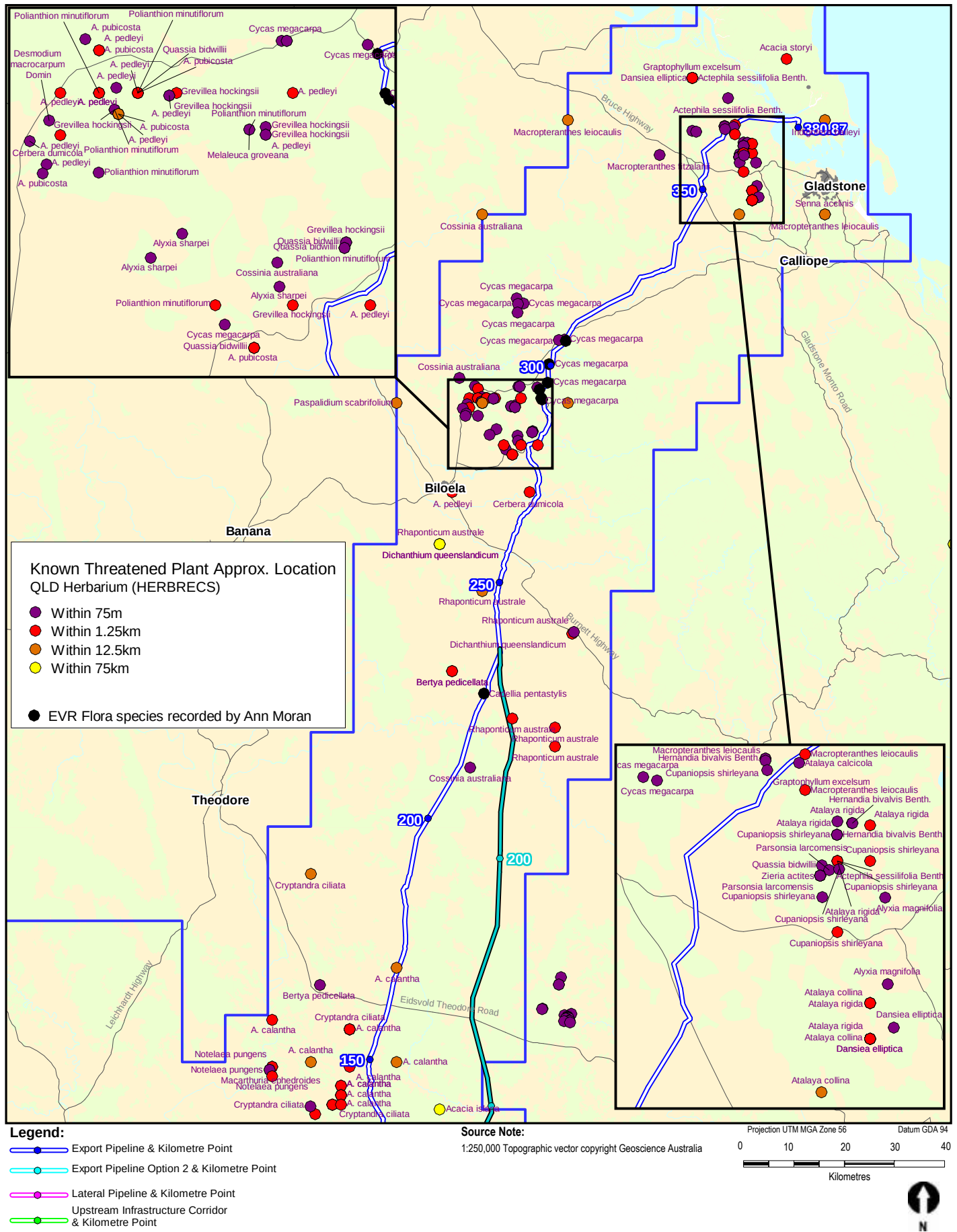
- *Acacia curranii*
- *Acacia wardellii*
- *Calytrix gurulumundensis*
- *Micromyrtus carinata*, and
- *Philotheca sporadica*.

The known locations of EVR flora according to Herbarium records and/or field surveys are presented in **Figure 4**. Note that as it was not as yet possible to undertake detailed flora surveys of the entire length of the pipeline corridors, it is anticipated that additional EVR flora species will be found.

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 A BG Group business	Project Queensland Curtis LNG Project		Title Known EVR Locations
	Client QGC - A BG Group business		
 ERM Environmental Resources Management Australia Pty Ltd	Drawn DB	Figure 4	Disclaimer: Maps and Figures contained in this Report may be based on Third Party Data, may not be to scale and are intended as Guides only. ERM does not warrant the accuracy of any such Maps and Figures.
	Approved CDIP	File No: EO5-P-MA-96174	
	Date 03.03.09	Revision A	



 A BG Group business	Project Queensland Curtis LNG Project		Title Known EVR Locations
	Client QGC - A BG Group business		
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	Approved	CDP	
	Date	20.05.09	
	Figure:	4	
	File No:	EO5-P-MA-96175	
	Revision	A	

6.1.4 Regionally Significant Flora Species

In addition to the EVR flora species, nine Regionally Significant flora species are known to occur within or in the vicinity of the pipeline corridors. These species have not been listed as being EVR under the EPBC Act or NC Act, but have been identified by the Environmental Protection Agency (EPA 2008b) as non-EVR priority taxa for the Brigalow Belt Bioregion. These are:

- *Acacia* sp. Gayndah – According to BAMB records presence of this narrow endemic taxa is recorded between KPs 2.7-4.2 along the Option 1 and Option 2 Export Pipeline corridor
- *Acacia aprepta* (Miles Mulga) – occurs as a dominant in patches with scattered distribution in vegetation transected by the UIC corridor between KP 145-157
- *Acacia melvillei* – was recorded by field surveys in small populations in areas between Kogan, Brigalow and Dalby (20 km north of UIC at KP 60)
- *Acacia omalophylla* – Field surveys recorded this species in the Wambo Creek area approximately 10 km north of the UIC at approximate KP 80
- *Acacia shirleyi* – scattered distribution, widespread and common in areas within the vicinity of the UIC. Also detected at three locations along the Export Pipeline at approximate KPs 1, 5 and 45 (M1, M4 and M9)
- *Boronia* sp. Aranbanga Creek – According to BAMB records presence of this narrow endemic taxa is recorded between KPs 2.7-4.2 along the Option 1 and Option 2 Export Pipeline corridor
- *Corymbia bloxsomei* – occasionally along edges of RE 11.7.5 approximately 10 km north of the UIC at KP 180 and at KP 29 along Option 1 and Option 2 Export Pipelines (M3)
- *Dodonea biloba* – field surveys recorded its presence in Barakula SF and in areas north of Chinchilla (e.g. Auburn Rd). It was also recorded in the Dogwood Creek area approximately 10km west of Option 1 and Option 2 Export pipeline corridor at KP 30, and
- *Dodonaea macrossanii* – widespread and common in the vicinity of the UIC at approximate KP 100 particularly in RE 11.5.1. Occurs often along roadsides and is often heavily grazed by kangaroos and wallabies down to stump level.

6.1.5 Least Concern Flora

A complete list of all flora species observed during the field survey is provided in **Attachment 4**. The field flora surveys recorded a total of 490 least concern flora species. Recorded locations for all species recorded within the flora survey sites are provided in **Attachment 4**.

Least Concern Flora known to be of regional significance (as per EPA 2008b) is identified in **Section 6.1.4**.

6.1.6 Aquatic Flora

Habitat for freshwater aquatic flora within the pipeline corridors is limited to ephemeral watercourses. A small number of common aquatic plants including *Cyperus spp.* and *Juncus spp.* were observed on the margins of these features.

Although there are no records of EVR aquatic flora species within any of the pipeline corridors, three (*Aponogeton queenslandicus*, *Eleocharis blakeana* and *Fimbristylis vagans*) are known to occur in the vicinity. Under the right seasonal conditions, there is potential for these three EVR species to occur in freshwater pools in watercourses, farm dams and weirs along and downstream of the pipeline corridors.

The database searches also identified two artesian spring EVR flora species as occurring in the vicinity, namely,

- Artesian Milfoil (*Myriophyllum artesium*), and
- Salt Pipewort (*Eriocaulon carsonii* subsp. *orientale*).

These species are found within artesian mound springs and associated bore drains. No such springs or drains are crossed by the pipeline corridors, although the Lateral is within 1-2 km of a mound spring containing these species at KP 8.

6.1.7 Declared Weeds

The field survey detected the following declared weeds within or in the vicinity of the Pipeline corridors:

- Mother of Millions (*Bryophyllum delagoense*)
- Rubber Vine (*Cryptostegia grandiflora*)
- Prickly Pear (*Opuntia spp.*)
- Parthenium Weed (*Parthenium hysterophorus*)
- Sicklepod (*Senna obtusifolia*)
- Cats Claw Creeper (*Macfadyena unguis-cati*)
- Lantana (*Lantana camara*), and
- Creeping Lantana (*Lantana montevidensis*).

Declared weeds are those species listed as noxious in the LP Act. Under this Act, pest species for both plants and animals are classified into three categories:

- Class 1 species: not generally established in Queensland and has potential to cause adverse economic, environmental or social impact. The landowner is obliged to take reasonable steps to keep their land free of Class 1 pest species, unless the owner holds a declared pest permit allowing the pests to be kept on the land
- Class 2 species: are established in Queensland and can cause significant adverse economical, environmental or social impact. The landowner is obliged to take reasonable steps to keep their land free of Class 2 pest species, unless the owner holds a declared pest permit allowing the pests to be kept on the land, and

- Class 3 species: established in Queensland and has or could have adverse economical, environmental or social impact. Legislative obligations relating to control these species are generally limited to specific conservation areas.

Parthenium Weed, Rubber Vine, Mother of Millions, Sicklepod and Prickly Pear are Class 2 species, while Lantana and Cats Claw Creeper are Class 3 species.

Some weed species are also recognised by the Commonwealth Government as Weeds of National Significance (WONS) based on their invasiveness and impact characteristics; potential and current area of spread; and current primary industry, environmental and socio-economic impacts. Parthenium Weed, Rubber Vine, Lantana and Prickly Acacia (discussed below) are WONS.

The Fitzroy Basin Association regards the following species as significant weeds in the Central Queensland region, due to their actual or potential impacts over large areas:

- Parkinsonia (*Parkinsonia aculeata*);
- Parthenium (*Parthenium hysterophorus*);
- Rubber Vine (*Cryptostegia grandiflora*);
- Harrisia Cactus (*Harrisia spp.*);
- Mother of Millions (*Bryophyllum delagoense*);
- Giant Rat's Tail Grass (*Sporobolus pyramidalis*, *S. natalensis*, etc.);
- Bellyache Bush (*Jatropha gossypifolia*); and
- Prickly Acacia (*Acacia nilotica*).

Of these weeds of regional significance Parkinsonia, Parthenium Weed, Rubber Vine, Harrisia Cactus and Mother of Millions were recorded on or adjacent to the pipeline corridors during the initial field survey. The remaining three species may also be present, as the field investigation did not survey the entire length of the alignment.

Parthenium Weed commonly displaces native and pasture grasses in areas of heavy clay soils which are intensively grazed and / or cropped. Parthenium Weed is also known to cause human health problems. Field surveys recorded Parthenium Weed in patches within private property in the vicinity of Option 1 and Option 2 Export Pipelines between KPs 282-297 (M24). This species was also recorded within a hollow south of Thangool at approximate KP 257 along Option 1 and Option 2 Export Pipelines. Note that these infestations are known to local authorities and are subject to monitoring and control programs (i.e. spraying). The detailed flora surveys planned prior to alignment finalisation will further map the location of Parthenium Weed along the preferred alignment as it is likely that additional sections contain this weed.

Rubber Vine invades riparian areas, smothering trees and impeding access. It was generally recorded within drainage basins or alongside watercourses within RE 11.3.25.

Mother of Millions displaces native ground storey species in a range of native communities. The field survey recorded this species alongside watercourses within RE 11.3.25.

Prickly Pear invades a wide range of native communities. This weed was recorded at a number of locations along the length of the pipeline corridors within wide range of RE types.

Lantana invades the mid storey of riparian forests and vine thickets, displacing native species and altering fire regimes. It was recorded in RE 11.3.25 and RE 11.8.4 and is likely to occur in a wide number of other REs.

Declared weeds are most prevalent in communities on Land Zone 3, which have more fertile alluvial soils. Lowest weed levels were recorded in communities on sand plains (Land Zone 5) and lateritic soils (Land Zone 7).

Table 8 summarises the known distribution of declared weeds within the vicinity of the pipeline corridors. As the entire alignments were not inspected, these weeds (and other declared species) may also be present in other locations.

Table 8: Recorded Locations of Declared Weeds

Name	General Distribution	Flora Site N°		REs
		Main Pipeline	UIC	
<i>Bryophyllum spp</i> (Mother of Millions)	Scattered in large clumps along watercourses /creek banks	M3, M37		11.3.25
<i>Cryptostegia grandiflora</i> (Rubber vine)	Large population at Calliope Creek.	M24, M31, M39		11.3.25 11.9.13
<i>Lantana camara</i> (Lantana)	Low in height and in low numbers scattered along creeks and vine thicket communities	M24, M28, M36, M39, M40, M50, M51, M52, M54, M55, M56, M57		11.3.4 11.3.25 11.8.4 11.11.4 11.11.18 11.12.1 11.12.6
<i>Lantana montevidensis</i> (Creeping lantana)	Smothering the ground-layer and over many hillsides in Calliope Shire	M36, M40, M54, M55, M57		11.12.1 11.12.6 Non-remnant
<i>Macfadyena unguis-cati</i> (Cats claw)	Very commonly observed along most creeks and watercourses from Calliope to Gladstone	M24, M37, M38		11.3.25
<i>Opuntia stricta</i> (Prickly pear)	Found occasional in a variety of REs including Brigalow communities	M1, M4, M5, M54, M55, M56, M57		11.3.4 11.7.4 11.7.7 11.12.1 11.12.6
<i>Opuntia tomentosa</i> (Velvety Tree Pear)	Prevalent in a wide range of native communities	M1, M10, M11, M12, M19, M28, M29, M31, M32, M35, M37, M54	M43	11.3.4 11.3.25 11.8.4 11.9.5 11.9.7 11.9.13 11.12.1 11.12.6
<i>Parthenium hysterophorus</i> (Parthenium Weed)	Recorded in patches along Option 1 and Option 2 Export Pipelines between approximate KPs 282-297 and in a hollow south of Thangool at approximate KP 257. Detailed surveys required to confirm likely presence in other sections.	M24		11.3.25

<i>Senna obtusifolia</i> (Sicklepod)	Few isolated plants along creeks.	M17, M23, M50		11.3.4 11.10.9
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Numerous environment weeds were also recorded during field surveys. Species that may impede rehabilitation works following construction include:

- Castor Oil Plant (*Ricinus communis*)
- Mexican Poppy (*Argemone ochroleuca*)
- Mimosa Bush (*Acacia farnesiana*), and
- Exotic pasture grasses, such as:
 - o Buffel grass (*Cenchrus ciliaris*)
 - o Guinea Grass (*Megathyrsus maximus* - syn. *Panicum maximum*)
 - o Thatch Grass (*Hyparrhenia rufa*), and
 - o Sabi Grass (*Urochloa mosambicensis*).

Many REs have been substantially degraded by Buffel Grass and Green Panic Grass, both of which have the capacity to displace native ground storey species and alter fire regimes irrevocably. Buffel Grass is now recognised as an emerging environmental weed of considerable importance (Best 1998; Clarke *et al.* 2005; Greenfield 2007). It is also widely used in the region as a pasture grass.

6.2 Fauna Environment

6.2.1 Fauna Habitats

The pipeline corridors encompass cleared grazing and cropping lands, roadside and travelling stock reserves, Council lands, State Forests and Resource Reserves.

Remnant vegetation in the corridors consists of nine broad habitat classifications as described in **Section 6.1.1**. Estimates of the areas of each habitat type are provided in **Table 3** in that Section.

A review of fauna databases identified a number of fauna species that have been recorded from, or that may potentially utilise habitat, within the wider area. A total of 322 fauna species were identified comprising of 1 insect, 55 fish, 13 crustaceans, 16 amphibians, 70 reptiles, 145 birds and 22 mammals (**Attachment 8**).

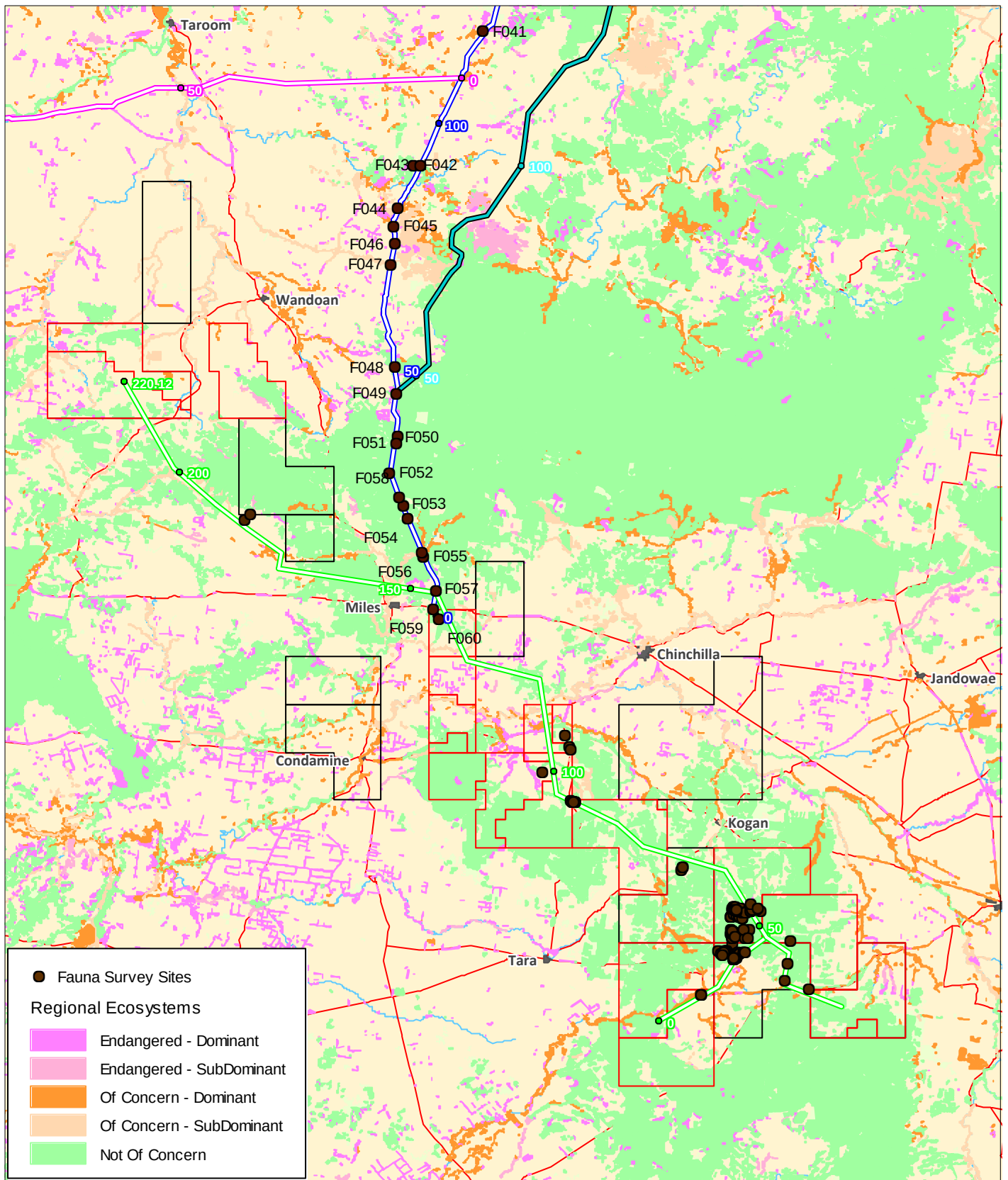
During the field assessment 211 fauna species were recorded these were 13 amphibians, 24 reptiles, 145 birds and 29 mammals (**Attachment 8**). The locations of the sites visited during the field surveys are shown in **Figure 5**.

6.2.2 EVR Fauna Species

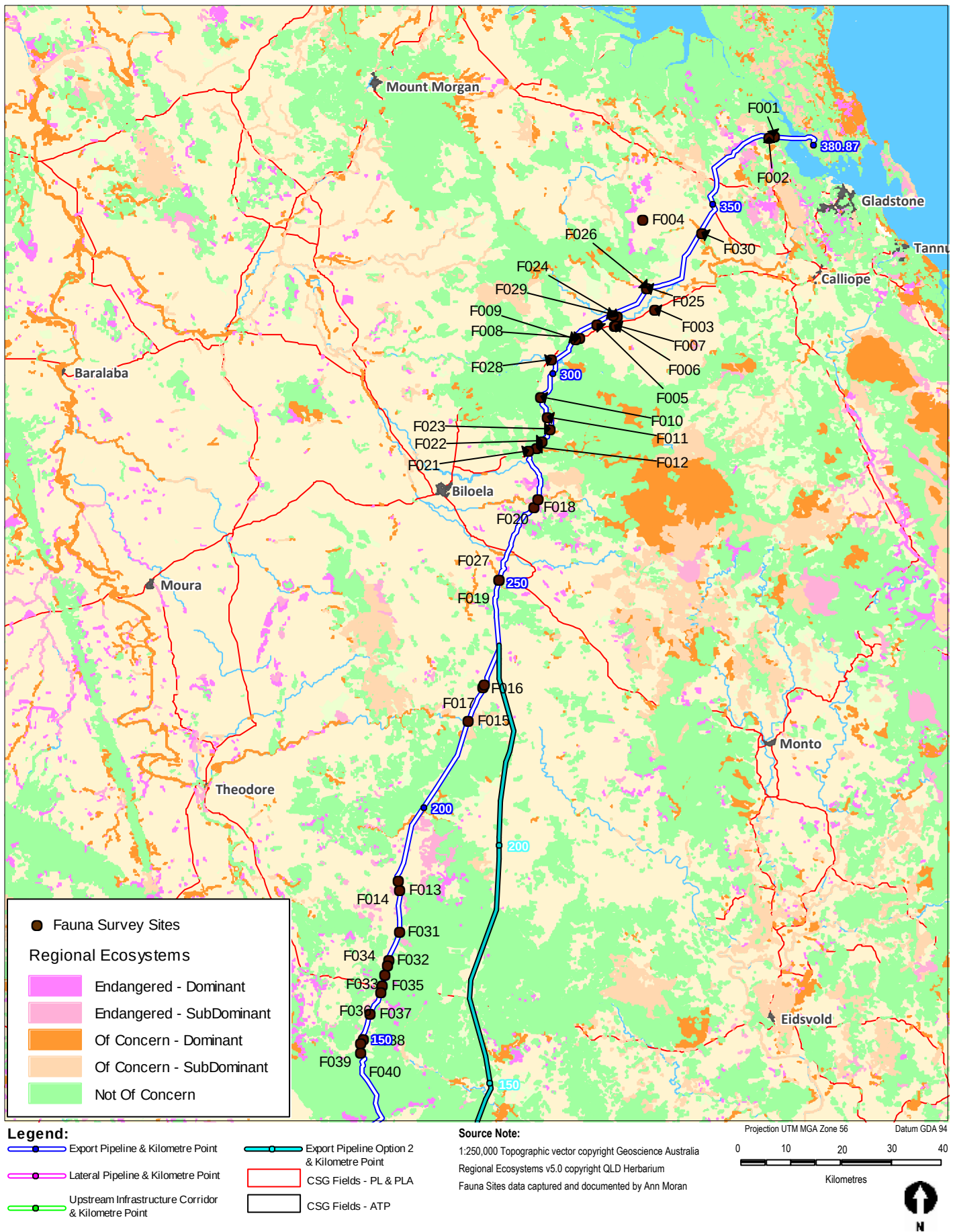
Database searches identified 42 fauna species listed as EVR under the EPBC Act and / or the NC Act as previously recorded from the pipeline corridors (2 fish, 1 mollusc, 1 insect, 1 frog, 12 reptiles, 17 birds and 8 mammals). Of these species, 9 are listed under both the EPBC Act and NC Act, while 29 are listed under the EPBC Act only and 20 are listed under the NC Act only. **Attachment 9** lists these EVR fauna species, together with their preferred habitat and an indication as to whether this habitat is present within the 10 km wide study corridor. Based on desktop and field assessment of available habitat, 38 of these listed EVR species could potentially utilise habitats within 5 km of the pipeline corridors.

EPBC Listed species identified by the EPBC MNES database as potentially occurring within the region include the Murray Cod (*Maccullochella peelii peelii*), the Australian Lung Fish (*Neoceratodus forsteri*) and the Fitzroy River Turtle (*Rheodytes leukops*). The southern portion of the Export Pipeline and the UIC are located in the Condamine River catchment which is part of the Murray-Darling system a known habitat of the Murray Cod. The Australian Lungfish is only known from the Burnett and Mary River Systems. The Option 2 Export Pipeline falls within the Burnett River catchment between KPs 180-230. The Fitzroy River Turtle is found in the Fitzroy River catchment which is predominantly to the north of the pipeline corridors, however the Dawson River and its tributaries are part of this system and their catchments are transected by the Export Pipeline.

The EPBC MNES database also identified a number of marine species as potentially occurring in the area. These are dealt with in a separate report assessing marine impacts in the Gladstone area (refer to **Volume 5, Chapter 7** of the EIS).



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	Project	Queensland Curtis LNG Project	Title Fauna Survey Sites and Mapped Regional Ecosystem Map 3 of 3
	Client	QGC - A BG Group business	
 Environmental Resources Management Australia Pty Ltd	Drawn	GH	Figure 5
	Approved	CDP	File No: E05-P-MA-96143
	Date	20.05.09	Revision A
			Disclaimer: Maps and Figures contained in this Report may be based on Third Party Data, may not be to scale and are intended as Guides only. ERM does not warrant the accuracy of any such Maps and Figures.

Field surveys conducted as part of the CSG Field study identified eight EVR fauna species. These records were obtained within the area where the UIC is proposed, and so are considered as relevant to this report:

- Imperial Hairstreak Butterfly (*Jalmenus evagoras eubulus*)- Vulnerable under the NC Act
- Golden-tailed Gecko (*Strophurus taenicauda*) – Rare under NC Act
- Glossy Black-cockatoo (*Calyptorhynchus lathamii*) – Vulnerable under the NC Act
- Little Pied Bat (*Chalinolobus picatus*) - Rare under the NC Act
- Eastern Long-eared Bat (*Nyctophilus timoriensis*)- Vulnerable under the EPBC and the NC Act
- White-throated Needletail (*Hirundapus caudacutus*) – Migratory species
- Fork-tailed Swift (*Apus pacificus*) – Migratory and Marine species, and
- Large-eared Pied Bat (*Chalinolobus dwyeri*) - Vulnerable under the EPBC and the NC Act (Tentative Record at Gurulmundi SF).

Field surveys also recorded two additional EVR species at Lake Broadwater, just to the south-east of the UIC. These are:

- Freckled Duck (*Stictonetta naevosa*)- Rare under the NC Act, and
- Magpie Goose (*Anseranus semipalmata*) – Marine species.

All EVR fauna records have been submitted to the EPA WildNet database.

One EVR fauna species, the Glossy Black-cockatoo, was recorded during the tertiary site survey along the Option 1 Export Pipeline.

6.2.1 Regionally Significant Fauna Species

According to database searches, 11 Priority Species listed under the BAMB Assessment for the Brigalow Belt South (Criteria H) (EPA 2008c) may potentially occur within or in the broad vicinity of the pipeline corridors. Nine of these species were identified during detailed field surveys of areas in the vicinity of the UIC. These species are presented in **Table 9** below. Species not observed in the field that could potentially occur are the Bush Thick-knee (*Burhinus grallarius*) and the Hooded Robin (*Melanodryas cucullata*).

Table 9: Regionally Significant Fauna

Common Name	Scientific Name
Salmon-striped Frog	<i>Limnodynastes salmini</i>
Speckled Warbler	<i>Chthonicola sagittata</i>
Brown Treecreeper	<i>Climacteris picumnus</i>
Barking Owl	<i>Ninox connivens</i>
Koala	<i>Phascolarctos cinereus</i>
Yellow-bellied Glider	<i>Petaurus australis</i>
Narrow-nosed Planigale	<i>Planigale tenuirostris</i>
Common Brushtail Possum	<i>Trichosurus vulpecula</i>
Eastern Pebblemound Mouse	<i>Pseudomys patrius</i>

6.2.2 Least Concern Fauna Species

All habitats (even cleared and degraded land), provide habitat for a range of common native fauna species. Remnant vegetation provides higher habitat values and thus will have a larger range of common and abundant species. The desktop study indicates that the study area is utilised by a large number of common fauna species. A total of 306 common fauna species were identified as potentially present by the database searches (excluding EVR and regionally significant fauna). These comprised 53 fish, 13 crustaceans, 16 amphibians, 65 reptiles, 138 birds (including the 3 species listed as Migratory and / or Marine Protected Species under the EPBC Act) and 21 mammals. The complete list of common and significant terrestrial fauna species and freshwater fish species identified as potentially present from the database searches is included in **Attachment 8**.

6.2.3 Aquatic Fauna

According to Queensland Museum records 55 fish species have been known to occur in watercourses in the broad vicinity of the pipeline corridors. All common and significant freshwater fish species (also those marine species that can potentially occur in freshwater areas) are listed in **Table 10**.

Of these species, the Murray Cod and the Australian Lungfish are listed as Vulnerable fauna species under the EPBC Act and the Southern Purple-spotted Gudgeon is identified as Priority Taxa under BAMM Criteria H (EPA 2008c).

Five species were identified as introduced species (indicated by asterisk in **Table 10**).

Table 10 Fish Species Recorded in the Vicinity of the Pipeline Corridors

Common Name	Scientific Name	Status
Yellow Fin Bream	<i>Acanthopagrus australis</i>	No status
Agassiz's Olive Glassfish	<i>Ambassis agassizii</i>	No status
Estuary Perchlet	<i>Ambassis marianus</i>	No status
Banded Grunter	<i>Amniataba percoides</i>	No status
Long Finned Eel	<i>Anguilla reinhardtii</i>	No status
Salmon Catfish	<i>Arius graeffei</i>	No status
Snubnose Garfish	<i>Arrhamphus sclerolepis</i>	No status
Silver Perch	<i>Bidyanus biyanus</i>	No status
	<i>Caragobius sp</i>	No status
Gold Fish	<i>Carassius auratus*</i>	No status
Darling River Hardyhead	<i>Cratercephalus amnicularis</i>	No status
Marjorie's Hardyhead	<i>Craterocephalus marjoriae</i>	No status
Fly-speck Hardyhead	<i>Craterocephalus stercusmuscarum</i>	No status
Spotted Sickie Fish	<i>Drepane punctata</i>	No status
Mosquito Fish	<i>Gambusia holbrooki*</i>	No status
None known	<i>Geophagus brasiliensis</i>	No status
Mouth Almighty	<i>Glossamia aprion</i>	No status
Castelnau's Herring	<i>Herklotsichthys castelnaui</i>	No status
Empire Gudgeon	<i>Hypseleotris compressus</i>	No status
Firetailed Gudgeon	<i>Hypseleotris galii</i>	No status
Western Carp Gudgeon	<i>Hypseleotris klunzingeri</i>	No status
Gudgeon Species	<i>Hypseleotris sp</i>	No status
Bottlenose Jewfish	<i>Johnius australis</i>	No status
Sharpnose Hammer Croaker	<i>Johnius borneensis</i>	No status
Common Ponyfish	<i>Leiognathus equulus</i>	No status
Spangled Perch	<i>Leiopotherapon unicolor</i>	No status
Greenback Mullet	<i>Liza subviridis*</i>	No status
Tade Mullet	<i>Liza tade</i>	No status
Diamond-tail Mullet	<i>Liza vaigiensis</i>	No status
Murray Cod	<i>Maccullochella peelii peelii</i>	V ²
Golden Perch	<i>Macquaria ambigua</i>	No status
Duboulay's Rainbowfish	<i>Melanotaenia duboulayi</i>	No status
Murray River Rainbowfish	<i>Melanotaenia fluviatilis</i>	No status
Eastern Rainbowfish	<i>Melanotaenia splendida</i>	No status
Southern Purple-spotted Gudgeon	<i>Mogurnda adspersa^</i>	No status
Bony Bream	<i>Nematalosa erebi</i>	No status

Australian Lung Fish	<i>Neoceratodus forsteri</i>	V ²
Eeltail Catfish	<i>Neosilurus hyrtlii</i> [^]	No status
Bullrout	<i>Notesthes robusta</i>	No status
Northern Mud Gudgeon	<i>Ophiocara porocephala</i>	No status
Sleepy Cod	<i>Oxyeleotris lineolatus</i>	No status
Silver Mullet	<i>Paramugil georgii</i>	No status
Mottled Sole	<i>Pardachirus rautheri</i>	No status
Flathead Gudgeon	<i>Philypnodon grandiceps</i>	No status
Guppy	<i>Poecilia reticulata</i> *	No status
Not Known	<i>Polydactylus sp</i>	No status
Rendah's Catfish	<i>Porochilus rendahli</i>	No status
Not Known	<i>Pseudogobius sp</i>	No status
Pacific Blue Eye	<i>Pseudomugil signifer</i>	No status
Australian Smelt	<i>Retropinna semoni</i>	No status
Spotted Arowana	<i>Scleropages leichardti</i>	No status
Southern Saratoga	<i>Scortum hillii</i>	No status
Common Eeltail Catfish	<i>Tandanus tandanus</i>	No status
Long-arm Mullet	<i>Valamugil cunnesius</i>	No status
Green Swordtail	<i>Xiphophorus helleri</i> *	No status

All records sourced from Qld Museum Records

V² Vulnerable under the EPBC Act *Introduced species

[^]Non EVR regionally significant fauna species (BAMM 2008).

According to Queensland Museum records at least 13 Crustacean species could potentially occur in watercourses located in the vicinity of the pipeline corridors (**Table 11**). None of these species are listed as EVR species or Priority Taxa under BAMM Criteria (EPA 2008c).

Table 11 Crustaceans Recorded in the Vicinity of the Pipeline Corridors

Common Name	Species Name	Status	Recorded Sitings According to QM
Shrimp	<i>Alpheus</i> sp.	No status	Calliope River and the Narrows near Gladstone
Brine Shrimp	<i>Artemia salina</i>	No status	Callide Creek
Shrimp	<i>Atyidae</i> sp	No status	Briffney Creek near Gladstone
Fairy Shrimp	<i>Branchinella australiensis</i>	No status	Nangram Lagoon located near Condamine
Shrimp	<i>Caridina indistincta</i>	No status	Lake Broadwater
Orange-fingered Yabby	<i>Cherax depressus</i>	No status	Dawson River near Taroom
Common Yabby	<i>Cherax destructor</i>	No status	Lake Broadwater
Waterbug	<i>Lepidurus viridus</i>	No status	In a watercourse in the vicinity of Tara
Long-arm Shrimp	<i>Macrobrachium australiense</i>	No status	Condamine River near Chinchilla
Shrimp	<i>Macrobrachium novaehollandiae</i>	No status	Boyne River in the vicinity of Benaraby
Crayfish	<i>Notodelphyidae</i> sp.	No status	Auckland Creek near Gladstone
Glass Shrimp	<i>Paratya australiensis</i>	No status	Lake Broadwater
Waterbug	<i>Tachaea caridophaga</i>	No status	Dawson River near Taroom

All records sourced from Qld Museum Records

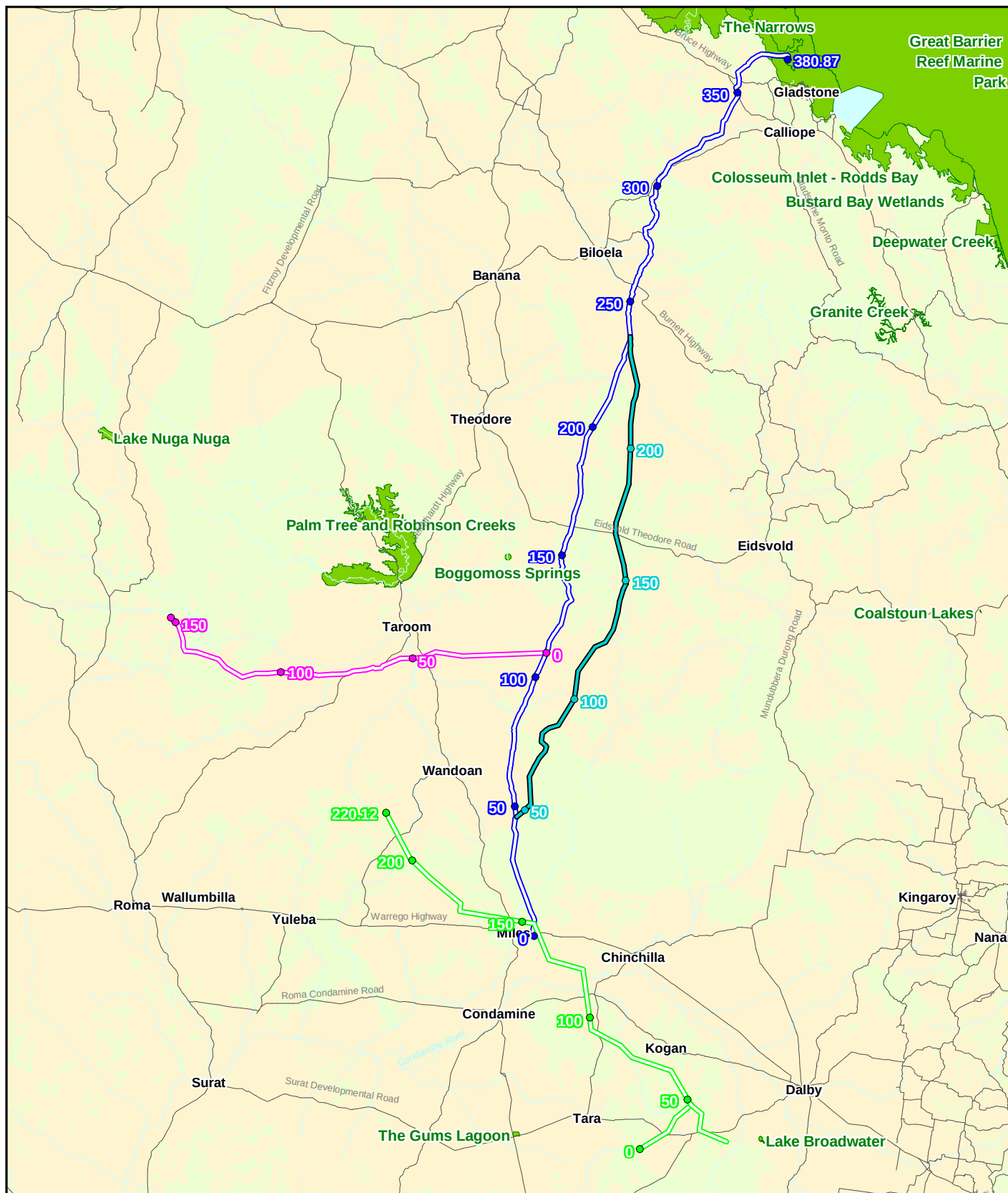
6.2.4 Introduced Fauna

Twelve introduced species have been recorded within the wider study area, including 2 fish, 1 amphibian, 2 birds and 7 mammals. These species are included in **Attachment 8** and **Table 11** where they are denoted as introduced species by an asterisk.

6.3 Wetlands

The UIC traverses the Condamine River and several nationally significant wetlands occur downstream, including the Ramsar-listed Narran Lake Nature Reserve approximately 450 km to the southwest. The Export Pipeline and Lateral traverse a number of significant watercourse catchments including the Auburn, Dawson, Nogoa and Calliope.

A search of the Directory of Important Wetlands in Australia indicates that the only wetland to be transected by the pipeline corridors is the Narrows located in close proximity to the marine crossing to Curtis Island (**Figure 6**). According to this



Legend:

- Export Pipeline & Kilometre Point
- Export Pipeline Option 2 & Kilometre Point
- Lateral Pipeline & Kilometre Point
- Upstream Infrastructure Corridor & Kilometre Point

From the Directory of Important Wetlands

Source Note:

1:250,000 Topographic Vector copyright Geoscience Australia
Important Wetlands copyright Department of Primary Industries
Coastal Wetland Vegetation

Projection UTM MGA Zone 56 Datum GDA 94
0 20 40 60 80
Kilometres



 A BG Group business	Project Queensland Curtis LNG Project		Title From the Directory of Important Wetlands
	Client QGC - A BG Group business		
 Environmental Resources Management Australia Pty Ltd	Drawn	GH	Disclaimer: Maps and Figures contained in this Report may be based on Third Party Data, may not be to scale and are intended as Guides only. ERM does not warrant the accuracy of any such Maps and Figures.
	Approved	CDP	
	Date	20.05.09	
		Figure 6	
		File No	EO5-P-MA-96161
		Revision	A

directory approximately 15 ha of this wetland is traversed by the Option 1 and Option 2 Export Pipeline corridor between KPs 373 and 376. Other important wetlands mapped as occurring in the broad vicinity of the pipeline corridors are:

- Palm Tree and Robinson Creek – approximately 25 km North of the Lateral at KP 50
- Boggomoss Springs- approximately 20 km east of Option 1 Export Pipeline at KP 150
- Gums Lagoon – 26 km south west of Tara and approximately 45km south of the UIC, and
- Lake Broadwater – 25 km south west of Kogan and approximately 10km west of KP 24 of the UIC.

None of the pipeline corridors are located within the catchment areas of any of these important wetlands.

The pipeline corridors also transect a couple of small areas mapped by the Queensland Herbarium mapping as wetlands. A small area (1.09 ha) of freshwater wetland (RE 11.3.27) is mapped as occurring along Option 1 and Option 2 Export Pipeline corridor between KPs 12 and 13. As a result of land access constraints it was not possible to visit this area, it is however, expected that these areas will be subject to detailed surveys prior to alignment finalisation to confirm the location and avoidability of any wetlands in this location. Estuarine wetlands (RE 11.1.2 (*Samphire forbland* on marine clay plains) and RE 11.1.4 (mangrove woodland on marine clay plains)) are mapped between KPs 373.2 and 374.4 along the Option 1 and Option 2 Export Pipeline corridors just before the marine crossing to Curtis Island. Due to access restrictions these areas could not be surveyed in the field and are therefore assumed to be in good condition.

6.4 EPA Identified Bioregional Values

6.4.1 Option 1 and Option 2 Export Pipeline

Between KPs 12-29 the Option 1 and Option 2 Export Pipeline passes through a tract of remnant vegetation mapped by EPA (2008a) as a Bioregional-wildlife Corridor of State and Local significance. The large tract of vegetation between KPs 29-40, also classed as a Bioregional-wildlife corridor, has additional State significance as it is an area of high species richness, species endemism and provides habitat for species with disjunct populations (EPA, 2008a). This area is identified as providing potential habitat for EVR flora species *Micromyrtus carinata*, *Calytrix gurlmundensis*, *Acacia curranii*, *Eucalyptus curtsii* and *Cadellia pentastylis*.

The Option 2 Export Pipeline corridor passes through large tracts of vegetation between KPs 68-84, 87-100 and 181-190. These areas of remnant vegetation form part of the Carnarvon Ranges, a landscape of State and Regional significance (EPA, 2008a). The ecological significance of the fragments that occur within this landscape is strongly correlated with the size of the tract of vegetation. Therefore based on this, it can be assumed that these larger tracts of remnant vegetation have relatively high bioregional significance.

According to Bioregional Mapping (EPA, 2008a) between KPs 241-241.2 and 242.7-242.8 the Option 2 Export Pipeline also passes through two small areas of Remnant Vine Thicket of State significance.

Between KPs 129-145 the Option 1 Export Pipeline is mapped as passing through Sandstone Ranges of State and Regional significance (EPA, 2008a). These sandstone ranges with gorges containing paperbark trees and artesian springs have ecological, scenic and cultural values. These areas also provide habitat for disjunct or endemic species which include EVR species *Acacia calantha*, *Eucalyptus rubiginosa*, *Leucopogon grandiflorus* and *Notelea pungens*.

The Option 1 Export Pipeline also passes through approximately 3 km of State/Regional significant Core Habitat for priority taxa between KP 204-205 and 209-211. (EPA, 2008a).

After the two pipelines converge at KP 238 the Option 1 and Option 2 Pipeline corridors pass through small fragments of remnant vegetation that are part of the State and Regionally significant Callide Ranges (KP 280-294). These sandstone ranges consist of shrubby woodlands, shrublands and vine thicket. This area provides potential habitat for EVR plant species such as *Cossinia australiana*, *Grevillia hockingsii*, *Trymalium minutiflorum* and *Quassia bidwillii* (EPA, 2008a).

Just prior to the Export 1 and Export 2 Pipeline corridors crossing over to Curtis Island they pass through an area of State significant wetlands (KP 370-376).

6.4.2 Lateral

Between KPs 50-80 the Lateral crosses four narrow strips of vegetation that have been classed as regionally significant Riparian Bioregional corridors which provide important wildlife habitat.

Between KPs 110-120 and 146-150 the Lateral passes through a total of 14 km of largely unfragmented remnant vegetation of State and Regional significance. This area forms part of the Expedition Castle Creek Landscape which contains concentrations of endemic and/or threatened or rare taxa (EPA, 2008a).

6.4.3 UIC

Between KPs 1-10 the UIC crosses three narrow strips of remnant vegetation mapped as Riparian Bioregional Corridors of State and Regional significance.

Between KPs 40- 87 the UIC passes through a large tract of unfragmented vegetation of which a small proportion is made up of Braemer State Forest. This area is mapped as containing a number of State, Regional and Locally significant Terrestrial Bioregional Corridors (EPA, 2008a).

The areas of remnant vegetation between KPs 125-140 has Regional and Local significance as this region represents the Eastern Range Limits of Mulga taxa such as *Acacia apreta*, *Acacia shirleyi* and *Acacia microsperma* (EPA, 2008a).

6.5 DERM Essential Habitat Areas

Essential Habitat areas are those areas mapped by DERM where EVR species have been known to occur and exhibit essential habitat features for that species. According to DERM database searches at least 15 Essential Habitat areas occur

along or within a 2 km buffer of the proposed pipeline corridors. The EVR species known to occur within these Essential Habitats, the pipeline and approximate location that they occur are set out in **Table 12**.

Table 12: Essential Habitat mapped as occurring along the pipeline corridors

Essential Habitat	Status (NCA)	Location	Coordinates	
			Eastings	Northings
Option 1 and Option 2 Export Pipeline				
<i>Grevillea hockingsii</i>	V	800m north west KP 182	-24.3128	150.6874
<i>Polanthion minutiflorum</i>	V	800m north west KP 182	-24.3128	150.6874
<i>Quassia bidwilli</i>	V	800m north west KP 182	-24.3128	150.6874
<i>Cycas megacarpa</i>	E	KP 306	-24.1385	150.6874
<i>Cupaniopsis shirleyana</i> (Wedge-leaf tuckeroo)	V	KP 360	-23.7652	151.0578
<i>Macropterantes leiocaulis</i>	R	KP 360	-23.7652	151.0578
<i>Hernandia bivalvis</i> (Cudgerie)	R	KP 360	-23.7652	151.0578
<i>Graptophyllum excelsum</i>	R	KP 360	-23.7652	151.0578
<i>Phascolarctos cinereus</i> (Koala)	V	KP 379.5	-23.7472	151.1999
Option 1 Export Pipeline				
<i>Paradelma Orientalis</i> (Brigalow Scaly-foot)	V	1.5 east at KP 217	-24.8481	150.5713
Upstream Infrastructure Corridor				
<i>Strophurus taenicauda</i> (Golden tailed Gecko)	R	KP 36	-27.3240	150.8768
<i>Philothea sporadica</i>	V	2 km east at KP 54	-27.1871	150.7886
<i>Philothea sporadica</i>	V	KP 69	-27.0815	150.6284
<i>Gonacarpus urceolatus</i>	V	KP 116	-26.7972	150.4457
<i>Rutidosia lanata</i>	E	KP 176	-26.5628	149.9867

These EVR flora and fauna species were targeted during the field surveys (**Section 6.1.3**). For the purposes of this assessment the assumption will be made that all areas mapped by DERM as Essential Habitat areas are in fact Essential Habitat areas.

6.6 Environmentally Sensitive Areas (ESAs)

6.6.1 Category A

No Category A areas fall within the proposed pipeline corridors. However, the Category A 'The Narrows' marine park occurs within 1 km of the Option 1 and Option 2 Export Pipeline between KP 380.8-383.3. The Narrows is designated as a Habitat Protection Zone in accordance with the *Marine Parks (Great Barrier Reef Coast) Zoning Plan 2004* (QLD).

6.6.2 Category B

The proposed pipeline corridors transect four Category B ESAs. These include:

- Endangered Regional Ecosystems (Biodiversity Status)
- Marine Plants Area
- Seaward side of Highest Astronomical Tide (H.A.T), and
- A World Heritage Area (WHA).

According to existing mapping it is estimated that approximately 21 ha of areas listed as Endangered under EPA's Biodiversity Status fall within the proposed pipeline corridors. A more detailed description of the area and the locations of these ESAs are set out in **Section 6.1.2**.

The Marine Plants Area occurs along the Option 1 and Option 2 Export Pipeline between KPs 377.5-380.2. This estuarine wetland area is made up of REs 11.1.2 and 11.1.4, and any potential seagrass beds within The Narrows. Due to access restrictions (i.e. waterlogging and cultural restrictions) these estuarine wetland areas could not be inspected in the field. These areas will be subject to detailed field studies prior to the commencement of alignment finalisation and the commencement of construction activities. Detailed studies of the seagrass beds that may potentially occur within the project area are addressed in **Volume 5 Chapter 7** of the EIS.

The proposed Option 1 and Option 2 Export Pipeline corridor will pass through areas below H.A.T as the pipeline leaves the mainland (approximate KP 380.7) and enters the coastal fringes of Curtis Island (approximate KP 382.5). These areas have been discussed in detail in **Volume 5 Chapter 7** of the EIS.

The Great Barrier Reef WHA is transected by the Option 1 and Option 2 Export Pipeline at the marine crossing between the mainland and Curtis Island (KP 379-387.1).

6.6.3 Category C

The only Category C ESAs transected by the proposed pipeline corridors are the Braemer, Barakula and Quandong State Forests.

The total area of State Forest that fall within the proposed pipeline corridors is approximately 63 ha. This is made up of:

- 40 ha of Braemer State Forest along the UIC between KPs 24.3-28.4
- 13.5 ha of Quandong State Forest along the Option 2 Export Pipeline between KPs 51.3-54, and
- 9.5 ha of Barakula State Forest along the Option2 Export Pipeline between KPs 73.2-75.1

The 40 ha of Braemer State Forest that is traversed by the UIC is made up of NOC REs 11.5.1 (KP 24.3-24.7) and the mixed community RE 11.7.6/11.5.4 (KP 24.7-28.4). It is important to note that this proposed UIC transect of the Braemer State Forest is in the very early stages of the planning process. Further refinements are expected following detailed field surveys and discussions with forestry officers.

The 13.5 ha of Quandong State Forest transected by the Option 2 Export Pipeline (KP 51.3-54) has been previously cleared with the exception of the small vegetated area that occurs at the entry to the State Forest (KP 51). This area of remnant vegetation is mapped as containing the NOC mixed community RE 11.5.1/11.5.1a/11.5.4. This area is expected to be groundtruthed by field surveys prior to alignment finalisation and the commencement of construction activities.

The Option 2 Export Pipeline transects the Barakula State Forest between KPs 73.1-75.1 and 80-83.5. The first of these transects (KP 73.1-75.1) has been previously cleared of vegetation with the exception of the small area of the NOC mixed community RE11.5.4/11.5.21/11.7.6 that occurs between KPs 74.8-75.1. The second of these transects (KP 80-83.5) is also predominantly clear with the exception of the small sub dominant Endangered community RE 11.10.9/11.9.5/11.10.9 (ratio of 60/20/20) that occurs between KPs 81.7-82.6. These areas are expected to be subject to detailed field studies prior to alignment finalisation.

7.0 POTENTIAL IMPACTS

The potential impacts discussed here are based on desktop studies of the pipeline alignments and rapid field investigations of available sections of the alignments. While these studies aim to address all significant impacts of the proposed development on flora and fauna, they cannot rule out the possibility of undetected issues, especially along sections of the alignments not yet assessed in the field.

7.1 Reversible and Non-reversible Impacts

The pipeline is likely to be decommissioned within several decades. Subject to landholders choosing to manage their property in a manner that inhibits natural regrowth, the impacts associated with clearing for construction and maintenance are considered to be reversible within all vegetation types over the long term.

In areas of high conservation value and sensitivity, there is potential to allow tree and shrub vegetation to naturally re-establish over portions of the alignment with the exception of the area immediately over the pipelines. Keeping a strip on either side of the pipeline free of trees and shrubs may be all that is necessary to protect the pipe from potential root damage and facilitate ongoing pipeline inspection and necessary maintenance.

7.2 Potential Impacts on Ecological Communities

7.2.1 Clearing

Approximately 216 km of remnant vegetation is transected by the pipeline corridors which have a total length of 755 km.

The majority of the area to be cleared consists of eucalypt woodlands and forests. Very minor clearing will also be required to cross fragmented stands of Brigalow which often occur on roadside verges or as wind breaks along the margins of pasture or cropping paddocks. Mostly, this will generally involve transecting relatively narrow linear corridors. The Queensland Herbarium mapping also indicates a small number of locations where the alignments may impinge on SEVT, Native Bluegrass Grassland and freshwater wetland communities. The detailed field assessment will confirm the extent and locality of these features and it is considered likely that these will be largely, if not totally avoidable.

In order to place the potential impacts of the project within a local and bioregional perspective, **Attachment 10** shows for each RE the following estimates:

- Total estimated clearing area
- Estimated extent within 5 km of the pipeline corridors, and
- Extent estimated to occur in the Bioregion.

For the purposes of the calculations shown in **Attachment 10**, no account was taken of the recommended offset activities.

The proposed pipeline corridors will require clearing of up to 1,462 ha of remnant vegetation, which represents approximately 0.56% of the amount of remnant vegetation estimated to occur within 5 km of either side of the pipeline corridors.

The actual area of clearing for the proposed pipeline is likely to be lower than this estimate, as:

- The ROW may be able to utilise existing cleared infrastructure corridors through remnant vegetation (at least in part)
- Pipeline construction will not require clearing of the full 50 m corridor (100 m for the UIC) width used in the calculations set out in this report, and
- Disturbance of remnant vegetation adjacent to the Narrows may be avoided by the use of Horizontal Directional Drilling (HDD).

Table 13 shows the clearing footprint totals for each conservation category. Note that offset activities are not accounted for in this Table.

Table 13 Estimated Clearing Extents by Conservation Status

RE Status	Clearing extents (Ha)	Extent within 5 km (Ha)	% of that within 5 km to be cleared (Ha)	Extent in Bioregion	% of that within Bioregion to be cleared
EPBC Listed*	17	6843	0.25	428,884	<0.01
Endangered	18	7200	0.25	475,891	<0.01
Of Concern	105	14,746	0.71	1,435,429	<0.01
Not of Concern	1339	240,519	0.56	8,294,793	0.02
TOTAL	1,462	262,465	0.56	10,206,113	0.01

* EPBC listed Communities are overlapping (and not additional to) VM Act RES

Whilst it is recognised that there is no guarantee that the current areas of RES within the buffer and Bioregion will be preserved into the future, these areas do provide an adequate reference point to facilitate consideration of the local and regional significance of the proposed clearing. It is considered likely that the current Commonwealth and State vegetation protection legislation will adequately ensure the long term preservation the majority of these areas.

7.2.2 Other Potential (non-clearing) Impacts on Vegetation Communities

Other potential impacts on vegetation communities include:

- The movement of machinery and vehicles between areas, which has the potential to spread weeds including a number of environmental and declared noxious species, such as Parthenium Weed, Giant Rat's-tail Grass and Buffel Grass

-
- Contamination, sedimentation and nutrification of waterways affecting aquatic ecological communities , and
 - The activities of machinery and construction operations may increase the likelihood of wildfires.

Throughout the following sections the potential impacts on each RE is considered under the following headings:

- Potential Impacts on EPBC Act and VM Act Endangered Ecological Communities / REs,
- Potential Impacts on VM Act Of Concern REs, and
- Potential Impacts on VM Act Not of Concern REs.

7.2.3 Potential Impacts on EPBC Act Listed Ecological Communities

Because of the small and fragmented nature of all EPBC Act Listed Ecological Communities transected by the pipeline corridors, the potential impacts from the pipelines are largely associated with the direct impact of vegetation clearing during construction. As such, the majority of the following discussion focuses on clearing footprints. However, other potential impacts from the construction and operation of the pipeline exist, namely:

- Introduction and spread of declared and environmental weeds
- Introduction or proliferation of pest animals
- Release of contaminants and / or silt into watercourses, mangrove and wetland areas
- Altered hydrological and sedimentation regimes due to construction of the pipeline across the mainland marine wetland areas, and
- Changes to fire regimes, in particular increased fire regimes due to higher weed biomass along cleared easements.

Mitigation measures to minimise the risk of these potential impacts having a significant impact are detailed in **Section 8**. However, due to the small and fragmented nature of all these EPBC listed communities and the degree of flexibility to move the alignments to avoid these areas (subject to constructability constraints) the impacts associated with these proposed pipelines corridors is projected to be low.

It is also important to note the significantly smaller area of EPBC listed communities that occur along the Option 2 Export Pipeline alignment. The estimated clearing footprints of these communities located within the two respective Export Pipeline options are set out in **Table 14**.

Table 14 Estimated Clearing Footprint Within EPBC Listed Ecological Communities

EPBC Listed Vegetation Community	Total clearing footprint using Option 1 (ha)*	Total clearing footprint using Option 2 (ha)*
Brigalow	21.59	14.42
SEVT	3.17	2.47
Grassland	2.21	0
Weeping Myall	0	0
Total	26.97	16.89

* Offset initiatives not accounted for the purposes of this table

As specified in **Attachment 10**, the existing Queensland Herbarium mapping indicate that no REs representative of EPBC Listed communities which, with the exception of RE 11.3.1, would require clearing in excess of 0.65% of that which occurs within 5 km of the pipeline corridor. None require clearing that would represent more than 0.007% of that which occurs within their Bioregion.

It is estimated that 1 ha of the Endangered Brigalow community RE 11.3.1 is traversed by the UIC. This area amounts to approximately 1.3% of that within 5km either side of the pipeline corridors and approximately 0.001% of that which occurs in the Bioregion. The areas of RE 11.3.1 that are proposed to be crossed are small narrow remnants that exist along fencelines in farming areas and these fragmented remnants are already adversely impacted by edge effects and weed invasion.

The total area of the Endangered Brigalow Community RE 11.4.3 transected by the pipeline corridors is estimated at 5 ha which equates to about 0.6% of that within 5 km either side of the pipelines and approximately 0.007% of that in the Bioregion. The areas of RE 11.4.3 that are transected by the corridors are also generally small narrow remnants that exist along roadsides or fencelines and therefore are already impacted by edge effects and weed invasion. This was seen to be the case where ground surveys identified two areas mapped as RE 11.4.3 were in fact either degraded non- remnants (M40) or were found only to show characteristics of a Not of Concern community (M4 at KP 5) None-the-less, provided there are no other constructability or land access constraints it is recommended that minor adjustments to the alignment be made in order to avoid the larger area (approximately 32 ha) mapped as RE 11.4.3 at KP 4.5-5 along the Option 1 and Option 2 Pipeline corridor.

The Option 1 Export Pipeline also transects an estimated 8 ha of the Endangered Brigalow Community RE 11.9.5, while Option 2 transects approximately 3 ha. The other Endangered Brigalow Communities transected by the pipeline corridors (REs 11.9.1, 11.9.6 and 11.12.21) are limited to narrow belts and small remnants transected by the Option 1 Export Pipeline.

SEVT communities are predominantly small and / or subdominant communities that detailed field investigations and alignment survey may well be able to avoid. One exception is the SEVT (RE 11.9.4) which occurs on the escarpments at the western end of the Lateral (KP 145.8-146 and KP 147.4-147.6). The ability to avoid these remnants would need to be determined by construction engineers in conjunction with determination of local scale alignment preferences.

The existing Queensland Herbarium Mapping indicates that the Option 2 Export Pipeline would require no clearing of Native Bluegrass Grassland Communities (RE 11.9.12). The Option 1 Export Pipeline would require the crossing of approximately 2 ha of this ecological community at one location.

The additional Threatened Ecological Community which may also be transected by the pipeline corridors is the Endangered Weeping Myall Open Woodland Community. This Community is not mapped by the Queensland Herbarium RE mapping nor was it detected by the initial field studies. However, it is described as occurring within the Brigalow Belt South Bioregion, generally in small patches of alluvial soils within REs 11.3.2 and 11.3.28. However, based on the fact that:

1. The area where the UIC pipeline corridors transects a RE potentially containing this community (RE 11.3.2 at KP 2-8.2 of the UIC) has been recommended for realignment, and
2. The initial field surveys did not record any communities which matched the description of Weeping Myall Open Woodland Community.

It is considered likely that the pipeline corridors will be able to avoid any areas containing this community. This will be confirmed in subsequent field assessments.

Although the potential clearing of EPBC Act Listed Communities is estimated to total approximately 17 ha, actual vegetation loss is likely to be considerably less because:

- Detailed field investigations will further refine the alignments to minimise the need to impact these communities
- Offset activities will be undertaken to replace unavoidable areas on a basis of at least 1:1.5 (in accordance with the Queensland Government's Environmental Offsets Policy (QGEOP), particularly the Policy for Vegetation Management (DNRW 2006).

Additional mitigation measures to minimise the impacts on EPBC Act Listed Communities are provided in **Section 8**. Assuming such measures are implemented the impact on these communities is unlikely to be significant.

7.2.4 Potential Impacts on VM Act Endangered / REs

As specified in **Attachment 10**, the existing Queensland Herbarium mapping shows that, with the exception of RE 11.3.1 (1.3%) and RE 11.4.3 (0.6%) (detailed above), there are no VM Act Endangered REs for which the pipeline corridors would require clearing of greater than 0.25% of that RE occurring within a 5 km buffer or 0.006% of that in the Bioregion.

The only REs which are not included in the discussion in **Section 7.2.1** above are:

- RE 12.3.3 (*Eucalyptus tereticornis* (Qld Blue gum) woodland on alluvial soils, and
- RE 11.12.17 (*Eucalyptus populnea* (Poplar Box) woodland on igneous rocks).

The proposed Export Pipeline would require 1 ha of RE 12.3.3 to be cleared at its most north-eastern point (on Curtis Island).

The Queensland Herbarium mapping indicates that no areas of RE 11.12.17 will be required to be cleared if the Option 2 Export Pipeline is used. If the Option 1 Export Pipeline was selected as the preferred route it would require clearing of a total of approximately 0.2 ha.

The proposed clearing locations are as specified in **Table 6. Section 8** includes recommendations that both of these communities be avoided through use of the Option 2 Export Pipeline and / or minor realignment.

Although **Attachment 10** indicates potential clearing of a total of 18 ha of VM Act Endangered REs, actual vegetation loss is likely to be considerably less because:

- Detailed field investigations will further refine the alignments to minimise the need to impact these communities, and
- Offset activities will be undertaken to replace unavoidable areas in accordance with the Queensland Government Environmental Offsets Policy (QGEOP).

Additional mitigation measures to minimise the impacts on VM Act Endangered REs are provided in **Section 8**.

7.2.5 Potential Impacts on VM Act Of Concern REs

As specified in **Attachment 10**, the existing Queensland Herbarium mapping shows that, with the exception of RE 11.3.17, there are no VM Act Of Concern REs for which the pipeline corridors would require clearing of greater than 1% of that which occurs within 5 km of the alignment. No Of Concern REs require clearing in excess of 0.02% of that in the Bioregion.

RE 11.3.17 occurs as a sub-dominant component of a mosaic RE at KPs 2-6 and 9.4-9.6 of the UIC. Based on the Queensland Herbarium mapping only a relatively small area (50 ha) of this RE occurs within 5 km of the pipeline corridor and clearing at these locations would require removal of approximately 4.2%. This would represent a significant reduction in local extent of this Of Concern RE. This same vegetated area (KP 2-6) is also mapped as containing potential habitat for the Weeping Myall Woodland community and the Of Concern RE 11.3.2. This area has been identified as a location where a realignment recommendation is likely to be accommodated.

Based on the Queensland Herbarium mapping, the total area of Of Concern eucalypt woodlands that would be required to be cleared is approximately 104 ha. However, if the Option 1 Export Pipeline was used this area would increase marginally to approximately 106 ha.

The Queensland Herbarium mapping also indicates the presence of four small remnants of the *Acacia* woodland (RE 11.9.10) along the Lateral and the Export

Pipeline. The total area of this RE which would be required to be cleared by the pipeline corridors is approximately 1 ha. This area would increase to approximately 1.8 ha if the Option 1 Export Pipeline was used.

The proposed clearing locations are as specified in **Table 7**. Although **Attachment 10** indicates potential clearing of a total of 105 ha of VM Act Of Concern REs, actual vegetation loss is likely to be considerably less because:

- Detailed field investigations will further refine the alignments to minimise the need to impact these communities
- Offset activities will be undertaken to replace unavoidable areas on a basis of at least 1:1.5 (in accordance with the Queensland Government's Environmental Offsets Policy (QGEOP), particularly the Policy for Vegetation Management (DNRW 2006).

Additional mitigation measures to minimise the impacts on VM Act Of Concern REs are provided in **Section 8**.

7.2.6 Potential Impacts on VM Act Not of Concern REs

Based on the Queensland Herbarium mapping the total area of Not of Concern eucalypt woodland that would require clearing if the Option 2 Export Pipeline was used would be approximately 1,229 ha. This amount would decrease to approximately 1,145 ha if Option 1 Export Pipeline was used.

As specified in **Attachment 10**, the existing Queensland Herbarium mapping shows that for all VM Act Not of Concern REs, with the exception of RE 11.3.27 (Freshwater wetlands, 4%) the pipeline corridors would require clearing of less than 2.5% of that which occurs within a 5 km buffer along the alignment

The area of RE 11.3.27 mapped as occurring within the Option 1 and Option 2 Export Pipelines is approximately 1 ha (between KP 12-13). **Section 8** includes a recommendation that any wetland in this location be avoided by minor realignment.

Other particularly sensitive Not of Concern REs are RE 11.3.25 (riparian woodland), REs 11.1.2 (*Samphire forbland*) and 11.1.4 (mangrove forest/woodland).

RE 11.3.25 occurs as narrow strips fringing larger watercourses along the pipeline corridors. It will be necessary for the pipelines to transect these corridors at numerous locations. Detailed field surveys have and will continue to identify the narrowest and most appropriate locations for these crossings.

According to existing mapping the two estuarine wetland communities REs 11.1.2 and 11.1.4 occur in large patches along the Export Pipeline just to the west of the marine crossing to Curtis Island (between KPs 372-375). Due to access restrictions (due to waterlogging and cultural restriction) these areas could not be inspected in the field. As such they are assumed to be in good condition.

The total area of estuarine wetland communities that are mapped as occurring within the pipeline corridors is approximately 15 ha. This area is the same regardless of which Export Pipeline option is used.

These four wetland / riparian communities are more sensitive to potential impacts associated with construction and operation of the pipeline, in particular:

- Release of contaminants, nutrients and / or silt, and
- Altered hydrological and sedimentation regimes due to construction of the pipeline across the mainland marine wetland areas.

As set out in **Attachment 10** the total area of VM Act Not of Concern REs that potentially could be cleared is estimated to be approximately 1339 ha. This equates to approximately 0.6% of that which occurs in a 5 km buffer and 0.016% of that within the bioregion. Note that the actual vegetation loss is likely to be less than this estimated amount due to:

- Detailed field investigations will further refine the alignments to minimise the need to impact these communities
- Offset activities will be undertaken to replace unavoidable areas on a basis of at least 1:1.5 (in accordance with the Queensland Government's Environmental Offsets Policy (QGEOP), particularly the Policy for Vegetation Management (DNRW 2006).

Additional mitigation measures to minimise the impacts on VM Act Not of Concern REs are provided in **Section 8**.

7.2.7 Comparison of Potential Impacts Associated with Option 1 and Option 2 Export Pipeline Alignments

According to existing Queensland Herbarium mapping the area of remnant vegetation that would require clearing by each option is estimated to be:

- 1,462 ha for the Option 1 Export Pipeline, and
- 1,382 ha for the Option 2 Export Pipeline.

Despite passing through more remnant vegetation, according to existing Qld Herbarium RE mapping the Option 2 Export Pipeline alignment transects a significantly smaller area of EPBC Act Listed Ecological Communities (**Table 4**) and VM Act (Qld) Endangered and Of Concern REs (**Attachment 10**).

The Ecological Communities / REs that are affected to a greater extent by the Option 1 Export Pipeline corridor are:

- 11.9.1 – Endangered (EPBC and VMA)
- 11.9.4 - Endangered (EPBC and VMA)
- 11.9.5 - Endangered (EPBC and VMA)
- 11.9.6 - Endangered (EPBC and VMA)
- 11.9.12 - Endangered (EPBC and VMA)
- 11.12.12 - Endangered (EPBC and VMA)
- 11.12.17 – Endangered (VMA)
- 11.9.7 – Of Concern (VMA), and
- 11.9.10 - Of Concern (VMA).

The Not of Concern Ecological Communities which are affected to a greater extent by the Option 1 Export Pipeline corridor are REs 11.10.9, 11.10.13 and 11.12.1.

The Option 2 Export Pipeline is mapped as passing through larger areas of the Not of Concern REs 11.5.1, 11.5.4, 11.5.20, 11.5.21, 11.7.6 and 11.11.15.

7.2.8 Potential Impacts on EVR Flora Species

The pipeline alignments contain potential habitat for 83 EVR flora species. Detailed survey is required to confirm the presence or absence and potential presence of each of these flora species along the pipeline alignments.

It is anticipated that EVR flora species recorded during the detailed alignment survey will generally be able to be avoided by alignment refinement and narrowing for short lengths. There may however be some populations which are unavoidable. Generally this would relate to species with restricted habitat niches from which a pipeline may not be able to deviate. For example, the rare Large-fruited *Zamia* (*Cycas megacarpa*) populations which occur on range spurs at KP 296.5-298.5, KP 301 and KP 305 which the Export Pipeline will need to follow for constructability purposes.

Attachment 11 identifies the potential impacts on each potential EVR flora species before and after mitigation measures. The analysis identifies that in the absence of appropriate mitigation measures there is a moderate to high potential to impact on these species. The high potential for impacts relates to species which are known to have restricted distributions. Assuming the successful implementation of the mitigation measures identified in **Attachment 11** for individual species, and in **Section 8** more generally, the potential to impact all EVR flora species is low with the exception of:

- Large-fruited *Zamia* *Cycas megacarpa*
- *Micromyrtus patula*
- *Philothea sporadica*

For each of these species, which have populations which could potentially be dense within constrained alignment locations, the potential for impacts associated with clearing for construction may be moderate due to inability to avoid. In such circumstances an EVR species conservation plan would be developed and approval sought from both DEWHA (for EPBC Act listed species) and EPA (for NC Act EVRs) prior to finalisation and construction of the alignment.

Although it is possible that isolated individuals or populations of EVR species may be present (especially in sections not visited during surveys), field survey results have indicated that there is limited potential for the pipeline to have adverse impacts on EVR flora species generally.

7.2.9 Potential Impacts on Regionally Significant Flora Species

Of the four Regionally Significant flora species known to occur within the pipeline corridors (Miles Mulga, Lancewood, *Dodonaea macrocarpa* and *Corymbia blosomei*), the first three are relatively widespread and common in the area. As such the proposed clearing is unlikely to have any significant effect on local or regional populations of these species.

Corymbia blosomei was observed in smaller numbers fringing the ecotone around RE 11.7.5 in the general vicinity of the western portion of the UIC. Without adequate mitigation measures there would be some potential for clearing within this area to have a significant impact on this species.

7.2.10 Potential Impacts on Least Concern Flora

As the proposed clearing within all RE types represents a small proportion of that found locally and regionally (**Attachment 10**), and assuming the successful implementation of the mitigation measures identified in **Section 8**, there is little potential for this clearing to have a significant impact on any Least Concern flora species.

7.2.11 Potential Impacts on Freshwater Aquatic Plants

The proposed pipeline route has the potential to impact on a range of aquatic plant species. Most species are widespread and abundant, so are unlikely to be significantly impacted by construction or operation of the proposed pipelines. Aquatic ecosystems could be indirectly impacted by altered water, sediment and nutrient flows if watercourse disturbance is not effectively managed. Construction works could also lead to introduction and spread of aquatic weeds.

Three EVR aquatic flora species (*Aponogeton queenslandicus*, *Eleocharis blakeana* and *Fimbristylis vagans*) may occur in temporary wetlands associated with watercourses.

No significant indirect impacts on any freshwater aquatic flora are considered likely provided that mitigation measures as outlined in **Section 8** are employed.

7.2.12 Potential Impacts Associated with Declared and Environmental Weeds

Construction and maintenance of the pipeline has the potential to introduce new weeds and spread existing weeds.

Of particular significance to landholders will be the potential to introduce and spread declared and agricultural weeds, including those already present within parts of the study corridor. Introduction and spread of declared weeds can render land less productive and in some cases have serious health impacts on livestock and people (e.g. Parthenium Weed).

Construction and maintenance activities for the pipeline also have the potential to spread environmental weeds into ecosystems that are currently in natural condition. Of particular concern is Buffel grass (*Cenchrus ciliaris*). This species is an introduced and highly valued pasture grass in many areas but also has the potential spread into native communities and conservation areas where it out-competes native species. It often causes an increase in biomass which drastically biases fire regimes towards much more intense and frequent fire events which can

destroy natural ecosystems. The grass itself also provides very little nutritive or forage value for wildlife and so, areas dominated by the Buffel grass can quickly become biological deserts.

Declared weeds should be controlled throughout the construction, operational and decommissioning phases of the project. It is recommended that environmental weeds, such as Buffel Grass, Castor Oil (*Ricinus communis*), Mexican Poppy (*Argemone ochroleuca*), Mimosa Bush (*Acacia farnesiana*) Guinea Grass (*Megathyrsus maximus*) and Green Panic (*Panicum maximum*) are also managed, particularly during the construction phase and subsequent rehabilitation works. Rehabilitation would also benefit from control of other exotic grasses; however, landholders may request that these species are retained for grazing purposes.

Good weed hygiene practices should be adopted to minimise the introduction or spread of declared, agricultural and environmental weeds along the pipeline corridors. Recommendations aimed at controlling the introduction and spread of weed species are provided in **Section 8**.

7.3 Potential Impacts on Fauna

The pipeline alignments have been selected to avoid as many large and connected areas of vegetation habitat as possible. With pipeline corridors of such length, however, it is not possible to avoid all areas that may provide fauna habitat. With successful implementation of appropriate environmental management controls, any potential impacts on fauna species are likely to be limited to direct impacts associated with construction of the proposed pipeline. The pipeline construction will require some clearing of vegetation and this generally equates to a loss of fauna habitat. This is unlikely to lead to significant long-term impacts on common fauna species due to presence of similar habitat, which these species could utilise, in areas adjacent to the pipeline

Overall levels of vegetation disturbance are considered to be low, relative to that which is to be retained in the vicinity and regionally (**Section 7.2** above).

Attachment 12 lists EPBC Listed fauna species that may potentially be impacted by the project and provides an assessment of Significant Impacts in accordance with the EPBC Significant Impact Guidelines, Policy Statement 1.1. Based on current information, the projected level of Significant Impacts for most species is low. Potential impacts include the following (which are further described under subheadings below):

- Removal of habitat such as mature vegetation, hollow-bearing trees and fallen logs, and therefore loss of nesting, shelter and foraging resources
- Fragmentation of habitat due to pipeline construction. These features may act as movement barriers, particularly to fossorial species, and alter movement patterns. They may also limit access to dry season fauna refuges associated with riverine environments
- Disturbance to fauna movement corridors and dry season fauna refuges (predominantly associated with rivers and creeks)
- The establishment of environmental weeds, particularly Buffel grass, has the potential to fundamentally destroy natural fauna habitats through altered fire regimes and removal of fauna food resources
- Noise and increased human activity, particularly during site development may restrict species movements, limit access to food or other resources
- Trenchfall - the potential for fauna to fall into and become trapped in the open pipeline trench during construction, and
- The elevated risk of wildfires as a result of construction activities including welding and machinery emissions.

Discussion of each of these potential impacts follows.

7.3.1 Removal of Mature Vegetation and Tree Hollows

Removal of mature vegetation reduces feeding resources and shelter for native fauna species. While it is recognised that the proposed loss of mature vegetation would not be significant, most of the fauna habitat within the study corridor has been heavily cleared and is now severely fragmented.

The great majority of the proposed pipeline route (85%) traverses cleared land. As a result of this and the fact the proposed alignment avoids remnant vegetation wherever practicable, relatively small amounts of fauna habitat are proposed to be cleared. The total areas of each Faunal Habitat proposed to be cleared were calculated from the RE clearing calculations. Overall, an estimated 1,462 ha of remnant habitat (i.e. all habitats combined) is proposed to be cleared along the pipeline corridors. The habitat types that are proposed to be cleared to the greatest extent are eucalypt woodland (1333 ha) and riparian eucalypt woodlands (47 ha). **Attachment 10** indicates that the total estimated clearing area of each RE is a small percentage of the total area of that RE present within a 5 km buffer of the alignment, (refer **Section 7.2**).

An important potential impact on fauna is the loss of hollow-bearing trees. A large number of Australian vertebrate fauna species are dependent on tree hollows for shelter and nesting, including (amongst others) parrots, owls, possums, gliders and bats (Gibbons and Lindenmayer, 2002). Mature trees with hollows are a limited resource in many of the rural and grazed lands of central Queensland where widespread clearing has removed much of the mature vegetation. The formation of hollows suitable for use by vertebrate fauna does not occur until eucalypts are at least 120 years old, with large hollows rare in trees under 220 years old. Therefore, the replacement of lost hollows may not occur for very long periods. Large hollow-bearing trees are especially important habitat in strips of riparian vegetation along watercourses that occur in otherwise cleared land. Even single or widely scattered mature hollow-bearing trees can be important habitat, for example, for hollow-roosting bats (Lumsden and Bennet, 2003; 2005). Hollow-bearing trees are likely to be present in varying but limited numbers in eucalypt woodland habitats along the pipeline route, and some of the highest quality hollow-bearing habitat is likely to occur in riparian eucalypt woodland along watercourses.

Fallen logs and dead timber on the ground and understorey vegetation provide shelter (either underneath timber or within hollow logs) and food resources for a broad range of small ground-dwelling fauna. These include, but are not exclusive to, native rodents, dasyurid marsupials, bandicoots, lizards, snakes, frogs, and some birds. Large fallen logs also provide essential protection for fauna against bushfire. Loss or removal of fallen timber severely reduces the abundance and diversity of small ground-dwelling fauna. Impacts from removal of dead timber will reverse over time as dead tree limbs and fallen trees accumulate, but are likely to result in loss of fallen timber-dependent species in the short to medium term. Such impacts can be reversed in the short term by collecting dead timber and respreading it over the pipeline route after construction.

7.3.2 Fragmentation of Habitats and Disturbance to Corridors

The pipeline route traverses Riparian Eucalypt Woodland habitat fringing major watercourses, which has important fauna values as refugia for wildlife during dry periods and as corridors facilitating the movement of migratory and nomadic species. Such refugia and corridors are particularly important as much of the wider environment of the study corridor is fragmented as a result of clearing for agriculture. Additionally these watercourses are often the only source of water during the dry season and therefore assist populations to persist in a dry and largely cleared landscape. Fragmentation and disturbance of these habitats may

be reversible in the medium to long term by natural revegetation and habitat rehabilitation or specific programs aimed at restoring habitat.

7.3.3 Environmental Weeds

As described in **Section 7.2.12**, construction and maintenance of the pipeline has the potential to introduce new weeds and spread existing weeds. The presence of weeds has the potential to alter fauna habitat values, particularly through modification of vegetation structures and fire regimes. Recommendations aimed at controlling the introduction and spread of weed species are provided in **Section 8**.

7.3.4 Trenchfall: The Trap Created by the Open Pipeline Trench

An open trench will be required to facilitate the laying of the pipeline. The trenching will be progressive and therefore the full length of the pipeline will not be open at any given time. The open trench provides a temporary barrier to fauna movement and there is potential for ground-dwelling fauna to fall into the trench and become trapped. Here trapped species can be exposed to overheating, dehydration, predation and / or drowning. Fauna entrapment within pipeline trenches has been recognised as a key environmental issue by the Australian Pipeline Industry Association Code of Environmental Practice (APIA, 2005).

Published information from other Australian pipeline projects has demonstrated that pipeline trenches can entrap large numbers of a wide diversity of terrestrial animals (including EVR species), particularly reptiles, frogs and small mammals, with the potential for very high levels of mortality (Ayers and Wallace, 1997, Woinarski *et al.*, 2000, Doody *et al.*, 2003, Wilson and Swan, 2004; Wilson, 2005).

7.3.5 Wildfire

Although work areas are generally clear of vegetation and leaf litter, risk of fire may be increased through use of equipment and general construction activities. Fire has been included here as a possible threat that needs to be considered in the course of construction activities.

7.4 Potential Impacts on EVR Fauna

All 37 EVR fauna species identified as having preferred habitat within a 5 km buffer of the pipeline corridors (**Table 9**), have the potential to be impacted by the proposed pipeline (**Attachment 12**). Potential impacts on these EVR fauna species are as described in the above in **Section 7.3**.

A number of EVR fauna species identified as potentially occurring within the proposed pipeline route are species that are nomadic, highly mobile or occupy very large home ranges. These include the Red Goshawk (*Erythrotriorchis radiates*), Squatter Pigeon (*Geophaps scripta scripta*), Glossy-Black Cockatoo (*Calyptorhynchus lathami*), Cotton Pygmy-goose (*Nettapus coromandelianus*), Grey Falcon (*Falco hypoleucos*), Black-necked Stork (*Ephippiorhynchus asiaticus*) and Black-chinned Honeyeater (*Melithreptus gularis*). Given the small amount of remnant habitat to be cleared by construction of the pipeline corridors, compared to the area over which individuals of these species range, the potential for these species to be significantly impacted is considered to be minimal.

Several other EVR fauna species have the potential to be directly impacted if present along the pipeline route in woodland and Brigalow habitats, but also have preferred habitat types that are well represented in the immediate vicinity of the alignment. These include Imperial Hairstreak (*Jalmenus evagoras eubulus*), Brigalow Scaly-foot (*Paradelma orientalis*), Yakka Skink (*Egernia rugosa*), Golden-tailed Gecko (*Strophurus taenicauda*), Northern Quoll (*Dasyurus hallucatus*) and Little Pied Bat (*Chalinolobus picatus*). Although there is potential for some direct impact on these species, the small amount of habitat to be cleared combined with the implementation of appropriate mitigation recommendations should result in minimal impacts on these EVR fauna species.

Potentially present EVR species that may be susceptible to entrapment in the open pipeline trench is made up of one frog, eight reptiles and one mammal. These are Tusked Frog (*Adelotus brevis*), Collared Delma (*Delma torquata*), Brigalow Scaly-foot (*Paradelma orientalis*), Yakka Skink (*Egernia rugosa*), Short-Necked Worm-Skink (*Anomalopus brevicollis*), Ornamental Snake (*Denisonia maculata*), Dunmall's Snake (*Furina dunmali*), Grey Snake (*Hemiaspis damelii*), Yellow-naped Snake (*Furina barnardi*) and Northern Quoll (*Dasyurus hallucatus*).

The detailed distributions of several of the EVR fauna species identified are poorly known, as they are particularly secretive or cryptic in their habits. Thus it is difficult to assess the likely presence of these species. These include Yellow-naped Snake, Dunmall's Snake, Ornamental Snake and Grey Snake. In the absence of adequate data the precautionary principle should apply, and it should be assumed that these reptile species are present, particularly in remnant Woodland and Brigalow habitats on cracking clay soils. As these habitats only make up a small area of the alignment, and provided mitigation measures outlined in **Section 8** are implemented, significant impacts on these species is considered to be minimal.

7.5 Impacts on Migratory and Marine Species

In addition to EPBC Act Listed species, the EPBC Act lists Migratory and Marine fauna, of which two species were identified by desktop studies and one was identified in field surveys. These species are included in **Attachment 9** and are bird species that occur fleetingly in the pipeline area. For these species, an assessment was made as to whether the project was likely to:

- Lead to loss or modification of habitat important for migratory species (including fragmentation, altered land use, fire regimes, altered nutrient cycle, altered hydrological cycles etc)
- Introduce or establish invasive species, and
- Disrupt species lifecycle (breeding, feeding, migration, roosting etc).

The level of disturbance proposed to native vegetation and other resources used by fauna is projected to be negligible, and so for migratory and marine species, impacts are projected to be even less. Of the three species, one, the Cotton Pygmy-Goose, is a water bird that occurs in large water bodies and because the pipeline is aligned to avoid large water expanses, impacts on this species are projected to be negligible. The second species, the Swift Parrot, breeds in Tasmania and fleetingly visits and feeds in the southern Queensland during the non-breeding period. Once again, the proportion of feeding habitat affected by the project is minimal and so impacts are projected to be negligible. The third, the White-throated Needletail, is an aerial forager and not known to land or breed in Australia. It ranges over vast areas of the eastern Australia and is not confined to a particular bioregion. It is also highly unlikely that the proposed pipeline would have any impact on any of these species.

7.6 Potential Impacts on Regionally Significant Fauna

Regionally significant fauna encompass a broad range of species groups and life forms as detailed in **Section 6.2.3**. As such, they will potentially be impacted by the factors described in **Section 7.3** above. However, by avoiding important habitat wherever possible and provided that mitigation measures set out in **Section 8** are put in place, it is considered unlikely that these species will be significantly impacted by the proposed construction activities.

7.7 Potential Impacts on Least Concern Fauna

As the proposed clearing within all RE types represents a small proportion of that found locally and regionally (**Attachment 10**) and provided that the mitigation measures identified in **Section 8** are successfully implemented there is little potential for this clearing to have a significant impact on Least Concern fauna species.

7.8 Potential Impacts on Freshwater Aquatic Fauna

Freshwater aquatic environments along the pipeline corridors are small in extent and therefore it is recommended that these areas are avoided wherever practicable. In situations where the pipelines have no alternative but to traverse

these features (e.g. water course crossings), the crossing should be made at right angles and should involve minimal clearing. No significant indirect impacts on freshwater aquatic fauna are considered likely provided that mitigation measures as outlined in **Section 8** are employed.

7.9 Potential Impacts on Wetlands

The UIC traverses the Condamine River and several nationally significant wetlands occur downstream, including the Ramsar-listed Narran Lake Nature Reserve approximately 450 km to the southwest. As it is approximately 450 km southwest of the pipeline there is low potential for the proposed activities to impact upon this wetland.

A search of the Directory of Important Wetlands in Australia indicates that the only Important Wetland to be transected by the pipeline corridors is the Narrows located in close proximity to the marine crossing to Curtis Island (**Figure 6**). According to this directory approximately 15 ha of this wetland is traversed by the Option 1 and Option 2 Export Pipeline corridor between KPs 373 and 376. Potential impacts on this wetland have been assessed in a separate study and are presented in **Volume 5 Chapter 7** of the EIS.

Other important wetlands mapped as occurring in the broad vicinity of the pipeline corridors are:

- Palm Tree and Robinson Creek – approximately 25 km North of the Lateral at KP 50
- Boggomoss Springs- approximately 20 km east of Option 1 Export Pipeline at KP 150
- Gums Lagoon – 26 km south west of Tara and approximately 45km south of the UIC, and
- Lake Broadwater – 25 km south west of Kogan and approximately 10km west of KP 24 of the UIC.

As none of the pipeline corridors are located within the catchment areas of any of these important wetlands the potential to impact on them is low.

As specified in **Attachment 10**, the existing Queensland Herbarium mapping indicates that three REs which are representative of wetland communities are transected by the pipeline corridors, namely:

- RE 11.3.27 (freshwater wetlands)
- RE 11.1.2 (*Samphire forbland* on marine clay plains), and
- RE 11.1.4 (mangrove woodland on marine clay plains).

The small area of RE 11.3.27 is mapped as occurring along Option 1 and Option 2 Export Pipeline corridor between KPs 12 and 13. As a result of land access constraints it was not possible to visit this area, it is however, expected that these areas will be subject to detailed surveys prior to the commencement of construction

activities. **Section 8.0** includes a recommendation that any wetland in this location be avoided by minor realignment.

Estuarine wetlands RE 11.1.2 and RE 11.1.4 are mapped between KPs 373.2 and 374.4 along the Option 1 and Option 2 Export Pipeline corridors just before the marine crossing to Curtis Island. Due to access restrictions (i.e. waterlogging and cultural restrictions) these areas could not be surveyed in the field and are therefore assumed to be in good condition.

The total area of estuarine and marine wetland communities that are mapped as occurring within the pipeline corridors is approximately 15 ha. This area is the same regardless of which Export Pipeline option is used.

These three wetland types are sensitive to potential impacts associated with construction and operation of the pipeline, in particular:

- Release of contaminants, nutrients and / or silt, and
- Altered hydrological and sedimentation regimes due to construction of the pipeline across the mainland marine wetland areas.

Due to their sensitivity, areas mapped as ephemeral wetlands within the broader pipeline area could potentially be impacted through sedimentation, nutrification and accidental release of contaminants. However, no significant direct or indirect impacts to freshwater wetlands are considered likely provided that the recommended mitigation measures as outlined in **Section 8.0**. The potential impacts on estuarine wetlands are described in **Volume 5, Chapter 7** of the EIS.

7.10 Potential Impacts on DERM Essential Habitat Areas

Potential impacts on all EVR flora and fauna species and their preferred habitats are discussed in **Sections 7.2.8** and **7.4**.

Provided that mitigation measures set out in **Section 8.3** are implemented it is considered that there is a low potential for the proposed pipeline corridors to significantly impact the environmental values associated with any Essential Habitat areas.

Provided that mitigation measures set out in **Section 8.5** are implemented it is considered that there is a low potential that the proposed pipeline corridors will significantly impact these Essential Habitat areas.

7.11 Potential Impacts on Environmentally Sensitive Areas

7.11.1 Category A

As a result of its close proximity, The Narrows State Marine Park may potentially be impacted by the release of dredge, sediment and waste from the proposed construction activities. A detailed study of the potential impacts on this area is set out in **Volume 5, Chapter 7** of the EIS.

7.11.2 Category B

According to existing mapping the total area of REs listed as Endangered under the EPA's Biodiversity Status and found within the pipeline corridors is approximately 21 ha. This equates to less than 0.03% of that which occurs within a 5 km buffer of the pipeline and 0.004% of that which occurs within the Bioregion. Potential impacts on these areas are set out in **Section 7.2.4**.

According to existing mapping a Marine Plant area and an area Seaward side of H.A.T are transected by the Option 1 and Option 2 Export Pipeline. Potential impacts on these marine areas have been assessed in a separate study and are presented in **Volume 5 of Chapter 7** of the EIS.

Potential impacts on the Great Barrier Reef WHA that occurs within the proposed pipeline corridors are also addressed in detail in **Volume 5, Chapter 7** of the EIS.

7.11.3 Category C

The total area of State Forests transected by the proposed pipeline corridors is approximately 63 ha. This is made up of:

- 40 ha of Braemar State Forest along the UIC,
- 13.5 ha of Quandong State Forest along the Option 2 Export Pipeline, and
- 9.5 ha of Barakula State Forest along the Option 2 Export Pipeline.

It is important to note that the 40 ha of Braemar State Forest that occurs along the UIC is an estimation made in the early stages of the planning process. It is expected that this area will significantly decrease as a result of refinements to the UIC alignment following detailed field surveys and discussions with Forestry Officers.

The 13.5 ha of Quandong State Forest transected by the Option 2 pipeline (KPs 73.2-75.1) has been previously cleared with the exception of the small vegetated area that occurs at the entry to the state forest. This area of remnant vegetation mapped as containing the NOC mixed community 11.5.1/11.5.1a/11.5.4. Within this remnant the proposed alignment follows an existing boundary fence and therefore only a further 15-20m of vegetation will be required to be cleared. Based on this, the worst case clearing footprint of remnant vegetation within Quandong State Forest is estimated at 2.3 ha.

As a result of field surveys and discussions with forestry officers the area of Barakula State Forest to be transected by the Option 2 Export Pipeline has been decreased to two small areas located between KPs 73.1-75.1 and 80-83.5.

The first of these transects (KP 73.1-75.1) has been previously cleared of vegetation with the exception of the small area of NOC mixed community RE 11.5.4/11.5.21/11.7.6 that occurs between KPs 74.8-75.1. As the proposed alignment follows an existing fenceline only a further 15-20 m of vegetation will be required to be cleared. As a result of this it is estimated that approximately 0.6ha of this mixed community will be required to be cleared.

The second of these transects (KP 80-83.5) is also predominantly clear with the exception of the small Endangered sub dominant community REs 11.10.9/11.9.5/11.10.9 (ratio of 60/20/20) that occurs between KPs 81.7-82.6. It

has been proposed that in order to avoid this remnant the alignment is located in cleared buffel grass country. Provided that management measures are implemented to minimise the potential for spreading buffel grass, from a flora and fauna perspective, this is considered to be the better option.

8.0 MITIGATION AND REHABILITATION RECOMMENDATIONS

8.1 Approvals Required in Relation to Flora and Fauna

The pipeline corridors will require a number of approvals in relation to flora and fauna, including:

- Agreement from DEWHA in relation to any unavoidable disturbance of EPBC Act listed flora
- A permit from EPA in relation to any unavoidable disturbance of NC Act listed EVR flora
- Information about the proposed disturbance of EVR plants (e.g. numbers of individuals unable to be avoided, estimates of numbers remaining in the local and regional contexts and offset activities) would be required to be provided as part of these permit applications
- A permit to disturb Marine Plants under the Queensland *Fisheries Act 1994*, and
- Accreditation and spotters permits from EPA for fauna handlers who may have to supervise trench construction activities.

8.2 Alignment-specific Recommendations

From an ecological perspective, Option 2 is considered to be the most desirable option of the two Export Pipeline alignments. This is due to the significantly smaller areas of Threatened Ecological Communities / REs that fall within the Option 2 Export Pipeline corridor (as detailed in **Section 7.2.5**). The main negative impact of the Option 2 alignment is that it transects larger remnants of Not of Concern Ecological Communities; however, this is considered to be the least ecological impact.

Other more minor realignment recommendations that were identified during the initial field inspection are shown in **Table 15**.

Table 15 Ecologically Preferred Alignment Suggestions

KP	Reason	Preferred Alignment	Ecological Desirability
Option 1 and Option 2 Export Pipeline Alignments			
4.5-5	Runs along the edge RE 11.4.3 remnant listed as Endangered under both the EPBC and VM Act.	To move the corridor 200m to the east.	High
12.4-12.8	Runs along the edge of freshwater wetland community RE 11.3.27	Move the alignment approximately 100m to the west of this remnant	High
292.7-262.9 and 263.5	Transects two small remnants of the mixed community of RE 11.9.5/11.9.7. RE 11.9.5 is listed as Endangered under the EPBC and VM Act and RE 11.9.7 is listed as Of Concern under the VM Act.	Move the alignment 200 m to the east	High
280.2-280.6	Transects a remnant of VM Act mixed Of Concern community RE 11.3.4/11.3.25/11.3.6	Move the alignment 650 m to the east at KP 280 in order to minimise the area crossed.	Moderate
280.2-280.5, 281.8-282.2 and 282.8-284	Transects a remnant of VM Act mixed Of Concern community RE 11.3.4/11.3.25/11.3.6	Move the alignment 600 m to the north at KP 281 and 150 m north at KP 283.5 in order to follow corridor of non-remnant vegetation.	Moderate
307	Runs along the edge of an area of State habitat for EVR species	Move the alignment 200 m to the east,	Mod
380.6-380.7	Transects a fragment of VM Act Endangered RE 12.3.3.	Move the alignment 100 m south.	High
Option 2 Export Pipeline			
215-217	Transects a large unfragmented patch of Not of Concern remnant vegetation	Move the alignment 500 m east at KP 216.	Moderate
Option 1 Export Pipeline			
130	Passes through a small mixed community of 11.9.4b/11.9.5 listed as Endangered under both the EPBC and VM Act.	Move the alignment 700 m east	High
177	Passes through a small roadside remnant of RE 11.12.21 listed as Endangered under both the EPBC and VM Act	Move the alignment 200 m to the west	High
Lateral			

43.9	Passes through a small fragment of the EPBC and VM Act Endangered community RE 11.9.5.	Move alignment 150 m to the north.	Mod
113.1	Transect small remnant of VM Act Of Concern community RE 11.3.2	Move the alignment 200 m to the south.	Mod
123.5	Transects two fragments of the VM Act Of Concern community RE 11.3.2.	Move the alignment 300 m north west in order to minimise the area crossed.	Mod
147.4-147.6	Transects a community of 11.9.4 listed as Endangered under both the EPBC and VM Act	Move the alignment 200 m to the east	High
UIC			
2-8.2	Runs through a mixed community of Of Concern communities RE 11.3.2 and RE 11.3.18 and riparian woodlands RE 11.3.25	Move the alignment south of this area	High
147.2-148	Transects 4.14 ha of Endangered Brigalow Community RE 11.9.4	Move the alignment 500 m south	High

Additional alignment preferences will be identified during the detailed surveys expected to be undertaken prior to alignment finalisation.

8.3 Mitigation and Rehabilitation Recommendations for Flora & Fauna

The following mitigation measures are recommended to help ensure that significant impacts on flora and fauna are avoided:

- Detailed field investigations be undertaken of the preferred alignments prior to finalisation
- The corridor impacted for pipeline construction within all areas of remnant vegetation should be minimised. Clearing widths should be minimised wherever possible
- Clearing width should be minimised in beds and banks of watercourses and in areas with Endangered and Of Concern vegetation
- Clearing of remnant vegetation areas should be avoided for the purposes of siting construction camps and where possible, vehicle access tracks
- Existing roads and tracks should be utilised for access where practicable
- Clearing boundaries within remnant vegetation areas should be clearly marked in the field
- Vegetated creeklines, fencelines and road reserves should be crossed at 90 degrees whenever possible to limit the extent of clearing

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- The EMP should include appropriate requirements in relation to management of waste and potential contaminants
 - All vehicles should contain spark arresters on diesel engines. A fire extinguisher and personnel trained in fire fighting should be on-hand during welding operations to minimise damage caused by accidental fires
 - Topsoil should be removed and re-spread across rehabilitation areas as soon as possible following disturbance (preferably within 12 months)
 - Care should be taken to ensure hydrological characteristics are not altered and appropriate soil and erosion management is implemented in and adjacent to riparian areas
 - Drainage should be reinstated at watercourse crossings immediately following completion of construction
 - Ensure no permanent barrier to fish movement at any stage of the Project
 - Design, install and maintain effective erosion and sediment control structures during construction and operation (especially near wetlands, watercourses, steep areas and areas of erodible / dispersive soils)
 - The treatment and disposal of hydrotest water should be in accordance with the recommendations made in the CSIRO Manufacturing and Infrastructure Technology report (2005)
 - Monitoring of weed infestations within disturbed areas should occur at least monthly during construction and then quarterly for a period of two years following construction. Appropriate weed control measures should be applied. Following the two year period, the frequency of monitoring should be reconsidered dependent on the success of control measures and the level of infestations
 - A Weed Management Plan that addresses the construction, rehabilitation and operation phases of the project should be prepared prior to construction. This Plan should include hygiene protocols to minimise the likelihood of introduction and spread of environmental, agricultural and declared weeds
 - All vehicles and plant should have certification that they are weed-free prior to their initial commencement of works and when moving from weed infested to weed free sections of the pipeline route
 - All vehicles should remain on designated access roads and tracks and within defined pipeline construction area and associated work / camp sites
 - Fauna handlers should be present to survey for, and as necessary relocate wildlife immediately prior to and during clearing activities
 - Trenching should occur progressively to minimise the period of time the trench is open and the length of open trench. The length of open trench at any one time should be the minimum practicable. Ramps and trench plugs with slopes of no greater than 50% (APIA, 2005) should be located at least every 500 m to assist escape for some species. Where possible, trench

plugs should coincide with stock and wildlife trails. Some form of cool insulated cover should be provided. Branches, ramped gangplanks or similar should also be used to create 'ladders' at regular intervals to assist small fauna to exit the trench (APIA, 2005)

- Qualified fauna spotters and handlers should be employed to survey the open trench, record and remove any trapped fauna species. Such surveillance should occur along the entire length of the trench and not merely those areas described as fauna habitats or sensitive areas, as trench fall can entrap significant numbers of fauna along any part of the trench
- Fauna spotters and handlers should be qualified or appropriately trained to assess and handle any injuries to native fauna that may occur due to trenchfall. Qualified veterinarian staff should be available to assess and treat or euthanize (as necessary) any large native vertebrates
- Consideration should be given to the use of temporary fencing to exclude access to the trench by livestock and larger native wildlife (APIA, 2005). Fauna searches should be conducted at least daily
- Vegetative waste as a result of clearing should be mulched or distributed across adjacent areas where it may provide refuge for terrestrial species. It should not be burnt
- Vegetative wastes resulting from clearing should, where practicable, be re-spread over the easement following construction. This will further encourage regrowth and minimise weed infestations
- Subject to easement requirements and landholder preferences, trees and shrubs should be allowed to naturally regenerate on those parts of the cleared pipeline corridor that are not required to be kept tree free for pipeline protection and maintenance access purposes
- Linear features such as roads and pipelines should be built to a standard sufficient to allow for their intended purpose but should be allowed to revegetate as much as possible so as to minimise their impact on terrestrial fauna movements
- It is understood construction will be year round but where practicable, time construction for the coolest and driest months (e.g. April to September), when reptiles and amphibians are least active and when conditions are most favourable for minimising mortality in the trench
- Vehicle movements should be restricted at night as far as practicable
- Vehicles should travel along the ROW at appropriate speeds that minimise environmental risks
- A seeding plan should be developed. The plan should be implemented using native groundcover species (or in existing pasture areas the dominant pasture species) at completion or reinstatement of each section of the pipeline

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- In areas where initial seeding and natural regeneration is not successful (i.e. has not achieved 50% of the desirable species cover on adjoining undisturbed areas within 24 months) should be reseeded with native groundcover species (or in existing pasture areas with dominant pasture species)
 - Rehabilitation of lands should be negotiated with landholders where applicable. Unless infrastructure is to be retained for other use (roads), areas should be ripped and allowed to naturally revegetate. Hardened road surfaces should be removed or regraded to restore the original land surface as much as possible
 - Vehicle tracks should be minimised and defined on alignment sheets following the rehabilitation of the corridor post-construction
 - Where possible, native shrubs should be allowed to regenerate to reduce the barrier to fauna movement, especially for small ground-dwelling fauna
 - Prior to the commencement of construction, all mapped Essential Habitat areas will be subject to preclearance surveys
 - All unavoidable clearing of these areas will be addressed through the establishment of environmental offsets as discussed in **Section 8.5**
 - Offsets should be established where impacts to native vegetation and fauna habitats are unavoidable. These areas should be managed with a strong conservation focus and aim to provide vital protection for flora and fauna in this region where other protected areas (Conservation Parks and National Parks) are absent. It is proposed that such areas should have conservation plans developed for them and active conservation management should be undertaken. This would include flora and fauna monitoring to assess the efficacy of conservation practices and to feedback into the development of improved future practices.

8.4 Mitigation and Rehabilitation Recommendations for Freshwater Wetlands

Mitigation and rehabilitation measures to reduce potential impacts on freshwater wetlands and aquatic plants include:

- Minimising clearing widths in beds of watercourses
- Minimising construction and other disturbance at watercourses during the wet season
- Minimising impacts on hydrology and sediment and nutrient flows by restoration of natural bank contours and surface levels
- Revegetation with appropriate plant species as soon as possible after construction
- Effective weed hygiene practices to avoid introduction and spread of aquatic weeds, and

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- Monitoring will be undertaken to assess for potential impacts adjacent to areas where clearing within and adjacent to wetland communities (i.e. REs 11.1.2, 11.1.4 and 11.3.27) is unavoidable.

8.5 Environmental Offsets

It is recommended that offsets be established to compensate for ecological impacts (e.g. loss of vegetation, fragmentation of fauna habitat and movement corridors, disturbance of EVR flora) where clearing within areas of remnant vegetation are unavoidable. It is envisaged that there will be opportunities to undertake some offset activities within the CSG Field. Other activities will be undertaken as close as practicable to where clearing is to occur.

As the scope of this project falls within the jurisdiction of both Commonwealth and Queensland Government, the objectives and principles of offsets policy for both levels of government will be considered.

Under Commonwealth legislation the requirements of offsets, as a possible approval condition, are set out in Part 9 of the EPBC Act (in particular s 134 and 136). Pursuant to the December 2007 amendments of the EPBC Act, s 134 now allows the Minister to attach conditions for the protection, repair or the mitigation of damage to Matters of National Environmental Significance (NES). Additionally, under s 136 an action is not to be approved unless it is consistent with the principles of Ecological Sustainable Development (detailed s 3A) and aims to 'maintain or enhance' the protected matter (DEWR 2007).

The guiding framework for the implementation of offsets in Queensland is the Queensland Government Environmental Offsets Policy (QGEOP). This broad framework consists of a number of specific-issue offset policies, which when applicable, set out environmental offset requirements (EPA 2008d).

The current offsets policies of both levels of government set out similar standards for an acceptable offset. Some of these common elements are:

- Offsets should only be utilised in situations where impacts on environmental values are 'unavoidable',
- The offset must directly relate to the environmental value that will be impacted, often referred to as the "like for like" principle,
- The offset may be either direct or indirect actions. A direct action usually requires the on-ground maintenance and/or improvement of the protected matter. An indirect action, however, includes a wide range of actions that improve the knowledge and understanding of a protected matter in order to facilitate its conservation. Note that the offset must be in a form that delivers the greatest conservation benefit,
- The implementation of the offset must be timed so to minimise the time-lag between the impact and the delivery of the offset,
- Where possible the offset should be located in the vicinity of the impact, and

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- Mechanisms should be put in place in order to ensure that the offset is enforceable, monitored and audited.

According to the QGEOP it is not necessary that an offset is in place before project approval is granted so long as an offset agreement is entered into before the matter to be offset is impacted. An offset agreement is a formal document between the regulator and proponent that sets out the arrangements for creating the offset. Once finalised these agreements form part of the development approval and are legally enforceable. An offset agreement needs to consider such matters as:

- A description of the matter to be offset,
- A description of the proposed offset,
- The mechanism to legally secure the offset,
- Timeframes to achieving offset objectives,
- The offset management plan,
- Reporting and monitoring plan, and
- When and how responsibility for the offset is extinguished (EPA 2008d).

According to the QGEOP, an environmental offset is taken to be legally secured if protected by some form of legally binding mechanism. These can include:

- Designation as a protected area under the *Nature Conservation Act*,
- Designation as an area of high nature conservation value under the *Vegetation Management Act*, and
- The purchase of land or the establishment of a covenant under the *Land Title Act 1994* (EPA 2008d).

Note that the selection of future offset sites will be dependant on a number of non-environmental factors which include:

- Land tenure – tenure needs to enable purchase or covenants on title,
- Landholder preferences - it will be necessary to find willing landholders to sell or covenant land, and
- Land use – (e.g. alienation of GQAL constraints and possible synergies and constraints relating to CSG activities and other land uses).

It is recommended that a QC LNG Offset Strategy be developed which sets out a process for identifying landholders within offset priority areas. In the first instance, sites should be identified on the basis of their conservation values and similarity to those areas likely to be impacted (“like for like”). Current government policy stipulates that a ‘package’ of offset actions is likely to lead to the better conservation outcomes. QC LNG will be in keeping with this best practice by considering a broad range of direct and indirect actions throughout the initial development stage of its Offsets Strategy.

Priority offset areas from an environmental perspective would include:

- Matters of National Environmental Significance,

- EREs,
- OC REs,
- Any REs where clearing may be considered as a significant impact,
- Particular EVR fauna habitats,
- EVR flora rich areas,
- Connections/Corridors,
- Riparian areas,
- Areas containing wetlands and Marine Plant areas (REs 11.1.2, 11.1.4, 11.3.27), and
- Areas linking/adjoining any of the above areas.

It is recommended that where offset areas are established, management and monitoring plans be developed in order to guide the strategic development of these areas, identifying key values, threats and the environmental management strategies required to achieve the appropriate conservation outcomes.

The environmental management of these areas would generally encompass:

- Fire management planning and activities (e.g. firebreak grading, fire mapping, fire response planning),
- Livestock exclusion (e.g. fencing),
- Weed control,
- Feral animal control activities (e.g. fox and rabbit baiting), and
- Flora and fauna monitoring in order to assess implemented management strategies.

9.0 CONCLUSION

Provided that the recommended mitigation and rehabilitation measures identified in this report are adopted and successfully implemented, the construction and operation of the pipeline infrastructure will be unlikely to have a significant impact on any of the biological features and values described.

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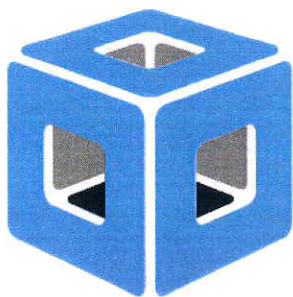
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**ATTACHMENT 1 – STAND ALONE REPORT ON TERRESTRIAL MATTERS
OF NATIONAL ENVIRONMENTAL SIGNIFICANCE**



UNIDEL
ENERGY AND INFRASTRUCTURE

ANNEX B

PIPELINE COMPONENT - REPORT ON MATTERS OF NATIONAL ENVIRONMENTAL SIGNIFICANCE

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1 INTRODUCTION

This Annex considers the Pipeline Component of the Project which consists of three pipeline corridors:

- The Export Pipeline - a gas pipeline that extends approximately 380km from the QGC Coal Seam Gas (CSG) Field near Miles to the QC LNG Plant Facility on Curtis Island near Gladstone
- The Lateral - a gas pipeline that originates from Fairview and/or Sunshine tenements and runs approximately 200km to join the Export Pipeline near Wandowan, and
- The Collection Header - a collection of gas and water pipelines approximately 200km in length extending across the CSG Field from East of Tara to West of Wandowan.

An overview of the QCLNG Project is provided in *Volume 1, Chapter 2* of the EIS (particularly **Section 4.2, Chapter 8** and **13**). The predominant land uses are rural grazing and dry land cropping.

The pipeline crossing The Narrows within the Port of Gladstone will fall within the Great Barrier Reef World Heritage Area (GBRWhA) which is also listed as a National Heritage Place. Relevant features of the GBRWhA, as well as listed threatened marine species and communities and listed marine migratory species, that are found within the Port of Gladstone and which may be affected by the construction of the pipeline across The Narrows are discussed in **Annex C**.

Besides the GBRMPA, the other MNES relate to Listed threatened species and communities (sections 18 & 18A) and Listed migratory species (sections 20 & 20A).

This assessment considered publically available databases and published information on the project area as well as detailed field surveys undertaken for the CSG Field and rapid flora field surveys of available sections of the Option 1 Export Pipeline and UIC.

This report details the existing nature conservation values of the pipeline corridors in terms of:

- Integrity of ecological processes, including habitats of species and communities listed under the EPBC Act
- Biological diversity, including habitats of rare and threatened species
- Integrity of landscapes and places including any natural places, and
- Aquatic and terrestrial ecosystems.

This report examines the potential and known occurrences of protected plants, animals and communities as identified under the EPBC Act.

The report discusses the nature conservation values of the areas likely to be affected by the Project and identifies mitigation measures to assist in avoiding or minimising impacts on Environmentally Sensitive Areas, areas of remnant vegetation and other areas of conservation value. Where avoidance is not possible, recommendations are made in relation to appropriate offset activities.

2 ASSUMPTIONS AND LIMITATIONS

The assessed pipeline alignments were indicative only and have been modified during the assessment process. Unfortunately this has meant that the assessment is primarily based on a desktop assessment. Field work was limited to a rapid assessment along parts of the Option 1 Export Pipeline and the UIC. Additionally, landholder access constraints prevented field inspection of significant portions of the pipelines at the time of the survey work. At the time of writing this technical report, no comprehensive detailed field surveys had been undertaken along any of the pipelines.

Due to constructability and land access constraints the Option 2 Export Pipeline alignment has been confirmed as the preferred route of the Export Pipeline. As a result of the identification of the preferred route, and developments in landholder access approvals, it will be possible to undertake a final detailed assessment of the entire alignment prior to the commencement of construction activities. This fieldwork will quantify areas and provide details of ecological features and values within the disturbance footprint. In the meantime the Queensland Herbarium RE mapping of these areas is assumed to be correct. Fauna habitat mapping has been derived from the same sources and is subject to similar assumptions and limitations.

Scale-dependant inaccuracies can occur with Queensland Herbarium RE mapping; for example, small remnants along creeks and road reserves may not be detected and small scale variation within larger remnants may not be recognised. Fauna habitat mapping has been derived from the same sources and is subject to similar assumptions and limitations.

The presence of a particular flora or fauna species within the pipeline corridors can only be confirmed by detailed targeted field surveys, so the precautionary approach has been adopted throughout this assessment. A species is assumed to occur in the study area if it was recorded in database searches for the region and the Queensland Herbarium's Regional Ecosystem (RE) mapping and / or the rapid field surveys indicated suitable habitat for the species, based on existing knowledge of the species' ecological requirements.

Whilst a significant proportion of the study area is cleared and is likely to be suitable for locating infrastructure which will be required for the construction and operation of the pipelines, the specific locations for access roads, compressor stations, construction camps and other support infrastructure were not known at the time of the assessment.

Estimated clearing footprints have been calculated using GIS based Queensland Herbarium RE mapping. Areas for individual REs are shown to two decimal points in order to better reflect the extent of the smaller remnant areas (e.g. <1 ha). Total areas are rounded to whole hectares where this rounding has no material affect on comparisons to better reflect the degree of accuracy of the estimations. Where totals have been rounded, they may not equal the sum of the component areas due to rounding errors.

This assessment considers only terrestrial ecological features and values. Marine ecology impacts are the subject of **Annex C**.

3 ASSESSMENT METHODOLOGY

3.1 Assessment of Significance of Impacts

In this report, assessments of potential impacts have been assessed in accordance with the EPBC Significant Impact Guidelines, Policy Statement 1.1 DEHWA (2006).

In this guideline, DEHWA provides a framework to assist in determining whether the impact of an action on any matter of NES is likely to be significant:

'An action has, will have, or is likely to have a significant impact on an endangered ecological community if it does, will, or is likely to:

- *Lead to a long-term adverse affect on an ecological community*
- *Reduce the extent of a community*
- *Fragment an occurrence of the community*
- *Adversely affect habitat critical to the survival of an ecological community*
- *Modify or destroy abiotic (non-living) factors (such as water, nutrients, or soil) necessary for the community's survival*
- *Result in invasive species that are harmful to the critically endangered or endangered community becoming established in an occurrence of the community, or*
- *Interfere with the recovery of an ecological community.'*

3.2 Flora Assessment

3.2.1 Determination of Significance Level

EPBC Act Listed Ecological Communities

EPBC Act Listed Ecological Communities as listed under the EPBC Act can be transposed for the most part, to the descriptions assigned by the Queensland Herbarium's Regional Ecosystem (RE) mapping. Those of relevance to the proposed pipelines are shown in **Table 1**.

Table 1 Translations from EPBC to VM Act Status for communities in the Brigalow Belt Bioregion.

RE Description	Qld VM Act Status	EPBC Act Listed Ecological Community
11.3.1	Endangered	Brigalow (<i>Acacia harpophylla</i> dominant and co-dominant)
11.4.3	Endangered	
11.4.7	Endangered	
11.4.8	Endangered	
11.4.9	Endangered	
11.4.10	Endangered	
11.5.16	Endangered	
11.9.1	Endangered	
11.9.5	Endangered	
11.9.6	Endangered	
11.11.14	Endangered	
11.12.21	Endangered	
11.2.3	Of Concern	Semi-evergreen vine thickets of the Brigalow belt (North and South) and Nandewar Bioregions
11.3.11	Endangered	
11.4.1	Endangered	
11.5.15	Not of Concern	
11.8.3	Not of Concern	
11.8.6	Not of Concern	
11.8.13	Endangered	
11.9.4	Endangered	
11.9.8	Not of Concern	
11.11.18	Not of Concern	
11.3.2 (in part)	Of Concern	Weeping Myall Woodlands
11.3.28 (in part)	Of Concern	

EPBC Act Listed Species

EPBC Act Listed species, pursuant to s 179 of the EPBC Act threatened flora species are classified as one of the following status categories:

- Extinct
- Extinct in the wild*
- Critically endangered*
- Endangered*
- Vulnerable*, or
- Conservation dependent.

Note that species classified as Extinct and Conservation dependant are not considered to be matters of National Environmental Significance (NES) (DEWHA 2009).

3.2.2 Flora Desktop Assessment

The flora desktop assessment included:

- Review of Queensland Herbarium HERBRECS data, DEWHA Protected Matters flora data and Queensland Museum data which was sourced 2nd February 2009 (EPA 2007). The data search areas were rectangular polygons and covered an area at least 5 km either side of the pipeline route. The search areas were:
 - Export Pipeline: 23.5333° S to 23.8622° S and 151.35° E to 150.0333° E
 - Lateral: 25.5333° S to 25.9° S and 150.3666° E to 148.85° E
 - Collection Header: 25.8166° S to 27.4333° S and 149.45° E to 151.1666° E
- Review Queensland Herbarium RE mapping (Version 5.0, 2005) for 10 km wide corridor centred on the pipeline route to establish those vegetation communities mapped by the EPA at a scale of 1:100 000
- Examination of satellite imagery to gain an appreciation of the project's proximity to sensitive areas, assess vegetation patterns and identify target areas for the rapid field investigations, and
- Review of the EPA Brigalow Belt South Biodiversity Planning Assessments (EPA 2008a), EPA Biodiversity Planning Assessment Brigalow Belt South Flora Expert Panel Report (EPA 2008b) and the Biodiversity Planning Assessment Brigalow Belt South Fauna Expert Panel Reports (EPA 2008c) to identify species and areas that are recognised as State, Regional or Local Biodiversity Significant or are flagged as important for their integrated biodiversity values within close proximity to the project area.

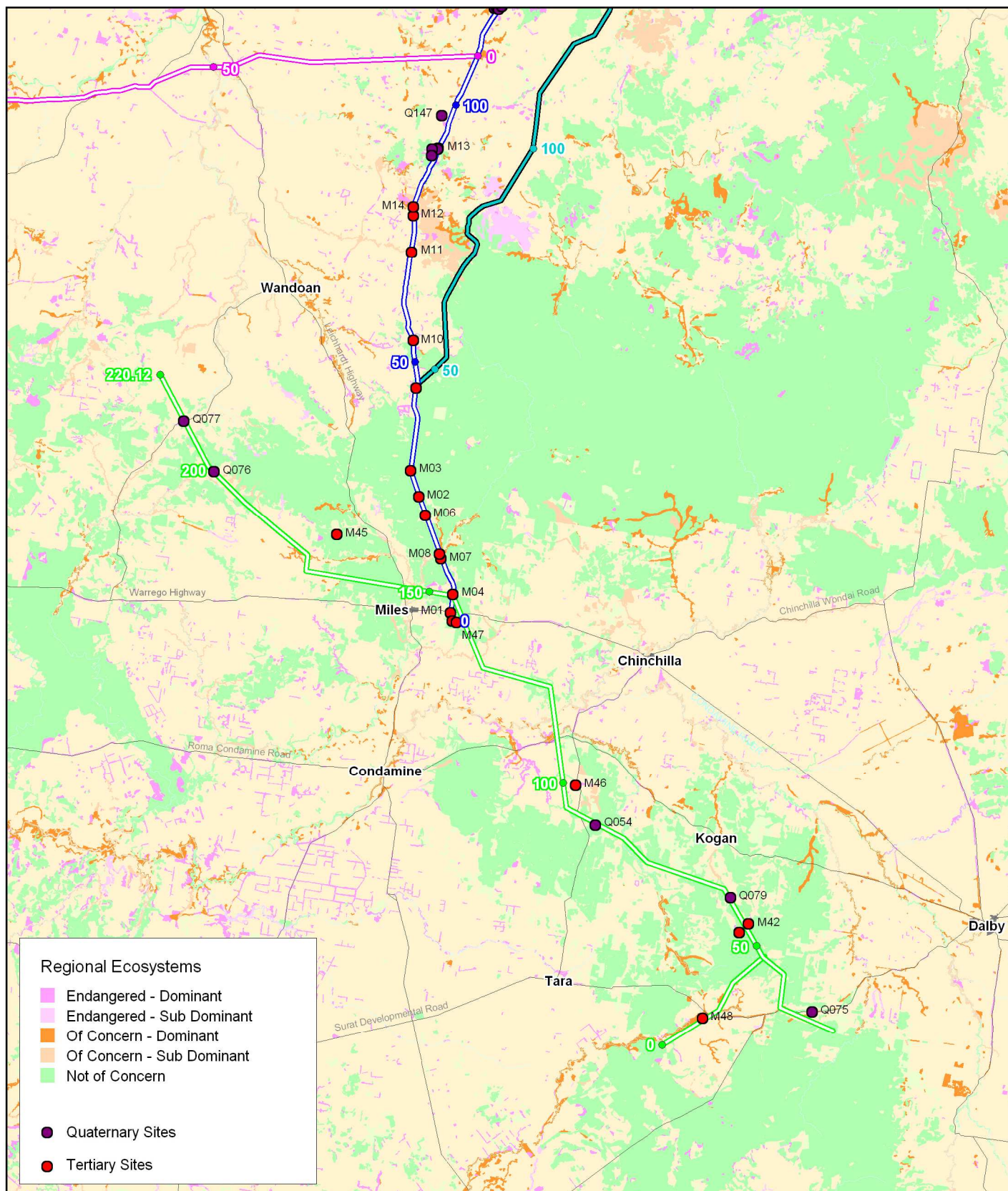
It is recognised that the information gained from these databases has caveats attached to it regarding the robustness or completeness of the information.

HERBRECS data is based almost exclusively on plant specimens actually recorded as present in the given locations. The absence of any specimen records for a particular species from an area does not imply that that species does not occur in that area.

Data from the DEWHA EPBC Act website is based on a combination of actual records, primarily from State Government databases, combined with modelled distributions of species according to their ecological characteristics. The mapping of a particular species in a search area does not guarantee that the species actually occurs in that area.

3.2.3 Flora Field Assessment

Rapid flora field surveys were conducted for the Option 1 Export Pipeline and UIC between the 29th of September and the 3rd of December 2008 by Unidel Botanists, Ann Moran and Martin Bennett (CVs provided in **Attachment 2 of Appendix 4.2**). Additional assessments of the Export Pipeline alignments were undertaken from the 1-3 April 2009 by Ann Moran. Where land access was available, representative portions of the pipeline corridors were traversed by vehicle and / or foot.. The locations of Tertiary sites are shown in **Figure 13.B.1-13.B.3**.



Legend:

- Export Pipeline & Kilometre Point
- Export Pipeline Option 2 & Kilometre Point
- Lateral Pipeline & Kilometre Point
- Upstream Infrastructure Corridor & Kilometre Point

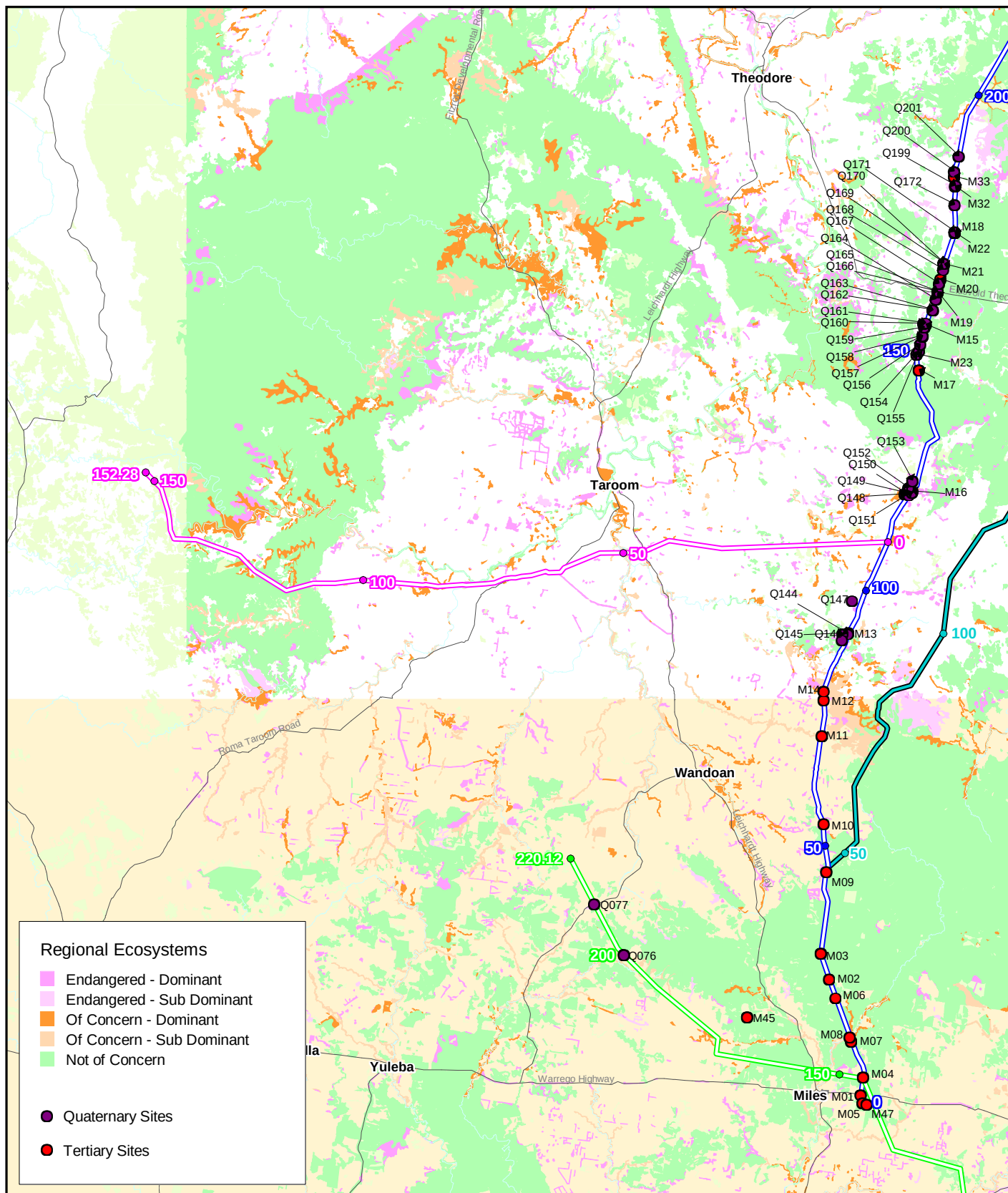
Source Note:

1:250,000 Topographic vector copyright Geoscience Australia
Regional Ecosystems v5.0 copyright QLD Herbarium
Quaternary and Tertiary Sites data captured and documented by Ann Moran

Projection UTM MGA Zone 56 Datum GDA 94
0 10 20 30 40
Kilometres



 QUEENSLAND CURTIS LNG A BG Group business	Project Queensland Curtis LNG Project		Title Flora Survey Sites and Mapped Regional Ecosystems
	Client QGC - A BG Group business		
 ERM Environmental Resources Management Australia Pty Ltd	Drawn: Mpels	Volume 13, Annex B Figure 13.B.1	Disclaimer: Maps and Figures contained in this Report may be based on Third Party Data, may not be to scale and are intended as Guides only. ERM does not warrant the accuracy of any such Maps and Figures.
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	Date: 15.06.09	Revision: A	



Export Pipeline & Kilometre Point

Export Pipeline Option 2 & Kilometre Point

Lateral Pipeline & Kilometre Point

Upstream Infrastructure Corridor & Kilometre Point

Legend:

Source Note:

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Quaternary and Tertiary Sites data captured and documented by Ann Moran

Projection UTM MGA Zone 56

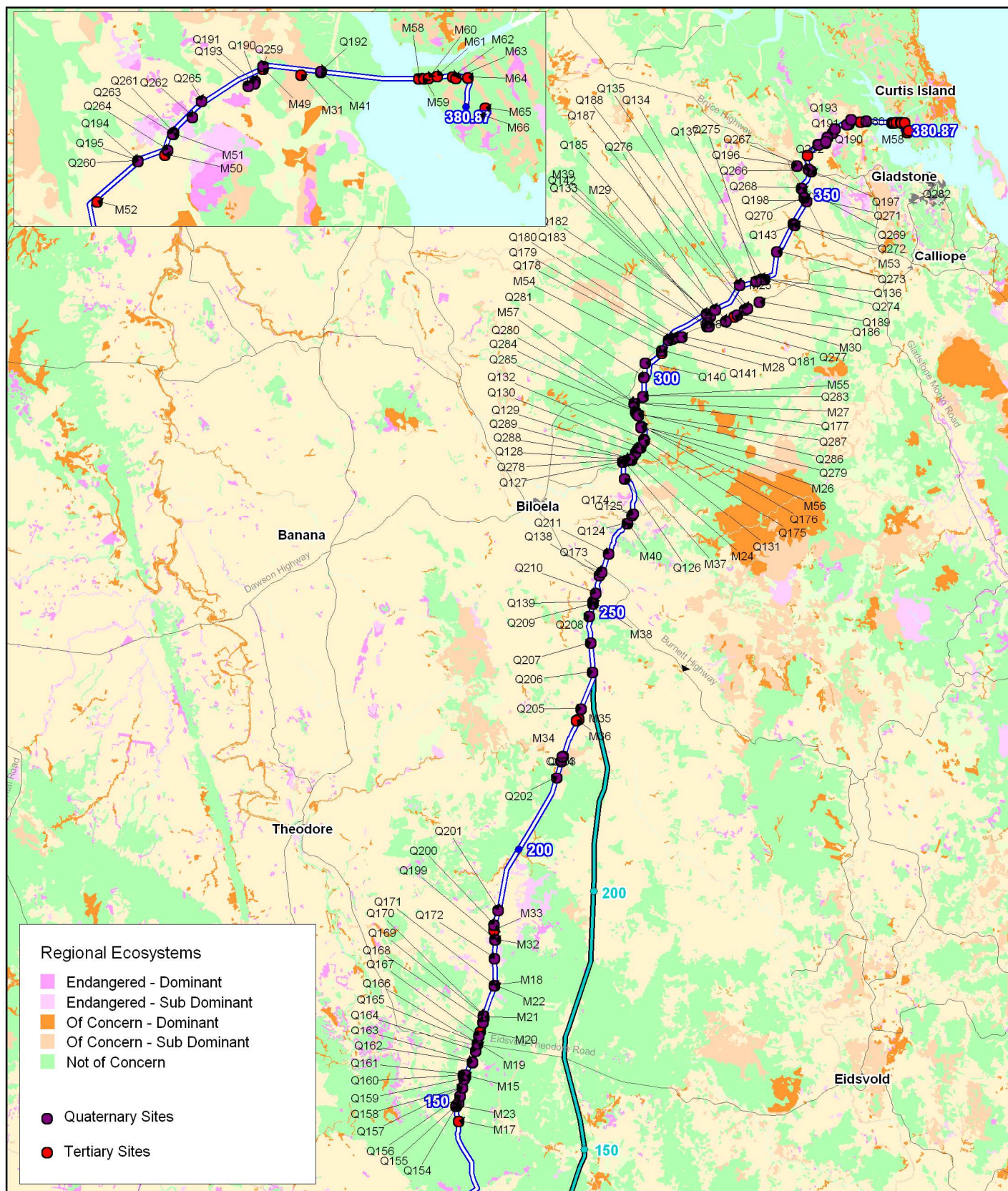
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QUEENSLAND CURTIS LNG A BG Group business	Project Queensland Curtis LNG Project		Title Flora Survey Sites and Mapped Regional Ecosystems Map 2 of 3
	Client QGC - A BG Group business		
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	Date 15.06.09	Revision A	



Legend:

- Export Pipeline & Kilometre Point
- Export Pipeline Option 2 & Kilometre Point
- Lateral Pipeline & Kilometre Point
- Upstream Infrastructure Corridor & Kilometre Point

Source Note:

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Quaternary and Tertiary Sites data captured and documented by Ann Moran

Projection UTM MGA Zone 56 Datum GDA 94
0 10 20 30 40
Kilometres



 A BG Group business	Project Queensland Curtis LNG Project		Title Flora Survey Sites and Mapped Regional Ecosystems	
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 Environmental Resources Management Australia Pty Ltd	Drawn	Mpela	Volume 13, Annex B Figure 13.B.3	Disclaimer: Maps and Figures contained in this Report may be based on Third Party Data, may not be to scale and are intended as Guides only. ERM does not warrant the accuracy of any such Maps and Figures.
	Approved	CD	File No: E05-P-MA-96198	
	Date	15.06.09	Revision	

Map 3 of 3

The survey focussed on a 100 m wide corridor, but also assessed surrounding areas where relevant (e.g. to identify options for avoiding ecological constraints on the proposed route)

The field surveys included:

- Investigation of the presence / absence or likely presence / absence of EPBC Act Listed flora species and communities identified in Commonwealth and State legislation
- Ground truthing of 184 sites along the Option 1 Export Pipeline and the Collection Header. Of these, 66 sites were detailed Tertiary level assessments and the remainder were assessed to Quaternary level. Quaternary assessments recorded dominant canopy species only while Tertiary assessments recorded an inventory of all woody flora species, their average height and their approximate abundance (including native and exotic flora species). Tertiary assessments also included targeted searches for potential EPBC Act Listed flora species and regionally significant species. As a result of alignment changes, time and access constraints it was not possible to locate a Tertiary site in each type of RE encountered along the pipeline corridors. These areas however, will be groundtruthed prior to alignment finalisation and the commencement of construction activities. Comprehensive flora species lists and detailed abundance data were also not collected nor considered necessary for the purposes of this assessment, and
- Observations on the wider environment of the pipeline alignments so that the potential impacts associated with proposed clearing could be discussed in a local, regional and State context.

The flora site surveys were in accordance with the Queensland Herbarium vegetation survey methods described in Neldner *et.al.* (2005). The following data was collected for the Tertiary sites:

- Confirmation of mapped RE
- General description of vegetation
- Structural characteristics of vegetation (based on life forms, approximate height and relative dominance)
- Groundcover characteristics
- Vegetation condition (integrity) as either pristine, excellent, very good, good, average, degraded or completely degraded
- Occurrence of weed species
- Dominant species in each structural component of the vegetation
- Patch size and shape
- Landscape characteristics
- Soil characteristics, and
- Notes on particular sensitivities to the proposed impacts.

GPS coordinates were taken using hand held GPS (accuracy +/- 10m) to identify survey site locations and to assist in validating the existing Queensland Herbarium RE mapping. The general distributions of declared and other significant pest plants within the corridors were also noted.

3.3 Fauna Assessment

3.3.1 *Determination of Significance Level*

As was the case for the flora species, pursuant to s 179 of the EPBC Act, threatened fauna species can be classified into one of the following categories:

- Extinct
- Extinct in the wild*
- Critically endangered*
- Endangered*
- Vulnerable*, and
- Conservation dependent.

Note that species classified as Extinct and Conservation dependent are not considered to be Matters of National Environmental Significance (MNES).

EPBC Act listed or non-listed Migratory and / or Marine species listed under international conventions or agreements ratified by the Commonwealth of Australia are given additional protection under the EPBC Act. These are:

- Japan - Australia Migratory Bird Agreement (JAMBA)
- China - Australia Migratory Bird Agreement (CAMBA)
- Republic of Korea – Australia Migratory Bird Agreement (ROKAMBA), and
- Convention on the Conservation of the Migratory Species of Wild Animals (Bonn Convention).

3.3.2 *Fauna Desktop Assessment*

The desktop study involved a review of published material and searches of relevant databases and archives. This assessment was used to document known records for the study area, identify the potential presence of significant fauna species and assist in targeting areas for field assessment. The desktop components undertaken included:

- Collection and review of existing EPA WildNet data, Birds Australia data, Queensland Museum data and EPBC Protected Matters Search. The data search areas were rectangular polygons and covered an area at least 5 km either side of the pipeline route. The search areas were:
 - Export Pipeline: 23.5333° S to 23.8622° S and 151.35° E to 150.0333° E
 - Lateral: 25.5333° S to 25.9° S and 150.3666° E to 148.85° E
 - Collection Header: 25.8166° S to 27.4333° S and 149.45° E to 151.1666° E
- Review of the Brigalow Belt (North and South) Biodiversity Planning Assessment (EPA 2008a) to identify areas that are recognised as State, Regional or Local Biodiversity Significant or flagged as important for their integrated biodiversity values that are within close proximity to the project area
- Review of Queensland Herbarium RE mapping for the corridor to establish those vegetation communities mapped by the EPA at a scale of 1:100 000 as

well as satellite imagery to gain an appreciation of potential fauna habitats and of the project's proximity to sensitive areas, and

- Search of the Directory of Important Wetlands database.

The following texts were also reviewed: Barker et al. (1995), Cogger (2000), Duncan et al. (1999), Ehmann (1992), Garnett and Crowley (2002), Greer (2005), Menkhorst and Knight (2004), Morcombe (2003), Robinson (1998), Strahan (1995), Wilson (2005), Wilson and Swan (2003) and Wilson and Knowles (1988).

3.3.3 Fauna Field Assessment

Rapid field assessment of the UIC was conducted by Bruce Thomson from 27 October to 2 November, the 12-18 November and 3-9 December. The Option 1 Export Pipeline was surveyed by Rebecca Goodwin-Pettit and Rebecca Gibson from the 24 November to the 3 December. KP 250-300 and 350-370 of the Option 2 Export Pipeline was surveyed by Bruce Thomson from 1-3 April 2009. Detailed field assessments of the Curtis Island portion and the mainland shoreline were undertaken from 6 to 16 by Bruce Thomson (reptiles and amphibians), David Rohweder and David Charley (birds) and Will Introna, Melissa Starling, Fiona Donohue and Tim Simpson (mammals) (CVs in **Attachment 2 of Appendix 4.2**).

The locations of the sites visited during the field surveys are shown in **Figure 13.B.4-13.B.6**. Accessible portions of the UIC and Option 1 Export Pipeline were traversed by vehicle and / or foot during the assessment. The survey focussed on a 100 m wide corridor, but also assessed surrounding areas where relevant (e.g. to identify options for avoiding ecological constraints on the proposed route).

With the exception of the intensive survey effort on Curtis Island and the mainland shoreline, no fauna trapping methods such as Elliott trapping, pit fall trapping, hair tube sampling or harp trapping were employed during this assessment. Rather, field surveys involved walk-through assessments of representative habitats along the alignments. The selection of these sites was based on the following:

- Occurrence of forested patches and other fauna habitats (such as riparian corridors and wetlands) determined from satellite imagery, combined with review of the Brigalow Belt (South) Biodiversity Planning Assessment (EPA 2008a), and
- Preferred habitat for EPBC Act Listed and regionally significant fauna identified from the database searches, determined from Queensland Herbarium RE mapping combined with satellite imagery

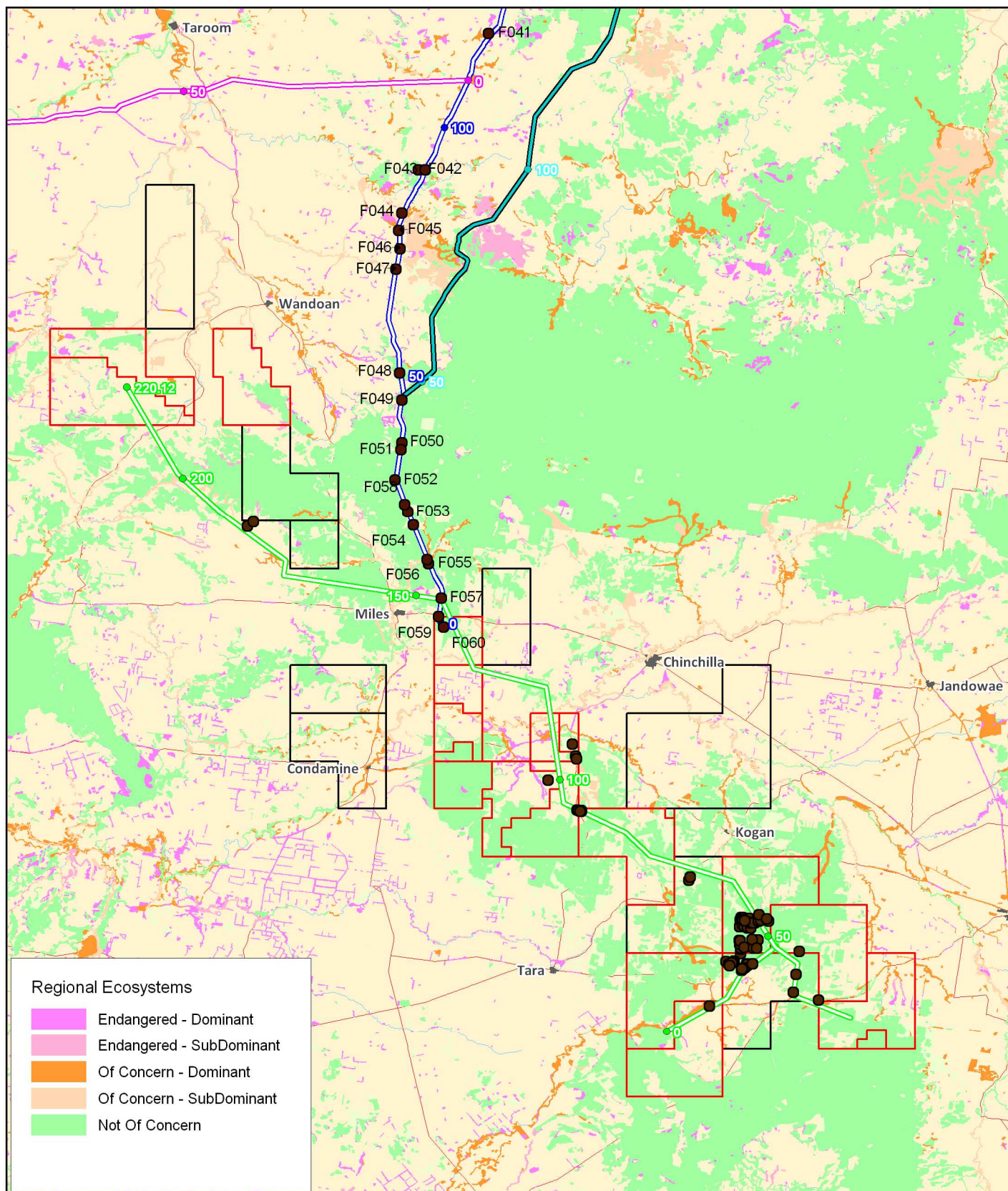
A total of 66 sites were visited and assessed along the UIC and Option 1 Export Pipeline in conjunction with the flora assessment. Tertiary assessments were carried out to evaluate:

- Habitat types / features
- Habitat integrity
- Habitat connectivity, and
- Significance of habitats.

Fauna trapping methods were employed on Curtis Island and the mainland shoreline. Elliott trapping, pit fall trapping, hair tube sampling or harp trapping were all employed.

The methods used in the fauna work on Curtis Island and adjoining mainland areas are those described in ERM (2009).

Assessments of the above attributes were supplemented by opportunistic observations of fauna at each site.



Project Queensland Curtis LNG Project

Client QGC - A BG Group business

Drawn Mpola **Volume** 13, Annex B Figure 13.B.4

Approved CDP **File No:** E05-P-MA-96143

Date 15.06.09 **Revision** A

Title Fauna Survey Sites and Mapped Regional Ecosystem

Map 1 of 3

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4 EXISTING ENVIRONMENT

The pipeline corridors all occur within the Brigalow Belt Bioregion, with the exception of the north eastern-most 4 km of the Export Pipeline (on Curtis Island), which is within the South East Queensland Bioregion.

4.1 Flora Environment

This description of vegetation communities within the pipeline corridors is based primarily on the existing Queensland Herbarium RE mapping. A rapid flora assessment has been undertaken where access was available based on the Option 1 Export Pipeline.

The Tertiary assessment data sheets are included in **Attachments 3** of **Appendix 4.2**. A complete flora list is provided in **Attachment 4** of **Appendix 4.2**.

It is recommended that detailed field investigations be undertaken of the preferred alignments prior to the commencement of construction activities.

4.1.1 Broad Vegetation Types

The pipeline corridors fall within cleared grazing and cropping lands, roadside and travelling stock reserves, Council lands, State Forests and Resource Reserves.

The proposed pipeline corridors traverse predominantly cleared areas. Based on the Queensland Herbarium RE mapping the approximate area of remnant vegetation within each pipeline corridor is as follows:

- 96 km of the 382 km Option 1 Export Pipeline
- 112 km of the 383 km Option 2 Export Pipeline
- 24 km of the 152 km Lateral, and
- 78 km of the 191 km Collection Lateral.

The area of each broad vegetation type that is identified by the Queensland Herbarium RE mapping as being transected by the proposed pipeline corridors is set out in **Table 2**.

Table 2 Broad Vegetation Communities Transected by the Proposed Pipeline Alignments

Vegetation Type	Area within Option 1 Export Pipeline (ha)	Area within Option 2 Export Pipeline (ha)	Area within Lateral (ha)	Area within UIC (ha)	Total (excluding Option 1) (ha)
Eucalypt woodlands	409.54	494.06	116.44	722.97	1333
Acacia woodlands	14.68	17.07	0.53	3.28	21
Brigalow / Belah woodland	13.77	6.60	0.89	6.92	14
Riparian Eucalypt woodland	13.25	11.03	2.12	33.48	47
Shrubland Community	7.78	12.69	nil	15.46	28
Semi-evergreen Vine Thicket	0.93	0.23	2.24	nil	2.5
Native Bluegrass Grasslands	2.21	nil	nil	nil	nil
Freshwater Wetlands	1.09	1.09	nil	nil	1
Estuarine Wetlands	14.88	14.88	nil	nil	15
Total Remnant Vegetation	478	558	122	782	1462

4.1.2 EPBC Act Listed Vegetation Communities

Based on Queensland Herbarium RE mapping, the pipeline corridors transect three EPBC Act Listed Ecological Communities as listed under the EPBC Act. These are represented on the Queensland Herbarium RE mapping by nine REs. These include:

- Brigalow woodland / open forest communities - REs 11.3.1, 11.4.3, 11.9.1, 11.9.5, 11.9.6, 11.12.21
- Native Bluegrass grassland community – RE 11.9.12, and
- Semi-evergreen Vine Thicket (SEVT) communities– RE 11.9.4 and 11.11.18.

Table 3 sets out each EPBC Act Listed Communities mapped as being present along the pipeline corridors and the corresponding Queensland RE code.

An additional EPBC Act Listed Ecological Community which may also be transected by the pipeline corridors is the Endangered Weeping Myall Open Woodland Community. This community is not mapped by the Queensland Herbarium RE mapping nor was it

detected by the initial field studies. However, it is described as occurring within the Brigalow South Bioregion generally in small patches of alluvial soils within REs 11.3.2 and 11.3.28. As such, it may potentially occur in alluvial areas transected by the pipeline corridors, in particular, the UIC which transects the RE 11.3.2.

Table 3 The EPBC Act Listed Ecological Communities Mapped as Present along the Pipeline Corridors and Corresponding QLD RE Codes

Communities	Option 1 Export Pipeline	Option 2 Export Pipeline	Lateral	UIC
Brigalow	11.4.3 11.9.1 11.9.5 11.9.6 11.12.21	11.4.3 11.9.5 11.12.21	11.9.5	11.3.1 11.4.3 11.9.5
Native Bluegrass Grassland Communities	11.9.12			
Semi-Evergreen Vine Thicket	11.9.4 11.11.18	11.9.4 11.11.18	11.9.4	

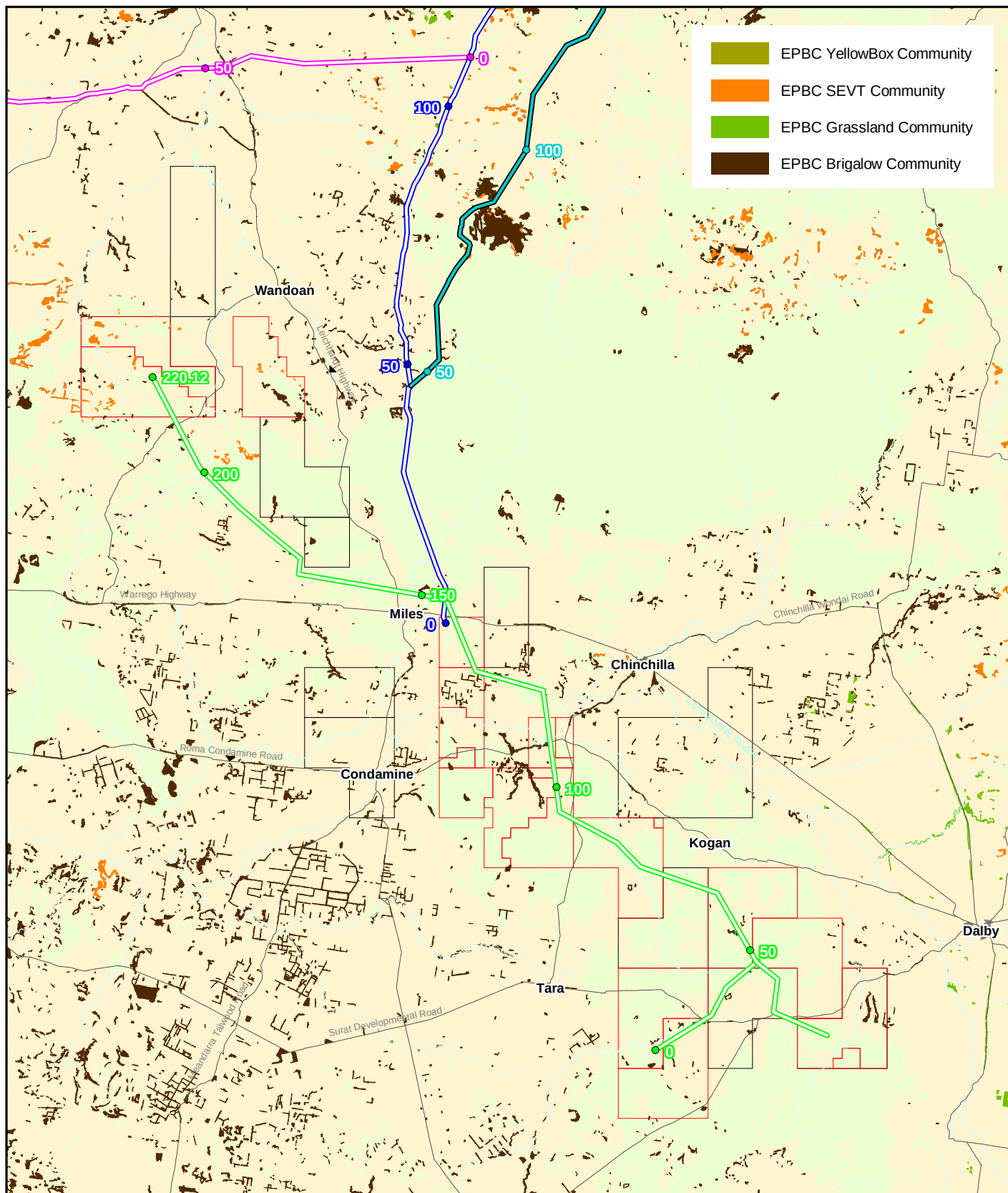
Existing Queensland Herbarium RE mapping indicates that the Endangered Brigalow communities almost always occur in small and narrow fragments which have been left along fencelines, creeks and roadsides **Figure 13.B.7-13.B.9**. One exception is the larger patches of the mixed community RE 11.9.5/11.9.6 that is crossed by the Option 1 Export Pipeline corridor at KPs 54.1-55 and 65.1-65.5.

Field surveys of a RE 11.9.5 remnant recorded in the vicinity of the pipeline at approximately KP 50.6 of Option 1 Export Pipeline (Site M10) found this area to be in an average condition due to grazing and weed invasion. The declared Class 2 weed *Opuntia tomentosa* was found present within this site.

Ground truthing of a mapped RE 11.4.3 remnant in the vicinity of Option 1 and Option 2 Export Pipeline (Site M40) found the area to be a degraded non-remnant. This remnant was considered to be degraded due to high weed densities and recent fire damage.

The total area of Endangered Brigalow Community that is located within the pipeline corridors is approximately 14 ha. However, if the Export Pipeline Option 1 corridor was utilised, this area would increase to approximately 22 ha.

RE mapping indicates the presence of one small fragment of Native Bluegrass Grassland community (RE 11.9.12) on the Option 1 Export Pipeline. The RE 11.9.12 occurs in a thin remnant at KP 95.9-96.2. Approximately 2 ha of this RE is transected by the Option 1 Export Pipeline corridor. If Option 1 is selected, detailed field investigations should confirm the precise location and avoidability of this remnant. No Native Bluegrass Grassland communities are mapped as being present along the Option 2 Export Pipeline corridor.



Legend:

- Export Pipeline & Kilometre Point
- Export Pipeline Option 2 & Kilometre Point
- Lateral Pipeline & Kilometre Point
- Upstream Infrastructure Corridor & Kilometre Point

- Gas Fields - PL & PLA
- Gas Fields - ATP

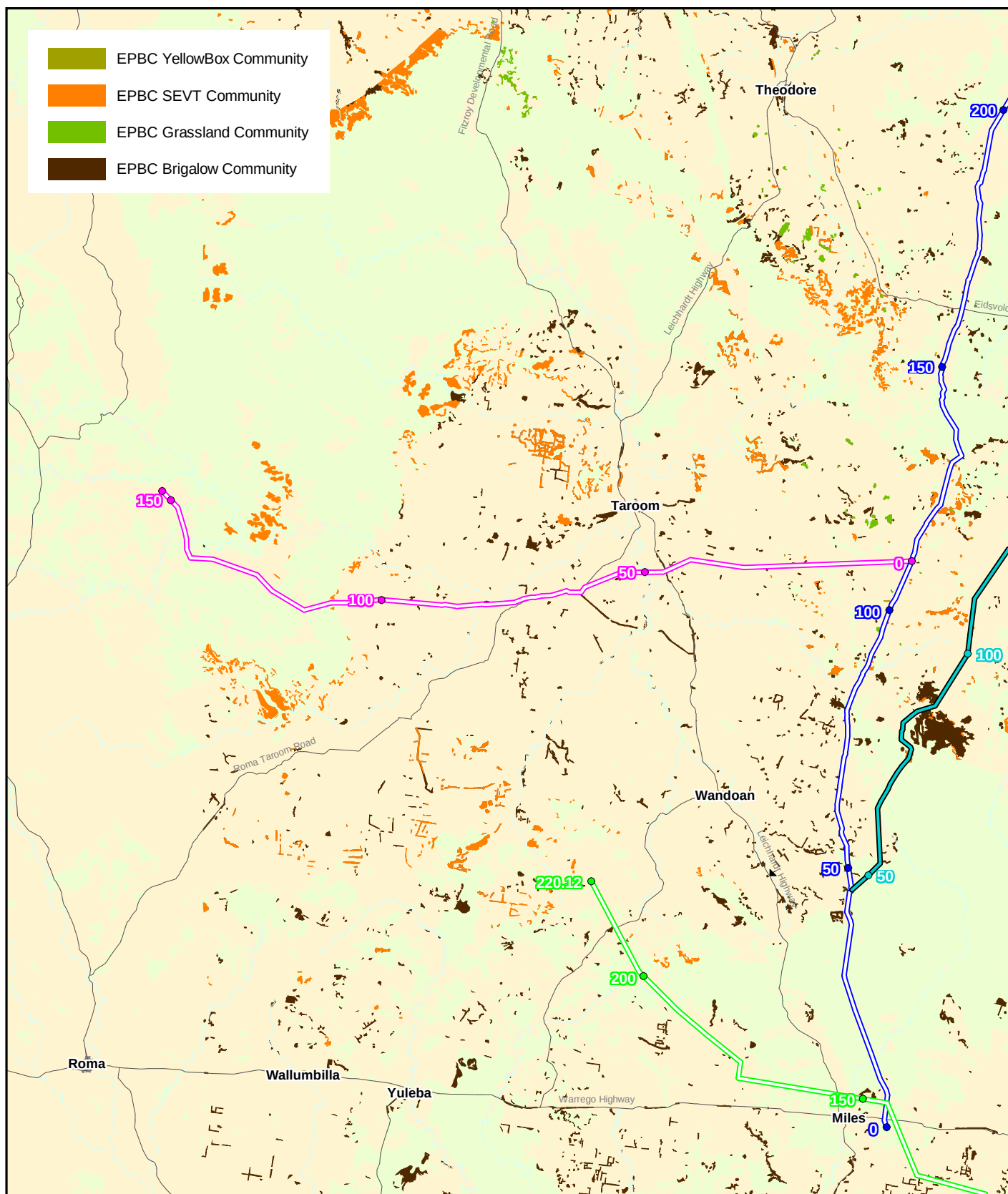
Source Note:

1:250,000 Topographic vector copyright Geoscience Australia
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Projection UTM MGA Zone 56 Datum GDA 94
0 10 20 30 40
Kilometres



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		File No: E05-P-MA-96199	
		Revision A	



Legend:

- Export Pipeline & Kilometre Point
- Export Pipeline Option 2 & Kilometre Point
- Lateral Pipeline & Kilometre Point
- Upstream Infrastructure Corridor & Kilometre Point

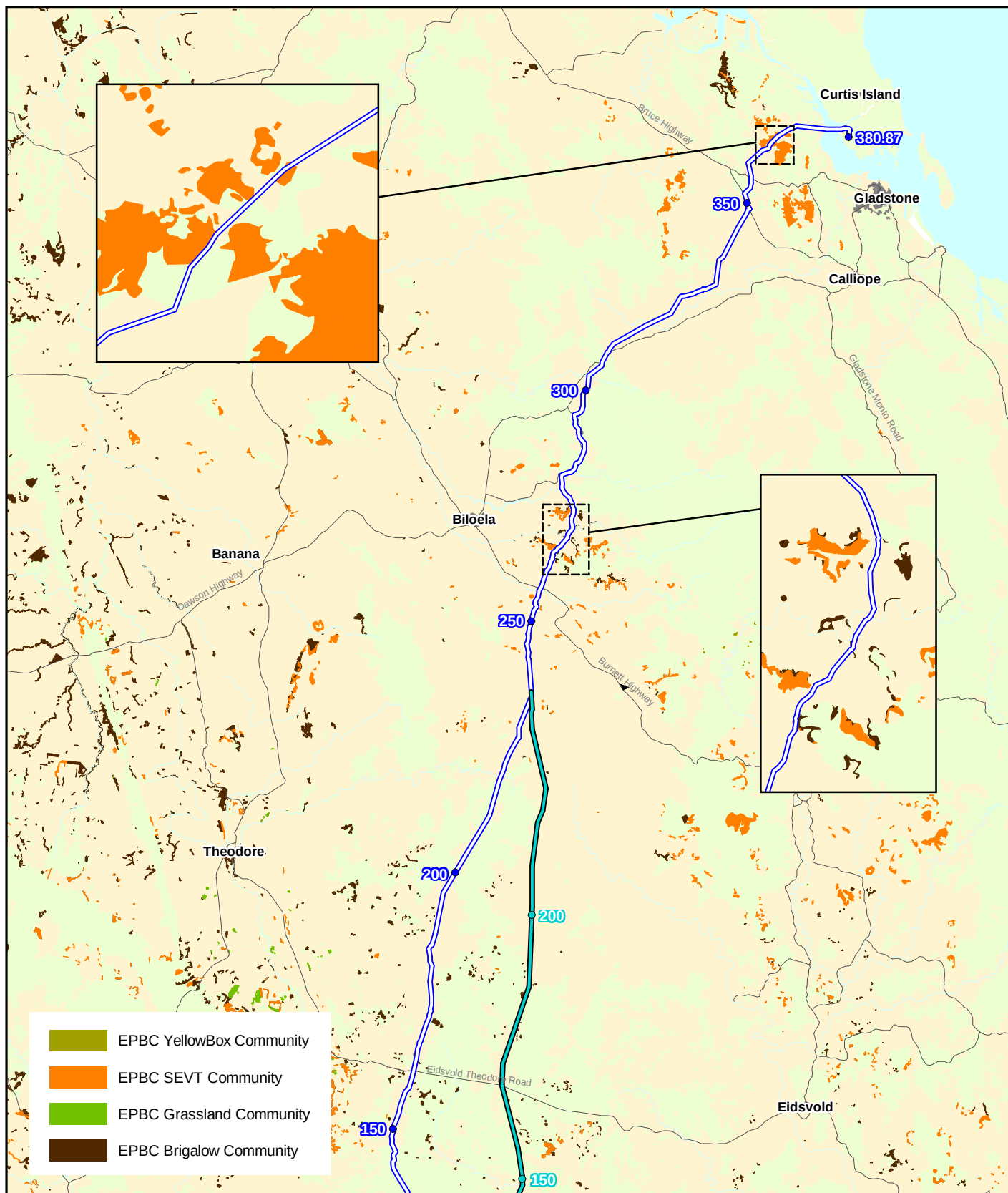
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0 10 20 30 40
Kilometres



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		Volume 13, Annex B Figure 13.B.8	
		File No: E05-P-MA-96203	
		Revision A	



Legend:

- Export Pipeline & Kilometre Point
- Export Pipeline Option 2 & Kilometre Point
- Lateral Pipeline & Kilometre Point
- Upstream Infrastructure Corridor & Kilometre Point

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Projection UTM MGA Zone 56 Datum GDA 94
0 10 20 30 40
Kilometres



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	Client QGC - A BG Group business		
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		Volume 13, Annex B Figure 13.B.9	
		File No: E05-P-MA-96204	
		Revision A	

Desktop studies also indicate the presence of the two SEVT communities REs 11.9.4 and 11.11.18 along the pipeline corridors. A small fragment (<0.1 ha) of SEVT community RE 11.9.4 is mapped as occurring along the Option 2 Export Pipeline at KP 83 and a larger area (0.8 ha) along the Option 1 Export Pipeline at KP 129.8-130.1. Mapping also indicates the occurrence of one community of RE 11.9.4 along the Lateral at KPs 145.8-146 and 147.4-147.6. The RE 11.11 18 makes up approximately 5% of the mixed community RE 11.11.15/11.11.18 mapped at KP 364-365 along Option 1 and Option 2 Export Pipeline. Groundtruthing surveys found this area not to be a mixed community, but rather a community solely made up of RE 11.11.18. This area was found to be in a degraded condition.

It is estimated that the total area of SEVT communities that occur within the pipeline corridors (based on using the Option 2 Export Pipeline) is approximately 2 ha. The desktop mapping indicates that use of the Option 1 Export Pipeline would require clearing of an additional 0.7 ha.

A complete list of the mapped position of the all EPBC listed communities transected by the pipeline corridors is set out in **Table 4**. These communities are shown in **Figure 13.B.7-13.B.9**.

Table 4 Location of EPBC Act Listed REs along the Proposed Pipeline Corridors

EPBC Act Listed Community	RE	Approximate KP				Survey Sites
		Option 1 Export Pipeline	Option 2 Export Pipeline	Lateral	UIC	
Brigalow	11.3.1(dominant RE in mosaic)				119.3-119.4	
	11.4.3(dominant RE in mosaic)	4.5-57.9	4.5-57.9		91.9-92.1 118.4-118.5	M4, M40
	11.9.1(dominant RE in mosaic)	85.6				
	11.9.5 (dominant RE in mosaic)	40.1-40.5 49.2 54.2-55 65.1-65.5 262.7-262.9 263.5	40.1-40.5 262.7-262.9 263.5	43.8-44	112.6 167.6-167.9	M10
	11.9.5 (sub-dominant RE in mosaic)	80.1-81.3 81.6-82.2 129.8-130.1	73.9		140.1-140.2	
	11.9.6 (sub-dominant RE in mosaic)	49.2 54.2-55 65.1-65.5				
	11.12.21 (dominant RE in mosaic)	177.4-177.6				
Grassland	11.9.12 (dominant RE in mosaic)	95.9-96.2				
SEVT	11.9.4 (dominant RE in mosaic)	129.8-130.1	73.9	145.8-146 147.4-147.6		
	11.11.18 (sub-dominant RE in mosaic)	364-365	364-365			M51

4.1.3 EPBC Act Listed Flora Species

Review of the Queensland Herbarium HERBRECS, WildNet and the EPBC Act Protected Matters databases for the study area identified 119 EVR plant species that have ranges that occur within and/ or in the vicinity of the pipeline corridors (**Attachment 7 of Appendix 4.2**). These included 48 species listed under the provisions of the EPBC Act including 9 Endangered, and 39 Vulnerable species.

Based on available ecological information, 32 of these EPBC Act Listed flora species (26 Vulnerable and 6 Endangered) have potential habitat within the pipeline alignments (**Table 5**). These species and their preferred habitats were targeted during initial field survey work and will be targeted during the planned detailed alignment surveys that will be undertaken before alignment finalisation and the commencement of construction activities.

The field surveys to date have observed two EVR species within or in the close proximity of the Export Pipeline alignments. These include:

- *Cadellia pentastylis* (Ooline) at approximate KP 227 (Site M36) along the Option 1 Export Pipeline, and
- A small population of *Cycas megacarpa* between KPs 296.5-298.5 (Sites M56 and M 57) and two additional plants at approximate KPs 301 and 305 along the Option 1 and Option 2 Export Pipeline corridors.

The initial field surveys did not detect the presence of any EPBC Act Listed species within the proposed 100 m UIC corridor, however, four EPBC Act Listed species were recorded within the vicinity. These are:

- *Acacia curranii*
- *Acacia wardellii*
- *Calytrix gurulmundensis* and,
- *Philothea sporadica*.

The known locations of EPBC Act Listed flora species, according to Herbarium records and/or field surveys are presented in **Figure 13.B.10-13.B.12**. Note that as it was not as yet possible to undertake detailed flora surveys of the entire length of the pipeline corridors, it is anticipated that additional EPBC Act Listed flora species will be found in a number of locations additional to those shown in **Figure 13.B.10-13.B.12** when the detailed alignment inspection is conducted.

Table 7. EPBC Act Listed Flora Species Recorded and With Preferred Habitat Within the Pipeline Corridors

Common Name	Scientific Name	EPBC	Preferred Habitat	Source^	Preferred habitat present				Comments
					Option 1 Export Pipeline	Option 2 Export Pipeline	Lateral	UIC	
Chinchilla Wattle	<i>Acacia chinchillensis</i>	V	Occurs in south-eastern Qld N of Chinchilla and near Tara. Grows in ironbark <i>Eucalyptus</i> , <i>Callitris columellaris</i> , <i>Casuarina</i> woodland, in sandy or gravelly soils (ABRS, 2001).	1,2,3,4	Yes	Yes	No	Yes	Suitable habitat in RE 11.5.1
Curly-bark Wattle	<i>Acacia curranii</i>	V	Only known in Gurulmundi wildflower area north of Miles.	1,2,3,4	Yes	Yes	No	Yes	Field surveys did identify potential habitat in the vicinity of the UIC, in particular areas of landzone 7
Hando's Wattle	<i>Acacia handonis</i>	V	Understorey plant in <i>Eucalyptus</i> forests on sandstone ridges. Restricted to Barakula State Forest.	1,2,3	No	Yes	No	No	Rapid assessment in Barukula SF indicated no / low numbers likely but detailed survey required to confirm
Tara Wattle	<i>Acacia lauta</i>	V	Found from Tara to Inglewood 1) Property "Marron Glen", 2) 15km nth of Tara and 3) 16km east of Tara.	1,2,3	No	No	No	Yes	
Wardell's Wattle	<i>Acacia wardellii</i>	V	Ridge crests with loamy or gravelly soil. Coloniser of disturbed areas – Thomby Range and a few ridges east of the Condamine.	1,2,3,4	No	No	No	Yes	Qld Herbarium records indicate potential habitat may occur along the UIC between KP 70-90. Verified Qld Herbarium record and found one other very large population 1 km long along an existing pipeline easement. Identified two trees with large

Common Name	Scientific Name	E P B C	Preferred Habitat	Source^	Preferred habitat present				Comments
					Option 1 Export Pipeline	Option 2 Export Pipeline	Lateral	U I C	
									numbers of seedlings spreading along recent disturbances. Appears to like disturbance and/or fire.
None known	<i>Atalaya collina</i>	E	Grows on hillsides, in remnant dry scrubs, together with <i>A. salicifolia</i> , but is not as common as that species (Reynolds, 1991)	3	Yes	Yes	No	No	Potential near Mt Larcom
Ooline	<i>Cadellia pentastylis</i>	V	Clay plains, sandstone and residual ridges in association with vine thickets, brigalow, belah and red bauhinia.	1,2,3,4	Yes	Yes	Yes	Yes	Initial field survey identified trees around KP 185 along the UIC and at KP 230 On the Option 1 Export Pipeline.
Yellow Fringed Myrtle	<i>Calytrix gurulmundensis</i>	V	Found on lateritic sandstone ridges. Localised and patchy distribution.	1,2,3,4	Yes	Yes	No	No	Known records within Gurulmundi and Barakula SF. Field surveys recorded small isolated patches spreading throughout the Gurulmundi SF. Plants were dense in disturbed sunlit areas.
Silver Commersonia	<i>Commersonia argentea</i> syn <i>Commersonia</i> sp.(<i>Cadarga</i> G.P. <i>Guymer</i> 1642)	V	Stony ridges, north of Chinchilla	1	Yes	Yes	No	No	Potential habitat possible north of Chinchilla
Cossinia	<i>Cossinia</i>	E	Small tree up to 7 m found	1,2,3	Yes	Yes	No	No	

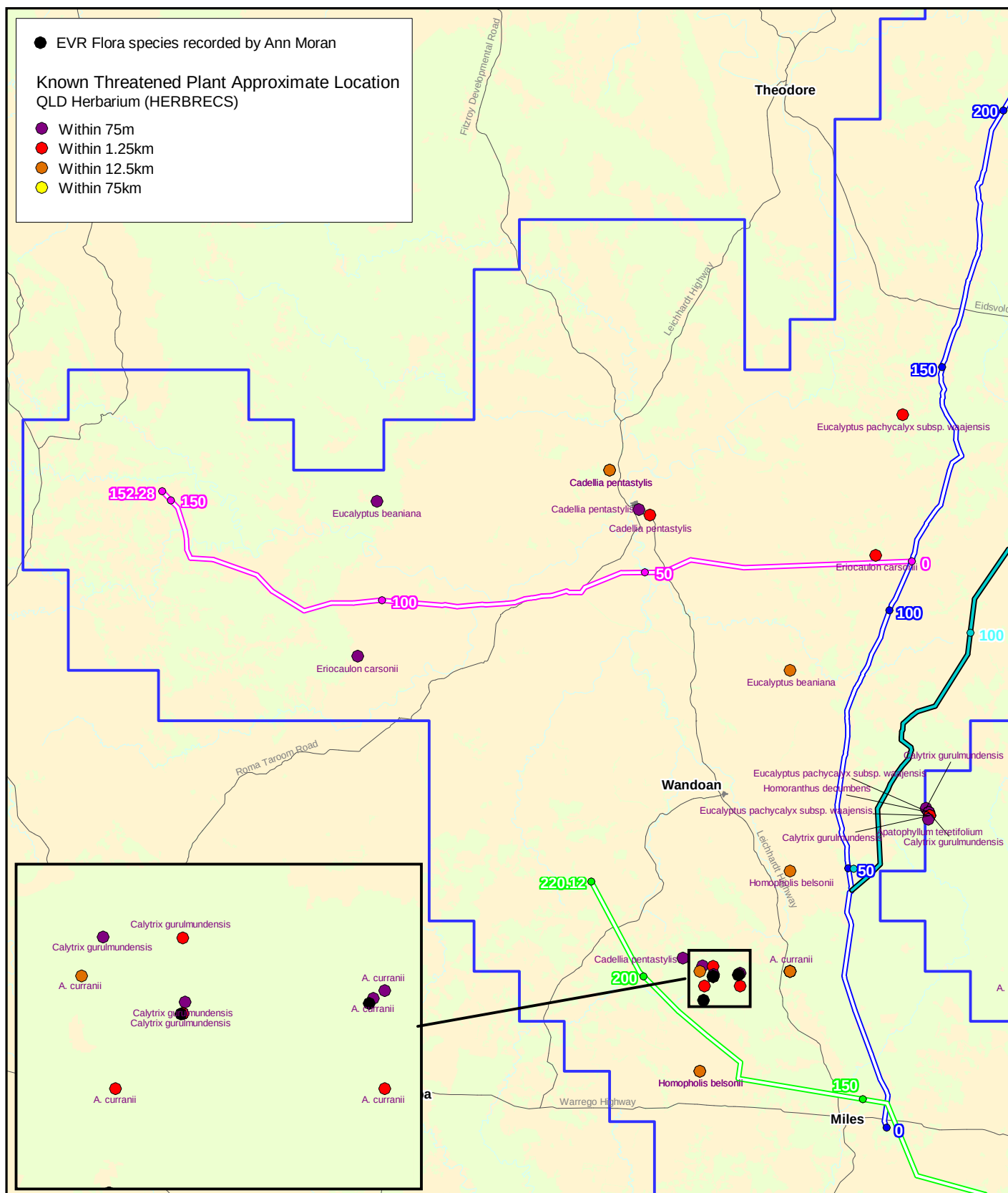
Common Name	Scientific Name	E P B C	Preferred Habitat	Source^	Preferred habitat present				Comments
					Option 1 Export Pipeline	Option 2 Export Pipeline	Lateral	U I C	
	<i>australiana</i>		in depauperate rainforest relicts, usually on volcanic soil (Stanley and Ross, 1986). Recorded at Kingaroy, Gympie, Munholme Ck, Burnett River (Qld Herbarium)						
Wedge-leaf Tuckeroo	<i>Cupaniopsis shirleyana</i>	V	Depauperate rainforests (Stanley and Ross, 1983).	1,2,3	Yes	Yes	No	No	Known in Mt Larcom area
Large-fruited Zamia	<i>Cycas megacarpa</i>	E	Stony clay loams on hill tops and steep slopes. Commonly in spotted gum and ironbark open forest and woodland with a grassy understorey (DNR, 1999). Known from KP 280-380.	1,2,3	Yes	Yes	Yes	No	Herbarium records close to Options 1 Option 2 Export Pipeline. Tentative sighting by land agent along Option 1 and Option 2 Export Pipeline at approximate KP 282. These records to be confirmed and preferred alignments to be surveyed in April/May 2009.
Small-leaved Denhamia	<i>Denhamia parvifolia</i>	V	Found in semi-evergreen vine thickets. Brown loam or clay loam soils.	1,2,3	No	No	Yes	Yes	
King Blue Grass	<i>Dichanthium queenslandicum</i>	V	Endemic to Qld black soil plains. Occurs in RE's 11.8.11, 11.3.21	1,2,3	Yes	Yes	No	No	
Tricolour Diuris	<i>Diuris tricolor (sheaffiana)</i>	V	Sandy soils, often in Callitris woodlands. Primarily a NSW species with scattered	1	Yes	Yes	No	Yes	

Common Name	Scientific Name	E P B C	Preferred Habitat	Source^	Preferred habitat present				Comments
					Option 1 Export Pipeline	Option 2 Export Pipeline	Lateral	U I C	
			records in Qld.						
Salt Pipewort, Button Grass	<i>Eriocaulon carsonii subsp. orientale</i>	E	Known in wet poorly drained soils. Mound Springs areas near Injune.	1,2,3	Yes	Yes	Yes	No	
Tony's ironbark	<i>Eucalyptus beaniana</i>	V	Rocky Areas such as Isla Gorge Robinson Gorge and Mundubbera	1,2,3	Yes	Yes	Yes	No	
Pumpkin Gum	<i>Eucalyptus pachycalyx</i>	E	On skeletal sandy soils (Botanic Gardens Trust, 2009)	1,2,3	Yes	Yes	Yes	Yes	
Shiny- leaved Ironbark	<i>Eucalyptus virens</i>	V	Sandstone ridges. Four populations – 1) Coolmunda Conservation Park 2) Tara, 3) NE of Eidsvold and 4) Maranoa River near Mt Moffatt.	1,2,3	No	No	No	Yes	
None known	<i>Homopholis belsonii</i>	V	Known from near Gurulmundi, 30km north of Miles in the Darling Downs district (Stanley and Ross, 1989).	1,2,3	Yes	Yes	No	Yes	
None known	<i>Homoranthus decumbens</i>	V	Found in two separate locations 1) Blackdown Tablelands and 2) State Forest 302, north of Chinchilla.	1,2,3	Yes	Yes	Yes	Yes	
None	<i>Leucopogon</i>	V	Mainly on rocky slopes, cliffs	1	Yes	Yes	Yes	No	

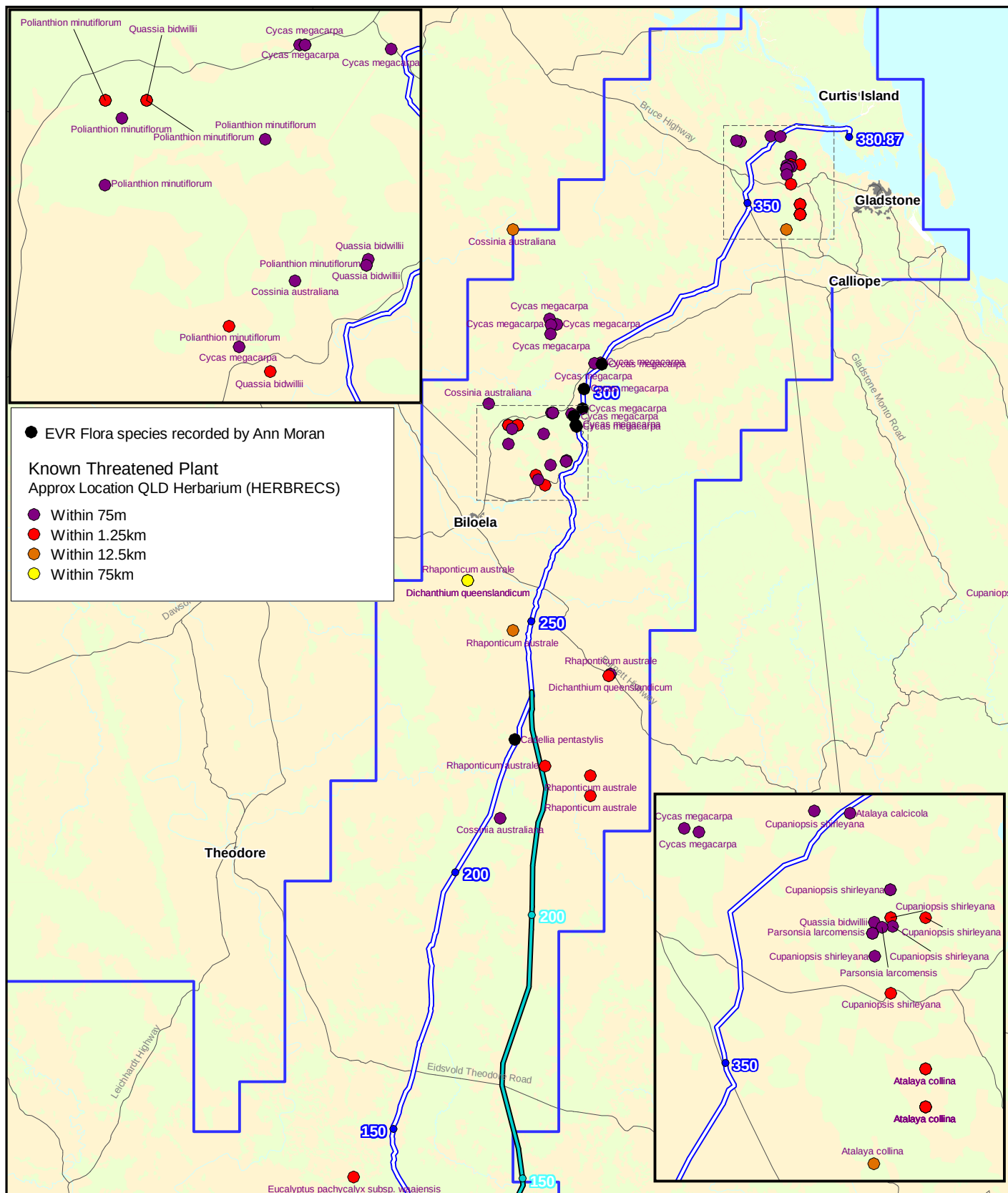
Common Name	Scientific Name	E P B C	Preferred Habitat	Source^	Preferred habitat present				Comments
					Option 1 Export Pipeline	Option 2 Export Pipeline	Lateral	U I C	
known	<i>cuspidatus</i>		and rocky outcrops. Commonly in woodland or open woodland and sometimes in heath or shrubland communities (M. Edginton, pers. comm.).						
None known	<i>Macrozamia crassifolia</i>	V	Restricted to the Eidsvold – Mundubbera district in Queensland. Found on sandy soils over granite (DEW 2007).	2,3	Yes	Yes	No	No	
None known	<i>Macrozamia fearnsidei</i>	V	Grows in open forest on sandy soils of sandstone origin either on rocky slopes or in gullies near ephemeral streams at approx 300-400m altitude. Restricted to central Qld (DNR 1999)	2,3	No	No	Yes	No	
None known	<i>Parsonsia larcomensis</i>	V	Recorded from 350-750 m elevation. It occurs in open heathland and shrubland at or near the summits of mountain peaks growing in shallow, loamy soils. Restricted to central east and south east Queensland and is confined to the Mt Perry area near Rockhampton (DRN 1999)	1,2,3	Yes	Yes	No	No	Potential near Mt Larcom

Common Name	Scientific Name	E P B C	Preferred Habitat	Source^	Preferred habitat present				Comments
					Option 1 Export Pipeline	Option 2 Export Pipeline	Lateral	U I C	
None known	<i>Philothea sporadica</i>	V	On residual lateritic rises. Known as widespread in patches in UIC area.	1,2,3,4	No	No	No	Yes	
None known	<i>Picris evae</i>	V	Small daisy in rocky and gravelly areas	2,3	Yes	Yes	Yes	Yes	
None known	<i>Polianthion minutiflorum</i>	V	Known from five areas in eastern Queensland, from Redcliffe Vale south to Kingaroy, usually in forest and woodland on sandstone slopes and gullies with skeletal soil, or sometimes deeper sands adjacent to deeply weathered laterite (Kellerman et al 2006)	3	Yes	Yes	No	No	Potential in Biloela Area
Quassia	<i>Quassia bidwillii</i>	V	Below 650m in rainforests, open forest, woodland and mangroves (DNR, 1999).	1,2,3	Yes	Yes	No	No	
Native Thistle	<i>Rhaponticum australe</i> (syn <i>Stemmacantha australis</i>)	V	On heavy clays derived from basalt (DNR, 1999).	1,2,3	Yes	Yes	No	No	
None known	<i>Trymalium minutiflorum</i>	V	Found up to an altitude of 340 m on sandy soil or light brown gravelly loam derived from sedimentary rocks. Been recorded in Callide Ranges, Goodger and Biloela areas (DNR	1,2	Yes	Yes	No	No	

Common Name	Scientific Name	E P B C	Preferred Habitat	Source^	Preferred habitat present				Comments
					Option 1 Export Pipeline	Option 2 Export Pipeline	Lateral	U I C	
			1999).						
Durong Sage	<i>Xerothamnella herbacea</i>	E	Found in Brigalow, Low chenopod shrubland Records Pelican Back Rd Chinchilla, Theodore S F (Qld Herbarium)	1,2,3	Yes	Yes	No	No	



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Legend:

Export Pipeline & Kilometre Point

Export Pipeline Option 2 & Kilometre Point

Lateral Pipeline & Kilometre Point

Upstream Infrastructure Corridor & Kilometre Point

Source Note:

1:250,000 Topographic vector copyright Geoscience Australia
EVR Data sourced from Queensland Herbarium

Projection UTM MGA Zone 56

Datum GDA 94

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10

20

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Kilometres

N

QUEENSLAND CURTIS LNG A BG Group business	Project Queensland Curtis LNG Project	Title Known EPBC Listed Flora Species Locations Map 3 of 3
	Client QGC - A BG Group business	
ERM Environmental Resources Management Australia Pty Ltd	Drawn Mipela Volume 13, Annex B Figure 13.B.12	Disclaimer: Maps and Figures contained in this Report may be based on Third Party Data, may not be to scale and are intended as Guides only. ERM does not warrant the accuracy of any such Maps and Figures.
	Approved CDP File No: E05-P-MA-96195	
	Date 15.06.09 Revision A	

4.1.4 *Existing Weed Impacts*

Many plant communities have been substantially degraded by Buffel and Guinea Grass, both of which have the capacity to displace native ground storey species and alter fire regimes irrevocably. Buffel Grass is now recognised as an emerging environmental weed of considerable importance (Best 1998; Clarke *et al.* 2005; Greenfield 2007). It is also widely used in the region as a pasture grass.

4.2 Fauna Environment

4.2.1 Fauna Habitats

The pipeline corridors encompass vegetated and cleared grazing lands, cropping lands, roadsides, travelling stock reserves, Council lands, State Forests and Resource Reserves.

Remnant vegetation in the corridors consists of nine broad habitat classifications. The area of each broad vegetation type that is identified by the Queensland Herbarium RE mapping as being transected by the proposed pipeline corridors is set out in **Table 2**.

A review of fauna databases identified a number of fauna species that have been recorded from, or that may potentially utilise habitat, within the wider area. A total of 322 fauna species were identified comprising of 1 insect, 55 fish, 13 crustaceans, 16 amphibians, 70 reptiles, 145 birds and 22 mammals (**Attachment 8 of Appendix 4.2**).

During the field assessment 211 fauna species were recorded, consisting of 13 amphibians, 24 reptiles, 145 birds and 29 mammals (**Attachment 8 of Appendix 4.2**).

4.2.2 EPBC Act Listed Fauna Species

Database searches identified 30 fauna species listed under the EPBC Act and of these 26 were considered to potentially occur in the area. They include 1 Mollusc, 1 Frog, 2 Freshwater fish, 8 reptiles, 8 birds and 6 mammals.

A list of the EPBC Act Listed fauna species, together with their preferred habitat and an indication as to whether this habitat is present within the project area is given in **Table 8**.

Aquatic EPBC Act Listed fauna species identified by the EPBC MNES database as potentially occurring within the region include the Murray Cod (*Maccullochella peelii peelii*), the Australian Lung Fish (*Neoceratodus forsteri*) and the Fitzroy River Turtle (*Rheodytes leukops*). The southern portion of the Export Pipeline and the UIC are located in the Condamine River catchment which is part of the Murray-Darling system and Murray Cod have been recorded in this area. The Australian Lung Fish is known from the Mary and the Burnett River systems. The Option 2 Export Pipeline transects a small area of the upper reaches of the Burnett River catchment area. The Fitzroy River Turtle is found in the Fitzroy River catchment which is predominantly to the north of the pipeline corridors, however the Dawson River and its tributaries are part of this system and their catchments are transected by the Export Pipeline.

The EPBC MNES database also identified a number of marine species as potentially occurring in the area. These are dealt with in **Annex C**.

Table 8 EPBC Act Listed Fauna of the Pipeline Corridors

Common Name	Scientific Name	EPBC Act	Source	Preferred Habitat	Preferred habitat present				Comments
					EP1	EP2	L	UIC	
Molluscs									
Boggomoss Snail	<i>Adclarkia dawsonensis</i>	CE	1	One subpopulation occurs on private property near Taroom. The second at a camping and water reserve at the Isla-Delusion crossing on the Dawson River. Possible occurrence on Cockatoo Creek.	yes	yes	yes	no	Highly restricted distribution. Population estimated at less than 600.
Amphibians									
Kroombit Tinker Frog	<i>Taudactylus pleione</i>	V	2	12 small rainforest patches above 500m at Kroombit Tops	yes	yes	no	no	Highly restricted distribution
Fish									
Australian Lungfish	<i>Neoceratodus forsteri</i>	V		Found in the Mary and Burnett River systems	no	yes	no	no	
Murray Cod	<i>Maccullochella peelii peelii</i>	V	2	Found in the Murray-Darling river system	no	no	no	yes	
Reptiles									
Five-clawed Worm-skink	<i>Anomalopus mackayi</i>	V	2	Grasslands on cracking clay soils. Darling Downs area.	no	no	no	yes	
Collared Delma	<i>Delma torquata</i>	V	2	Brigalow and Eucalypt communities – SE Qld but disjunct occurrences elsewhere.	yes	yes	yes	yes	
Ornamental Snake	<i>Denisonia maculata</i>	V	2	Found in cracking clay soils in open forests, woodlands and riparian habitats. Shelters under fallen timber and in soil cracks.	yes	yes	yes	no	
Yakka Skink	<i>Egernia rugosa</i>	V	1,2	Dry open forests or woodland with dense ground vegetation, rocky areas, fallen timber and other debris.	yes	yes	yes	yes	
Dunmall's Snake	<i>Furina dunmalli</i>	V	1,2	Dry sclerophyll forest and woodland and Brigalow scrub on floodplains of cracking soils.	yes	yes	yes	yes	
Brigalow Scaly-foot	<i>Paradelma orientalis</i>	V	1,2	Eucalypt and Acacia woodlands, usually found under logs and debris.	yes	yes	yes	yes	
Fitzroy River Turtle	<i>Rheodytes leukops</i>	V	1,2	Confined to fast flowing waters in the Fitzroy River and tributaries.	yes	yes	no	no	Unlikely to occur in the study area.
Grassland Earless Dragon	<i>Tympanocryptis</i>	E	2	Black, cracking clay soils of the Darling	no	no	no	yes	

Common Name	Scientific Name	EPBC Act	Source	Preferred Habitat	Preferred habitat present				Comments
					EP1	EP2	L	UIC	
	<i>pinguicolla</i>			Downs where it is often found in agricultural cropping and grazing areas.					
Birds									
Yellow Chat (Dawson)	<i>Epthianura crocea macgregori</i>	CE	2	Samphire and low shrublands in the northern parts of Curtis Island. May occur in a very limited area in proximity to the main line.	yes	yes	no	no	
Red Goshawk	<i>Erythrorichis radiatus</i>	V	2	In association with large tracts of intact forest and woodland. Fringes of rainforest and mountainous forest along the Great Dividing Range.	yes	yes	yes	no	More likely to occur in the northern parts of the study area. Doubtful records from the south.
Squatter Pigeon (Southern Subspecies)	<i>Geophaps scripta scripta</i>	V	1,2	Forests and woodlands in proximity to water courses.	yes	yes	yes	no	Now absent from the southern parts of the study area but may occur to the north.
Swift Parrot	<i>Lathamus discolor</i>	E/Ma	2	Seasonal vagrant from Tasmania where it breeds.	yes	yes	yes	yes	
Southern Giant-Petrel	<i>Macronectes giganteus</i>	E/Mi	2	Marine species, not recorded from the study area.	no	no	no	no	
Star Finch (eastern), Star Finch (southern)	<i>Neochmia ruficauda ruficauda</i>	E	2	Sparsely distributed along well vegetated watercourses. Possibly more abundant in the northern parts of the study area. No recent records from the south.	yes	yes	yes	no	
Cotton Pygmy-Goose	<i>Nettapus coromandelianus</i>	Ma/Mi	1,2	Freshwater lakes, swamps and impoundments.	yes	yes	yes	yes	
Plains-wanderer	<i>Pedionomus torquatus</i>	V	1	Open woodlands and grasslands in western Qld. Not recorded in the study area.	no	no	no	no	
Superb Parrot	<i>Polytelis swainsonii</i>	V	2	Not known from the study area. Found in NSW.	no	no	no	no	
Australian Painted Snipe	<i>Rostratula australis</i>	V	1,2	Freshwater swamps, marshes and seasonally inundated grasslands.	yes	yes	yes	yes	
Black-breasted Button-quail	<i>Turnix melanogaster</i>	V	2	Vine thickets and rainforest habitats. Sometimes in adjacent, disturbed but well vegetated habitats. SE Qld and	yes	yes	yes	yes	

Common Name	Scientific Name	EPBC Act	Source	Preferred Habitat	Preferred habitat present				Comments
					EP1	EP2	L	UIC	
				northern NSW.					
Mammals									
Large-eared Pied Bat, Large Pied Bat	<i>Chalinolobus dwyeri</i>	V	2	Cave or tree-roosting bat usually found in association with sandstone escarpments and gorges. Kroombit Tops, Carnarvon Ranges, Cania Gorge.	yes	yes	yes	no	
Northern Quoll	<i>Dasyurus hallucatus</i>	E	2	Patchy occurrence in northern parts of the study area in forests and woodlands. Records from Carnarvon Range and parts of the Great Dividing Range.	yes	yes	yes	no	
Spotted-tailed Quoll (Southern Subspecies)	<i>Dasyurus maculatus maculatus</i>	E	1,2	Rainforest and wet sclerophylly forest habitats is south east Qld. Possibly a patchy distribution in the study area.	yes	yes	yes	no	
Semon's Leaf-nosed Bat	<i>Hipposideros semoni</i>	E	2	Dubious records from St Mary's Forest. Otherwise only known from northern Qld.	no	no	no	no	
Eastern Long-eared Bat	<i>Nyctophilus timoriensis</i>	V	1,2	Arid woodlands in the southern parts of the study area.	no	no	no	yes	
Grey-headed Flying-Fox	<i>Pteropus poliocephalus</i>	V	1,2	Coastal forests, mangroves and woodlands.	yes	yes	no	no	
False Water Rat	<i>Xeromys myoides</i>	V	2	Coastal mangroves and samphire habitats. Patchy distribution along the Qld coast.	yes	yes	no	No	

***Status:** Commonwealth (EPBC) listed: **EX** = Extinct; **CE** = Critically Endangered; **EN** = Endangered; **VU** = Vulnerable; **Mi** = Migratory Species, **Ma** = Marine Species.

¹Wildlife Online ²EPBC Protected Matters search

Field studies identified four EPBC Act Listed fauna species within the CSG Field, in proximity to the Collection Header. These are:

- Eastern Long-eared Bat (*Nyctophilus timoriensis*)- Vulnerable under the EPBC and the NC Act
- White-throated Needletail (*Hirundapus caudacutus*) – Migratory species
- Fork-tailed Swift (*Apus pacificus*) – Migratory and Marine species, and
- Large-eared Pied Bat (*Chalinolobus dwyeri*)- Vulnerable under the EPBC and the NC Act (Tentative Record at Gurulmundi SF).

Field surveys also recorded the EPBC Act listed marine species the Magpie Goose (*Anseranus semipalmata*) at Lake Broadwater, just outside the south-east corner of the CSG Field:

All records of protected fauna have been submitted to the EPA WildNet database.

EPBC Act Listed fauna species recorded during the survey are described below.

Eastern Long-eared Bat, *Nyctophilus timoriensis*

EPBC: Vulnerable

This species was encountered only once during the survey in a relatively extensive tract of natural vegetation near Condamine. Previous records are also known from this area and also to the north of Miles near Gurulmundi State Forest. Other records are known from areas to the south and south-east of the CSG Field and the species is recorded infrequently across the NSW and Queensland Brigalow Belts. It is likely therefore, that this species occurs over much of the southern pipeline corridors, possibly restricted to larger tracts of intact native vegetation. The draft Biodiversity Action Plan for EPA Back on Track species in the Murray-Darling Region (EPA 2008d) indicates habitat fragmentation as a major threat to this species.

Large-eared Pied Bat, *Chalinolobus dwyeri*

EPBC: Vulnerable

Additionally, an echo-location call of an unknown bat species was recorded on the rocky escarpments in Gurulmundi State Forest. The call is similar to that reported for the EPBC Act Listed Large-eared Pied Bat (Pennay, *et. al.* 2004) but the identification can not be confirmed until further reference calls are obtained for this species. For the purposes of this report, a conservative approach is taken and this species has been assumed to occur in areas where suitable habitat exists.

White-throated Needletail, *Hirundapus caudacutus*, EPBC: Mi, and Fork-tailed Swift, *Apus pacificus*, EPBC: Mi, Ma

These birds were observed in the air space over the pipeline corridors and as in other parts of the continent, it is highly unlikely that they land. Both species possibly sleep on the wing and were observed flying ahead of summer storm fronts in the area. These birds are reliant upon flying insects that may originate in the Pipeline corridors area, but it is highly unlikely that they would be affected in any way by the proposed development.

Overall distributional range is not restricted to the Brigalow Belt Bioregion.

4.2.3 *Aquatic Fauna*

According to Queensland Museum records 55 fish species have been known to occur in watercourses in the broad vicinity of the pipeline corridors. Of these species, the Murray Cod and the Australian Lungfish are listed as Vulnerable under the EPBC Act.

4.2.4 *Introduced Fauna*

Twelve introduced species have been recorded within the wider study area, including 2 fish, 1 amphibian, 2 birds and 7 mammals. These species are included in **Attachment 8** of **Appendix 4.2**, where they are denoted as introduced species by an asterisk.

4.3 Wetlands

The UIC traverses the Condamine River and several nationally significant wetlands occur downstream, including the Ramsar-listed Narran Lake Nature Reserve approximately 450 km to the southwest. The Export Pipeline and Lateral traverse a number of significant watercourse catchments including the Auburn, Dawson, Nogoa and Calliope.

5 POTENTIAL IMPACTS

The potential impacts discussed here are based on desktop studies of the pipeline corridors and rapid field investigations of available sections of the alignments. While these studies aim to address all significant impacts of the proposed development on flora and fauna, they cannot rule out the possibility of undetected issues, especially along sections of the alignments not yet assessed in the field.

5.1 Reversible and Non-reversible Impacts

The pipelines are likely to be decommissioned within several decades. Subject to landholders choosing to manage their property in a manner that inhibits natural regrowth, the impacts associated with clearing for construction and maintenance are considered to be reversible within all vegetation types over the long term.

In areas of high conservation value and sensitivity, there is potential to allow tree and shrub vegetation to naturally re-establish over portions of the alignment with the exception of the area immediately over the pipelines. Keeping a strip on either side of the pipeline free of trees and shrubs may be all that is necessary to protect the pipe from potential root damage and facilitate ongoing pipeline inspection and necessary maintenance.

5.2 Potential Impacts on EPBC Act Listed Ecological Communities

5.2.1 Potential Impacts Associated with Clearing

Approximately 216 km of remnant vegetation is transected by the pipeline corridors which have a total length of 755 km.

The majority of the area to be cleared consists of eucalypt woodlands and forests. Very minor clearing will also be required to cross fragmented stands of brigalow which often occur on roadside verges or as wind breaks along the margins of pasture or cropping paddocks. Mostly, this will involve transecting relatively narrow, linear corridors. The Queensland Herbarium mapping also indicates a small number of locations where the alignments may impinge on SEVT, Native Bluegrass Grassland and freshwater wetland communities. The detailed field assessment will confirm the extent and locality of these features and it is considered likely that these will be largely, if not totally avoidable.

The estimated clearing footprints within each EPBC Act Listed Vegetation Community are shown in **Table 9**.

Table 9 Estimated Clearing Footprint Within EPBC Listed Vegetation Communities

EPBC Listed Vegetation Community	Total clearing footprint using Option 1 (ha)*	Total clearing footprint using Option 2 (ha)*
Brigalow	21.59	14.42
SEVT	3.17	2.47
Grassland	2.21	0
Weeping Myall	0	0
Total	26.97	16.89

* Offset initiatives not accounted for the purposes of this table

According to existing Herbarium RE mapping 17ha of EPBC listed community may be cleared if Option 2 for the Export Line is chosen. This represents 0.15% of that which occurs within a 5 km buffer of the pipelines and is less than 0.01% of that which occurs in the bioregion.

The actual area of clearing for the proposed pipeline is likely to be lower than the above estimate, as:

- The ROW may be able to utilise existing cleared infrastructure corridors through remnant vegetation (at least in part)
- Pipeline construction may not require clearing of the full 50 m corridor (100 m for the UIC) width within some sections of remnant vegetation, and
- Disturbance of remnant vegetation beside major watercourses may be avoided by the use of Horizontal Directional Drilling (HDD).

Existing Queensland Herbarium mapping indicates that there are no REs representative of EPBC Act Listed communities which, with the exception of RE 11.3.1, would require clearing in excess of 0.61% of that which occurs within 5 km of the pipeline corridor. None require clearing that would represent more than 0.007% of that which occurs within their Bioregion.

The Endangered Brigalow community RE 11.3.1 is traversed by the Collection Header (approximately 1 ha). This area amounts to approximately 1.3% of that within 5km either side of the pipeline corridors and approximately 0.001% of that which occurs in the Bioregion. The areas of RE 11.3.1 that are proposed to be crossed are small narrow remnants that exist along fencelines in farming areas. These remnants were found to be adversely impacted by edge effects and weed invasion.

The total area of the Endangered Brigalow Community RE 11.4.3 that is transected by the pipeline corridors is approximately 5 ha which equates to approximately 0.6% of that within 5 km either side of the pipelines and 0.0067% of that in the Bioregion. The areas of RE 11.4.3 that are transected by the corridors are also generally small narrow remnants that exist along roadsides or fencelines and therefore already impacted by edge effects and weed invasion. This was seen to be the case where ground surveys identified two areas mapped as RE 11.4.3 were in fact either degraded non-remnants (M40) or were found only to show characteristics of a Not of Concern community (M4 at KP 5). None-the-less, provided there are no other constructability or land access constraints it is recommended that minor adjustments to the alignment be made in order to miss the larger area (approximately 32 ha) mapped as RE 11.4.3 at KP 4.5-5 along the Option 1 and Option 2 Pipeline corridor.

The Option 1 Export Pipeline also transects a total of 8.3 ha of the Endangered Brigalow Community RE 11.9.5, while Option 2 transects 3.28 ha. The UIC transects an additional 4.14 ha of this RE and it is recommended that this could be significantly reduced by realignment at KP167.6-167.9.

The other Endangered Brigalow Communities transected by the pipeline corridors (REs 11.9.1, 11.9.6 and 11.12.21) are limited to narrow belts and small remnants transected by the Option 1 Export Pipeline.

SEVT communities are predominantly small and / or subdominant communities that detailed field investigations and alignment survey may well be able to avoid. One exception is the SEVT (RE 11.9.4) which occurs on the escarpments at the western end of the Lateral (KP 145.8-146 and KP 147.4-147.6). The ability to avoid these remnants would need to be determined by construction engineers in conjunction with determination of local scale alignment preferences.

The existing Queensland Herbarium Mapping indicates that the Option 2 Export Pipeline would require no clearing of Native Bluegrass Grassland Communities. It also indicates that the Option 1 Export Pipeline would require transecting approximately 2.21 ha at one location, although detailed field survey would be required to confirm the extent and avoidability of this community if Option 1 was selected as the preferred alignment.

The additional Threatened Ecological Community which may also be transected by the pipeline corridors is the Endangered Weeping Myall Open Woodland Community. This Community is not mapped by the Queensland Herbarium RE mapping nor was it detected by the initial field studies. However, it is described as occurring within the Brigalow South Bioregion, generally in small patches of alluvial soils within REs 11.3.2 and 11.3.28. However, based on the fact that:

- The main location where the pipeline corridors transect one of the REs within which this Community potentially occurs (RE 11.3.2 at KP 2-8.2 of the UIC) has been identified as location where a realignment recommendation is likely to be able to be accommodated, and
- The initial field surveys did not record any communities which matched the description of Weeping Myall Open Woodland Community.

It is considered likely that the pipeline corridors will be able to avoid any areas containing this community. The detailed field assessments undertaken prior to alignment finalisation will confirm the avoidability of any such locations.

Although the potential clearing of EPBC Act Listed Communities is estimated to total approximately 17 ha, actual vegetation loss is likely to be considerably less because:

- Detailed field investigations will further refine the alignments to minimise the need to impact these communities, and
- Offset activities will be undertaken to replace unavoidable areas on a basis of at least 1:1.5 (in accordance with the Queensland Government's Environmental Offsets Policy (QGEOP) (EPA 2007).

5.2.2 Other (Non-clearing) Potential Impacts

Because of the small and fragmented nature of all EPBC Act Listed Vegetation Communities transected by the pipeline corridors, the potential impacts from the pipelines are largely associated with the direct impact of vegetation clearing during construction. As such, the majority of the following discussion focuses on clearing footprints. However, other potential impacts from the construction and operation of the pipeline exist, namely:

- Introduction and spread of declared and environmental weeds
- Introduction or proliferation of pest animals
- Release of contaminants and / or silt into watercourses, mangrove and wetland areas

- Altered hydrological and sedimentation regimes due to construction of the pipeline across the mainland marine wetland areas, and
- Changes to fire regimes, in particular increased fire regimes due to higher weed biomass along cleared easements.

While these potential impacts exist, the fact the pipeline corridors do not go through any large intact stands of these communities indicates that the potential for significant impacts from these developments is low. Nonetheless, additional mitigation measures to minimise potential impacts on EPBC Act Listed Communities are provided in **Section 6**.

5.3 Potential Impacts on EPBC Act Listed Flora Species

The pipeline alignments contain potential habitat for 32 EPBC Act Listed flora species. Detailed survey is required to confirm the presence or absence and potential presence of each of these flora species along the pipeline alignments.

It is anticipated that EPBC listed flora species recorded during the detailed alignment survey will generally be able to be avoided by alignment refinement and narrowing for short lengths. There may however be some populations which are unavoidable. Generally this would relate to species with restricted habitat niches from which a pipeline may not be able to deviate. For example, the rare Large-fruited *Zamia* (*Cycas megacarpa*) populations which occur on range spurs at KP 296.5-298.5, KP 301 and KP 305 which the Export Pipeline will need to follow for constructability purposes..

Table 10 identifies the potential impacts on each potential EPBC Act Listed flora species before and after mitigation measures. The analysis identifies that in the absence of appropriate mitigation measures there is a moderate to high potential to impact on these species. The high potential for impacts relates to species which are known to have restricted distributions and special extents. Assuming the successful implementation of the mitigation measures identified in **Section 6** more generally, the potential to impact all EPBC Act Listed flora species is low with the exception of:

- Large-fruited *Zamia* (*Cycas megacarpa*), and
- *Philothea sporadica*.

For each of these species, which have populations which could potentially be dense within constrained alignment locations, the potential for impacts associated with clearing for construction may be moderate due to inability to avoid. Where such circumstances are identified, a Threatened species conservation plan would be developed and approval sort from DEWHA, prior to finalisation and development of the alignment.

Table 10 Potential for EPBC Act Listed Flora Species to be Impacted

Common Name	Scientific Name	Status	Habitat	Potential to be Impacted Without Mitigation Measures^	Mitigation Measures	Potential to be Significantly Impacted with Mitigation Measures
Chinchilla Wattle	<i>Acacia chinchillensis</i>	V	Occurs in south-eastern Qld N of Chinchilla and near Tara. Grows in ironbark <i>Eucalyptus</i> , <i>Callitris columellaris</i> , <i>Casuarina</i> sp. woodland, in sandy or gravelly soils (ABRS, 2001).	Moderate on Option 1, Option 2 and UIC	Clearance Survey	Low (easily avoidable)
Curly-bark Wattle	<i>Acacia curranii</i>	V	Only known in Gurulmundi wildflower area north of Miles.	High at and near Gurulmundi State Forest (restricted species)	Clearance Surveys. Exclusion area in Gurulmundi SF and area to north west	Low (Potentially High in Gurulmundi area without exclusion areas)
Hando's Wattle	<i>Acacia handonis</i>	V	Understorey plant in <i>Eucalyptus</i> forests on sandstone ridges. Restricted to Barakula State Forest.	Moderate on Option 2	Planning Survey and Clearance Surveys	Low (easily avoidable)
Tara Wattle	<i>Acacia lauta</i>	V	Found from Tara to Inglewood 1) Property "Marron Glen", 2) 15km nth of Tara and 3) 16km east of Tara.	Moderate on UIC	Clearance Survey	Low (easily avoidable)
Wardell's Wattle	<i>Acacia wardellii</i>	V	Ridge crests with loamy or gravelly soil. Coloniser of disturbed areas – Thomby Range and a few ridges east of the Condamine.	Moderate on UIC	Clearance Survey	Low (restricted habitat type, easily avoidable)
Roadside	<i>Atalaya collina</i>	E	Grows on hillsides, in	Moderate on	Clearance Survey	Low (restricted

Common Name	Scientific Name	Status	Habitat	Potential to be Impacted Without Mitigation Measures^	Mitigation Measures	Potential to be Significantly Impacted with Mitigation Measures
Wallaby Grass			remnant dry scrubs, together with <i>A. salicifolia</i> , but is not as common as that species (Reynolds, 1991)	Options 1 and 2		habitat type, easily avoidable)
Ooline	<i>Cadellia pentastylis</i>	V	Clay plains, sandstone and residual ridges in association with vine thickets, brigalow, belah and red bauhinia.	Moderate	Clearance Survey	Low (low numbers anticipated, easily avoided)
Yellow Fringed Myrtle	<i>Calytrix gurlmundensis</i>	V	Found on lateritic sandstone ridges. Localised and patchy distribution.	High at and near Gurulmundi State Forest (restricted species)	Clearance Surveys. Exclusion area in Gurulmundi SF and area to north west	Low (Potentially High in Gurulmundi area without exclusion areas)
Silver Commersonia	<i>Commersonia argentea</i> syn <i>Commersonia</i> sp.(<i>Cadarga</i> G.P. Guymer 1642)	V	Stony ridges, north of Chinchilla	High on Option 2 (restricted species)	Clearance Survey	Low (low numbers anticipated, restricted habitat type, easily avoided)
Cossinia	<i>Cossinia australiana</i>	E	Small tree up to 7 m found in depauperate rainforest relicts, usually on volcanic soil (Stanley and Ross, 1986). Recorded at Kingaroy, Gympie, Munholme Ck, Burnett River (Qld Herbarium)	Moderate on Options 1 and 2	Clearance Survey	Low (restricted habitat type, easily avoidable)
Wedge-leaf	<i>Cupaniopsis</i>	V	Depauperate rainforests	Moderate on Options 1 and 2	Clearance Survey	Low (low numbers anticipated,

Common Name	Scientific Name	Status	Habitat	Potential to be Impacted Without Mitigation Measures^	Mitigation Measures	Potential to be Significantly Impacted with Mitigation Measures
Tuckeroo	<i>shirleyana</i>		(Stanley and Ross, 1983).			restricted habitat type, easily avoided)
Large-fruited Zamia	<i>Cycas megacarpa</i>	E	Stony clay loams on hill tops and steep slopes. Commonly in spotted gum and ironbark open forest and woodland with a grassy understorey (DNR, 1999).	High on Options 1 and 2	Clearance Survey	Moderate (populations expected on rocky slopes near KP 305 and near Mt Larcom, potential inability to avoid to be confirmed by detailed field assessment))
Small-leaved Denhamia	<i>Denhamia parvifolia</i>	V	Found in semi-evergreen vine thickets. Brown loam or clay loam soils.	Moderate on UIC and Lateral	Clearance Survey	Low (low numbers anticipated, restricted habitat type, easily avoided)
King Blue Grass	<i>Dichanthium queenslandicum</i>	V	Endemic to Qld black soil plains. Occurs in RE's 11.8.11, 11.3.21	Moderate on Options 1 and 2	Clearance Survey	Low (restricted habitat type, easily avoided)
Tricolour Diuris	<i>Diuris tricolor (sheaffiana)</i>	V	Sandy soils, often in Callitris woodlands. Primarily a NSW species with scattered records in Qld.	Moderate on Options 1 and 2 and UIC	Clearance Survey	Low (low numbers anticipated, easily avoidable).
Salt Pipewort, Button Grass	<i>Eriocaulon carsonii subsp. orientale</i>	E	Known in Wet poorly drained soils. Mound Springs areas near Injune Area	High (restricted species)	Clearance Survey, Erosion and Sedimentation Controls near watercourse crossings. Contamination	Low (restricted habitat type, easily avoided)

Common Name	Scientific Name	Status	Habitat	Potential to be Impacted Without Mitigation Measures^	Mitigation Measures	Potential to be Significantly Impacted with Mitigation Measures
					controls.	
Tony's ironbark	<i>Eucalyptus beaniana</i>	V	Rocky Areas such as Isla Gorge Robinson Gorge and Mundubbera	Moderate on Options 1 and 2	Clearance Survey	Low (low numbers anticipated, restricted habitat type, easily avoided)
Pumpkin Gum	<i>Eucalyptus pachycalyx</i>	E	On skeletal sandy soils (Botanic Gardens Trust, 2009)	Moderate	Clearance Survey	Low (low numbers anticipated, restricted habitat type, easily avoided)
Shiny-leaved Ironbark	<i>Eucalyptus virens</i>	V	Sandstone ridges. Four populations – 1) Coolmunda Conservation Park 2) Tara, 3) NE of Eidsvold and 4) Maranoa River near Mt Moffatt.	High on UIC (restricted species)	Clearance Survey	Low (low numbers anticipated, restricted habitat type, easily avoided)
None known	<i>Homopholis belsonii</i>	V	Known from near Gurulmundi, 30km north of Miles in the Darling Downs district (Stanley and Ross, 1989).	High (restricted species)	Clearance Survey	Low (low numbers anticipated, easily avoided)
None known	<i>Homoranthus decumbens</i>	V	Found in two separate locations 1) Blackdown Tablelands and 2) State Forest 302, north of Chinchilla.	Moderate	Clearance Survey	Low (low numbers anticipated, easily avoided)
None known	<i>Leucopogon cuspidatus</i>	V	Mainly on rocky slopes, cliffs and rocky outcrops. Commonly in woodland or open woodland and	Moderate on Options 1 and 2 and Lateral	Clearance Survey	Low (low numbers anticipated, restricted habitat type, easily avoided)

Common Name	Scientific Name	Status	Habitat	Potential to be Impacted Without Mitigation Measures^	Mitigation Measures	Potential to be Significantly Impacted with Mitigation Measures
			sometimes in heath or shrubland communities (M. Edginton, pers. comm.).			
None known	<i>Macrozamia crassifolia</i>	V	Restricted to the Eidsvold – Mundubbera district in Queensland. Found on sandy soils over granite (DEW 2007).	Moderate on Options 1 and 2	Clearance Survey	Low (low numbers anticipated, restricted habitat type, easily avoided)
None known	<i>Macrozamia fearnsidei</i>	V	Grows in open forest on sandy soils of sandstone origin either on rocky slopes or in gullies near ephemeral streams at approx 300-400m altitude. Restricted to central Qld (DNR 1999)	Moderate on Lateral	Clearance Survey	Low (low numbers anticipated, restricted habitat type, easily avoided)
None known	<i>Parsonsia larcomensis</i>	V	Recorded from 350-750 m elevation. It occurs in open heathland and shrubland at or near the summits of mountain peaks growing in shallow, loamy soils. Restricted to central east and south east Queensland and is confined to the Mt Perry area near Rockhampton (DRN 1999)	Moderate on Options 1 and 2	Clearance Survey	Low (low numbers anticipated, restricted habitat type, easily avoided)
None known	<i>Philotheca sporadica</i>	V	On residual lateritic rises. Known as widespread in patches in UIC area.	High	Planning and Clearance Survey,	Moderate (restricted habitat type, limited clearing may be

Common Name	Scientific Name	Status	Habitat	Potential to be Impacted Without Mitigation Measures^	Mitigation Measures	Potential to be Significantly Impacted with Mitigation Measures
					If necessary EPBC Act Listed Species Management Plans as part of EPA permit and DEWHA approval process	required for linear infrastructure if large patches unavoidable)
None known	<i>Picris evae</i>	V	Small daisy in rocky and gravelly areas	Moderate	Clearance Survey	Low (low numbers anticipated, easily avoided)
None known	<i>Polianthion minutiflorum</i>	V	Known from five areas in eastern Queensland, - Redcliffe Vale to Kingaroy, usually in forest and woodland on sandstone slopes / gullies with skeletal or sandy soil, adjacent to deeply weathered laterite (Kellerman et al 2006)	Moderate	Clearance Survey	Low (low numbers anticipated, restricted habitat type, easily avoided)
Quassia	<i>Quassia bidwillii</i>	V	Below 650m in rainforests, open forest, woodland and mangroves (DNR, 1999).	Moderate on Options 1 and 2	Clearance Survey	Low (low numbers anticipated, restricted habitat type, easily avoided)
Native Thistle	<i>Rhaponticum australe</i> (syn <i>Stemmacantha australis</i>)	V	On heavy clays derived from basalt (DNR, 1999).	Moderate on Options 1 and 2 and Lateral	Clearance Survey	Low (low numbers anticipated, restricted habitat type, easily avoided)
None known	<i>Trymalium minutiflorum</i>	V	Found up to an altitude of 340 m on sandy soil or light	High on Options 1 and 2 and Lateral	Clearance Survey	Low (low numbers anticipated, easily

Common Name	Scientific Name	Status	Habitat	Potential to be Impacted Without Mitigation Measures^	Mitigation Measures	Potential to be Significantly Impacted with Mitigation Measures
			brown gravelly loam derived from sedimentary rocks. Recorded in Callide Ranges, Goodger and Bileola areas (DNR 1999).	(restricted species)		avoided)
Durong sage	<i>Xerothamnella herbacea</i>	E	Found in Brigalow, Low chenopod shrubland. Records Pelican Back Rd Chinchilla, Theodore S F (Qld Herbarium)	High on Options 1 and 2 (restricted species)	Clearance Survey	Low (low numbers anticipated, restricted habitat type, easily avoided)

***Status:** Commonwealth (EPBC) listed: **E**= Endangered; **V**= Vulnerable

5.4 Potential Adverse Impacts on EPBC Act Listed Fauna

The pipeline alignments have been selected to avoid as many large and connected areas of vegetation habitat as possible. With pipeline corridors of such length, however, it is not possible to avoid all areas that may provide fauna habitat. With successful implementation of appropriate environmental management controls, any potential impacts on fauna species are likely to be limited to direct impacts associated with construction of the proposed pipeline. The pipeline construction will require some clearing of vegetation and this generally equates to a loss of fauna habitat. This is unlikely to lead to significant long-term impacts on common fauna species due to presence of similar habitat, which these species could utilise, in areas adjacent to the pipeline.

Overall levels of vegetation disturbance are considered to be low relative to that retained in the immediate vicinity and regionally (**Attachment 10** of **Appendix 4.2** details the estimated clearing proportion for each RE type). **Table 11** lists EPBC Act Listed fauna species (and migratory and marine) that may potentially be impacted by the project and provides an assessment of Significant Impacts in accordance with the EPBC Significant Impact Guidelines, Policy Statement 1.1.

Table 11 Potential for EPBC Act Listed Fauna Species to be Impacted

Common Name	Scientific Name	EPBC Act	Source	Potential to be Impacted without Mitigation Measures				Mitigation Measures	Potential to be Impacted with Mitigation Measures			
				ML	ML 2	CL	UIC		ML	ML 2	CL	UIC
Molluscs												
Boggomoss Snail	<i>Adclarkia dawsonensis</i>	CE	1	high	high	mod	-	Field survey to determine if snail is present on the proposed pipeline route. Re-align to avoid populations	nil	nil	nil	-
Amphibians												
Kroombit Tinker Frog	<i>Taudactylus pleione</i>	V	2	mod	mod	-	-	Survey rainforest patches – avoidance .	low	low	-	-
Fish												
Australian Lung Fish	<i>Neoceratodus forsteri</i>	V	1,2		low			Avoid disturbance of aquatic habitats		nil		
Murray Cod	<i>Maccullochella peelii peelii</i>	V	2	-	-	-	mod	Avoid disturbance of aquatic habitats	-	-	-	low
Reptiles												
Five-clawed Worm-skink	<i>Anomalopus mackayi</i>	V	2	-	--	-	mod	Fauna spotter to remove entrapped reptiles from pipeline trench. Wildfire prevention during construction.	-	-	-	low
Collared Delma	<i>Delma torquata</i>	V	2	mod	mod	mod	mod	Fauna spotter to remove entrapped reptiles from pipeline trench. Wildfire prevention during construction.	low	low	low	low
Ornamental Snake	<i>Denisonia maculata</i>	V	2	mod	mod	mod	-	Fauna spotter to remove entrapped reptiles from pipeline trench. Wildfire prevention during construction.	low	low	low	-
Yakka Skink	<i>Egernia rugosa</i>	V	1,2	mod	mod	mod	mod	Fauna spotter to remove entrapped reptiles from pipeline trench. Wildfire prevention during construction. Respread cleared timber/vegetation over site.	low	low	low	low
Dunmall's Snake	<i>Furina dunmalli</i>	V	1,2	mod	mod	mod	mod	Fauna spotter to remove entrapped reptiles from	low	low	low	low

Common Name	Scientific Name	EPBC Act	Source	Potential to be Impacted without Mitigation Measures				Mitigation Measures	Potential to be Impacted with Mitigation Measures			
				ML	ML 2	CL	UIC		ML	ML 2	CL	UIC
								pipeline trench. Avoidance of Brigalow communities				
Brigalow Scaly-foot	<i>Paradelma orientalis</i>	V	1,2	mod	mod	mod	mod	Fauna spotter to remove entrapped reptiles from pipeline trench. Wildfire prevention during construction. Respread cleared timber/vegetation over site.	low	low	low	low
Fitzroy River Turtle	<i>Rheodytes leukops</i>	V	1,2	low	low	-	-	Site inspections. Avoidance of major water holes. Minimal disturbance to riparian areas.	low	low	-	-
Grassland Earless Dragon	<i>Tympanocryptis pinguicollis</i>	E	2	-	-	-	mod	Fauna spotter to remove entrapped reptiles from pipeline trench. Wildfire prevention during construction.	low	low	low	low
Birds												
Yellow Chat (Dawson)	<i>Epthianura crocea macgregori</i>	CE	2	low	low	-	-	Minimise damage to riparian areas. Directional drilling on mangrove and samphire areas.	low	low	-	-
Red Goshawk	<i>Erythrotriorchis radiatus</i>	V	2	low	low	low	-	Wildfire prevention during construction. Allow partial site regeneration.	low	low	low	low
Squatter Pigeon (Southern Subspecies)	<i>Geophaps scripta scripta</i>	V	1,2	low	low	low	-	Site inspections. Avoidance of major water holes. Minimal disturbance to riparian areas. Wildfire prevention during construction.	low	low	low	-
Swift Parrot	<i>Lathamus discolor</i>	E/Ma	2	low	low	low	low	Wildfire prevention during construction. Allow partial site regeneration.	low	low	low	low
White-throated Needletail	<i>Hirundapus caudacutus</i>	Mi	2	low	low	low	low	Found in the airspace above the pipeline alignment. Not known to land in Australia.	low	low	low	low
Star Finch (eastern), Star Finch (southern)	<i>Neochmia ruficauda ruficauda</i>	E	2	low	low	low	-	Site inspections. Minimal disturbance to riparian areas.	low	low	low	-

Common Name	Scientific Name	EPBC Act	Source	Potential to be Impacted without Mitigation Measures				Mitigation Measures	Potential to be Impacted with Mitigation Measures			
				ML	ML 2	CL	UIC		ML	ML 2	CL	UIC
								Wildfire prevention during construction.				
Cotton Pygmy-Goose	<i>Nettapus coromandelianus</i>	Ma/Mi	1,2	low	low	low	low	Site inspections. Avoidance of major water holes. Minimal disturbance to riparian areas. Wildfire prevention during construction.	low	low	low	low
Australian Painted Snipe	<i>Rostratula australis</i>	V	1,2	low	low	low	low	Minimal disturbance to riparian areas. Wildlife prevention during construction. Allow partial site regeneration.	low	low	low	low
Black-breasted Button-quail	<i>Turnix melanogaster</i>	V	2	low	low	low	low	Avoidance of SEVT habitats. Minimal disturbance to riparian areas.	low	low	low	low
Mammals												
Large-eared Pied Bat, Large Pied Bat	<i>Chalinolobus dwyeri</i>	V	2	low	low	low	-	Minimal disturbance in riparian areas. Prevention of wildfire during construction. Allow partial revegetation.	low	low	low	-
Northern Quoll	<i>Dasyurus hallucatus</i>	E	2	low	low	low	-	Allow partial revegetation after construction.	low	low	low	-
Spotted-tailed Quoll (Southern Subspecies)	<i>Dasyurus maculatus maculatus</i>	E	1,2	low	low	low	-	Avoidance of SEVT and rainforest habitats	low	low	low	-
Eastern Long-eared Bat	<i>Nyctophilus timoriensis</i>	V	1,2	low	low	low	low	Minimise clearance in remnant vegetation. Allow partial revegetation after construction.	low	low	low	low
Grey-headed Flying-Fox	<i>Pteropus poliocephalus</i>	V	1,2	low	low	-	-	Minimal disturbance in riparian areas. Prevention of wildfire during construction. Allow partial revegetation.	low	low	-	-

*Status: Commonwealth (EPBC) listed: **CE** = Critically Endangered; **E** = Endangered; **VU** = Vulnerable; **Mi** = Migratory Species, **Ma** = Marine Species.

¹Wildlife Online

²EPBC Protected Matters search

Based on current information, the projected level of Significant Impacts for most species is low. Potential impacts include the following (which are further described under subheadings below):

- Removal of habitat such as mature vegetation, hollow-bearing trees and fallen logs, and therefore loss of nesting, shelter and foraging resources
- Fragmentation of habitat due to pipeline construction. These features may act as movement barriers, particularly to fossorial species, and alter movement patterns. They may also limit access to dry season fauna refuges associated with riverine environments
- Disturbance to fauna movement corridors and dry season fauna refuges (predominantly associated with rivers and creeks)
- The establishment of environmental weeds, particularly Buffel grass, has the potential to fundamentally destroy natural fauna habitats through altered fire regimes and removal of fauna food resources
- Noise and increased human activity, particularly during site development may restrict species movements, limit access to food or other resources
- Trenchfall - the potential for fauna to fall into and become trapped in the open pipeline trench during construction, and
- The elevated risk of wildfires as a result of construction activities including welding and machinery emissions.

5.4.1 Removal of Tree Hollows and Vegetation

Removal of mature vegetation in general reduces feeding resources and shelter for native fauna species. While it is recognised that the proposed loss of mature vegetation would not be significant, most of the fauna habitat within the study corridor has been heavily cleared and is now severely fragmented.

The great majority of the proposed pipeline route (85%) traverses cleared land. As a result of this and the fact the proposed alignment avoids remnant vegetation where possible, relatively small amounts of fauna habitat are proposed to be cleared. The total areas of each Faunal Habitat proposed to be cleared were calculated from the RE clearing calculations. Overall, an estimated 1462 ha of remnant habitat (i.e. all habitats combined) is proposed to be cleared along the pipeline corridors. The habitat types that are proposed to be cleared to the greatest extent are Eucalypt Woodland (1333 ha) and Riparian Eucalypt Woodland (47 ha). **Attachment 10 of Appendix 4.2** indicates that the total estimated clearing area of each RE is a small percentage of the total area of that RE present within a 5 km buffer of the alignment.

An important potential impact on fauna is the loss of hollow-bearing trees. A large number of Australian vertebrate fauna species are dependent on tree hollows for shelter and nesting, including (amongst others) parrots, owls, possums, gliders and bats (Gibbons *et al* 2002). Mature trees with hollows are a limited resource in many of the rural and grazed lands of central Queensland where widespread clearing has removed much of the mature vegetation. The formation of hollows suitable for use by vertebrate fauna does not occur until eucalypts are at least 120 years old, with large hollows rare in

trees under 220 years old. Therefore, the replacement of lost hollows may not occur for very long periods. Large hollow-bearing trees are especially important habitat in strips of riparian vegetation along watercourses that occur in otherwise cleared land. Even single or widely scattered mature hollow-bearing trees can be important habitat, for example, for hollow-roosting bats (Lumsden 2002). Hollow-bearing trees are likely to be present in varying but limited numbers in Eucalypt Woodland habitats along the pipeline route, and some of the highest quality hollow-bearing habitat is likely to occur in Riparian Eucalypt Woodland along watercourses.

Fallen logs and dead timber on the ground and understorey vegetation provide shelter (either underneath timber or within hollow logs) and food resources for a broad range of small ground-dwelling fauna. These include, but are not exclusive to, native rodents, dasyurid marsupials, bandicoots, lizards, snakes, frogs, and some birds. Large fallen logs also provide essential protection for fauna against bushfire. Loss or removal of fallen timber severely reduces the abundance and diversity of small ground-dwelling fauna. Impacts from removal of dead timber will reverse over time as dead tree limbs and fallen trees accumulate, but are likely to result in loss of fallen timber-dependent species in the short to medium term. Such impacts can be reversed in the short term by collecting dead timber and respreading it over the pipeline route after construction.

5.4.2 *Habitat Fragmentation and Disturbance to Movement Corridors*

The pipeline route traverses Riparian Eucalypt Woodland habitat fringing major watercourses, which has important fauna values as refugia for wildlife during dry periods and as corridors facilitating the movement of migratory and nomadic species. Such refugia and corridors are particularly important as much of the wider environment of the study corridor is fragmented as a result of clearing for agriculture. Additionally these watercourses are often the only source of water during the dry season and therefore assist populations to persist in a dry and largely cleared landscape. Fragmentation and disturbance of these habitats may be reversible in the medium to long term by natural revegetation and habitat rehabilitation or specific programs aimed at restoring habitat.

5.4.3 *Access by Predators*

Predators such as dingoes, and to a lesser extent, foxes and cats, are known to use roads and tracks extensively as they provide rapid and uncluttered access across the landscape and the relative lack of contact with vegetation also ensures minimal parasite contact. Tracks also have the potential to open up dense understorey habitats which may be important refugia for fauna.

5.4.4 *Environmental Weeds*

As described in previously, construction and maintenance of the pipeline has the potential to introduce new weeds and spread existing weeds. The presence of weeds has the potential to alter fauna habitat values, particularly through modification of vegetation structures and fire regimes. Recommendations aimed at controlling the introduction and spread of weed species are provided in **Section 6**.

5.4.5 *Trenchfall: The Trap Created by the Open Pipeline Trench*

An open trench will be required to facilitate the laying of the pipeline. The trenching will be progressive and therefore the full length of the pipeline will not be open at any given time. The open trench provides a temporary barrier to fauna movement and there is potential for ground-dwelling fauna to fall into the trench and become trapped. Here

trapped species can be exposed to overheating, dehydration, predation and / or drowning. Fauna entrapment within pipeline trenches has been recognised as a key environmental issue by the Australian Pipeline Industry Association Code of Environmental Practice (APIA, 2009).

Published information from other Australian pipeline projects has demonstrated that pipeline trenches can entrap high numbers of a wide diversity of terrestrial animals (including EPBC Act Listed species), particularly reptiles, frogs and small mammals, with the potential for very high levels of mortality (Ayers and Wallace, 1997, Woinarski et al., 2000, Doody et al., 2003, Wilson and Swan, 2004; Wilson, 2005).

5.4.6 Wildfire

Risks of fire may be increased through use of equipment and general construction activities, although generally, work areas are cleared of vegetation and leaf litter. Fire has been included here as a possible threat that needs to be considered in the course of construction activities.

5.4.7 Determination of Potential Impacts for EPBC Act Listed Fauna

A number of EPBC Act Listed fauna species identified as potentially occurring within the proposed pipeline route are species that are nomadic, highly mobile or occupy very large home ranges. These include the Red Goshawk (*Erythrotriorchis radiates*), Squatter Pigeon (*Geophaps scripta scripta*) and Cotton Pygmy-goose (*Nettapus coromandelianus*). Given the small amount of remnant habitat to be cleared by construction of the pipeline corridors, compared to the area over which individuals of these species range, no significant impact is likely upon these species.

Several other EPBC Act Listed fauna species have the potential to be directly impacted if they are present along the pipeline route in woodland and brigalow habitats, but also have preferred habitat types that are well represented in the immediate vicinity of the alignment. These include the Brigalow Scaly-foot (*Paradelma orientalis*), Yakka Skink (*Egernia rugosa*) and Northern Quoll (*Dasyurus hallucatus*). Although there is potential for some direct impact on these species, the small amount of habitat to be cleared combined with the implementation of appropriate mitigation recommendations should result in minimal impacts on these EPBC listed fauna species.

Potentially present EPBC Act Listed species that may be susceptible to entrapment in the open pipeline trench is made up of one frog, seven reptiles and one mammal. These include the Collared Delma (*Delma torquata*), Brigalow Scaly-foot (*Paradelma orientalis*), Yakka Skink (*Egernia rugosa*), Ornamental Snake (*Denisonia maculata*), Dunmall's Snake (*Furina dunmali*) and Northern Quoll (*Dasyurus hallucatus*).

The detailed distributions of several of the EPBC Act Listed fauna species identified are poorly known, as they are particularly secretive or cryptic in their habits. It is therefore difficult to assess the likely presence of these species. These include Dunmall's Snake and Ornamental Snake. In the absence of adequate data the precautionary principle has been applied, and it is assumed that these reptile species are present, particularly in remnant woodland and brigalow habitats on cracking clay soils. As these habitats only make up a small area of the alignment, and provided mitigation measures outlined in **Section 6** are implemented, significant impacts on these species is considered to be minimal.

5.4.8 Impacts on Migratory and Marine Species

In addition to EPBC Act Listed species, the EPBC Act lists Migratory and Marine fauna, of which 2 species were identified by desktop studies and one was identified in field surveys. These species are included in **Table 11** and are bird species that occur fleetingly in the pipeline area. For these species, an assessment was made as to whether the project was likely to:

- lead to loss or modification of habitat important for migratory species (including fragmentation, altered land use, fire regimes, altered nutrient cycle, altered hydrological cycles etc)
- introduce or establish invasive species, and
- disrupt species lifecycle (breeding, feeding, migration, roosting etc).

The level of disturbance proposed to native vegetation and other resources used by fauna is projected to be negligible, and so for migratory and marine species, impacts are projected to be even less. Of the three species, one, the Cotton Pygmy-Goose, is a water bird that occurs in large water bodies and because the pipeline is aligned to avoid large water expanses, impacts on this species are projected to be negligible. The second species, the Swift Parrot, breeds in Tasmania and fleetingly visits and feeds in the southern Queensland during the non-breeding period. Once again, the proportion of feeding habitat affected by the project is minimal and so impacts are projected to be negligible. The third, the White-throated Needletail, is an aerial forager and not known to land or breed in Australia. It ranges over vast areas of the eastern Australia and is not confined to a particular bioregion. It is also highly unlikely that a development such as this would have any impact on the species.

5.5 Potential Impacts on Aquatic Fauna

Freshwater aquatic environments along the pipeline corridors are small in extent and therefore it is recommended that these areas are avoided wherever practicable. In situations where the pipelines have no alternative but to traverse these features (eg water course crossings), the crossings should be made at right angles and should involve minimal clearing. No significant indirect impacts on freshwater aquatic flora are considered likely provided that mitigation measures as outlined in **Section 6** are employed.

5.6 Potential Impacts on Wetlands

The UIC traverses the Condamine River and several nationally significant wetlands occur downstream, including the Ramsar-listed Narran Lake Nature Reserve approximately 450 km to the southwest. As it is approximately 450 km southwest of the pipeline there is low potential for the proposed activities to impact upon this wetland.

6 MITIGATION AND REHABILITATION RECOMMENDATIONS

6.1 Alignment-specific recommendations

From an ecological perspective, Option 2 is considered to be the most desirable option of the two Export Pipeline alignments.. This is due to the significantly smaller areas of Threatened Ecological Communities that fall within the Option 2 corridor. The main negative impact of the Option 2 alignment is that it transects larger remnants of Not of Concern Ecological Communities; however, this is considered to be the least ecological impact.

Other more minor realignment recommendations that were identified during the initial field inspection are shown in **Table 12**.

Table 12 Ecologically Preferred Alignment Suggestions

KP	Reason	Preferred Alignment	Ecological Desirability
Option 1 and Option 2 Export Pipeline Alignments			
4.5-5	Runs along the edge RE 11.4.3 remnant listed as Endangered under both the EPBC and VM Act.	To move the corridor 200m to the east.	High
12.4-12.8	Runs along the edge of freshwater wetland community RE 11.3.27	Move the alignment approximately 100m to the west of this remnant	High
292.7-262.9 and 263.5	Transects two small remnants of the mixed community of RE 11.9.5/11.9.7. RE 11.9.5 is listed as Endangered under the EPBC and VM Act and RE 11.9.7 is listed as Of Concern under the VM Act.	Move the alignment 200 m to the east	High
307	Runs along the edge of an area of State habitat for EPBC Act Listed species	Move the alignment 200 m to the east,	
Option 1 Export Pipeline			
130	Passes through a small mixed community of 11.9.4b/11.9.5 listed as Endangered under both the EPBC and VM Act.	Move the alignment 700 m east	High
177	Passes through a small roadside remnant of RE 11.12.21 listed as Endangered under both the EPBC and VM Act	Move the alignment 200 m to the west	High
Lateral			
43.9	Passes through a small fragment of the EPBC and VM Act Endangered community RE 11.9.5.	Move alignment 150 m to the north.	?
147.4-147.6	Transects a community of 11.9.4 listed as Endangered under both the EPBC and VM Act	Move the alignment 200 m to the east	High
UIC			
2-8.2	Runs through a mixed community of Of Concern communities RE 11.3.2 and RE 11.3.18 and riparian woodlands RE 11.3.25	Move the alignment south of this area	High
147.2-148	Transects 4.14 ha of Endangered Brigalow	Move the alignment 500 m south	High

	Community RE 11.9.5		
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Additional alignment preferences will be identified during the detailed surveys that are expected to be undertaken prior to alignment finalisation.

6.2 Mitigation and Rehabilitation Recommendations

The following mitigation measures will be undertaken to help ensure that significant impacts on flora and fauna are avoided:

- Detailed field investigations will be undertaken of the preferred alignments prior to finalisation
- The corridor impacted for pipeline construction within all areas of remnant vegetation will be minimised (i.e. 40m width). Clearing widths should be minimised wherever possible
- Clearing width will be minimised in beds and banks of watercourses and in areas with Endangered and Of Concern vegetation. It is recognised that battering of steep watercourse banks may require clearing widths in excess of 40m width
- Clearing of remnant vegetation areas will be avoided for the purposes of siting construction camps and where possible, vehicle access tracks
- Existing roads and tracks will be utilised for access where practicable
- Clearing boundaries within remnant vegetation areas will be clearly marked in the field
- Vegetated creeklines, fencelines and road reserves will be crossed at approximately 90 degrees whenever possible and at locations with reduced vegetation to limit the extent of clearing
- The EMP will include appropriate requirements in relation to management of waste and potential contaminants
- A fire extinguisher and personnel trained in fire fighting will be on-hand during welding operations to minimise damage caused by accidental fires
- Topsoil will be removed and re-spread across rehabilitation areas as soon as possible following disturbance (preferably within 12 months)
- Care will be taken to ensure hydrological characteristics are not altered and appropriate soil and erosion management will be implemented in and adjacent to riparian areas
- Drainage will be reinstated at watercourse crossings immediately following completion of construction;
- Ensure no permanent barrier to fish movement at any stage of the Project
- Design, install and maintain effective erosion and sediment control structures during construction and operation (especially near wetlands, watercourses, steep areas and areas of erodible / dispersive soils)
- The treatment and disposal of hydrotest water will be in accordance with the recommendations made in the CSIRO Manufacturing and Infrastructure Technology report (2005)
- Monitoring of weed infestations within disturbed areas will occur at least monthly during construction and then quarterly for a period of two years following construction. Appropriate weed control measures will be applied. Following the two year period, the frequency of monitoring will be reconsidered dependent on the success of control measures and the level of infestations

- A Weed Management Plan that addresses the construction, rehabilitation and operation phases of the project will be prepared prior to construction. This Plan should include hygiene protocols to minimise the likelihood of introduction and spread of environmental, agricultural and declared weeds
- All vehicles and plant will have certification that they are weed-free prior to their initial commencement of works and when moving from weed infested to weed free sections of the pipeline route
- All vehicles will remain on designated access roads and tracks and within defined pipeline construction area and associated work / camp sites
- Whenever practicable fauna handlers will be present to survey for, and as necessary relocate wildlife immediately prior to and during clearing activities
- Trenching will occur progressively to minimise the period of time the trench is open and the length of open trench. The length of open trench at any one time will be the minimum practicable. Ramps and trench plugs with slopes of no greater than 50% (APIA, 2009) will be located at least every 500 m to assist escape for some species. Where possible, trench plugs will coincide with stock and wildlife trails. Some form of cool insulated cover will be provided. Branches, ramped gangplanks or similar will also be used to create 'ladders' at regular intervals to assist small fauna to exit the trench (APIA, 2009)
- Qualified fauna spotters and handlers will be employed to survey the open trench, record and remove any trapped fauna species. Such surveillance will occur along the entire length of the trench and not merely those areas described as fauna habitats or sensitive areas, as trench fall can entrap significant numbers of fauna along any part of the trench
- Fauna spotters and handlers will be qualified or appropriately trained to assess and handle any injuries to native fauna that may occur due to trenchfall. Qualified veterinarian staff will be available to assess and treat or euthanise (as necessary) any large native vertebrates
- Consideration will be given to the use of temporary fencing to exclude access to the trench by livestock and larger native wildlife (APIA, 2009). Fauna searches will be conducted at least daily
- Vegetative waste as a result of clearing will be mulched or distributed across adjacent areas where it may provide refuge for terrestrial species, encourage regrowth and minimise weed infestations. It will not be burnt
- Subject to construction requirements and landholder preferences, trees and shrubs will be allowed to naturally regenerate on those parts of the cleared pipeline corridor that are not required to be kept tree free for pipeline protection and maintenance access purposes
- Linear features such as roads and pipelines will be built to a standard sufficient to allow for their intended purpose but will be allowed to revegetate as much as possible so as to minimise their impact on terrestrial fauna movements
- Vehicle movements will be restricted at night as far as practicable
- Vehicles will travel along the ROW at appropriate speeds that minimise environmental risks

- Areas where initial seeding and natural regeneration is not successful (i.e. has not achieved 50% of the desirable species cover on adjoining undisturbed areas within 24 months) will be reseeded with native groundcover species (or with dominant pasture species in existing pasture areas)
- Rehabilitation of lands will be negotiated with landholders where applicable. Unless infrastructure is to be retained for other use (roads), areas will be ripped and allowed to naturally revegetate. Hardened road surfaces will be removed or regraded to restore the original land surface as much as possible;
- Vehicle tracks will be minimised and defined on alignment sheets following the rehabilitation of the corridor post-construction;
- Where possible, native shrubs will be allowed to regenerate to reduce the barrier to fauna movement, especially for small ground-dwelling fauna; and
- Offsets will be established where impacts to native vegetation and fauna habitats are unavoidable. These areas will be managed with a strong conservation focus and aim to provide vital protection for flora and fauna in this region where other protected areas (Conservation Parks and National Parks) are absent. It is proposed that such areas will have conservation plans developed for them and active conservation management will be undertaken. This would include flora and fauna monitoring to assess the efficacy of conservation practices and to feedback into the development of improved future practices.

6.3 Environmental Offsets

As detailed in **Section 7.7 of Annex A**, an environmental offsets strategy will be developed prior to the commencement of the Project. In summary environmental offsets will be established to meet the requirements of the Queensland Environmental Offsets Policy where clearing within areas of remnant vegetation are unavoidable.

7 CONCLUSION

The proposed mitigation and rehabilitation measures will enable the pipeline corridors to be developed and operated without significant impact on any EPBC Act MNES.

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ATTACHMENT 2 - CURRICULA VITAE

Profile

Ann is the Owner and Director of a small environmental business and has over 20 years experience in environmental assessment, property management plans and mine rehabilitation in Queensland and the Northern Territory. She provides her expertise to Community Group Education with Land for Wildlife, Coast Care programs, nature conservation and catchment management programs. Ann initiates strategies and guidelines for sustainable development and the protection, enhancement and rehabilitation of species and regional ecosystems

Qualifications

Bachelor of Science (Environmental)	University of the Sunshine Coast
Train the trainer courses CN404 Instructional Skills	Cooloola Sunshine Coast Institute of TAFE
Regional Ecosystem Assessment and Accreditation	

Affiliations

Greencorp
 TAFE Greening Australia Community Group training
 Department of Natural Resources

Awards

Australian Federation of University Women Sunshine Coast Branch Science Faculty Award: USC Maroochydoore Shire Bicentennial Foundation Award 1992 – Pursuit of excellence for outstanding achievements in Biology	Scientific permit: No. WISP01050603 from EPA – DPI certificate no.85
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Areas Of Expertise

- | | |
|--|---|
| <ul style="list-style-type: none"> • Environmental surveys, monitoring and mapping • Environmental policy and planning development and review • Biodiversity, conservation significance and environmental impact assessment | <ul style="list-style-type: none"> • Biodiversity Mapping fauna corridors, foreshores, vegetation, waterways and weeds • Environmental monitoring for Developments and Councils |
|--|---|

Relevant Experience

- Biodiversity Mapping Methodology and Ecological Assessments
- Landscape plans Environmental Management Plans
- Weed Management and Environmental monitoring Programs
- Vegetation Management retention of vegetation communities
- Rare and Threatened species and related issues
- Flora and Fauna surveys, Vegetation and species mapping (GIS & GPS)
- Prepare and post auditing under power line for tree removal throughout Queensland
- Assessed several optional routes for (Main Road, Water and Gas pipeline)
- NHT Panel assessing community projects and catchment management initiatives
- Review and verifying Regional Ecosystems in Caboolture and other shires
- Monitoring recreational use and impacts on migratory and resident shorebirds of the Noosa North Shore
- Design and implementation of Greening Brisbane re-vegetation project

Profile

Martin's identification skills have been learnt in the field under the teaching of botanists, field naturalists, the use of the Queensland Herbarium and his own keen observation skills. His involvement in the weed control and re-vegetation of a 35ha area with vine thicket species an example of his knowledge. His expertise in weed control and re-vegetation has been welcomed by many Queensland Councils, EPA Nature refuges, Voluntary Conservation Agreement Landholders as well as CSIRO, West Moreton Landcare Group and New Hope Coal Australia to name a few. He was also involved in the weed control and re-vegetation of a 35ha area with vine thicket species.

Martin has delivered presentations for Ipswich City Council, South East Queensland Catchments, and local Landcare groups on weed control, native plant identification and re-vegetation projects and has issued environmental reports for Councils and the University of Queensland (Gatton Campus).

Career Summary

- | | |
|----------------|---|
| 2007 – Present | Land for Wildlife Extension Officer for Somerset Regional Council |
| 2007 – Present | Land for Wildlife Extension Officer for Lockyer Valley Regional Council |
| 2000 – 2007 | Weed Control Contractor (self employed) <ul style="list-style-type: none"> • Lockyer Valley Regional Council • Somerset Regional Council • Ipswich City Council • EPA Nature Refuges • Land for Wildlife • Voluntary Conservation Agreement Landholders • Voluntary Conservation Covenant Landholders • CSIRO • West Moreton Landcare Group • Black Snake Creek Catchment • Woolshed & Plain Creek Catchment • Oxley Catchment Group • New Hope Coal (Australia) |
| 1998 – 2000 | Lockyer Valley Rainforest Nursery |

Areas Of Expertise

- | | |
|----------------------------|---|
| • Araucarian ecosystems | • Open forest/woodland communities |
| • Microphyll vine thickets | • Regional ecosystems in the Lockyer Valley |

Relevant Experience

- Flora Surveys
- Environmental reports
- Re-vegetation projects
- Weed Control
- Native plant identification

Profile

Bruce Thomson is a senior ecologist and biodiversity planner with extensive experience in a broad range of biological field survey, research environmental management, concept planning, project proposal and development and conservation disciplines. Has worked as a professional botanist, wildlife researcher and conservation manager and has managed scientific and technical staff (project management) and associated budgets and work programs. Government and university background with experience in fauna consultancy work for the mining industry. Bruce has conducted field surveys throughout the Northern Territory for the NT Herbarium and also the Wildlife Research Unit of the Conservation Commission of the NT. He has also conducted wildlife surveys in southeast Queensland for the Queensland Parks and Wildlife Service.

Qualifications

PhD "Social ecology of the Chocolate Wattled Bat, <i>Chalinolobus morio</i> , in southeast Queensland	University of Queensland
Masters of Business Administration (Marketing, Public Sector & Strategic Management)	University of New England NSW
Bachelor of Applied Science (Natural Resource Management)	University of Canberra, ACT

Papers & Publications

- Thomson, B.G., Wits, S. & Martin, P. (1979) Niche Separation in Three Species of Water Birds on Sullivans Creek, A.C.T. *Corella* Vol. 1 (3). RAOU
- Thomson, B.G. (1982) Records of *Eptesicus vulturus* (Thomas) (Vespertilionidae: Chiroptera) from the Alice Springs Area, Northern Territory. *Aust. Mammalogy* Vol. 5: 69 - 70
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- Thomson, B.G. (1995) *Vespadelus caurinus* (species account) in Strahan (ed.) *Complete Book of Australian Mammals*, 2nd. Edn. Reed/ Australian Museum, Sydney
- Thomson, B.G. (1995) *Euphorbia* L. in Dunlop, C. & Leach G. & Cowie, I.D. *Flora of the Darwin Region* Vol.2. Conservation Commission of the N.T.
- Thomson, B.G. (1997) *Defunct Coal Mine Goes Into Bat for Tourists*. Qld Government Mining Journal (Sept), Qld Department of Mines and Energy, Brisbane
- Thomson, B., Clague, C., Ellis, M., Schulz, M. and Young A. (1999) *Little Pied Bat* in Duncan, Baker and Montgomery (eds) *Action Plan for Australian Bats*, Environment Australia, Canberra
- McKenzie, N., Reardon, T. and Thomson, B. (1999) *Central Long-eared Bat* in Duncan, Baker and Montgomery (eds) *Action Plan for Australian Bats*, Environment Australia, Canberra
- McKenzie, N., Schulz, M., and Thomson, B. *Northern Leaf-nosed Bat* in Duncan, Baker and Montgomery (eds) *Action Plan for Australian Bats*, Environment Australia, Canberra
- Thomson, B.G. and Ducummon S. (1999) *Bats in Australia's abandoned mines: a cooperative approach for integrating bat conservation and mine land reclamation* in Proceedings of the 24th Annual Environmental

Workshop, Minerals Council of Australia, Townsville

Thomson, B.G. (1998) *Cooperation to protect rare Cape York Bats*, Qld Government Mining Journal (July), Qld. Department of Mines and Energy, Brisbane

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Thomson, B.G. (2004) Conservation Management of Cave-dwelling Bats in *Protected Area Management (Principles and Practices)*. Oxford University Press

Thomson, B.G., Reardon, T. and Pavey, C. (2004). *Recovery plan for cave-dwelling bats - Rhinolophus philippinensis, Hipposideros semoni and Taphozous troughtoni* 2000 -2005. Report to Department of the Environment and Heritage, Canberra. Queensland Parks and Wildlife Service, Brisbane

Thomson, B.G. (2006) *Australia's Most Deadly and Dangerous Beasts*, Lothian Publishers, Melbourne

Shulz, M and Thomson, B (2007) National Recovery Plan for the Bare-rumped Sheath-tail Bat, *Saccolaimus saccolaimus*. Report to Department of the Environment and Water Resources, Canberra. Queensland Parks and Wildlife Service, Brisbane

Career Summary

2003 – Current	Queensland Parks and Wildlife Service - Senior Conservation Officer (Central Office Secondment) - Bat conservation and policy development
1993 – 2002	Queensland Parks and Wildlife Service - Senior Conservation Officer (Management Planning)
1983 – 1993	Wildlife Research Section, Conservation Commission of the Northern Territory, Alice Springs - Officer in Charge, Northern Territory Southern Regional Herbarium
1981 – 1983	Northern Territory Herbarium, NT Department of Primary Production, Alice Springs - Scientific Research Officer, P2
1979 – 1981	Wildlife Research Section, Territory Parks and Wildlife Commission, Alice Springs - Technical Assistant T2

Areas Of Expertise

- Collection and identification of botanical specimens
- Elliott and large cage trapping and pit fall trapping of small mammals, reptiles and arthropods
- Collection of nocturnal insects using mercury vapour lamps
- Collection and identification of small mammal bone material from Owl pellets and excavated cave floor deposits
- Extensive involvement with Aboriginal Traditional Owners in fauna survey work in the NT
- Bat survey using mist nets, bat traps, water trip lines and echo-location call analysis
- Bird surveys using transect methodologies and anecdotal observations
- Anecdotal observations of wildlife and active searching techniques with spotlights and binoculars etc
- Recording of wildlife with automated camera systems (built by Bruce Thomson)

Relevant Experience

Flora	• Conducted botanical surveys and provided species inventories and biodiversity assessments for numerous development proposals including the Yulara development at Ayers Rock, and acquisition planning for national parks such as Kings Canyon NP, Gregory NP on the Victoria River and parts of the Tanami Desert. A number of my botanical collections are type specimens for newly recognised species • Monitored and conducted ecological studies on two species of rare and endangered plants; a rare palm <i>Livistona mariae</i>, in Finke Gorge National Park and a rare shrub <i>Eremophila prostrata</i> in Rainbow Valley Conservation Reserve (NT) • I conducted taxonomic research into the genus <i>Euphorbia</i> across Australia and described two new species from the northern parts of WA • I curated the NT Herbarium, providing plant identifications and advice to herbarium clients, and also undertook standard maintenance activities for the collection
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	including the supervision of the herbarium computer database and updating and review of taxonomic nomenclature as required
Fauna	- I was involved in the initial capture and captive breeding of the Bilby and Rufous Hare Wallaby (Alice Springs, NT) and conducted dietary studies of the Bilby through faecal analysis - Academic supervision of Masters research project on bat roosting ecology, University of New England (Honorary Research Associate) - Researched the behaviour of bats when negotiating steel grills (on mine entrances) and developed compatible gate designs for the protection of cave and mine sites for cave-dwelling bat species. I successfully gained funding from the mining industry environmental representative body to study mine land rehabilitation in the United States - Conducted flying fox taste and smell deterrent chemical trials for fruit crop protection in conjunction with the Qld DPI and the Queensland Fruit and Vegetable Growers Ltd - Research into the social ecology of the Chocolate Wattled Bat (PhD) using a range of techniques; implanting passive integrated transponder tagging ("microchips"), designing and installing tag reader systems, measuring and analysing microclimate data and conducted structured observational investigations of animal behaviour - I have conducted genetic research using PCR protocols, sequencing and standard analysis using specialised programs such as PAUP, Sequencher and Arlequin, at the Queensland Biosciences Precinct University of Queensland, St Lucia
Conservation Management	- Researched and developed concept plans and project proposals for the sustainable development of tourism on Queensland Park's estates. The process normally involves close liaison with major stakeholders – local councils, park staff, tour operators and local business; an assessment of market size, demand and product requirements; assessment of conservation values and resilience of the environment to sustain development, eg. development proposals for Coomanglah State Forest . I was co-author of the original concept plan for the multi-million dollar, Alice Springs Desert Park, Member of the Steering Committee for the Yulara development at Ayers Rock - Developed and assisted implementation of conservation planning strategies for the management of National Parks in southeast Queensland – conservation management of rare and threatened species, feral animals and weed control strategies, fire management and national park visitor impacts and management. I have also developed monitoring programmes to assess long term trends in resource condition in relation to the above issues; fauna monitoring programmes for the Bunya Mountains National Park in southeast Queensland, feral animal assessments, fire monitoring - Setup on-ground conservation measures to protect roosting habitat for rare and threatened bat species in abandoned mines. Negotiated workable protection measures with other stakeholders including the Department Mines and Energy, Burgowan Colliery near Hervey Bay and Jibinbar State Arsenic Mine near Stanthorpe. Subsequently, DME included amendments to their Guidelines for Hardrock Drilling to endorse the use of these techniques for adit closures (gating) across the State - Designed and provided advice on the construction of several experimental 'artificial caves' at Riverton (by DML Lime Pty Ltd), North Stradbroke Island (by CRL Pty Ltd) and Manumbar (D'Angular Gold Pty Ltd) mining areas - Developed a collaborative conservation plan with Rosalie Shire Council in southeast Queensland, to protect an historic railway tunnel which houses a large population of bent-wing bats each winter. The agreement provides for the use of the tunnel by

visitors during summer. The main section of the tunnel is closed by gates during winter to protect the bats

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|--|--|
| <p>Other Scientific Services – advisory and public relations</p> | <ul style="list-style-type: none"> • Developed a Species Recovery Plan for three species of Qld endangered bats under Australian Government guidelines. I coordinated input from recovery team members: Qld Department of Mines and Energy, Department of Natural Resources, community groups such as the Central Queensland Speleological Society and Chillagoe Caving Club, and research staff from the University of Queensland and elsewhere. Other groups consulted were the Wildlife Preservation Society of Qld and Balkanu Cape York Development Corporation (Aboriginal) • Developed a cooperative program to address abandoned mine gating between QPWS, NSW Parks and Wildlife Service and the Victorian Department of Conservation and Natural Resources. The program will facilitate information exchange and cost share the development of a mines database and staff training materials • Negotiated and implemented an ongoing, cooperative research program between the then Conservation Commission of the NT and the University of Sydney to conduct botanical and invertebrate research on central Australian parks • After representations to fruit growers at packing shed meetings in 1998, I was invited to become a founding member of the Queensland Government's Flying Fox Consultative Committee to explore options for flying fox management on fruit crops. I was a scientific advisor on this panel • Provided advice to the Melbourne Botanic Gardens in respect of their flying fox dilemma and also the Sydney Botanic Gardens, Mt Isa and numerous local authorities in the greater Brisbane area • In the NT, I provided a range of botanical services to the Conservation Commission of the NT and the Department of Primary Production. These services related to the identification of plants, their distributional range and abundance, chemical content (poisons), aboriginal usage and basic ecology; environmental management of rare and endangered fauna, fire, weeds, feral animal damage and control of human impacts on the Conservation Commission's protected area estate |
| <p>Communication</p> | <ul style="list-style-type: none"> • I have negotiated conservation outcomes in difficult situations with potentially hostile stakeholders, as in the case of fruit growers and flying foxes and grazing lessees in State Forests. I have worked closely with Aboriginal groups, both in the field and office, to conduct surveys and involved these important stakeholders in conservation management deliberations • I have presented scientific and conservation papers at Australian and International scientific conventions and I am an invited speaker at the 2007 International Bat Conference in Mexico • I have written numerous documents, from survey reports, to ministerial briefing notes and popular publications. Please see the attached list of publications for further details of published reports and documents • Provided high level advice to senior government departmental staff; regional directors, regional and district managers with respect to conservation management and the strategic management of protected areas. I have conducted workshops and seminars on these topics and have also provided regional representation to head office in relation to conservation issues • I have provided TV interviews for news reports on weed species (Local WIN TV) and appeared in documentaries and children's programs such as Totally Wild (Ch10) and provided interviews to ABC and regional radio networks, to promote conservation |
| <p>Administrative and Financial</p> | <ul style="list-style-type: none"> • Have supervised up to 6 staff, including 3 professional level positions and have administered budgets up to \$150,000. I have successfully applied for numerous |

grants and administered them to the complete satisfaction of the sponsors; C'th Endangered Species grants from \$5,000 to \$20,000, RIRDC grants of \$20,000 and C'th ABRS grants of \$35,000

- Prepared position descriptions, advertised, interviewed and appointed technical, research and field staff with the NT Department of Primary Industries and the Queensland Environmental Protection Agency
- I have managed staff and built effective team environments, developed work programmes and performance measures with team members. I have formal qualifications in HRM through my MBA
- With Queensland Parks and Wildlife Service (QPWS), I have actively participated in the Departments Enterprise Bargaining (E.B. Focus Group member), EEO matters and the development of Departmental Code of Conduct
- I coordinated the QPWS regional industrial placement program for students from University of Queensland to undertake business-related work programmes
- Applied for and negotiated EPA License (Integrated Environmental Management System) for the QPWS Southern Region's protected area estate (toilets and other facilities) as per the Environmental Protection Act 1995. Organised implementation of license conditions
- Coordinated and supervised the preparation of plans of management for the QPWS protected area estate in Southern Region. This is essentially a strategic planning exercise, applied to national parks
- Supported and trained all Regional field staff involved in management and strategic planning activities

Rebecca Goodwin-Pettit

B.Landscape Management & Conservation
Ecologist
Australia



Rebecca is an Ecologist within ERM based in Sydney.

Rebecca holds a Bachelor of Landscape Management and Conservation, majoring in Natural Resource Conservation and Restoration. Her major project focused on the analysis of habitat corridors in wildlife management and conservation, through a feasibility study for a faunal underpass at Soldiers Pinch in the Blue Mountains of New South Wales.

Rebecca has 2-years on-ground experience in bush-regeneration and native revegetation, through her volunteer work with Landcare and Bushcare, and previous employment with Greening Australia. She also has experience in plant identification, mammal tracking, erosion control, weed control, seed collection, habitat assessment and environmental impact assessment.

Fields of Competence

- Flora and Fauna Assessment
- Flora and Fauna Monitoring
- Landscape Ecology
- Bush Regeneration

Education

- Higher School Certificate, Ulladulla High School, New South Wales, Australia.
- Bachelor of Landscape Management and Conservation, University of Western Sydney, Australia.

Languages

- English

Key Industry Sectors

- Ecology
- Land Management

Honours & Awards

- Environment and Conservation Scholarship, University of Western Sydney, 2004

Key Projects

Habitat Assessment for Gujarat Colliery, Wollongong NSW. *Natural Resources Environment Colliery, February 2008*

Rebecca and three field staff conducted habitat assessment, flora and fauna survey, and targeted threatened species searches within Wongawilli West and Wongawilli East sites. The sites were stratified based upon a comparison of biophysical attributes and vegetation units assessed by a desktop analysis of vegetation maps and aerial photography. The assessments were carried out within a 20m by 20m quadrants and recorded vegetation species, dominant species, structural formation class, percentage of vegetation cover (ground, understorey and canopy), fire history, and existing fauna habitat.

Vegetation Monitoring for Marulan Training Area (MTA) Kangaroo Exclusion Fence, Canberra, ACT. *Department of Defence, December 2008*

Rebecca conducted 22 vegetation assessments to determine the potential impacts on the Natural Temperate Grasslands (NTG) and the Box Gum Grassy Woodland (BGGW) associated with the kangaroo population at the MTA, and the effectiveness of the kangaroo exclusion fence erected at the site in 2007. The assessments were carried out within a 20m by 20m quadrants and recorded the percentage of vegetation cover, bare ground, moss, cryptograms, macropod scats, tussock structure, tussock density, herbage mass, dominant tree species and dominant weed species.

British Gas Pipeline, Miles to Gladstone, Queensland. *British Gas, November 2008*

Rebecca conducted 41 fauna habitat assessments along the proposed LNG Pipeline from Miles to Gladstone in Queensland. The surveys included the identification of native bird species, scats, tracks, and hollow bearing tree. Rebecca also identified the overall habitat rating for each site and provided recommendations for avoidance of significant habitats identified.

British Gas Proposed LNG Plant, Curtis Island, Queensland. *British Gas, November 2008*

Rebecca carried out the supervision of survey/clearance of three metre wide access tracks and 10m by 10m drill pads, through endangered Box-Gum Woodland on Curtis Island, and the drilling of boreholes at selected locations carried out by Bechtel/Goulder Associates.

Rebecca was consulted on all movements carried out by Bechtel/Goulder staff throughout the clearing and drilling processes.

Marulan South Quarry, Landscape and Rehabilitation Management Plan. *Boral Quarries, 2008*

ERM was commissioned to prepare a Landscape and Rehabilitation Management Plan for a proposed quarry to extract granodiorite in Marulan in the Southern Tablelands of NSW. The project includes site rehabilitation, vegetation and habitat management, and visual impact assessment. Rebecca was involved in the development of recommended management actions regarding vegetation, earthworks, threatened species and invasive species.

Regional Forestry Agreement (RFA) Access Road Case Study- Morton National Park. *NSW National Parks and Wildlife Service, 2002-2003*

Rebecca conducted a systemic analysis of the management systems that influence the management and sustainability of the RFA access roads in the new additions of Morton National Park, NSW. Information obtained included present management framework, area mapping, and relationships and perspectives of stakeholders, as well as identification of structures, processes and activities for the transformation of an improved system.

Implementation of an Environmental Database. *University of Western Sydney, 2003-2004*

Rebecca composed a database of all academics and environmental practitioners within University of Western Sydney - Hawkesbury campus and their particular areas of expertise and or interest. The project involved a survey of all staff and student groups on Hawkesbury campus, and also a select group of Australian universities, as well as identification of sustainability trends and environmental groups on campus.

Analysis of Habitat Corridors in Wildlife Management and Conservation. *Blue Mountains City Council, 2004-2005*

Rebecca developed a feasibility study, on behalf of Blue Mountains City Council (BMCC) for a faunal underpass at Soldiers Pinch, and assessment of predominate factors relating to faunal underpasses. The project involved investigation of all relevant information regarding the analysis of habitat corridors and conservation, and the ecological effects of roads, as well as identification of strategies used in the construction and maintenance of faunal underpasses.

Rebecca Gibson

Ecologist
Australia



Rebecca Gibson is an Ecologist within ERM's Canberra Office, Australia.

Rebecca completed her Bachelor of Science with First Class Honours at The Australian National University, Canberra, in May 2007. Her majors include 'Sustainability Science' and 'Evolution and Ecology'. Rebecca conducted her Honours project on the feeding ecology of the Mountain Pygmy-possum (*Burramys parvus*), with a focus on conservation management.

Rebecca has undertaken several years of volunteer work with the Department of Environment and Climate Change (DECC) on the population monitoring of *B. parvus*. She has also been employed by DECC to undertake field sampling, laboratory work, analysis and writing of journal articles as an extension of her honours project.

Rebecca has worked with ERM since August 2007 and in this time has gained experience from a wide range of projects including Environmental Impact Assessments, Due Diligence Studies, Environment Scoping Studies, Environmental Management Systems and Natural Heritage Assessments. Many projects have been Defence related and as a result, Rebecca has gained a sound understanding of Defence operations and management. Rebecca is employed as an Environmental Generalist but, due to previous education and experience, is interested in ecological assessments and has a passion for conservation.

Fields of Competence

- Literature Reviews
- Scientific Report Writing
- Data Entry
- Statistical Analysis
- Conducting Small Mammal Population Monitoring
- Conducting Captive Experiments on Small Mammals
- Care of wild (captive) and domestic animals
- Vegetation Surveys in regional ACT and alpine NSW
- Natural heritage assessment
- Risk assessment
- Field work in remote locations
- Biological Sample Preparation for Analysis and Preservation
- Microscopic Analysis

Education

- Bachelor of Science – Zoology and Sustainability Science (1st Class Honours), The Australian National University, 2007.

Languages

- English

Training

- ANU Chemical Safety Certificate (OH&S and Injury Management), 2007
- St. Johns Ambulance Senior First Aid Certificate (Remote Area). Valid to 2009
- Australian Network for Plant Conservation (ANPC) Plant ID Course for ACT Grassland and Grassy Woodland Species, November 2007
- Wildlife Carer Course, RSPCA Wildlife ACT, March 2008. Rebecca is a volunteer wildlife carer.
- Field Assistant Volunteer for the Mon Repos Marine Turtle Conservation Project, Bundaberg QLD, December 2007.

Key Projects

Googong Foreshores Reserve, Heritage Assessment and Heritage Management Plan (May 2008 - June 2008)

ERM was engaged by Department of Finance to undertake a Heritage Assessment of Googong Foreshores Reserve. Rebecca was the ecologist for this project and undertook the Natural heritage assessment of the study area. This included literature review, field surveys, assessment of natural heritage values against the Natural Heritage Charter and Commonwealth Heritage List (CHL) criteria, and report write up. Rebecca also assisted in providing recommendations for the Heritage Management Plan for Natural Heritage Values.

HMAS Harman and Bonshaw, Heritage Assessment (February 2008 - April 2008).

ERM was engaged by Defence to undertake a Heritage Assessment of HMAS Harman and Bonshaw. Rebecca was the ecologist for this project and undertook the Natural heritage assessment of the sites. This included literature review, field surveys, assessment of natural heritage values against the Natural Heritage Charter and Commonwealth Heritage List (CHL) criteria, and report write up.

Enhanced Land Force (ELF) Stage 1 Environmental Scoping Study for Defence (November 2007 - July 2008).

ERM was engaged by Defence to provide consultancy services for the design, construction, maintenance and operation of the Enhanced Land Force (ELF) Stage 1 Project incorporating proposed infrastructure for numerous bases and training areas throughout Australia. Rebecca was the Project Co-ordinator for this large project and worked closely with Troy Powell, the Project Manager, in project set-up, co-ordination of work schedules and report collation. Rebecca was also one of the ecologists to undertake field work in determining the presence and condition of the critically endangered ecological community Box - Gum Grassy Woodland and Derived Native Grasslands at Kapooka, as well as further desktop research for the addendum to the ESS (ELF Variation). Rebecca assisted in the provision of recommendations and report write up.

Environmental Management System (EMS)

Development for RMC Duntroon & ADFA, as well as a regional EMS for ACT/SNSW (2007 - current).

ERM was commissioned to provide in-house consultancy services within the ACT/SNSW regional office to develop the EMS for ADFA and RMC Duntroon, and the ACT/SNSW region as a whole. Rebecca works 2-3 days per week in the Brindabella Offices and communicates regularly with the ACT/SNSW Regional Environmental Officers and Senior Environmental Manager. Rebecca adds value to the Defence EMS project team because:

- She is based locally and can inform the project team on site specific issues; and
- Rebecca has a strong grounding in ecological assessments within the ACT region.

Rebecca has gained a strong understanding of Defence activities and environmental management. Rebecca is experienced in undertaking Risk Assessments using the Defence Risk Assessment Tool.

Land Development Agency, Kingston Foreshore Development Project (Kingston, ACT, 2007 - current).

ERM have been engaged to provide specialist advice and consulting services during the bulk earthworks for the future Harbour. The site is located on contaminated land. Rebecca is currently assisting the ERM team in undertaking regular inspections of contractor activities and providing liaison between the contractor and approved Site Auditor. Rebecca has gained knowledge of Commonwealth, Territory and local legislation and its application. In addition, she has experience in the identification, assessment and remediation of contaminated land.

Vegetation Assessments at Majura Training Area, ACT (September 2008)

Rebecca participated in field surveys of vegetation condition and herbage mass at Majura Training Area in the ACT as part of ongoing surveys monitoring kangaroo grazing pressures and kangaroo condition at the Defence site. Rebecca assisted in plant identification, herbage mass assessment and other data collection in the field.

British Gas LNG Facility, habitat assessment of pipeline, fauna surveys of LNG Facility site and Bushfire Management Plan (August 2008 – current).

Rebecca participated in fieldwork assessing the ecological impacts along the proposed 400km pipeline route for the LNG Facility from Curtis Island QLD to the gas fields approximately 400km west of Gladstone QLD. This involved assessment of habitat quality and incidental fauna observations. Rebecca also participated in mammal surveys, including terrestrial mammal trapping and nocturnal spotlight searches, on Curtis Island, including terrestrial trapping and setting out hair tubes. Rebecca has assisted in the drafting of the Bushfire Assessment and Bushfire Management Plan for the LNG Facility on Curtis Island.

Gujarat RNE, V-mains Ecological Impact Assessment and Subsidence Management Plan (November 2008 – December 2008)

Rebecca assisted with mammal surveys, including terrestrial mammal trapping and nocturnal spotlight searches, and vegetation mapping of the V-mains impact area of the Gujarat Mine near Woollongong, NSW. In addition, incidental fauna observations and targeted amphibian, reptile and bird searches were undertaken. Rebecca also assisted in drafting the Ecological Impact Assessment for this project, including a 7-part test for the threatened species significance assessment.

Ashton Coal Mine, Biannual Monitoring and South-East Open Cut Ecological Impact Assessment (October 2008 – November 2008).

Rebecca assisted with mammal surveys including terrestrial and arboreal mammal trapping and nocturnal spotlight searches, targeted threatened species searches and incidental observations within the Southern Woodlands conservation area, as part of the Biannual Monitoring program for the subsidence impacts of a nearby Ashton Coal Longwall Mine. In addition, Rebecca assisted in fieldwork for the flora and fauna impact assessment of a proposed open cut site in the coal seams of Singleton NSW. This included habitat assessment, vegetation mapping and incidental fauna observations. Rebecca drafted the Ecological Impact Assessment for the proposed open cut mine, including a 7-part test for the threatened species significance assessment

Garden Island, WA, Spatial Environment and Heritage Management Plan (January 2009 – Current)

ERM was engaged by Defence to undertake a Heritage Review of the Naval Base, Garden Island and to develop a spatially-based Environment and Heritage Management Plan.

Rebecca was one of the ecologists for this project and undertook the natural heritage assessment of the sites. This included literature review, field surveys, review and validation of natural heritage values against the Natural Heritage Charter and Commonwealth Heritage List (CHL) criteria, and report write up. Rebecca is also providing input into the spatial mapping and management recommendations.

Bindoon Defence Training Area, WA, Heritage Management Plan (January 2009 – Current)

ERM was engaged by Defence to undertake a Heritage Review of the Bindoon Defence Training Area, WA and to develop a spatially-based Heritage Management Plan. Rebecca was one of the ecologists for this project and undertook the natural heritage assessment of the sites. This included literature review, field surveys, review and validation of natural heritage values against the Natural Heritage Charter and Commonwealth Heritage List (CHL) criteria, and report write up. Rebecca is also providing input into the spatial mapping and management recommendations.

CURRICULUM VITAE

Dr DAVID ANDREW ROHWEDER

GENERAL INFORMATION

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Email: sandpipereco@optusnet.com.au
PO Box 401, ALSTONVILLE, 2477

Date of Birth: 27 December 1968

Qualifications: PhD, waterbird ecology - SCU
B. App. Sci (Hons), Coastal Management - UNENR
Dip App. Sci, Resource Management – NRCAE

EMPLOYMENT HISTORY

- 1996 to present – Director, Sandpiper Ecological Surveys Pty Ltd.
- 2003 to 2005 – Partner, Sandpiper Environmental.
- October 2001 to October 2003 – Conservation Planning Officer & Project Officer for NSW National Parks and Wildlife Service
- April to June 2001 – Planning Officer for the NSW National Parks and Wildlife Service.
- May 1999 to December 1999 – Project Officer for Birds Australia.
- December 1998 to March 1999 – Project Officer at Gunninah Environmental Consultants
- January 1997 to May 1998 – Project Officer at Centre for Coastal Management, SCU.
- 1995 – Lecturer in Wildlife Conservation in School of Resource Science and Management, SCU
- 1992 to 1998 – Tutor in the School of Resource Science & Management, SCU.
- 1988 to 1989 – Project Officer for Greening Australia.

AREAS OF EXPERTISE

- Ecology of coastal vertebrate communities.
- Ecology of wetland fauna.
- Targeted surveys for threatened fauna.
- Ecological monitoring.
- Environmental Impact Assessment.
- Survey design and data analysis.
- Hollow tree assessments and pre-clearing surveys
- Report preparation.
- Peer reviews.

PUBLISHED JOURNAL ARTICLES

- Lewis, B. D. & Rohweder, D. A. (2005). Distribution and habitat requirements of the giant barred frog (*Mixophyes iteratus*) in the Bungawalbyn Catchment, northern NSW. *Pacific Conservation Biology*: **11**, 189-197.
- Mellish, G. & Rohweder, D. A. (in prep). Reconstructing the diet of the beach stone-curlew (*Esacus neglectus*) using faecal analysis.
- Owner, D. & Rohweder, D. A. (2003). Distribution and habitat of pied oystercatchers (*Haematopus longirostris*) inhabiting ocean beaches in northern NSW. *Emu*: **103**, 163-170.
- Rohweder, D. A. (1996). Nocturnal habitat use and foraging behaviour of Pacific Golden Plover (*Pluvialis fulva*) in northern NSW – Abstract. Page 56 in Proceedings of the Southern Hemisphere Ornithological Congress, RAOU, Melbourne.
- Rohweder, D. A. (1997). Observation of attempted raptor predation on migratory waders in northern NSW. *Stilt*: **31**, 41.
- Rohweder, D. A. (1999). An evaluation of three methods used to attach radio-transmitters to migrant shorebirds (Sub-Order Charadrii) in northern NSW. *Corella*: **23**, 7-10.
- Rohweder, D. A. (2001). Nocturnal roost use by migratory waders in the Richmond River estuary, northern NSW. *Stilt*: **40**, 23-28.
- Rohweder, D. A. (2003). Population census for Beach Stone-Curlew (*Esacus neglectus*) in northern NSW. *Australian Field Ornithology*: **20**, 8-16.
- Rohweder, D. A. (2004). Survey of shorebirds in the Bellinger River Estuary, northern New South Wales. *Stilt*:
- Rohweder, D. A. (2007). Temporal variation in the shorebird population in the Tweed River Estuary, northern NSW, 1987 to 2003 – *Australian Zoologist*: **34**, 125-132.
- Rohweder, D. A. (in prep). Conservation status of shorebirds (sub-order Charadrii) in NSW.
- Rohweder, D. A. & Baverstock, P. R. (1996). Preliminary investigation of nocturnal habitat use by migratory waders (Order Charadriiformes) in northern NSW. *Wildlife Research*: **23**, 169-184.
- Rohweder, D. A. & Baverstock, P. R. (1999). Distribution of platypus *Ornithorhynchus anatinus* in the Richmond River catchment, northern NSW. *Australian Zoologist*: **31**, 30-37.
- Rohweder, D. A. & Lewis, B. D. (2002). Night-day habitat use by Double-banded Plovers *Charadrius bicinctus* in the Richmond River Estuary, northern NSW. *Corella*: **26**, 33-37.
- Rohweder, D. A. & Lewis, B. D. (2004). Night-day foraging behaviour of double-banded plover (*Charadrius bicinctus*) in the Richmond River estuary, northern NSW. *Notornis*. **51**, 141-146.

CONSULTING REPORTS

I have prepared over 100 consulting reports ranging in size from brief data summaries to detailed supporting documents for Environmental Impact Statements. Reports have been prepared in the following areas:

- Supporting documents for Environmental Impact Statements, Reviews of Environmental Factors & Statements of Environmental Effects;
- General fauna assessment reports;
- Species specific survey reports;
- Species Impact Statements;
- Monitoring reports;
- Statements of Evidence for court proceedings; and
- Peer reviews.

Examples of my reports can be provided in digital format upon request.

PROJECT MANAGEMENT

David has had considerable experience managing small teams of staff in both field and office situations. Some of the projects that have involved project and staff management include:

- Large scale fauna surveys for the Clarence Valley Regional Water Supply Project when I was in charge of a team of three field staff.
- Preparation of four Development Applications for residential dwellings on 200ha of land at South Ballina, northeastern NSW. This project involved coordinating the activities of a large project team, including planners, contaminated lands specialists, bushfire specialists, archaeologists, engineers, and ecologists.
- Coordinating of a team of ecologists to prepare threatened species profiles for Byron Shire Council.
- Managed a small business for over 10 years and worked on numerous joint projects with other consulting firms.

MAJOR INFRASTRUCTURE PROJECTS

Brisbane Aquifer Project

- Designing a program to monitor the impact of groundwater extraction on wetland vertebrates. The project involved baseline surveys and analysis to identify potential vertebrate indicators of changes in groundwater discharge; the design of a monitoring program and the collection of baseline data – Brisbane City Council (2007).

Bulahdelah Bypass

- Identification of potential hollow bearing trees, pre-clearing surveys, clearing supervision and nest box assessment and installation – Abigroup (2007).
- Survey to determine the distribution of wallum froglets in the vicinity of the Bulahdelah Bypass and determine appropriate impact amelioration measures - Abigroup (2008).

Bundacree Creek to Possum Brush Pacific Highway Upgrade

- Hollow bearing tree identification and clearing surveys - Baulderstone Hornibrook (2004).
- Assessment of nest-box requirements and placement of nest-boxes – Baulderstone Hornibrook (2006).
- Monitoring use of nest boxes by vertebrates – Bilfinger Berger Services (2008-2009).

Clarence/Coffs Regional Water Supply Project

- Systematic riparian fauna surveys for the proposed Regional Water Supply Project - NSW Department of Public Works (1997).
- Vertebrate fauna survey for the proposed Shannon Creek Dam – NSW Department of Public Works (1997).
- Review of SIS for the proposed Shannon Creek Dam - ERM Australia (1998).
- Targeted surveys for brush-tailed rock wallaby, large-footed myotis, greater broad-nosed bat, giant barred frog and black bittern – NSW Dept of Public Works (1998).

Coopernook to Herons Creek Pacific Highway Upgrade

- Hollow bearing tree identification - Parsons Brinkerhoff (2007).
- Pre-clearing surveys and clearing supervision - Coopernook to Herons Creek Alliance (2007-2008)
- Baseline ecological assessment for the proposed Camden Haven and Rossglen haul roads and batch plant water supply dam and verification of EEC mapping - Coopernook to Herons Creek Alliance (2007-2008).
- Installation of nest boxes - Coopernook to Herons Creek Alliance (2007-2008).

Gujarat Coal Mine Extension

- Targeted diurnal and nocturnal bird surveys for proposed extensions to the Gujarat Coal Mine, Wollongong – ERM Australia (2006).

Karuah Bypass

- Glider crossing monitoring program (Bilfinger Berger Services 2008).

Karuah to Bulahdelah Pacific Highway Upgrade

- Selection of nest box locations K2B section1 – Baulderstone Hornibrook (2007).
- Installation of nest boxes K2B sections 2 and 3 – Abigroup (2008).
- Hollow-bearing tree identification and clearing surveys for sections 1, 2 & 3 – Abigroup (2007) and Baulderstone Hornibrook (2004).
- Monitoring of glider crossings and underpasses for section 1 – Bilfinger Berger Services (2007 - 2008).
- Assessment of proposed glider crossings, section 1 - Baulderstone Hornibrook (2005).
- Design and implementation of *Tetratheca juncea* monitoring program, section 1 – Baulderstone Hornibrook (2004).
- Supplementary SIS for the Pacific Highway Upgrade, Karuah to Bulahdelah - NSW RTA (2000).
- Assessment of the impact of the Karuah to Bulahdelah Pacific Highway Upgrade on *Angophora inopina* – NSW RTA (2000).

- Compensatory Habitat Assessment – RTA (1999).
 - Independent review and evaluation of the SIS and EIS - NSW RTA (1999).
 - General fauna survey - NSW RTA (1998).
- Kempsey Bypass**
- Vertebrate fauna surveys for the Kempsey Bypass Species Impact Statement – Lewis Ecological Surveys (2004-2005).
- Newee Creek Rail Deviation**
- Vertebrate fauna survey for the proposed Newee Creek rail deviation – Rail Services Australia (2001).
- Tugun Bypass**
- Monitoring grass owl, brahminy kite and bush-hens during the construction phase of the Tugun Bypass – Pacific Link Alliance (2006-2009).
 - Preliminary flocking surveys for the Tugun Bypass – Pacific Link Alliance (2006-2007).
 - Assessment of the impact of the proposed Tugun Bypass on Avifauna - Qld Dept of Main Roads (2000-2001).
- Twin Hills Silver Mine**
- Vertebrate fauna survey for the proposed Twin Hills Silver Mine, Texas – MACMIN NL (2000).
- Upgrading the Pacific Motorway**
- Vertebrate fauna and flora survey, and assessment of the Koala Funnel Tunnel, Pacific Highway, Qld – Rust PPK (1996).

MINOR INFRASTRUCTURE PROJECTS

- Byron Town Centre Bypass**
- Species Impact Statement for Stage One of the Proposed Byron Town Centre Bypass - Byron Shire Council (2001).
 - Assessment of impacts on threatened fish: Stage One – Byron Town Centre Bypass – Byron Shire Council (2001).
- Effluent Reuse Projects**
- Ecological assessment for the proposed Tyagarah effluent reuse pipeline - Byron Shire Council (2005).
 - Hollow tree assessment and clearing supervision for the Alstonville reclaimed water project - Ballina Shire Council (2005).
 - Review of Species Impact Statement (SIS) for the Byron Bay Sewage Scheme - Byron Shire Council (2001).
- Foreshore Protection**
- Review and evaluation of proposed emergency foreshore protection works at the Byron Bay Beach Resort – Byron Shire Council (2005).
 - Statement of evidence for court proceedings.
- Floodgate Management**
- Assessment of the impact of floodgate modification on comb-crested jacana at the Baggotville Barrage - Richmond River County Council (2001).
- Gwydir Highway**
- Targeted hollow dependent fauna survey at Mulligans & Cangai Bluffs, Gwydir Highway - NSW RTA (2006).
 - Assessment of nest-box requirements and placement of nest-boxes, Mulligans and Cangai Bluff Slope Stabilisation Project – NSW RTA (2006-2007).
 - Pre-clearing fauna surveys – NSW RTA (2006-2007).
 - Assessment of the impact of slope stabilisation works at Mulligans and Cangai Bluffs, Gwydir Highway – NSW RTA (2004).
- Local power supply projects**
- Preliminary fauna (terrestrial & aquatic) assessment for the Laverty's Gap to Terranora underground power line and upgrading of the Terranora and Laverty's Gap Electricity Sub-stations – ERM Australia (1999).
 - Assessment of the impacts of upgrading the Byron No. 1 and Byron South Feeders on threatened Fauna – Northpower (2000).
 - Route selection for a proposed underground power cable at the Bogangar Sub-station - Northpower (2000).
- Pacific Highway**
- Ecological assessment and targeted fauna survey for proposed upgrading of the Pacific Highway at New Italy - NSW RTA (2004).
 - Assessment of the impact of widening the Pacific Highway between Coolgardie Road and Whytes Lane on fauna – NSW RTA (2004).
 - Assessment of clearzone enhancement works on the Pacific Highway, Halfway Creek – NSW RTA (2004).
- Quarries**
- Fauna survey for a proposed sand quarry, Kangaroo River, Coutts Crossing – GHD (2005).
 - Targeted survey for *Crinia tinnula* at Rileys Hill Rock Quarry - ERM Australia (2000).
- Summerland Way Upgrade**
- Assessment of the impact of the proposed upgrade of the Summerland Way at Dairy Flat on fauna and flora – NSW RTA (2003-2004).
 - Vertebrate fauna survey for the proposed upgrading of the Summerland Way at Grevillia – NSW RTA (2001).

- Vertebrate fauna survey for the proposed upgrading of the Summerland Way at Dairy Flat – NSW RTA (2001).

Vincentia Town Centre Project

- Targeted nest surveys for Glossy Black Cockatoo – ERM (2007)
- Pre-clearing surveys and clearing supervision – ERM (2007).

RESIDENTIAL DEVELOPMENTS

Ballina Shire

- Fauna survey and constraints analysis for the proposed rezoning of land at Ross Lane, Lennox Head – 21st Century Builders (2005).
- Targeted fauna survey of lots 113, 4, 64, 89, 90 & 91, Empire Vale, South Ballina. – P. Menegazzo & Co. (2005).
- Supplementary reports and Environmental Management Plans for lots 113, 4, 64, 89, 90 & 91, Empire Vale, South Ballina. – P. Menegazzo & Co. (2006).
- Targeted fauna survey to assess the impact of dwelling and infrastructure construction on lot 1, Moylans Lane South Ballina – M. Howes (2004).

Byron Shire

- Assessment of the impacts associated with a proposed residential development at Shara Boulevard, North Ocean Shores – Polepic P/L (2001).
- Review and evaluation of the ecological assessment for the proposed subdivision of part lot 17 DP 270338, Sallywatlie Drive and Kalemajere Drive, Suffolk Park. – Byron Shire Council (2004)

Cessnock Shire

- Review of SIS for the proposed Hunter Lakes Resort for Cessnock City Council (2001).

Clarence Valley Shire

- Fauna survey for the proposed Grafton Airpark – Clarence Valley Council (2005).

Hastings Shire

- Vertebrate fauna survey for a proposed residential development at Pacific Palms, NSW – ERM Australia (1999).

Tweed Shire

- Vertebrate fauna survey for a proposed resort development at Kings Beach, Kingscliff – Gunninah Environmental Consultants (1998).
- Assessment of Core Koala habitat, EEC and SEPP 14 Wetlands at Kings Forest, Kingscliff (2006) – NSW Department of Planning.
- Preparation of eight-part test for Stages 3 and 4 of Koala Beach – Australian Koala Foundation (2001).
- Casuarina Beach Environmental Management Plan – provision of background information on the management of fauna – NOREDO (2001).

MONITORING PROGRAMS

Threatened Terrestrial Birds

- Monitoring the distribution and status of Eastern Bristlebirds in northern NSW – NSW Department of Environment & Conservation (1999 – 2007).
- Design and Implementation of a long-term vegetation monitoring program to assess the post-fire recovery of eastern bristlebird habitat in northern NSW – NSW Department of Environment & Conservation (1999-2007).

Wetland Vertebrates

- Monitoring wetland birds and wallum frogs for the Salty Lagoon Ecosystem Recovery Monitoring Program – Worley Parsons (2008-2009).
- Providing specialist input to the design of the Salty Lagoon Ecosystem Recovery Monitoring Program – John Wilson & Partners (2007).
- Design of a program to monitor the impact of groundwater extraction on wetland vertebrates – Brisbane City Council (2007).
- Monitoring bird and frog populations in Eighteen Mile Swamp, North Stradbroke Island – Redland Shire Council (2005-2006).
- Baseline survey of migratory shorebirds in Twelve Mile Creek, Salt Ash Air Weapons Range, Port Stephens – SKM (2007).
- Monitoring of estuarine birds in the Tweed River Estuary between 1997 and 2002 - Tweed Shire Council.
- Assessment of methods used to monitor bird populations at Bicentennial Park Homebush Bay – Bicentennial Park Trust (2000-2001).
- Little Tern monitoring program, Tweed River Estuary – Dept of Land & Water Conservation (1999-2000).
- Monitoring of Shorebirds in the Richmond River Estuary - NSW NP&WS (1996-1998).

Bird Strike

- Monitoring of bird strike at Maroochydore Airport – Sanctuary Pest Management (1998).
- Monitoring of bird strike at Coolangatta Airport – Sanctuary Pest Management (1998).

Platypus & Turtles

- Monitoring platypus and turtle populations during the operational and construction phases of the Walla Weir, Burnett River, Sunwater (1997-2004).

Highway upgrades

- Monitoring of glider crossings and underpasses for section 1 of the Karuah to Bulahdelah Pacific Highway Upgrade – Baulderstone Hornibrook (2007).
- Design and implementation of *Tetratheca juncea* monitoring program, section 1 of the Karuah to Bulahdelah Pacific Highway Upgrade – Baulderstone Hornibrook (2004)

SPECIALIST SURVEYS & ASSESSMENTS

- Assessment of the impact of effluent irrigation on Bird Strike Risk at the Evans Head Aerodrome, Richmond Valley Council (2007).
- Population census for beach stone-curlew in northern NSW, for the NSW NP&WS (2000).
- Habitat assessment for eastern bristlebirds in northern NSW for the NSW NP&WS (1999).
- Estuarine and coastal wetland bird surveys – Natural Resource Audit Council (1994).
- Review of Environmental Factors (REF) for proposed burns in eastern bristlebird habitat in the Border Ranges National Park – NSW NP&WS (2000).
- REF for Fire Management Plan, Goobang National Park – NSW NP&WS (2000).
- Survey to assess the impact of human recreation on the riparian and aquatic fauna of Tucki Tucki Creek, Lismore - Lismore City Council (1993).
- Systematic fauna survey of Nymboi-Binderay National Park, NSW NPWS (2000).
- Assessment of the impact of removing aquatic weeds on threatened waterbirds at Vintage Lakes – Tweed Shire Council (2001).

CONSERVATION PROGRAMS

- Preparation of Species Profiles for a threatened fauna within Byron Shire. Byron Shire Council (2007)
- Preparation of a Decision Making Framework for the National Shorebird Conservation Project (2006) – WWF Australia
- Shorebird Values & Threats in the Clarence Estuary: A guide for Clarence Valley Council Staff – WWF Australia (2006).
- Mapping of shorebird roost and foraging habitat in the Clarence River Estuary – WWF Australia (2006).
- Preparation of a Shorebird Issues Paper for the Clarence River Estuary, northern NSW (2004) – WWF Australia.

PLANS OF MANAGEMENT

- Management guidelines for the Micalo North Shorebird Roost – WWF Australia (2006).
- Boyters Lane Wetland Plan of Management, (2004) – Kempsey Shire Council.
- Preparation of a Koala Plan of Management for the proposed Port Macquarie Link Road, ERM Australia (2001)

COURT EXPERIENCE

- Expert witness – NSW Land & Environment Court (DAVFAST v Ballina Shire Council) – Ballina Shire Council (2000).
- Expert witness – NSW Land & Environment Court (Becton v Byron Shire Council) – Byron Shire Council (2005).
- Expert witness – NSW Land & Environment Court (Ringtank v Dept of Planning & Ballina Shire Council) – Ringtank 2007.

EDUCATIONAL PROGRAMS

- Lecturer in Wildlife for students from Ball State University – Ball State University Australia Centre, Lennox Head (2003 - 2006).
- Coordinator of a community Shorebird Monitoring Program in the Clarence River Estuary, northern NSW – WWF Australia (2004).
- Public Awareness Program – The potential impacts of reduced water quality on platypuses in Tucki Tucki Creek – Lismore City Council (2000).
- Preparation of a Public Information Brochure on the importance of Letitia Spit for Shorebirds – NSW DLWC (2000).
- Lecturer in Techniques in Wildlife Conservation - Southern Cross University, Lismore (1995)
- Tutor in Aquatic Ecology and Wildlife Biology – Southern Cross University (1992 to 1996).

David Charley

Curriculum Vitae



David has extensive knowledge and experience as a field ecologist. He has wide-ranging expertise relating to the study and survey of both flora and fauna with a particular focus on threatened birds and mammals. David worked for the National Parks and Wildlife Service for over 23 years gaining valuable experience in the study and management of our natural resources including bushfire management, Threatened species management, pest species management and general land management. Since leaving the NSW National Parks and Wildlife Service David worked as an Environmental Consultant for ASPECT north (now LandPartners Limited) where he was involved in a number of projects assessing the impacts of various developments on the environment; and, more particularly assessing the potential impacts on flora and fauna. He also provided advice on projects involving remediation of degraded land. More recently, he has established a private consultancy where he has been involved in threatened species management and monitoring, liaison with private landholders concerning threatened species habitat management, pest species management as well as targeted surveys for threatened fauna.

Contact Details

Wildsearch Environmental Services

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Via BALLINA NSW 2478

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Mobile: 0448 865 308

Email: d.charley@bigpond.com

Qualifications and Memberships

Field Biologist

Bachelor of Science (UNE) 1981

Member of: Ecological Consultants Association of NSW; Zoological Society of NSW; Australasian Bird Study Association; Australasian Ornithologists Union (Birds Australia); Bird Observers Club of Australia; NSW Field Ornithologists; South Australian Ornithologists Union; Birds Queensland.

Professional Experience:

- Founding member of the Eastern Bristlebird Recovery Team - Northern Working Group and NSW representative on the National Recovery Team (1989 – 2003);
- Founding member of the Coven's Fig-parrot Recovery Team (1990 – 2003);

- Team Leader and Assistant Team Leader North-east Forests Biodiversity Study (NEFBS) – fauna survey (1990 – 1992);
- 25 years bushfire management / bushfire control in all regions of NSW. Trained and experienced at the Incident Management Team level where I have been required to act in the Incident Controller, Operations Officer, Planning Officer and Divisional Commander roles. I have attended over 100 bushfires or hazard reduction programs throughout the state.
- NPWS liaison officer with Southern Cross University undergraduate and graduate research program (1992 – 2004). Required to undertake the role of fauna survey supervisor / demonstrator / guest lecturer and undergraduate research project supervisor, Southern Cross University. Coordinated a co-operative research program between the University and the Northern Rivers Region of NPWS;
- Endangered species recovery program (Ripple-leaved Muttonwood), habitat restoration and rehabilitation, Kyogle Management Area;
- Joint coordinator of the Osprey management and recovery program, Lismore District 1988 – 1994;
- Past member – “Caldera Parks and Reserves Plan of Management” Steering Committee;
- Past member – “The Parks and Reserves of the Northern Richmond Range Plan of Management” Steering Committee;
- Past member of the Richmond Catchment Management Committee;
- 30 years amateur ornithologist / birdwatcher;
- Conducted or participated in numerous fauna surveys and biodiversity assessments throughout NSW including: proposed additions to Bundjalung National Park; Mount Nullum Comprehensive fauna surveys; numerous pre-hazard reduction fauna surveys – Northern Rivers Region;
- Targeted surveys for the Coxen's Fig-Parrot, Northern NSW / Southeast Queensland; Coordinated and lead targeted surveys for the Hastings River Mouse in Border Ranges National Park; On-going research into the diet of the Barn Owl in the Lake Eyre Basin, Northern South Australia.

Specialisations:

Endangered Species Management and Monitoring

Comprehensive and targeted Fauna Surveys and Research

Flora and Fauna Assessments

Species Impact Statements / Recovery Planning

Other Skills:

Senior First Aid Certificate

Smarttrain – Chemical Application Certificate

"Green Card" General Induction for Construction Work in NSW issued by Workcover

Extensive four-wheel drive experience / 4wd Certified (NSW NPWS records - 1981)

Trained and experienced with ArcView Geographic Information Systems (ARCVIEW 0.3)

Extensive experience with avifauna, mammals and herpetofauna throughout Australia

Extensive experienced in remote area survey and fieldwork

Experience in light aircraft and helicopters wildlife surveys/ monitoring programs

Extensive experience / training in Incident Management Systems (ICS) and fire fighting operations

Fox Den fumigation training (NSW NPWS)

Licences/ Permits

Scientific Licence Issued by NSW Department of Environment and Climate Change.

Animal Care and Ethics Committee approvals issued by NSW Department of Agriculture.

Animal Care and Ethics approval issued by Queensland Department of Primary Industries and Fisheries.

Scientific Purposes Permit issued by Queensland Parks and Wildlife Service.

NSW Drivers licence

Employment History:

2005 - Present. Partner, Wildsearch Environmental Services;

2004 - 2007. Environmental Project Officer, ASPECT north limited (Now LandPartners Limited).

1985 - 2004. Twenty years as a ranger and senior ranger with the NSW National Parks and Wildlife Service (now the Department of Environment and Climate Change (NSW)) - Broken Hill District and Lismore District (now Northern Rivers Region);

1981 - 1985. Temporary ranger and project officer various locations. NSW National Parks and Wildlife Service - Armidale District, North Metropolitan District, Blue Mountain District, Kosciuszko National Park;

1981. Temporary technical officer with the Australian Museum, Sydney;

1981. Volunteer field assistant, NSW National Parks and Wildlife Service.

Consulting Experience**2004 – Current (Selective)****2008**

- Review of Environmental Factors for Eastern Bristlebird Habitat Rehabilitation – Long Creek, Richmond Gap, Grassy Spur, Border Ranges National Park, Department of Environment and Climate Change (NSW);

- Review of Environmental Factors for Prescribed Fire for Lantana Control at Sheepstation Creek, Border Ranges National Park, Department of Environment and Climate Change (NSW);
- Eastern Bristlebird Habitat Enhancement and Rehabilitation on Private Lands in NSW – Stage 2, Northern Rivers Catchment Management Authority;
- Red Fox Monitoring and Control, Private Lands adjacent to Yabbara National Park, Northern Rivers Catchment Management Authority;
- Rufous Bellong Survey and Monitoring, Yabbara National Park for Northern Rivers Region, NSW National Parks and Wildlife Service;
- Cane Toad Survey of Tooloom, Richmond Range National Parks and Captains Creek Nature Reserve, NSW Department of Environment and Climate Change;
- Spotted-tailed Quoll Monitoring and Survey – Nightcap and Bundjalung National Parks, Tabletop Swamp Nature Reserve and Whian Whian State Conservation Area;
- Targeted fauna survey – Lot 1 DP874387, Patches Beach, Ballina Shire;
- Comprehensive fauna survey – Cumbalum Ridge, Lennox Head, NSW;
- Targeted Koala surveys – Innes Lake property, Port Macquarie, NSW;
- A Comprehensive Survey of the Mangrove Honeyeater and Collared Kingfisher in NSW - current private project;
- Osprey population / nest site monitoring in the Richmond and Evans Estuaries, North-east NSW – current project.
- Voluntary Conservation Agreement Surveys, NSW Northern Tablelands and Northern Rivers Regions –property flora, fauna habitat assessments- on-going contract to the NSW DECC, Sydney;
- Long-term Hastings River Mouse and ground mammal population survey and monitoring, Border Ranges National Park.

2007

- Red Fox Monitoring and Control – Stage 2, Private lands adjacent to Yabbara National Park, Northern Rivers Catchment Management Authority;
- Rufous Bellong Survey and Monitoring, Yabbara National Park for Northern Rivers Region, NSW National Parks and Wildlife Service;
- Cane Toad Survey of Yabbara and Tooloombar National Parks, NSW Department of Environment and Climate Change;
- Eastern Bristlebird Population Census on Private lands, for Sandpiper Environmental Surveys;
- Eastern Bristlebird habitat enhancement and rehabilitation on Private Lands in NSW –Stage 2, Northern Rivers Catchment Management Authority;
- Comprehensive Flora and Fauna Survey, South Ballina Sand Quarry;

2006

- Rufous Bellong Survey and Monitoring, Yabbara National Park for Northern Rivers Region, NSW National Parks and Wildlife Service;
- Red Fox Monitoring and Control on private lands adjacent to Yabbara National Park, Northern Rivers Catchment Management Authority;
- Eastern Bristlebird habitat enhancement and rehabilitation on Private lands in NSW and Qld, Northern Rivers Catchment Management Authority;
- Eastern Bristlebird population census on private lands for Sandpiper Environmental Surveys;
- Review of Koala Management Plan and supplementary fauna survey, Lot 1 DP715446, Airforce Road, Lismore;

2005

- Rufous Bellong Survey and Monitoring, Yabbara National Park for Northern Rivers Region, NSW National Parks and Wildlife Service;
- Albert's Lyrebird and Red Fox Monitoring, Northern Rivers Region, NSW National Parks and Wildlife Service;
- Comprehensive Fauna Survey, Mount Grenfell Historic Site for Cobar Region, NSW Department of Environment and Conservation;
- Assessment of the Environmental Constraints - "Wardrop Valley", East Murwillumbah;
- Fauna Assessment, Hang Ten Development, Broken Head;
- Flora and Fauna Assessment - "WATPAC" development, West Ballina;
- Grass Owl Survey, Freeburn property, West Ballina;
- Flora and Fauna Assessment - Lot 1 Chinderah Bay, Chinderah;
- Flora and Fauna Assessment and Bushfire Threat Assessment - Lot 1 Clothiers Creek Road, Tanglewood;
- Comprehensive Fauna Survey, Hardie Holdings, Copmanhurst;
- Flora and Fauna Assessment - Freeburn property, West Ballina;
- Comprehensive Fauna Survey - "Water at Wooyung", Wooyung;
- Grass Owl and Endangered Amphibian Survey - Gudgen Paddock, Kings Forest Development;

2004

- Environmental Constraints Report including Flora and Fauna Assessment, Sleepy Hollow Golf Course Site;
- Flora and Fauna Assessment - "Water at Wooyung", Wooyung;
- Koala Population Monitoring, Maher's Headland for Charley Brothers (2004 – 2007);

Other Selective Major Projects, Reports and Surveys.

1981-2008

Charley, D. (2005). Vertebrate Fauna Survey, Mount Grenfell Historic Site and National Park, 2005. Unpublished report to the NSW Department of Environment and Conservation, Cobar, NSW;

Charley, D. (2005). Long-term Small Mammal Monitoring Program, Richmond Gap, Border Ranges National Park. Survey Two - 2004. Unpublished report to the NSW National Parks and Wildlife Service – Kyogle;

Charley, D. (2004). Long-term Monitoring of Small Mammal at Richmond Gap, Border Ranges National Park. 2003 Survey. Unpublished report to the NSW National Parks and Wildlife Service – Kyogle;

Charley, D. (2004). A Survey for the Eastern Bristlebird in North East New South Wales. 2003 Survey. Unpublished Report to the NSW National Parks and Wildlife Service – Kyogle.

NPWS (2004). Northern Rivers Region Pest Management Plan (Incorporating restoration and weed control strategies) Border Ranges National Park. NSW National Parks and Wildlife Service, Northern Rivers Region, Alstonville. Principle author.

Charley, D. and D. Newell. (2003). Review of Environmental Factors. Hoag's Frog Breeding Site and Habitat Protection, Red Cedar Loop, Brindle Creek, Border Ranges National Park. NSW National Parks and Wildlife Service, Northern Rivers Region, Alstonville.

NPWS (2002). Coxen's Fig-Parrot *Cyclopsitta diophthalma coxeni* (Gould) Recovery Plan. NSW National Parks and Wildlife Service, Hurstville NSW. Contributing member of recovery team.

NPWS (2002). Fire Management Plan – Border Ranges National Park. NSW National Parks and Wildlife Service. Joint authors; Charley, D. and T. Perry.

Charley, D. (2002). Review of Environmental Factors. Richmond Gap SWCZ, Prescribed Burn. NSW National Parks and Wildlife Service, Northern Rivers Region, Alstonville.

Charley, D. and D. Rohweder (2001). Review of Environmental Factors for Proposed Habitat Management Burns in Border Ranges National Park. NSW National Parks and Wildlife Service, Northern Rivers Region, Alstonville.

Charley, D. (1999). Predator-avoidance Behaviour in the Double-eyed Fig-Parrot *Cyclopsitta diophthalma macleayana*. *Australian Bird Watcher* 18, (5).

Charley, D. (1998). "Seabird Islands No 237, Cook Island", New South Wales'. *Corella* 22: 67-68.

Charley, D. and D. Sharpe (1995). Tuckean Swamp Catchment. A Survey of the Terrestrial Flora and Fauna. Report to the Richmond River County Council, Casino.

Charley, D. and R. Moffatt (1991). "Ospreys – *Their management in northern New South Wales*". Paper presented to the "Conservation Biology in Australia and Oceania" conference. Queensland University.

Will INTRONA

Ecologist

Will is an ecologist with 11 years post-graduate experience as an ecologist. Will has worked as an environmental consultant at Environmental Resources Management for nearly 8 years and Eco Logic Australia for nearly 2 years.

Will has well-developed consulting skills and is experienced in the design and execution of ecological surveys, environmental impact assessments, the development of management plans, literature reviews and all aspects of project management.

QUALIFICATIONS

Master of Science, University of Technology, Sydney. *The effects of fire on vegetation communities in Ku-ring-gai Chase National Park.*

Bachelor of Science in Environmental Biology, University of Technology, Sydney

BACKGROUND

- Experience in ecology of south-east and central Queensland.
- Considerable experience in ecology of NSW, particularly eastern NSW.
- Extensive experience in plant identification and vegetation survey.
- Extensive experience in fauna survey, including targeted survey for birds, ground and arboreal mammals, reptiles, amphibians and bats and ecological monitoring.
- Prepared literature reviews, environmental impact assessments and impact mitigation measures.
- Prepared fire, weed and pest management plans, and threatened species monitoring plans.
- Excellent project management skills.
- Good communicator and negotiator with public and private sector.

RELEVANT PROJECT EXPERIENCE:

A selection of project experience is provided below. A more targeted project list can be provided on request.

- *Court Appointed Expert, Eastlakes at Botany Council, Land and Environment Court of NSW:* Expert opinion on whether there would be a significant impact on the endangered ecological community Eastern Suburbs Banksia Scrub and whether a Species Impact Statement was required. Provision of written report, oral evidence at court site visit and evidence at hearing.
- *Eastlakes Vegetation Management Plan, Outdoor Systems Pty Ltd:* Preparation of a vegetation management plan in response to a Land and Environment Court direction for management of potential impacts of bridge construction and rehabilitation of a patch of Eastern Suburbs Banksia Scrub, an endangered ecological community.
- *Sydney Metropolitan Weed Management Strategy, SMCMA:* Preparation of a strategy in close relation with Sydney Weeds Committees that sought to enhance and protect biodiversity with the Sydney Metropolitan Catchment by enhancing land holder capacity and coordination. Consultation with stakeholders included an online survey, three workshops and strategy exhibition to gain input into the strategy.
- *Ourimbah Creek Amphibian and Riparian Habitat Monitoring, Department of Commerce:* Site assessments, impact assessments, development of monitoring methods for potentially occurring threatened amphibians and extant riparian habitat on Ourimbah Creek in relation to proposed extraction of water.
- *Campbelltown Biodiversity Study Stage 2, Campbelltown City Council:* Seasonal targeted flora and fauna surveys in three priority areas within Campbelltown LGA to fill in gaps on biodiversity information. Surveys were undertaken for birds, ground mammals, arboreal mammals, insectivorous bats, reptiles, amphibians and the Cumberland Land Snail. Resultant information was collated and analysed together with Stage 1 information to identify areas of high, medium and low biodiversity value within the LGA.
- *Berkeley Vale Flora and Fauna Assessment and Vegetation Management Plan, Falcon Ridge (Berkeley Vale) Pty Ltd:* Bat surveys, habitat assessments, impact assessment of the removal of vegetation for industrial subdivision.
- *Shoalhaven Transfer Project:* Impact assessment of the construction and operations activities on terrestrial flora and fauna of a number of proposals related to the transfer of water from the Shoalhaven to the Sydney Metropolitan system.
- *Illawarra Escarpment Ground Truthing:* Ground truthing and verifying mapped vegetation polygons within the Wollongong Local Government Area. This included assessment of vegetation types and condition of the vegetation at randomly selected sites throughout the Illawarra, including coast and escarpment communities.
- *Wollar – Wellington Proposed Transmission Line and Wollar Switching Station Corridor Selection Report Recommendation, TransGrid:* Mapping of ecological constraints, including National Parks, State Forests, Crown Land, endangered ecological communities and habitat for state and federally listed threatened species and other areas of high ecological sensitivity. Assessment by flight inspection, aerial photographs and on ground field assessment. Evaluation of the preferred route in terms of ecology by ranking and comparison of ecological constraints. Liaison with state and federal agencies and stakeholders.

- *Tuggerah Sterland 330kV Double Circuit Transmission Line Construction Environmental Risk Report, Review of Environmental Factors and Pre-clearing Surveys, TransGrid:* General and targeted flora and fauna surveys and pre-clearing surveys for risk assessment, constraints mapping and flora and fauna impact assessment for the proposed duplication of transmission line through private land and State Forest estate. Consultation with State Forests, National Parks and Wildlife Service and local ecologists. Preparation of environmental impact assessment for the REF including summary and background documentation and amelioration measures.
- *Penrith Sewage Treatment Plant Amplification and Glenbrook Waste Water Transfer Environmental Impact Statement, Sydney Water:* Flora and fauna assessment including assessment of an old railway corridor and tunnel. Targeted surveys for threatened species and preparation of eight part tests to determine whether there would be a significant impact on threatened species. Recommendation of measures to conserve biodiversity.
- *Parramatta Rail Link Environmental Impact Statement and Species Impact Statement, NSW Department of Transport:* Aerial photograph interpretation, ground-truthing of vegetation maps, flora and fauna surveys and habitat assessment of native vegetation along the length of the proposed rail link, which potentially passes through Lane Cove National Park. Liaison with National Parks and Wildlife Service, preparation of flora and fauna technical report and chapter for the Environmental Impact Statement. Targeted surveys for the threatened species Red-crowned Toadlet and Powerful Owl to determine distribution and abundance of local populations. Detailed assessment of the impact of the project on population and conservation status of these species within Lane Cove National Park and recommendation of mitigation measures to minimise impacts on these and other threatened species.
- *Interconnection to the National Grid Environmental Impact Assessment, Powerlink:* Ground truthing and mapping of 300 kilometres of vegetation along a transmission line route between Tarong and Texas in southeast Queensland. Classification of vegetation types based on structure and composition and identification of sensitive habitats for flora and fauna. Assessment of impact of substation sites on flora and fauna, including threatened flora and fauna. Preparation of the ecological section of the Environmental Impact Assessment Report.
- *Vincentia Species Impact Statement, Stockland:* Preparation of preliminary flora and fauna impact assessment report. Management of a team of nine ecologists for a two-week flora and fauna survey, including targeted surveys for threatened orchids, ground mammals, birds, frogs and arboreal mammals. Threatened species targeted and recorded included yellow-bellied glider, powerful owl, glossy black-cockatoo, eastern bristlebird, ground parrot, eastern pygmy possum, *Prasophyllum affine* and *Cryptostylis hunteriana*. Other targeted species included common dunnart, southern brown bandicoot, long-nosed potoroo and giant burowing frog.
- *Inverell to Moree 132kV Transmission Line Management Plans, TransGrid:* Targeted surveys and habitat assessment for a 100 km transmission line between Inverell and Moree, NSW. Assessment of habitat for threatened flora and fauna species based on vegetation and environmental characteristics. Preparation of flora and fauna management plans and weed control plan.
- *Western Sydney Parklands Ecological and Fire Assessment Phase 2, APP:* Input into Concept Plans and Master Plans for three connected precincts including strategic ecological objectives to protect, conserve and enhance areas of high biodiversity value, maintain identified corridor networks and details of offsetting strategies. Included consultation with Landcom, Department of Environment and Conservation,

Department of Planning, Department of Natural Resources, Rural Fire Service and other companies working on the Concept and Master Plans.

- *Hunter and Central Coast Regional Environmental Strategy Systematic Vegetation Surveys, Hunter Councils:* Systematic vegetation quadrat and habitat surveys in the upper Hunter Valley from May 2005 until September 2005. Surveys undertaken on private and public land in the upper Hunter Valley in an area bounded by the Liverpool Ranges in the north, the Great Dividing Range near Rylstone in the south, Cassilis and Munghorn Gap in the west and approximately 30km east of Merriwa. Results of surveys was entered into a project specific Access database, with photos and project herbarium was provided.
- *Honeman Close Ecological Assessment, Valad Property Group:* Field survey and assessment of the vegetation and habitat values of a small property in western Sydney. Areas of ecological constraint were identified using a Department of Environment and Conservation endorsed process. Areas of development and conservation potential were identified.
- *Nola Road Ecological Assessment:* Assessment of the type and condition of vegetation along a tributary of Little Blue Gum Creek on the north shore of Sydney to provide information to Council in assessing a development application. Flora and fauna and aquatic habitat were assessed.
- *Hawkesbury Vegetation Field Validation, Hawkesbury Council:* Ground truthing and verifying mapped vegetation polygons within Council managed lands in the Hawkesbury Local Government Area.
- *Aldi Prestons Due Diligence:* Ground truthing and targeted Cumberland Land Snail surveys to verify the vegetation community and ecological constraints on a site in western Sydney. Identification of potential development and conservation areas as well as initial assessment of offsetting requirements under the draft Liverpool Council Offsetting Development Control Plan.
- *North Hawks Nest LES Ecological Assessment:* One day and one week of field work including targeted surveys for threatened species to identify flora and fauna constraints in relation to expansion of a golf course into bushland. Fieldwork included i Elliot trapping for ground and arboreal mammals, bird and owl surveys and hollow-bearing tree assessments.
- *West Dapto Biodiversity and Bushfire Study Stage 2:* Input of bushfire advice in relation to proposed development areas for West Dapto.
- *Riverview Mine Extension Flora and Fauna Surveys, Coal & Allied:* Three-week flora and fauna surveys of the areas proposed for coal mine expansion and potential green offset areas. Vegetation, mammals, bird, reptile and amphibian surveys including targeted surveys for threatened species such as woodland birds. Ground truthing of vegetation and mapping of endangered ecological communities. Preliminary mapping of results for future Environmental Impact Statement.
- *Project Land, Australia, AAP:* Ecology due diligence of four Department of Defence properties prior to sale to government department Landcom for residential development. Assessment of flora and fauna issues and constraints gaps in flora and fauna information and recommendations to address issues.
- *UTS Ku-ring-gai Phase II Rezoning and Masterplan Ecological Summary Report, CRI Australia:* Assessment and summarisation of ecological constraints. Input into the development masterplan and rezoning application. Identification of ecological, threatened species and corridor issues and provision of strategic options and solutions

to deal positively with ecological issues including management and mitigation measures. Liaison with local and state agencies and a community reference group.

- *Extension of Hunter Valley Operations, West Pit Environmental Impact Statement, Coal & Allied*: Flora and fauna surveys in woodland in the Hunter Valley, New South Wales, including targeted surveys for a number of state and nationally threatened woodland birds, mammals, reptiles, amphibians and plants. Consultation with relevant state and federal agencies, local ecologists and interest groups. Flora and fauna impact assessments and development of mitigation measures.
- *SEPP 59 Ecological Assessment, AAP*: Flora and fauna surveys and assessment of ecological constraints of five properties. Assessment of ecological values according to National Parks and Wildlife Service guidelines.
- *Holsworthy Program of Works Environmental Impact Assessment and Referral, Australia, Department of Defence*: Vegetation mapping and assessment of potential impacts to state and federally listed endangered ecological communities and threatened species. Recommendation of amelioration and green offset measures. Preparation of Referral to the federal agency Environment Australia.
- *Watanobbi Ecological Constraints Assessment, Landcom*: Desktop study of flora and fauna constraints in relation to development of a lock of land at Wyong on the Central Coast of New South Wales. Review of Wyong Council draft Biodiversity Strategy and provision of ecological and development strategy advice.
- *Seconds Ponds Creek Bushfire Management Plan, Landcom*: Provision of bushfire management advice for a proposed rezoning of land in western Sydney to accompany a master plan and development control plan for residential and commercial development. This advice allowed Landcom to comply with state and local bushfire management legislation and policies to protect life and property and maintain biodiversity.
- *Majura Training Area Vegetation Mapping and Campbell Park Endangered Vegetation Assessment, Australia, Department of Defence*: Design and implementation of data collection and monitoring program to determine the extent of endangered vegetation communities (grasslands and woodlands) on two sites totalling over 5, 000 hectares in size. Yearly monitoring and statistical analysis of vegetation community distribution and Geographical Information System mapping.
- *Second Ponds Creek Fire Management Plan, Australia, Landcom*: Identification of fire management issues and input into the master planning stage of a proposed residential development in western Sydney. Preparation of a fire management plan for residential development, which complied with government guidelines.
- *Regional Water Supply Project Management Plans, North Coast Water*: Preparation of habitat, threatened species management and monitoring, weed, pest animal and fire management plans for construction and operation of water storage facility catchment area. Provision of maps, works schedule and statistically sound monitoring strategies. Consultation with relevant agencies including National Parks and Wildlife Service.
- *Extension to Warkworth Coal Mine Environmental Impact Statement, Species Impact Statement, Referral to Environment Australia and Green Offsets Strategy, Coal & Allied*: Seasonal flora and fauna surveys in woodland in the Hunter Valley, New South

Wales, including targeted surveys for a number of state and nationally threatened woodland birds, mammals, reptiles, amphibians and plants. Detailed consultation with relevant state and federal agencies, local ecologists and interest groups. Preparation of general flora and fauna impact assessments, threatened species impact assessments, and green offsets strategies. The Green Offsets Strategy was a finalist in the Hunter Coal Industry Environmental Management Awards.

- *Woodside Army Training Area Biodiversity Report and Feral and Weed Management Plan, Department of Defence*: Flora and fauna surveys, weed and feral animal mapping of an army training area in the Mt Lofty Ranges in South Australia. General and targeted surveys for flora and fauna including threatened species. Preparation of a biodiversity report and electronic herbarium database.
- *Londonderry Drop Zone Phase II Flora and Fauna Studies, Department of Defence*: Extensive flora and fauna survey of a military drop zone for a comprehensive assessment of flora and fauna quality, and assessment of existing impacts and recommendations for management. Detailed vegetation mapping and data collection for statistical analysis of vegetation communities. Mapping of threatened plant species and habitats for threatened fauna.
- *St Marys Property Fire Management Plan, Comland Limited*: Assessment of the fire risk and damage potential to life and property and environmental values. Mapping and modelling of fire risk using a Geographic Information System. Compliance with relevant legislation and government bushfire risk management plans. Identification of fire management zones and preparation of works schedule for fire protection measures.
- *Proposed Asphalt Recycling Facility at 12 Grand Avenue, Camellia Environmental Impact Statement, CSR Emoleum Road Services*: Assessment of flora and fauna habitat of the site, especially for the Green and Golden Bell Frog (*Litoria aurea*). Targeted surveys for this species, which was detected on the site, and preparation of mitigation measure to ensure continuation of habitat (compensatory habitat-construction of ponds) and movement corridors on the site. Liaison with NPWS in relation to the Green and Golden Bell Frog and preparation of the flora and fauna technical report.
- *Arrionga Place Flora and Fauna Impact Assessment, Timothy Smyth, 2002*: Flora and fauna surveys including targeted surveys for threatened plants, frogs and owls. Identification of development constraints, consultation with local council, provision of advice on development layout and preparation of flora and fauna impact assessment report to accompany a development application.
- *Arrionga Place Bushland Management Plan, Timothy Smyth*: Preparation of a bushland management plan to mitigate against impacts of vegetation clearance and residential development, weeds and feral animals. Incorporation of bushfire management measures.
- *South Lemington to Warkworth Access Road Flora and Fauna Impact Assessment, Coal & Allied*: General and targeted flora and fauna surveys in regrowth woodland in the Hunter Valley, New South Wales, including habitat assessment and targeted surveys for threatened plants. Preparation of the flora and fauna impact assessment for a Statement of Environmental Effects including Eight Part Tests and amelioration measures.

- *Elanora Country Club Hazard Reduction Assessment, Elanora Country Club:* Assessment of potential impacts on threatened flora and fauna of a proposed hazard reduction fire surrounding the Elanora Country Club.
- *Development Analysis of 'E & F' Precincts in Abandoned Warringah Transport Corridor, NSW Department of Urban Affairs and Planning and Roads and Traffic Authority:* Assessment of ecology constraints and opportunities for development of four sites in Seaforth. Recommendations of areas for conservation of biodiversity in the local area, linkages between bushland sites, identification of suitable development sites and recommendations of measures to conserve biodiversity.
- *Wyang Coal Flora and Fauna Assessment, Wyong Coal:* Aerial photograph interpretation, vegetation mapping and general and targeted flora, fauna and habitat survey and assessment of 800 hectares of natural and remnant bushland at Wyee, New South Wales. Impact assessment of proposed coal mine surface facilities. Identifications of any ecological constraints and mitigation measures to development and implications with respect to current environmental legislation.
- *Green Point Flora and Fauna Assessment, Landcom, 2001:* Flora and fauna survey and impact assessment for proposed residential development. Review of council biodiversity policies and provision of ecological advice. Preparation of flora and fauna report.
- *Rolleston Coal Mine Flora and Fauna Survey, MIM:* Flora and fauna surveys of proposed coal mine in central Queensland. Habitat assessments and targeted surveys for threatened species including birds and reptiles.
- *ACT Properties Weed Control Program, Riverina Murray Valley Defence Properties Weed Management Strategy, South Coast Weed Management Strategy, Department of Defence:* Detailed surveys and mapping of Noxious Weeds, Weeds of National Significance and significant weeds over 13 bases in New South Wales which supported endangered ecological communities and threatened species. Ranking and risk assessment for each base. Identification of control measures, works schedules and monitoring strategies including a computer database to track weed distribution and control efforts.
- *ADI Cumberland Plain Woodland Vegetation Survey, ADI Lend Lease Joint Venture:* Vegetation survey and ground truthing of mapped Cumberland Plain Woodland in western Sydney. Data collected formed was added to a database and formed control plots for adjacent surveys in remnant vegetation. Assessment of the level of weed invasion and potential rehabilitation strategies.
- *Roadside Rest Areas Flora and Fauna Impact Assessment, Roads and Traffic Authority:* Flora and fauna surveys and impact assessment of proposed roadside rest areas in the Riverina of New South Wales. Identification of potential impacts and provision of advice to avoid significant impacts on flora and fauna.
- *Boral Greystanes Quarry Flora and Fauna Assessment and Species Impact Statement, CRI Pty Ltd:* Vegetation mapping and detailed flora, fauna and habitat survey and assessment of Boral Greystanes quarry to identify ecology constraints. Targeted surveys of threatened plants, communities and fauna. Advice on development proposals, preparation of Species Impact Statement and liaison with government departments.

- *Baulkham Hills Local Government Area Aerial Photographic Interpretation, Baulkham Hills Shire Council*: Independent aerial photographic interpretation of the Baulkham Hills Shire Council for the purposes of vegetation mapping and analysis. Drawing of vegetation communities for digitisation by Geographic Information System.
- *Boral Moorebank Brickworks Flora and Fauna Assessment, Boral, 2001*: Vegetation mapping and detailed flora, fauna and habitat survey and assessment of Boral Moorebank estate, including assessment of threatened vegetation communities. Impact assessment and identification of any ecological constraints to development and implications with respect to current environmental legislation.
- *Summerland Point Public School Threatened Species Assessment, Landcom, 2000*: Targeted searches for threatened plants including orchids and Squirrel Gliders (*Petaurus norfolcensis*). Mapping of significant habitat features of the site, determining constraints to development and recommending development areas and mitigation measures. Compliance with local council flora and fauna guidelines and threatened species management plans
- *Ravensworth East Flora and Fauna Management Plan, Peabody Resources Limited*: Preparation of management plan to mitigate the impacts of mining activities upon vegetation communities, fauna habitats and threatened fauna including the Masked Owl (*Tyto novaehollandiae*) and the Eastern Freetail Bat (*Mormopterus norfolkensis*). Identification of strategies to improve the overall conservation value of the entire mining lease area. Prepared in compliance with concurrence conditions from the NSW Department of Urban Affairs and Planning, and with the advice from NSW National Parks and Wildlife Service.
- *Rookwood Cemetery Flora and Fauna Assessment, Catholic Cemetery Trust, 2000*: Assessment of flora and fauna values of Rookwood Cemetery. Flora and surveys and vegetation and habitat mapping. Provision of advice for proposed expansion of cemetery and management of vegetation, including endangered communities and flora species.
- *Red Dome Gold Mine Environmental Report, Nuigini Mining, 1999*: Assessment of the success of rehabilitation of the Red Dome Mine, Chillagoe, located 300 km west of Cairns. This included assessment of the ecology of the raw water dam and surrounds in terms of aquatic invertebrates, fish, riparian vegetation, water birds and terrestrial flora and fauna including insectivorous bats.
- *Flora and Fauna Assessment Cattai Creek, Baulkham Hills Council*: Identification and mapping of two threatened plants, *Darwinia biflora* and *Epacris purpurascens* var. *purpurascens*, at Cattai Creek for a Statement of Evidence in the Land and Environment Court.
- *Hunter Fire Management Plans, NSW National Parks and Wildlife Service*: Preparation of fire management plans for Tomaree National Park (2, 266 hectares), Glenrock State Recreation Area, Awabakal Nature Reserve, Lake Macquarie State Recreation Area, Pulbah Island Nature Reserve and Tingira Heights Nature Reserve. Identification of zones for fire management objectives, including conservation and the protection of life and property. Utilisation of Geographic Information System (GIS) and ground truthing to map vegetation, fuel load, flora and fauna habitat and assets, as well as development of a model of fire damage potential for each reserve.

- *Regional Water Supply Project Environmental Impact Statement, Lower Clarence County Council:* Review of technical reports of terrestrial and aquatic flora and fauna surveys of the Clarence River catchment, Nymboida River and proposed Shannon Creek dam site. Compilation of information from field reports into a sections of the Environmental Impact Statement as well technical background reports. Included vegetation mapping and descriptions and assessment of the development on the ecology of the catchment including threatened species. Targeted surveys for threatened plants *Melichrus hirsutus* and *Angophora robur* and habitat assessments.
- *Biodiversity Survey Blue Mountains, Australian Catholic University:* Assistance in biodiversity survey of two upper catchments in the Blue Mountains in relation to effects of urban development. This included a detailed flora survey, habitat assessment, water quality measurement, trapping for ground and arboreal mammals, bird surveys and sampling aquatic macroinvertebrates.
- *Voyager Point Environmental Assessment, Delfin Management Services Pty Ltd:* Flora and fauna survey of a 10 and 9 hectare area of remnant bushland. Vegetation mapping, detailed flora survey, detailed fauna survey and habitat assessment and targeted threatened species surveys. Assessment of potential impacts and preparation of report for development application.
- *Killalea State Park Fire and Habitat Management Plans, Killalea State Park Trust:* Formulation of a management plan to make provision for land managers to protect life and property and maintain biodiversity and manage flora and fauna of conservation significance. Preparation of fire management guidelines to protect and conserve natural and cultural features including threatened species and their habitats.

MELISSA J STARLING

CURRICULUM VITAE

POSITION:

Field Zoologist, Biosis Research Pty. Ltd.

QUALIFICATIONS:

BSc (Honours) Australian National University

Senior First Aid Certificate – St John Ambulance, expires 30/7/2010

Occupational Health and Safety for Construction Sites Green Card, 2007

Completed One Day General Driving 4WD Vehicle Bush Course – Rear Wheel Plus Training Services, 2007.

Completed four day Frog, Bat and Reptile Species Identification and Survey Skills course – NSW Department of Primary Industries, 2007.

OHS Consultation Course, NSCA, 2008

One day ATV training course, Stay Upright, 2008

PROFESSIONAL AFFILIATIONS AND MEMBERSHIPS:

Birds Australia

WIRES

EMPLOYMENT PROFILE:

2008 Field Zoologist, Biosis Research Pty. Ltd.

2007 Research Assistant, Biosis Research Pty. Ltd.

2007 Consultant, Landscape, NSW.

2007 Ecological Consultant, LesryK Environmental Consulting, NSW.

2006 Research Assistant, Centre for Tropical Research, Los Angeles.

2005-2006 Research Assistant, bird behavioural ecology research group, ANU, ACT.

2004 Research Assistant, vertebrate physiology lab, ANU, ACT.

2004 Research Assistant, ANU Green, ACT.

2003-2004 Volunteer Field Assistant, Pheasant Coucal Project, ANU, NT.

FIELDS OF COMPETENCE:

- ✓ Terrestrial ecology
- ✓ Zoology
- ✓ Flora and fauna survey and identification
- ✓ Identification of Australian vertebrates
- ✓ Identification of Australian invertebrates
- ✓ Literature reviews
- ✓ Experimental design
- ✓ Laboratory experimental techniques

PROFESSIONAL EXPERIENCE:

A sample of key professional experience at Biosis Research is presented below.

Research Assistant, Flora and Fauna assessment, Tomago (2008, for Tomago Substation Augmentation Species Impact Statement).

Research Assistant, Flora and Fauna assessment, Cessnock (2008, for Cessnock Waste Disposal Extension Species Impact Statement).

Research Assistant, Flora and Fauna Conservation Advices (2007-08, for the Department of Water, Environment, Heritage and the Arts).

Research Assistant, Regent Honeyeater targeted surveys, Kurri Kurri (2007, for Hunter Economic Zone).

Research Assistant, Fauna impact assessment for Ballina Bypass Pacific Highway modifications (2007 for Arup and NSW RTA).

Research Assistant, Fauna impact assessment of Tintenbar to Ewingsdale Pacific Highway Upgrade; Environmental Assessment (2007 for Arup and NSW RTA).

Research Assistant, Invertebrate identification (ants) for Dendrobium Area 1 Ecological Monitoring (2007 for BHP Billiton).

Research Assistant, Bird, reptile and frog surveys, Dendrobium (2007 for BHP Billiton).

Research Assistant, flora and fauna assessment of Westcliff Colliery Stage 3, coal wash emplacement application; Species Impact Statement (2007 for BHP Billiton).

A sample of other key professional experience is presented below.

Ecologist, Prepared Review of Environmental Factors for installation of a Variable Message Sign. (2007, Gosford City Council)

Zoologist, Managed fauna section of flora and fauna survey. (2007, Wyong Shire Council)

Zoologist, Prepared desktop fauna survey. (2007, Hunter Water Corporation).

Zoologist, Assisted in preparing targeted Green and Golden Bell Frog report. (2007, LesryK Environmental Consulting)

Research Assistant, Assisting with preparation of PCR plates, data entry and data analysis, and general laboratory maintenance. (2006 Centre for Tropical Research, UCLA, LA)

Field Assistant, Searching for nests, assisting with mist-netting, banding and measuring adult birds. (2006 for PhD project for Centre of Tropical Research, UCLA, in Mexico)

Research Assistant, Management of Superb Fairy-wren territories, assisting in mist-netting, banding and bleeding of nestlings, data collection and entry. (2005/2006 for bird behaviour research group, School of Botany and Zoology, ANU, ACT)

Chief Investigator, Co evolution between Pallid Cuckoo and its host species. (2004/2005 Honours project, ANU, ACT)

Research Assistant, Management & responsibility for laboratory beetle adults and larvae during experimental trials, data collection and collation, mixing chemical standards, operating NIR machine. (2004 for vertebrate physiology lab, School of Botany and Zoology, ANU, ACT)

Research Assistant, Identifying terrestrial invertebrate samples to Order or Family. (2004 for ANU Green, ACT)

Field Assistant, Finding nests and collection of behavioural observations of Pheasant Coucal in Darwin, NT for a PhD project on natural history and breeding system of the Pheasant Coucal. (2003/2004 for research project for PhD candidate at ANU)

PUBLICATIONS:

Starling, M., Heinsohn, R. Cockburn, A., Langmore, N.E. (2006) Cryptic gentes revealed in the Pallid Cuckoo (*Cuculus pallidus*) using reflectance spectrophotometry. *Proceedings of the Royal Society of London, Series B.* 273.

CONSULTANT REPORTS:

Biosis Research 2008. *Cessnock Landfill Extension Species Impact Statement*. Report for Cessnock City Council. Authors: K. Crosby, B. Smith, R. Blakey, **M. Starling**, and R. Harrington

Biosis Research 2007. *Tintenbar to Ewingsdale Pacific Highway Upgrade: Environmental Assessment Draft Terrestrial Flora and Fauna Report* (in prep). Report for Arup. Authors: R. Harrington, S. Wilkins, T. English, T. Pizzuto, **M. Starling**, K. Cartner and R. Blakey

Biosis Research. 2007. *Ballina Bypass Modifications: Terrestrial Flora and Fauna Assessment*. (in prep.). Report for Arup. Authors: S. Wilkins, M. Beitzel, R. Blakey, J. Charlton, **M. Starling** and T. Pizzuto

Fiona Donohoue

Ecologist



Fiona Donohoue joined ERM as an Ecologist in March 2006 and is currently based in Melbourne.

Fiona's academic background includes Bachelor of Science (Zoology and Botany) and Bachelor of Arts (Environmental Geography) degrees. She has also completed a number of other professional and vocational qualifications. These studies have provided her with a sound understanding of issues relating to ecological processes.

Fiona's experience includes 4 years working as an ecologist with the SA Department of Land, Water and Biodiversity Conservation. During this period, she worked on a wide range of large scale innovative development projects including wind farms and projects in the mining sector. She has a strong background in ecological impact assessments and environmental monitoring and management. She also has a detailed understanding of issues related to land clearance and fragmentation, biodiversity and landscape rehabilitation.

Fiona has recently returned to Australia after 18 months working as an ecologist in Ecuador and Chile. She speaks fluent Spanish

Fields of Competence

- Flora and Fauna Assessment
- Flora and Fauna Monitoring
- Flora and Fauna Management
- Landscape Ecology

Education

- Bachelor of Science (Zoology and Botany), University of Adelaide, 1999
- Bachelor of Arts (Environmental Geography), University of Adelaide, 1998

Languages

- English
- Spanish (fluent)

Key Industry Sectors

- Ecology
- Land Management
- Land Development

Employment History

Flora and Fauna Surveys

Biological Features Assessment, Mount Eliza, Victoria.

Fiona prepared a preliminary flora and fauna report to assess the potential ecological impacts of a proposed residential development in Mount Eliza, Mornington Peninsula. The report included calculation of Net Gain for the Coast Banksia Woodland EVC and development of a set of recommendations to minimise impacts on this vegetation community.

Biological Features and Net Gain Assessment, Mooroolbark, Victoria

Fiona undertook an assessment of the key biological features of a site located in Mooroolbark, Victoria. This involved comprehensive flora and fauna surveys and an assessment of likely habitat for indigenous flora and fauna, including individual tree assessment. Fiona also provided assistance in development plan design and negotiations with local authorities.

Targeted Flora Assessment, Salisbury, South Australia.

Fiona was involved in the assessment of the potential impacts of development on four threatened plant species. This involved a targeted assessment for Cotton-bush *Maireana aphylla*, Grassland Sida *Sida corrugata* var. *Angustifolia*, Grey Bindyi *Sclerolaena diacantha* and South Australian Mallee Box *Eucalyptus porosa*. Fiona developed a range of mitigation measures to reduce potential impacts on these species and provided input into the development plan design for the site.

Targeted Fauna Assessment, Ryans Corner, Victoria

Fiona was involved in the assessment of the potential impacts on two threatened frog species of a windfarm in the Western Basalt Plains of western Victoria. Fiona undertook a targeted assessment for Brown Toadlet *Pseudophryne bibronii* and Southern Toadlet *Pseudophryne semimarmorata* and any other threatened reptiles potentially present at the site.

Environmental Management Plans

Land Management Plans, Victoria. Fiona has prepared Land Management Plans for sites of Aboriginal cultural significance and medium to large scale residential developments. The plans were based on existing indigenous flora species and structure and included detailed pest plant and animal management guidelines and mitigation measures to avoid environmentally sensitive areas. Input from landowners, stakeholders,

community groups and key government organisations was also considered.

Vegetation Offset Management Plans, Victoria.

Fiona has prepared a number of practical ten-year plans to guide the management of vegetation defined as offsets to compensate for vegetation removal. The plans are based around the site condition components of the Habitat Hectare Scoring method to illustrate how vegetation quality can be improved at each level.

Environment and Heritage Management Plan, Salisbury, South Australia.

ERM was commissioned to prepare an Environment and Heritage Management Plan (EHMP) for a site in northern Adelaide. Fiona developed a set of recommendations to minimise the impacts of development on threatened flora and existing areas of native vegetation within the site. Fiona also provided input into a site handbook containing a set of conservation *Dos* and *Don'ts*. This involved developing simple and practical guidelines for site personnel on landscaping and flora and fauna management at the site.

Pest Plant and Animal Management Plan, Victoria and New South Wales.

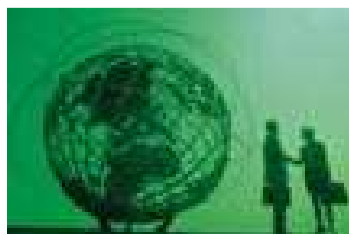
Fiona has prepared a number of five and ten year Pest Plant and Animal Management Plans for medium to large scale residential developments. The plans included detailed pest plant and animal management guidelines, including appropriate control techniques and recommendations for short and long-term monitoring.

Due Diligence

Due Diligence Assessments, Victoria. Fiona has prepared a number of flora and fauna due diligence assessments. The purpose of these studies is to provide advice in relation to the potential ecological constraints to development of the site, including issues that have the potential to cause time delays during development and significant financial injections from the developer.

Tim Simpson

Ecologist
Australia



Tim is a terrestrial ecologist based in ERM's Perth office with over five years professional experience in Environmental Impact Assessment. This has included five years employment as an ecologist and a six month contract as a policy officer with the Commonwealth Department of Agriculture Fisheries and Forestry.

To date Tim has focussed largely on the design and completion of flora and fauna surveys and assessment under State and Commonwealth legislation in order to facilitate project approvals. However, more recently Tim has become responsible for the completion of several Review of Environmental Factors (REF) and Commonwealth EPBC referrals which has broadened his scope of environmental impact assessment (EIA) expertise. This has included the consideration, assessment and resolution of impacts relating to cultural heritage, air and water quality, noise and traffic.

In addition, Tim has recently (June 2007) commenced a Masters in Environmental Law at Macquarie University. The purpose of this is to gain a stronger understanding of the application and development of environmental law and policy in Australia and overseas.

To date Tim's work has been concentrated on the east coast of NSW however, Tim has extensive experience within the ACT and southern Tablelands having worked as an ecologist based in Canberra during 2006 and having considerable project experience on defence projects within the area. In addition Tim has been able to apply his expertise in ecology and impact assessment to projects in far western NSW, Victoria and Central Queensland. Tim has recently relocated to ERM's Perth office.

Fields of Competence

- Environmental Legislation
- Environmental Impact Assessment
- Flora and fauna Assessment
- Environmental Management Plans
- Geographic Information Systems

Education

- University of Newcastle, 1998 – 2000.
Environmental Science Degree
- Macquarie University, Masters in Environmental Law Currently Completing.

Key Industry Sectors

- Utilities
- Government
- Property Development
- Urban Planning

Key Projects

REF – Sewage Pipeline Infrastructure

Currently managing the completion of a Review of Environmental Factors (REF) for a proposed sewage pipeline at Port Macquarie. Works have included the completion of detailed flora and fauna surveys and resolution and management of issues relating the presence of threatened species, aboriginal heritage values and acid sulphate soils.

Commonwealth EPBC Referrals

Responsible for the preparation of successful referrals under the Commonwealth EPBC Act for actions affecting matters of National Environmental Significance (NES). This has included both actions on Commonwealth land and potential impacts to listed threatened and migratory species.

REF – Water Supply Infrastructure

Responsible for the completion of an REF for proposed water supply infrastructure at Broken Hill in NSW. This EIA included consideration of a wide range of environmental issues including air quality, heritage, noise, water and ecology.

EIA – Proposed Windfarm

Conducted preliminary field surveys and vegetation mapping of QLD state and Commonwealth listed vegetation communities for a proposed windfarm in central QLD. Project included the consideration of potential impacts on matters of NES as a result of the windfarm construction and operation.

HMAS Creswell Kangaroo Management Plan

Managed a Kangaroo darting procedures on site at HMAS Creswell to remove radio tracking collars from 18 'tagged' kangaroos as part of the Kangaroo Management Plan for the Navy base.

Environmental Management Plan, Woodland Waters, Melbourne. Completed an EMP for a proposed residential sub-division at Mernda on the out-skirts of Melbourne. This EMP addressed a significant number of construction and non-construction related impacts including the management of a nature reserve to comply with Victorian 'net gain' legislation.

Box-Gum Grassy Woodland Monitoring Department of Defence. Undertook field surveys for the assessment and mapping of Box-Gum Grassy Woodland at MTA, CPO and ADFA, as well as mapping of the Hoary Sunray at ADFA.

Ecological Constraints mapping for the RTA – Hume Highway Duplication.

Completed an ecological constraints analysis for the Hume Highway duplication s project. This involved fauna survey, environmental constraints mapping, and assessment and mapping of the Box Gum Grassy Woodland endangered ecological community resulting in the assessment of preferred route options.

Property Vegetation Plan Taree, NSW. Successfully completed a Property Vegetation Plan (PVP) for a proposed new town development at Taree on the NSW mid north coast. The purpose of the PVP was to give the client an indication where the proposal stood with respect to the increasing focus on proposals 'improving or maintaining' environmental variables. The project required considerable liaison with CMA and DEC officers, PVP survey design, field surveys and eventual running of the Biometric program and report preparation. The report enabled the client to identify appropriate offsets for proposed vegetation removal within the site and further discussions with DEC and appropriate government bodies.

Targeted Koala Searches and Nocturnal Surveys, Stockton. Completed three days of Koala habitat assessments at Stockton on the NSW Central Coast in accordance with the Australian Koala Foundations Spot Assessment Technique (SAT) for identifying potential koala habitat. Also included 4 nights nocturnal surveys including spotlighting, owl and Yellow-bellied Glider call playback and Anabat detection.

Environmental Management Plans NSW Central Coast. Completed numerous Environmental Management Plans to manage impacts on vegetation and wildlife during and post construction. Included development of threatened species management protocol and vegetation rehabilitation programs.

Ecological Constraints Analysis–Michelago, NSW June 2006. Completed an ecological constraints analysis for a large subdivision proposal in the Michelago area of the Cooma Monaro LGA. Assessment included site inspection, extensive research into threatened species and ecological communities and analysis of environmental legislation, with conclusions recommending additional surveys to determine the status of listed endangered ecological communities within the study area.

Threatened Species Assessment–Industrial subdivision, Western Sydney. Successfully managed and completed a threatened species assessment for a proposed 100 ha industrial subdivision in Western Sydney. In completing the considerable discussions with local government and the client were undertaken

to resolve issues relating to the presence of an Endangered Ecological Community within the site.

Threatened Species Assessment – ACM Landmark, Cessnock. Prepared a Threatened Species Assessment report for a proposed development on land at Cessnock. Filed surveys included targeted surveys for Squirrel Gliders *Petaurus norfolcensis* and *Grevillea parviflora*. With eventual identification and mapping of *Grevillea parviflora* within the study area.

Threatened Species Assessment – Woodbury Park Estates, Somersby . Successfully managed and completed a threatened species assessment for a proposed 40 ha residential sub-division at Somersby on the NSW Central Coast. Tasks included survey design, map preparation, flora and fauna surveys and eventual reporting against the NSW *Threatened Species Conservation Act* to resolve significant threatened species issues within the site.

Threatened Species Assessment, Maitland NSW. Completed a threatened species assessment for a proposed residential subdivision at Maitland within an area of Spotted Gum woodland. Arboreal mammal trapping resulted in the identification of several Squirrel Gliders (*Petaurus norfolcensis*) within the site.

Targeted threatened flora species surveys

Undertook targeted surveys for *Hibbertia procumbens*, *Tetratheca glandulosa* and *Rutidosis heterogama* at two sites on the NSW Central Coast including population counts and habitat mapping.

**ATTACHMENT 3 - TERTIARY SITE VEGETATION ASSESSMENT DATA
SHEETS**

Tertiary Site Vegetation Assessment Data Sheet

Job Number: Main Line

Site Number: M01 KP: 1.4

Assessor: Ann

Date : 24/11/2008

Location: Warrego Highway

Photo #: 3

GPS Projection: UTM Datum: GDA94; Easting: 227186 Northing: 7047970

Width of RE: >300

Width of total remnant: >300

Total RE Area: >50ha

Total remnant Area: >50ha

	RE code	EPBC status	VMA status
DNRW RE map	11.7.4/11.7.7/11.7.5/11.7.2		Not of Concern
Survey result	11.7.4		Not of Concern

Canopy stratum form: Tree

Canopy Crown Cover: 70%

Canopy Median Height: 15 m

Structural Code: Woodland

All woody species present within 50m x 10m plot (plus dominant and EVR non-woody species)

Name	Rel. No.	Height Ocular estimate (m)						Ground Cover	
		E	T1	T2	T3	S1	S2	Ground Layer <1m	No.
<i>Eucalyptus crebra</i>	C		15	10	8			<i>Oxalis exilis</i>	P
<i>Acacia conferta</i>	O						2	<i>Panicum decompositum</i>	P
<i>Acacia deanei ssp deanei</i>	O					5		<i>Paspalidium caespitosum</i>	P
<i>Acacia spectabilis</i>	O						2	<i>Podolepis longipedata</i>	P
<i>Alphitonia excelsa</i>	O			10	8		2	<i>Rostellularia adscendens</i>	U
<i>Angophora floribunda</i>	O		15	10	8			<i>Sclerolaena glabra</i>	U
<i>Callitris glaucophylla</i>	O			10	8			<i>Sida subspicata</i>	U
<i>Chrysocephalum apiculatum</i>	O						<1	<i>Solanum nemophilum</i>	U
<i>Einadia nutans ssp nutans</i>	P						<1	<i>Themeda triandra</i>	P
<i>Notelaea microcarpa</i>	P					4		<i>Tricoryne elatior</i>	U
<i>Acacia leiocalyx</i>	U					4		<i>Gahnia aspera</i>	U
<i>Corymbia clarksoniana</i>	U				8	4		<i>Goodenia disperma</i>	P
<i>Acacia shirleyi</i>	E			10	8			<i>Hybanthus stellarioides</i>	P
								<i>Lomandra confertifolia</i>	P
								<i>Lomandra filiformis</i>	P
								<i>Lomandra leucocephala</i>	U
Canopy stratum (70%)								<i>Lomandra multiflora</i>	U
Mid stratum (30%)								<i>Aristida caput-medusae</i>	C
Ground stratum (50%)								<i>Dianella revoluta v revoluta</i>	U
Rock cover (10%)								<i>Enneapogon nigricans</i>	U
Bare ground cover (20%)								<i>Dianella revoluta v revoluta</i>	U
Litter cover (20%)								<i>Cheilanthes distans</i>	U

Species annotations: C = Collected * Exotic Species ** Declared Species E = Edge or Outside but adjoining 50m x 10m plot Relative Numbers within stratum (D = dominant; A = Abundant C = Common; O = Occasional; U = Uncommon; P = Present R = Rare)
Strata: E = Emergent; T1-3 = Tree strata 1-3; S1-2 = Shrub strata 1-2; G = Ground stratum\l

Scheduled flora possibilities: Yes *Fimbristylis vagans*

Additional notes on pest plants

**Gomphrena celosioides*

**Opuntia stricta* v *stricta*

**Opuntia tomentosa*

**Chenopodium murale*

**Eragrostis cilianensis*

**Megathyrsus maximus*

**Melinis repens*

**Urochloa mosambicensis*

**Verbena tenuisecta*

Weed Cover (%): <5-25;

Disturbance (% of site affected): <1;

Health: Degraded

Slope: Flat;

Soils: Surface observation **Reliability:** Low,

Soil Colour: yellow;

Soil Texture: sandy loam;

Particular sensitivities to proposed impacts (incl. fragmentation): Erodible Soils

Special conservation significance:.....

Other notes such as Health, Condition: Poor

Landuse; Grazing

Over fence or opposite sides road

Tertiary Site Vegetation Assessment Data Sheet

Job Number: Main Line

Site Number: M02 KP: 24.4 Assessor: Ann

Date : 24/11/2008

Location: WARRAMOO RD

Photo #: 4-5

GPS Projection: UTM Datum: GDA94; Easting: 220856 Northing: 7069488

	RE code	EPBC status	VMA status
DNRW RE map	11.7.4		Not of Concern
Survey result	11.7.4		Not of Concern

Canopy stratum form: Tree; Canopy Crown Cover: 70%
Canopy Median Height: 15m Structural Code: Ironbark Woodland

All woody species present within 50m x 10m plot (plus dominant and EVR non-woody species)

Name	Rel. No.	Height Ocular estimate (m)						Ground Cover	
		E	T1	T2	T3	S1	S2	Ground Layer <1m	No.
<i>Allocasuarina luehmannii</i>	C			10	8	5		<i>Aristida holathera v holathera</i>	O
<i>Callitris glaucophylla</i>	C				8	4		<i>Eragrostis elongata</i>	O
<i>Eucalyptus crebra</i>	C		15					<i>Eremochloa bimaculata</i>	O
<i>Eucalyptus fibrosa ssp nubilis</i>	E				8	4		<i>Entolasia stricta</i>	P
<i>Acacia semilunata</i>	O					4		<i>Brunoniella australis</i>	U
<i>Melaleuca nodosa</i>	P					3		<i>Chrysocephalum apiculatum</i>	U
								<i>Eucalyptus populnea</i>	U
								<i>Dianella revoluta v revoluta</i>	U
								<i>Aristida caput-medusae</i>	U
								<i>Aristida holathera</i>	O
								<i>Eragrostis elongata</i>	O
								<i>Eremochloa bimaculata</i>	O
								<i>Entolasia stricta</i>	P
								<i>Thyridolepis mitchelliana</i>	C
Canopy stratum (70%)									
Mid stratum (30%)									
Ground stratum (20%)									
Rock cover (%)									
Bare ground cover (50%)									
Litter cover (30%)									

Species annotations: C Collected * Exotic Species ** Declared Species E = Edge or Outside but adjoining 50m x 10m plot Relative Numbers within stratum (D = dominant; A = Abundant C = Common; O = Occasional; U = Uncommon; P = Present R = Rare)
Strata: E = Emergent; T1-3 = Tree strata 1-3; S1-2 = Shrub strata 1-2; G = Ground stratum\

Scheduled flora possibilities: No

Additional notes on pest plants None Seen

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Weed Cover (%): <5

Disturbance (% of site affected): 0

Health: Good

Slope: Flat;

Soils: Surface observation Reliability: Low,

Soil Colour: brown;

Soil Texture: sandy loam;

	Description	Plants per plot
D	Dominant	>100
A	Abundant	50 - 100
C	Common	20 - 50
O	Occasional	10 - 20
U	Uncommon	5 - 10
P	Present	3 - 5
R	Rare	1 - 3

Particular sensitivities to proposed impacts: Fragmentation of remnant

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.....

Special conservation significance:.....

Other notes such as Health, Condition: Excellent habitat for reptiles and birds

Landuse Grazing

observed or Horticultural Crops

Over fence or opposite sides road

Tertiary Site Vegetation Assessment Data Sheet

Job Number: Main Line

Site Number: M03 KP: 29.3

Assessor: Ann

Date : 25/11/2008

Location: LTREE CREEK ROAD

Photo #: 4

GPS Projection: UTM Datum: GDA94; Easting: 219029 Northing: 7074135

Width of RE: >300

Width of total remnant: >300

Total RE Area: >50ha

Total remnant Area: >50ha

	RE code	EPBC status	VMA status
DNRW RE map	11.7.5		Not of Concern
Survey result	11.7.5		Not of Concern

Canopy stratum form: Shrub;

Canopy Crown Cover: 90%

Canopy Median Height: 3-4m

Structural Code: Shrubland with emergent

All woody species present within 50m x 10m plot (plus dominant and EVR non-woody species)

Name	Rel. No.	Height Ocular estimate (m)						Ground Cover	
		E	T1	T2	T3	S1	S2	Ground Layer <1m	No.
<i>Calytrix longiflora</i>	A						3	<i>Podolepis longipedata</i>	O
<i>Hovea longipes</i>	C						3	<i>Laxmannia gracilis</i>	O
<i>Melaleuca nodosa</i>	C						2	<i>Scleria sphacelata</i>	P
<i>Corymbia bloxsomei</i>	E		15					<i>Panicum decompositum</i>	P
<i>Lysicarpus angustifolius</i>	E				8			<i>Alloteropsis semialata</i>	P
<i>Eucalyptus exserta</i>	O					4	3	<i>Triodia scariosa</i>	P
<i>Homoranthus melanostictus</i>	O						3	<i>Homoranthus melanostictus</i>	O
<i>Hakea purpurea</i>	O						3	<i>Plectranthus parviflorus</i>	P
<i>Xanthorrhoea johnsonii</i>	O				2			<i>Poranthera microphylla</i>	O
<i>Homalocalyx polyandrus</i>	P						3	<i>Lindernia alsinoides</i>	P
<i>Melaleuca uncinata</i>	P						3	<i>Caladenia caerulea</i>	P
<i>Boronia bipinnata</i>	P						3	<i>Cassytha filiformis</i>	P
<i>Acacia blakei</i> ssp <i>blakei</i>	U						3		
<i>Micromyrtus sessilis</i>	U						3		
Mid stratum (90%)									
Ground stratum (50%)									
Rock cover (10%)									
Bare ground cover (20%)									
Litter cover (20%)									

Species annotations: C Collected * Exotic Species ** Declared Species E = Edge or Outside but adjoining 50m x 10m plot Relative Numbers within stratum (D = dominant; A = Abundant C = Common; O = Occasional; U = Uncommon; P = Present R = Rare)

Strata: E = Emergent; T1-3 = Tree strata 1-3; S1-2 = Shrub strata 1-2; G = Ground stratum\

Scheduled flora possibilities: Yes - very likely Philotheca sporadica

Additional notes on pest plants Nil on Site
Nearby creek banks had *Bryophyllum* spp (mother of millions) present.

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Weed Cover (%): 0

Disturbance (% of site affected): 0

Health: Very Good

Slope: Crest; Ridge;

Soils: Surface observation Reliability: Low,

Soil Colour: yellow; orange;

Soil Texture: stony clay;

	Description	Plants per plot
D	Dominant	>100
A	Abundant	50 - 100
C	Common	20 - 50
O	Occasional	10 - 20
U	Uncommon	5 - 10
P	Present	3 - 5
R	Rare	1 - 3

Particular sensitivities to proposed impacts; Fragmentation of small heathland area

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Special conservation significance:.....

Other notes such as Health, Condition: Good health after recent fires

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Landuse Grazing.....Cultural – possible cultural heritage area

observed or Horticultural Crops

Over fence or opposite sides road

Tertiary Site Vegetation Assessment Data Sheet

Job Number: Main Line

Site Number: M04 KP: 5 Assessor: Ann

Date : 25/11/2008

Location: MAINLINE

Photo #: 2

GPS Projection: UTM Datum: GDA94; Easting: 226403 Northing: 7052790

Width of RE: >300

Width of total remnant: >300

Total RE Area: >50ha

Total remnant Area: >50ha

	RE code	EPBC status	VMA status
DNRW RE map	11.4.3	Endangered	Endangered
Survey result	11.7.4	-	Not of Concern

Canopy stratum form: Tree

Canopy Crown Cover: 60%

Canopy Median Height: 20m

Structural Code: Woodland

All woody species present within 50m x 10m plot (plus dominant and EVR non-woody species)

Name	Rel. No.	Height Ocular estimate (m)						Ground Cover	
		E	T1	T2	T3	S1	S2	Ground Layer <1m	No.
<i>Eucalyptus fibrosa ssp nubila</i>	C		25	20				<i>Aristida caput-medusae</i>	O
<i>Maireana microphylla</i>	O						2	<i>Brunoniella australis</i>	P
<i>Acacia shirleyi</i>	O			20	15			<i>Alstonia constricta</i>	P
<i>Maytenus cunninghamii</i>	P						2	<i>Calotis lappulacea</i>	P
<i>Sida cordifolia</i>	P						1	<i>Brunoniella acaulis</i>	P
<i>Acacia harpophylla</i>	P						1	<i>Cheilanthes sieberi</i>	O
<i>Acacia semilunata</i>	U					3		<i>Oxalis exilis</i>	P
<i>Allocasuarina luehmannii</i>	O				8			<i>Phyllanthus virgatus</i>	P
								<i>Ancistrachne uncinulata</i>	P
								<i>Aristida holathera</i>	P
								<i>Pseuderanthemum variabile</i>	U
								<i>Evolvulus alsinoides v decumbens</i>	U
								<i>Goodenia delicate</i>	U
								<i>Aristida latifolia</i>	U
								<i>Enchylaena tomentosa</i>	U
Canopy (60%)								<i>Aristida caput-medusae</i>	O
Mid stratum (20%)									
Ground stratum (50%)									
Rock/Log cover (10%)									
Bare ground cover (20%)									
Litter cover (20%)									

Species annotations: C Collected * Exotic Species ** Declared Species E = Edge or Outside but adjoining 50m x 10m plot Relative Numbers within stratum (D = dominant; A = Abundant C = Common; O = Occasional; U = Uncommon; P = Present R = Rare)

Strata: E = Emergent; T1-3 = Tree strata 1-3; S1-2 = Shrub strata 1-2; G = Ground stratum\|

Scheduled flora possibilities: No

Additional notes on pest plants

Optunia stricta
Verbena tenuisecta

Weed Cover (%): <5 ;

Disturbance (% of site affected): 1-5;

Health: Degraded

Slope: Mid slope

Soils: Surface observation **Reliability:** Low,

Soil Colour: pale brown

Soil Texture: silty clay loam

	Description	Plants per plot
D	Dominant	>100
A	Abundant	50 - 100
C	Common	20 - 50
O	Occasional	10 - 20
U	Uncommon	5 - 10
P	Present	3 - 5
R	Rare	1 - 3

Particular sensitivities to proposed impacts;

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.....

Special conservation significance: Degraded

Other notes such as Health, Condition:

.....
Landuse Grazing

Tertiary Site Vegetation Assessment Data Sheet

Job Number:

Site Number: M05 KP: Assessor: Ann Moran Date : 30/09/2008

Location: CONDAMINE POWER STATION Photo #:

GPS Projection: UTM Datum: GDA94; Zone: 56

Easting: 228351..... Northing: 7046395.....Waypoint #: 26.40648.....

Width of RE: >300m

Width of total remnant: >300m

Total RE Area: Does not extend beyond site; >50ha

Total remnant Area: Does not extend beyond site; >50ha

	RE code	EPBC status	VMA status
DNRW RE map	11.7.7/11.7.5	N/A	Not of Concern
Survey result	11.7.5	N/A	Not of Concern

Canopy stratum form: Shrubland

Canopy Crown Cover: 40%

Canopy Median Height: 2m Structural Code: Woodland

All woody species present within 50m x 10m plot (plus dominant and EVR non-woody species)

Name	Rel. Dom.	Height						
		Ocular estimate (m)						
		E	T1	T2	T3	S1	S2	G
<i>Brachychiton populneus</i>	P	25	20	15				
<i>Angophora leiocarpa</i>	O				8			
<i>Callitris glaucophylla</i>	C							
<i>Thyridolepis mitchelliana</i>	C							<1
<i>Acacia ixiophylla</i>	O						2	
<i>Melichrus urceolatus</i>	O							<1
<i>Gahnia aspera</i>	O							<1
<i>Alphitonia excelsa</i>	P						2	
<i>Acacia crassa ssp crassa</i>	P					3		
<i>Aristida leptopoda</i>	P							<1
<i>Fimbristylis dichotoma</i>	P							<1
<i>Micromyrtus sessilis</i>	C					3		
<i>Badingtonia jucunda</i>	P						4	
<i>Solanum nemophilum</i>	O							<1
<i>Aristida caput-medusae</i>	C							<1
<i>Acacia triptera</i>	O						2	
<i>Cheilanthes distans</i>	P							<1
<i>Oxalis corniculata</i>	P							<1
<i>Cyanthillium cinereum</i>	P							<1
<i>Aristida holathera</i>	P							<1
<i>Goodenia delicata</i>	P							<1
<i>Bulbostylis sp.</i>	P							<1
<i>Laxmannia gracilis</i>	P							<1
<i>Wahlenbergia communis</i>	C							
Canopy stratum (%)								
Mid stratum (%)								
Ground stratum (%)								
Rock cover (%)								
Bare ground cover (%)								
Litter cover (%)								

Strata: E = Emergent; T1-3 = Tree strata 1-3; S1-2 = Shrub strata 1-2; G = Ground stratum

Scheduled flora possibilities: Possibility for rare and threatened plants to be found in the area.

Additional notes on pest plants: *Sida spinosa* was found to be present.

Weed Cover (%): <5

Disturbance (% of site affected): 0

Health: Average

Slope: Flat

Soils: Surface observation Reliability: Low

Soil Colour: Orange

Soil Texture: Silty Clay

Legend	Description	Plants per plot
D	Dominant	>100
A	Abundant	50 - 100
C	Common	20 - 50
O	Occasional	10 - 20
U	Uncommon	5 - 10
P	Present	3 - 5
R	Rare	1 - 3
E	Edge not inside community	1 - 10
*	Weed or Garden escapee	

Particular sensitivities to proposed impacts (incl. fragmentation): Erodible soils

Special conservation significance:

- cultural
- commercial
- recreational

observed or Horticultural Crops

Other notes:

Very interesting shrubland

Job Number:

Location: CREEKLINE..... Photo #: .4.....

Width of RE: >300

Total RE Area: 50ha

Total remnant Area: >50ha

	RE code	EPBC status	VMA status
DNRW RE map	11.3.14 (non remnant)		Not of concern
Survey result	11.3.14		Not of concern

Canopy Crown Cover: 70.....%

Structural Code: Woodland.....

[illegible]

Species annotations: C = Collected * Exotic Species ** Declared Species E = Edge or Outside but adjoining 50m x 10m plot
Numbers within stratum (D = dominant; A = Abundant C = Common; O = Occasional; U = Uncommon; P = Present R = Rare)
Strata: E = Emergent; T1-3 = Tree strata 1-3; S1-2 = Shrub strata 1-2; G = Ground stratum||

Scheduled flora possibilities: Yes possible EVR sedge species

Additional notes on pest plants nil.....
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Weed Cover (%): <5
Disturbance (% of site affected): 0
Health: Good
Slope: Open depression
Soils: Surface observation **Reliability:** Low
Soil Colour: yellow
Soil Texture: sand

	Description	Plants per plot
D	Dominant	>100
A	Abundant	50 - 100
C	Common	20 - 50
O	Occasional	10 - 20
U	Uncommon	5 - 10
P	Present	3 - 5
R	Rare	1 - 3

Particular sensitivities to proposed impacts (incl. fragmentation): Erodible soils.....
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Special conservation significance:.....
Other notes such as Health, Condition:
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Landuse Grazing.....culturalcommercialrecreational.....
observed or Horticultural Crops
Over fence or opposite sides road

Job Number:

GPS Projection: UTM Datum: GDA94; Easting: 225225.. Northing: 7058091

	RE code	EPBC status	VMA status
DNRW RE map	11.7.4/ 11.7.7/11.7.5/11.7.2		Not of concern
Survey result	11.7.5		Not of concern

Canopy stratum form: Shrub Canopy Crown Cover: 90.....%

Canopy Median Height: 3.m. Structural Code: Shrubland.....

[illegible]

Species annotations: C = Collected * Exotic Species ** Declared Species E = Edge or Outside but adjoining 50m x 10m plot Relative Numbers within stratum (D = dominant; A = Abundant C = Common; O = Occasional; U = Uncommon; P = Present R = Rare)
Strata: E = Emergent; T1-3 = Tree strata 1-3; S1-2 = Shrub strata 1-2; G = Ground stratum||

Scheduled flora possibilities: Yes *Philotheca sporacida* and *Micromyrtus* spp expected due their common presence in the regional ecosystem. They were however, not observed during surveys.....

Additional notes on pest plants No weeds.....

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Weed Cover (%): <5

Disturbance (% of site affected): 0

Health: Good

Slope: Flat

Soils: Surface observation Reliability: Low

Soil Colour: orange

Soil Texture: stony, clay loam

	Description	Plants per plot
D	Dominant	>100
A	Abundant	50 - 100
C	Common	20 - 50
O	Occasional	10 - 20
U	Uncommon	5 - 10
P	Present	3 - 5
R	Rare	1 - 3

Particular sensitivities to proposed impacts (incl. fragmentation): Erodibility of soils.

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Special conservation significance: potential EVR species.....

Other notes such as Health, Condition: Very good health.

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Landuse predominantly grazing areas

observed or Horticultural Crops

Over fence or opposite sides road

Tertiary Site Vegetation Assessment Data Sheet

Job Number:

Site Number: M8..... KP: 13..... Assessor: Ann..... Date : 25/11/2008

Location: Dogwood Creek Photo #: .4.....

GPS Projection: UTM Datum: GDA94; Easting: 224983.. Northing: 7058925

Width of RE: >300

Width of total remnant: >300

Total RE Area: 50ha

Total remnant Area: >50ha

	RE code	EPBC status	VMA status
DNRW RE map	11.3.4/11.3.25		Of Concern / Not of Concern
Survey result	11.3.4		Of Concern

Canopy stratum form: Tree

Canopy Crown Cover: 70....%

Canopy Median Height: 25.m.

Structural Code: Tall open forest.....

All woody species present within 50m x 10m plot (plus dominant and EVR non-woody species)

Name	Rel. No.	Height Ocular estimate (m)						Ground Cover	
		E	T1	T2	T3	S1	S2	Ground Layer >1m	No.
<i>Callitris glaucophylla</i>	A			15	10	8		<i>Lomandra leucocephala v leucocephala</i>	C
<i>Eucalyptus tereticornis</i>	A	25	20	15				<i>Lomandra longifolia</i>	C
<i>Callistemon viminalis</i>	C							<i>Desmodium rhytidophyllum</i>	O
<i>Eucalyptus populnea</i>	E				10	8		<i>Calotis lappulacea</i>	O
<i>Cymbidium canaliculatum</i>	O						4	<i>Emilia sonchifolia v sonchifolia</i>	O
<i>Hibiscus sturtii v sturtii</i>	O						2	<i>Tricoryne elatior</i>	O
<i>Leptospermum polygalifolium</i>	O						5	<i>Laxmannia gracilis</i>	O
<i>Angophora floribunda</i>	O	25					4	<i>Sonchus oleraceus</i>	P
								<i>Opuntia tomentosa</i>	P
								<i>Dianella rara</i>	P
								<i>Phyllanthus virgatus</i>	P
								<i>Commelina ensifolia</i>	U
								<i>Zornia dyctiocarpa v dyctiocarpa</i>	U
								<i>Cheilanthes sieberi</i>	U
								<i>Chrysocephalum apiculatum</i>	U
								<i>Podolepis longipedata</i>	U
								<i>Gahnia aspera</i>	U
								<i>Rostellularia adscendens v adscendens</i>	---
								<i>Fimbristylis dichotoma</i>	---
								<i>Crotalaria montana</i>	U
Canopy stratum (%) 70									
Mid stratum (%)									
Ground stratum (%)									
Rock cover (%)									
Bare ground cover (%)									
Litter cover (%)									

Species annotations: C Collected * Exotic Species ** Declared Species E = Edge or Outside but adjoining 50m x 10m plot Relative Numbers within stratum (D = dominant; A = Abundant C = Common; O = Occasional; U = Uncommon; P = Present R = Rare) Strata: E = Emergent; T1-3 = Tree strata 1-3; S1-2 = Shrub strata 1-2; G = Ground stratum\

Scheduled flora possibilities: Yes *Fimbristylis vagans*.....

Additional notes on pest plants *Verbena tenuisecta* (maynes pest) was observed on the site.

Weed Cover (%): <5

Disturbance (% of site affected): 0

Health: Good

Slope: Open depression

Soils: Surface observation Reliability: Low

Soil Colour: yellow

Soil Texture: sand

	Description	Plants per plot
D	Dominant	>100
A	Abundant	50 - 100
C	Common	20 - 50
O	Occasional	10 - 20
U	Uncommon	5 - 10
P	Present	3 - 5
R	Rare	1 - 3

Particular sensitivities to proposed impacts (incl. fragmentation): Banks prone to erosion.

Special conservation significance:

Other notes such as Health, Condition: 11.3.27b old oxbow

Landuse Grazing.....culturalcommercialrecreational.....
observed or Horticultural Crops
Over fence or opposite sides road: cattle yard on western banks.

Tertiary Site Vegetation Assessment Data Sheet

Job Number:

Site Number: M09. KP: 45. Assessor: Ann.. Date : 26/11/2008

Location: Upper Downfall Rd Photo #: 2.....

GPS Projection: UTM Datum: GDA94; Easting: 219883..... Northing: 7089571

	RE code	EPBC status	VMA status
DNRW RE map	11.7.2 /11.7.7		Not of Concern
Survey result	11.7.6		Not of Concern

Canopy stratum form: Tree Canopy Crown Cover: 50%
Canopy Median Height: 20.m. Structural Code: .Woodland

All woody species present within 50m x 10m plot (plus dominant and EVR non-woody species)

Name	Rel. No.	Height Ocular estimate (m)						Ground Cover	
		E	T1	T2	T3	S1	S2	Ground Layer >1m	No.
<i>Allocasuarina luehmannii</i>	O				8			<i>Cheilanthes sieberi</i>	U
<i>Acacia harpophylla</i>	E						1	<i>Calyptochloa gracillima</i>	O
<i>Acacia shirleyi</i>	C			15	10			<i>Panicum effusum v simile</i>	O
<i>Corymbia citriodora ssp variegata</i>	C		20	15	10			<i>Thyridolepis mitchelliana</i>	O
<i>Alphitonia excelsa</i>	U						2	<i>Brunoniella australis</i>	O
								<i>Chrysocephalum apiculatum</i>	O
								<i>Enchylaena tomentosa v tomentosa</i>	O
								<i>Evolvulus alsinoides v decumbens</i>	C
								<i>Goodenia delicata</i>	O
								<i>Tricoryne elatior</i>	U
								<i>Oxalis exilis</i>	O
								<i>Dianella revoluta v revoluta</i>	O
								<i>Solanum nemophilum</i>	U
Canopy stratum (%) 50									
Mid stratum (%)									
Ground stratum (%)50									
Rock cover (%) 20									
Bare ground cover 3(%)									
Litter cover (%)									

Species annotations: C Collected * Exotic Species ** Declared Species E = Edge or Outside but adjoining 50m x 10m plot Relative Numbers within stratum (D = dominant; A = Abundant C = Common; O = Occasional; U = Uncommon; P =Present R = Rare)
Strata: E = Emergent; T1-3 = Tree strata 1-3; S1-2 = Shrub strata 1-2; G = Ground stratum\|

Scheduled flora possibilities: No

Additional notes on pest plants nil.....
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Weed Cover (%): <5
Disturbance (% of site affected): >5

Health: Degraded

Slope: Flat

Soils: Surface observation Reliability: Low

Soil Colour: yellow

Soil Texture: sandy loam

	Description	Plants per plot
D	Dominant	>100
A	Abundant	50 - 100
C	Common	20 - 50
O	Occasional	10 - 20
U	Uncommon	5 - 10
P	Present	3 - 5
R	Rare	1 - 3

Particular sensitivities to proposed impacts (incl. fragmentation):.....
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Special conservation significance:.....

Other notes such as Health, Condition:
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Landuse Grazing.....culturalcommercialrecreational.....

observed or Horticultural Crops

Over fence or opposite sides road

Tertiary Site Vegetation Assessment Data Sheet

Job Number:

Site Number: M 10. KP: 50.6.... Assessor: Ann..... Date : 25/11/2008

Location: Photo #: 134-135...

GPS Projection: UTM Datum: GDA94; Easting: 219410..... Northing: 7094752

	RE code	EPBC status	VMA status
DNRW RE map	11.9.5	Endangered	Endangered
Survey result	11.9.5	Endangered	Endangered

Canopy stratum form: Tree; Canopy Crown Cover: 70....%
 Canopy Median Height: 20m. Structural Code: Woodland.....

All woody species present within 50m x 10m plot (plus dominant and EVR non-woody species)

Name	Rel. No.	Height Ocular estimate (m)						Ground Cover	
		E	T1	T2	T3	S1	S2	Ground Layer <1m	No.
<i>Acacia harpophylla</i>	A			15				<i>Oxalis exilis</i>	O
<i>Eucalyptus populnea</i>	C		20					<i>Phyllanthus maderaspatensis</i>	O
<i>Psydrax attenuata forma attenuata</i>	C					3		<i>Ancistrachne uncinulata</i>	O
<i>Psydrax odorata</i>	C				4			<i>Enneapogon nigricans</i>	O
<i>Acacia harpophylla</i>	A			15				<i>Paspalidium caespitosum</i>	O
<i>Casuarina cristata</i>	O			15				<i>Enteropogon acicularis</i>	P
<i>Alphitonia excelsa</i>	O					3			
<i>Solanum nemophilum</i>	O						2		
<i>Carissa ovata</i>	P						2		
<i>Acacia julifera ssp julifera</i>	U					3			
<i>Bursaria incana</i>	U					3			
Canopy stratum (%) 70									
Mid stratum (%) 30									
Ground stratum (%) 50									
Rock cover (%) -									
Bare ground cover (%) 30									
Litter cover (%) 20									

Species annotations: C Collected * Exotic Species ** Declared Species E = Edge or Outside but adjoining 50m x 10m plot Relative Numbers within stratum (D = dominant; A = Abundant C = Common; O = Occasional; U = Uncommon; P =Present R = Rare)
 Strata: E = Emergent; T1-3 = Tree strata 1-3; S1-2 = Shrub strata 1-2; G = Ground stratum\\

Scheduled flora possibilities: No.....
Additional notes on pest plants ... *Optuntia tomentosa*

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Weed Cover (%): <5
Disturbance (% of site affected): 1-5

Health: Average

Slope: Flat

Soils: Surface observation Reliability: Low

Soil Colour: brown; red; pale

Soil Texture: sandy clay loam

	Description	Plants per plot
D	Dominant	>100
A	Abundant	50 - 100
C	Common	20 - 50
O	Occasional	10 - 20
U	Uncommon	5 - 10
P	Present	3 - 5
R	Rare	1 - 3

Particular sensitivities to proposed impacts (incl. fragmentation):.....

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Special conservation significance:.....

Other notes such as Health, Condition:
Small community could be missed- is situated 50 m to the west

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Landuse Grazing.....culturalcommercialrecreational.....

observed or Horticultural Crops
Over fence or opposite sides road

Tertiary Site Vegetation Assessment Data Sheet

Job Number:

Site Number: 11..... KP: 71.2..... Assessor: Ann..... Date : 25/11/2008

Location: ROCHE CREEK..... Photo #: 3.....

GPS Projection: UTM Datum: GDA94; Easting: 218534..... Northing: 7114744

	RE code	EPBC status	VMA status
DNRW RE map	11.3.25/11.9.10/11.9.7		Not of Concern / Of Concern
Survey result	11.9.7		Of Concern

Canopy stratum form: Tree

Canopy Crown Cover:%

Canopy Median Height:m.

Structural Code: .Woodland.....

All woody species present within 50m x 10m plot (plus dominant and EVR non-woody species)

Name	Rel. No.	Height Ocular estimate (m)						Ground Cover	
		E	T1	T2	T3	S1	S2	Ground Layer	No.
<i>Eremophila mitchellii</i>	C				10			<i>Austrostipa ramosissima</i>	C
<i>Eucalyptus populnea</i>	C			15			2	<i>Enchylaena tomentosa v tomentosa</i>	O
<i>Archidendropsis basaltica</i>	E				10			<i>Cenchrus ciliaris</i>	O
<i>Acacia excelsa ssp excelsa</i>	O						3		
<i>Myoporum acuminatum</i>	O					4			
<i>Angophora floribunda</i>	O			15					
<i>Eucalyptus melanophloia</i>	O			15	10				
<i>Eucalyptus tereticornis</i>	O	25	20	15	15	10			
<i>Callitris glaucophylla</i>	U					8			
<i>Geijera parviflora</i>	U					4	3		
<i>Alectryon oleifolius ssp oleifolius</i>	U					10			
Canopy stratum (%)									
Mid stratum (%)									
Ground stratum (%)									
Rock cover (%)									
Bare ground cover (%)									
Litter cover (%)									

Species annotations: C Collected * Exotic Species ** Declared Species E = Edge or Outside but adjoining 50m x 10m plot Relative Numbers within stratum (D = dominant; A = Abundant C = Common; O = Occasional; U = Uncommon; P = Present R = Rare)
Strata: E = Emergent; T1-3 = Tree strata 1-3; S1-2 = Shrub strata 1-2; G = Ground stratum\|

Scheduled flora possibilities: No.....

Additional notes on pest plants: *Optuntia tomentosa* was found to be present

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Weed Cover (%): <5
Disturbance (% of site affected): 0

Health: Average

Slope: Flat

Soils: Surface observation Reliability: Low,

Soil Colour: pale

Soil Texture: stony; silty clay loam

	Description	Plants per plot
D	Dominant	>100
A	Abundant	50 - 100
C	Common	20 - 50
O	Occasional	10 - 20
U	Uncommon	5 - 10
P	Present	3 - 5
R	Rare	1 - 3

Particular sensitivities to proposed impacts (incl. fragmentation):.....

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Special conservation significance:.....

Other notes such as Health, Condition:

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Landuse Grazing.....culturalcommercialrecreational.....

observed or Horticultural Crops

Over fence or opposite sides road

Tertiary Site Vegetation Assessment Data Sheet

Job Number:

Site Number: 12..... KP: 78..... Assessor: Ann..... Date : 25/11/2008

Location: Photo #: 2.....

GPS Projection: UTM Datum: GDA94; Easting: 218726.429 Northing: 7121535.04

	RE code	EPBC status	VMA status
DNRW RE map	11.9.7 / 11.3.4		Of Concern / Of Concern
Survey result	11.9.7		Of Concern

Canopy stratum form: Tree

Canopy Crown Cover: 70%

Canopy Median Height: 20.m.

Structural Code: Woodland.....

All woody species present within 50m x 10m plot (plus dominant and EVR non-woody species)

Name	Rel. No.	Height Ocular estimate (m)						Ground Cover	
		E	T1	T2	T3	S1	S2	Ground Layer	No.
<i>Eucalyptus populnea</i>	A	25	20	15	10	8	5	<i>Aristida caput-medusae</i>	C
<i>Maireana microphylla</i>	C						1	<i>Cenchrus ciliaris</i>	E
<i>Geijera parviflora</i>	O					4	2	<i>Verbena tenuisecta</i>	O
<i>Alectryon diversifolius</i>	O						2	<i>Pseuderanthemum variabile</i>	O
<i>Capparis lasiantha</i>	O						2	<i>Rostellularia adscendens</i>	O
<i>Maytenus cunninghamii</i>	O						2	<i>Pseuderanthemum variabile</i>	O
<i>Petalostigma pubescens</i>	O					8		<i>Rostellularia adscendens</i>	O
<i>Acacia excelsa ssp excelsa</i>	O						3	<i>Atriplex muelleri</i>	O
<i>Dodonaea viscosa ssp spatulata</i>	O						2	<i>Enchylaena tomentosa v tomentosa</i>	O
<i>Eremophila mitchellii</i>	P				10	8		<i>Boerhavia dominii</i>	O
<i>Corymbia tessellaris</i>	P				10	8		<i>Alloteropsis semialata</i>	O
<i>Eucalyptus crebra</i>	P				10	8		<i>Microlaena stipoides</i>	O
<i>Brachychiton rupestris</i>	P				10			<i>Themeda avenacea</i>	O
<i>Casuarina cristata</i>	U				10				
<i>Acacia harpophylla</i>	P					5			
Canopy stratum (%) 10									
Mid stratum (%) 10									
Ground stratum (%) 50									
Rock cover (%) -									
Bare ground cover (%) 30									
Litter cover (%) 20									

Species annotations: C Collected * Exotic Species ** Declared Species E = Edge or Outside but adjoining 50m x 10m plot Relative Numbers within stratum (D = dominant; A = Abundant C = Common; O = Occasional; U = Uncommon; P =Present R = Rare)
Strata: E = Emergent; T1-3 = Tree strata 1-3; S1-2 = Shrub strata 1-2; G = Ground stratum\

Over fence or opposite sides road

Tertiary Site Vegetation Assessment Data Sheet

Job Number:

Site Number: 13..... KP: 91.3..... Assessor: Ann..... Date : 26/11/2008

Location: BIG VALLEY RD..... Photo #:

GPS Projection: UTM Datum: GDA94; Zone: 56, Easting: 223027..... Northing: 7133893

	RE code	EPBC status	VMA status
DNRW RE map	11.10.9		Not of Concern
Survey result	11.10.13		Not of Concern

Canopy stratum form: Tree; Shrub; Herb; Grass; Aquatic

Canopy Crown Cover:%

Canopy Median Height:m.

Structural Code:

All woody species present within 50m x 10m plot (plus dominant and EVR non-woody species)

Name	Rel. No.	Height Ocular estimate (m)						Ground Cover	
		E	T1	T2	T3	S1	S2	Ground Layer	No.
<i>Eucalyptus crebra</i>	A		15					<i>Aristida latifolia</i>	U
<i>Acacia podalyriifolia</i>	C						2	<i>Calyptochloa gracillima</i>	O
<i>Callitris glaucophylla</i>	C			10	8	5		<i>Cenchrus ciliaris</i>	E
<i>Psydrax odorata</i>	C				8	4		<i>Cymbopogon refractus</i>	O
<i>Eucalyptus sideroxylon</i>	E		15					<i>Enteropogon acicularis</i>	U
<i>Exocarpos cupressiformis spatulata</i>	O				8	3		<i>Entolasia stricta</i>	U
<i>Maytenus cunninghamii</i>	O					5		<i>Panicum effusum v simile</i>	O
<i>Maireana microphylla</i>	O						2	<i>Paspalidium caespitosum</i>	U
<i>Hovea longipes</i>	O					5		<i>Brachyscome sp</i>	O
<i>Hibiscus sturtii v sturtii</i>	O						1	<i>Podolepis longipedata</i>	O
<i>Acacia leiocalyx ssp leiocalyx</i>	O						2	<i>Vittadinia hispidula v hispidula</i>	U
<i>Capparis mitchellii</i>	O			10				<i>Opuntia tomentosa</i>	P
<i>Allocasuarina luehmannii</i>	O					5		<i>Evolvulus alsinoides v decumbens</i>	U
<i>Alphitonia excelsa</i>	O						2	<i>Oxalis exilis spinosa</i>	P
<i>Abutilon auritum</i>	P					5		<i>Dianella revoluta v revoluta</i>	U
<i>Alstonia constricta</i>	P					5		<i>Stackhousia viminea</i>	U
<i>Acacia conferta</i>	U						2	<i>Carissa ovata</i>	U
<i>Bursaria spinosa sp</i>	U					5		<i>Sida rhombifolia</i>	P
<i>Hakea lorea ssp lorea</i>	U				8		2	<i>Fimbristylis dichotoma</i>	P
<i>Capparis canescens</i>	U					3		<i>Lomandra longifolia</i>	P
<i>Petalostigma pubescens</i>	U					3		<i>Cheilanthes sieberi</i>	O
<i>Dodonaea viscosa ssp</i>	U						2		
Canopy stratum (%) 70									
Mid stratum (%) 30									
Ground stratum (%) 50									
Rock cover (%) 10									
Bare ground cover (%) 30									
Litter cover (%) 10									

Species annotations: C Collected * Exotic Species ** Declared Species E = Edge or Outside but adjoining 50m x 10m plot Relative Numbers within stratum (D = dominant; A = Abundant C = Common; O = Occasional; U = Uncommon; P = Present R = Rare)

Strata: E = Emergent; T1-3 = Tree strata 1-3; S1-2 = Shrub strata 1-2; G = Ground stratum\l

Scheduled flora possibilities: No

Additional notes on pest plants: *Eragrostis curvula*,
Cenchrus ciliaris and *Verbena aristigera* were all
found to be present.....

Weed Cover (%): <5

Disturbance (% of site affected): 0

Health: Average

Slope: Crest

Soils: Surface observation Reliability: Low

Soil Colour: orange

Soil Texture: stony

	Description	Plants per plot
D	Dominant	>100
A	Abundant	50 - 100
C	Common	20 - 50
O	Occasional	10 - 20
U	Uncommon	5 - 10
P	Present	3 - 5
R	Rare	1 - 3

Particular sensitivities to proposed impacts (incl. fragmentation):.....

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Special conservation significance:.....

Other notes such as Health, Condition:

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Landuse: Predominantly grazing.....

observed or Horticultural Crops

Over fence or opposite sides road

Tertiary Site Vegetation Assessment Data Sheet

Job Number:

Site Number: 14..... KP: 79.6..... Assessor: Ann..... Date :26/11/2008

Location: ROCK CREEK CROSSING..... Photo #:

GPS Projection: UTM Datum: GDA94; Easting: 218654.48 Northing: 7123119.04

Width of RE: >300

Width of total remnant: >300

Total RE Area: >50ha

Total remnant Area: >50ha

	RE code	EPBC status	VMA status
DNRW RE map	11.9.7/11.3.4		Of Concern/Of Concern
Survey result	11.10.9		Not of Concern

Canopy stratum form: Tree

Canopy Crown Cover: 50....%

Canopy Median Height: 15m.

Structural Code: Woodland.....

All woody species present within 50m x 10m plot (plus dominant and EVR non-woody species)

Name	Rel. No.	Height Ocular estimate (m)						Ground Cover	
		E	T1	T2	T3	S1	S2	Ground Layer	No.
<i>Eremophila mitchellii</i>	U				8	6	3	<i>Macroptilium atropurpureum</i>	O
<i>Bursaria incana</i>	U					5		<i>Ancistrachne uncinulata</i>	P
<i>Hakea lorea ssp lorea</i>	P				5			<i>Austrostipa ramosissima</i>	O
<i>Alectryon diversifolius</i>	U				5			<i>Cymbopogon refractus</i>	U
<i>Pimelea linifolia ssp linifolia</i>	U						1	<i>Dichanthium sericeum ssp sericeum</i>	C
<i>Acacia excelsa ssp excelsa</i>	O						3	<i>Eremochloa bimaculata</i>	O
<i>Acacia harpophylla</i>	C				8			<i>Themeda avenacea</i>	U
<i>Eucalyptus melanophloia</i>	C	20	15	10				<i>Themeda triandra</i>	C
<i>Eucalyptus populnea</i>	P			10				<i>Cyanthillium cinereum</i>	U
<i>Brachychiton rupestris</i>	O				5			<i>Verbesina encelioides</i>	E
								<i>Malvastrum americanum v americanum</i>	U
								<i>Dianella sp</i>	U
								<i>Gahnia aspera</i>	U
								<i>Scleria mackaviensis</i>	U
Canopy stratum (%) 50									
Mid stratum (%) -									
Ground stratum (%) 80									
Rock cover (%) 100% in places									
Bare ground cover (%) 10									
Litter cover (%) 10									

Species annotations: C Collected * Exotic Species ** Declared Species E = Edge or Outside but adjoining 50m x 10m plot Relative Numbers within stratum (D = dominant; A = Abundant C = Common; O = Occasional; U = Uncommon; P =Present R = Rare)
Strata: E = Emergent; T1-3 = Tree strata 1-3; S1-2 = Shrub strata 1-2; G = Ground stratum\)

Scheduled flora possibilities:Yes
Dichanthium sericeum (Qld Blue Grass),

Additional notes on pest plants

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Weed Cover (%): <5

Disturbance (% of site affected): 0

Health: Very Good

Slope: Simple slope

Soils:Surface observation Reliability: Low

Soil Colour: black

Soil Texture: clay loam

	Description	Plants per plot
D	Dominant	>100
A	Abundant	50 - 100
C	Common	20 - 50
O	Occasional	10 - 20
U	Uncommon	5 - 10
P	Present	3 - 5
R	Rare	1 - 3

Particular sensitivities to proposed impacts (incl. fragmentation): The fragmentation will transect the creek habitat.....

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Special conservation significance:.....

Other notes such as Health, Condition: There was evidence of significant erosion.....

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Landuse: Predominantly grazing areas

observed or Horticultural Crops

Over fence or opposite sides road

Job Number:

Location: ROCKY CREST..... Photo #: 3.....

Width of RE: >300

Width of total remnant: >300

Total RE Area: >50ha

Total remnant Area: >50ha

	RE code	EPBC status	VMA status
DNRW RE map	11.12.2 / 11.12.1		Not of Concern/ Not of Concern
Survey result	11.12.2		Not of Concern

Canopy stratum form: Tree

Canopy Crown Cover: 30....%

Canopy Median Height:m.

Structural Code: .Woodland.....

[illegible]

Species annotations: C = Collected * Exotic Species ** Declared Species E = Edge or Outside but adjoining 50m x 10m plot Relative Numbers within stratum (D = dominant; A = Abundant C = Common; O = Occasional; U = Uncommon; P = Present R = Rare)
Strata: E = Emergent; T1-3 = Tree strata 1-3; S1-2 = Shrub strata 1-2; G = Ground stratum||

Scheduled flora possibilities: Yes *Dichanthium sericium* (Queensland Blue Grass)

Additional notes on pest plants
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Weed Cover (%): <5
Disturbance (% of site affected): 0
Health: Very Good
Slope: Simple slope
Soils: Surface observation **Reliability:** Low
Soil Colour: black
Soil Texture: clay

	Description	Plants per plot
D	Dominant	>100
A	Abundant	50 - 100
C	Common	20 - 50
O	Occasional	10 - 20
U	Uncommon	5 - 10
P	Present	3 - 5
R	Rare	1 - 3

Particular sensitivities to proposed impacts (incl. fragmentation): Fragmentation occurs through two creek habitats.....
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Special conservation significance:.....
Other notes such as Health, Condition: Evidence of erosion.....
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Landuse: Predominantly grazing
observed or Horticultural Crops
Over fence or opposite sides road

Job Number:

GPS Projection: UTM Datum: GDA94; Easting: 234453.958 Northing: 7160509.71

	RE code	EPBC status	VMA status
DNRW RE map	11.9.7 / 11.3.25		Of Concern / Not of Concern
Survey result	11.9.7		Of Concern

Canopy stratum form: Tree Canopy Crown Cover: 70%
Canopy Median Height: 20.m. Structural Code: .Woodland.....

[illegible]

Species annotations: C = Collected * Exotic Species ** Declared Species E = Edge or Outside but adjoining 50m x 10m plot Relative Numbers within stratum (D = dominant; A = Abundant C = Common; O = Occasional; U = Uncommon; P = Present R = Rare)
Strata: E = Emergent; T1-3 = Tree strata 1-3; S1-2 = Shrub strata 1-2; G = Ground stratum||

Scheduled flora possibilities: No.....

Additional notes on pest plants

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Weed Cover (%): <5

Disturbance (% of site affected): 0

Health: Good

Slope: Flat

Soils: Surface observation Reliability: Low

Soil Colour: brown; pale

Soil Texture: sandy loam

	Description	Plants per plot
D	Dominant	>100
A	Abundant	50 - 100
C	Common	20 - 50
O	Occasional	10 - 20
U	Uncommon	5 - 10
P	Present	3 - 5
R	Rare	1 - 3

Particular sensitivities to proposed impacts (incl. fragmentation): Fragmentation may disturb fine silty soils.....

Special conservation significance:.....

Other notes such as Health, Condition: Excellent habitat for reptiles and birds.....

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Landuse Grazing.....culturalcommercialrecreational.....

observed or Horticultural Crops

Over fence or opposite sides road

Job Number:

GPS Projection: UTM Datum: GDA94; Latitude 233685 . Longitude: 7184041

Total remnant Area: >50ha

	RE code	EPBC status	VMA status
DNRW RE map	11.12.1 / 11.10.9		Not of Concern / Not of Concern
Survey result	11.10.9		Not of Concern

Structural Code: .Woodland.....

[illegible]

Species annotations: C = Collected * Exotic Species ** Declared Species E = Edge or Outside but adjoining 50m x 10m plot
Numbers within stratum (D = dominant; A = Abundant C = Common; O = Occasional; U = Uncommon; P = Present R = Rare)
Strata: E = Emergent; T1-3 = Tree strata 1-3; S1-2 = Shrub strata 1-2; G = Ground stratum||

Scheduled flora possibilities: Yes

Additional notes on pest plants *Optuntia tomentosa*, *Acacia farnesiana*, *Argemone ochroleuca* (Mexican poppy) and *Senna obtusifolia* (Sicklepod)...

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Weed Cover (%): <5

Disturbance (% of site affected): 0

Health: Average

Slope: Flat

Soils: Surface observation Reliability: Low

Soil Colour: yellow

Soil Texture: sandy clay

	Description	Plants per plot
D	Dominant	>100
A	Abundant	50 - 100
C	Common	20 - 50
O	Occasional	10 - 20
U	Uncommon	5 - 10
P	Present	3 - 5
R	Rare	1 - 3

Particular sensitivities to proposed impacts (incl. fragmentation):.....

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Special conservation significance:.....

Other notes such as Health, Condition: Evidence of erosion and was considered to be good habitat for reptiles.

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Landuse:Predominantly grazing areas

observed or Horticultural Crops

Over fence or opposite sides road: Brigalow edges.....

Job Number:

GPS Projection: UTM Datum: GDA94; Northing 241498 Easting 7209004

Total remnant Area: >50ha

	RE code	EPBC status	VMA status
DNRW RE map	11.12.2 / 11.12.2a		Not of Concern / Not of Concern
Survey result	11.12.6		Not of Concern / Not of Concern

Structural Code: Tall Open Forest

[illegible]

Species annotations: C = Collected * Exotic Species ** Declared Species E = Edge or Outside but adjoining 50m x 10m plot Relative
Numbers within stratum (D = dominant; A = Abundant C = Common; O = Occasional; U = Uncommon; P = Present R = Rare)
Strata: E = Emergent; T1-3 = Tree strata 1-3; S1-2 = Shrub strata 1-2; G = Ground stratum||

Scheduled flora possibilities: No

Additional notes on pest plants
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Weed Cover (%): <5
Disturbance (% of site affected): 0
Health: Average
Slope: Flat
Soils Surface observation **Reliability**: Low
Soil Colour: brown
Soil Texture: silty clay loam

	Description	Plants per plot
D	Dominant	>100
A	Abundant	50 - 100
C	Common	20 - 50
O	Occasional	10 - 20
U	Uncommon	5 - 10
P	Present	3 - 5
R	Rare	1 - 3

Particular sensitivities to proposed impacts (incl. fragmentation):.....
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Special conservation significance:.....
Other notes such as Health, Condition:
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Landuse: Predominantly grazing areas.....
observed or Horticultural Crops
Over fence or opposite sides road

Job Number:

Site Number: 19..... KP: 161.6..... Assessor: Ann..... Date : 28/11/2008

Location: ROAD CROSSING..... Photo #:

GPS Projection: UTM Datum: GDA94; Easting: 238554..... Northing:7197868

	RE code	EPBC status	VMA status
DNRW RE map	11.12.1 / 11.12.2		Not of Concern / Not of Concern
Survey result	11.12.1		Not of Concern

Canopy stratum form: Tree

Canopy Crown Cover: 70%

Canopy Median Height: 21.m.

Structural Code: Ironbark Woodland....

All woody species present within 50m x 10m plot (plus dominant and EVR non-woody species)

[illegible]

Species annotations: C = Collected * Exotic Species ** Declared Species E = Edge or Outside but adjoining 50m x 10m plot Relative Numbers within stratum (D = dominant; A = Abundant C = Common; O = Occasional; U = Uncommon; P = Present R = Rare)
Strata: E = Emergent; T1-3 = Tree strata 1-3; S1-2 = Shrub strata 1-2; G = Ground stratum||

Scheduled flora possibilities: No.....

Additional notes on pest plants *Optuntia tomentosa* was found to be present

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Weed Cover (%): <5

Disturbance (% of site affected): 0

Health: Average

Slope: Flat

Soils: Surface observation Reliability: Low

Soil Colour: yellow

Soil Texture: stony

	Description	Plants per plot
D	Dominant	>100
A	Abundant	50 - 100
C	Common	20 - 50
O	Occasional	10 - 20
U	Uncommon	5 - 10
P	Present	3 - 5
R	Rare	1 - 3

Particular sensitivities to proposed impacts (incl. fragmentation):.....

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Special conservation significance:.....

Other notes such as Health, Condition:

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Landuse: Predominantly grazing

observed or Horticultural Crops

Over fence or opposite sides road

Tertiary Site Vegetation Assessment Data Sheet

Job Number:

Site Number: 20..... KP: 164..... Assessor: Ann .. Date : 28/11/2008

Location: Eucalyptus Woodland..... Photo #:

GPS Projection: UTM Datum: GDA94; Easting: 238900 Northing: 7200137

Width of RE: >300

Width of total remnant: 300

Total RE Area: >50ha

Total remnant Area: >50ha

	RE code	EPBC status	VMA status
DNRW RE map	11.12.1 / 11.12.2		Not of Concern / Not of Concern
Survey result	11.9.13		Of Concern

Canopy stratum form: Tree

Canopy Crown Cover: 70%

Canopy Median Height: 20.m.

Structural Code: Ecotonal Ironbark.....

All woody species present within 50m x 10m plot (plus dominant and EVR non-woody species)

Name	Rel. No.	Height Ocular estimate (m)						Ground Cover	
		E	T1	T2	T3	S1	S2	Ground Layer	No.
<i>Eucalyptus moluccana</i>	A	25	20	15				<i>Chrysocephalum apiculatum</i>	O
<i>Eucalyptus crebra</i>	C			15				<i>Opuntia tomentosa</i>	O
<i>Allocasuarina luehmanna</i>	E				10			<i>Eremophila debilis</i>	O
<i>Corymbia citriodora ssp variegata</i>	E				10			<i>Cymbopogon refractus</i>	P
<i>Dodonaea viscosa ssp spatulata</i>	O					5		<i>Pterocaulon sphacelatum</i>	P
<i>Alphitonia excelsa</i>	O						2	<i>Cheilanthes sieberi</i>	U
<i>Psydrax attenuata forma megalantha</i>	O						3	<i>Aristida caput-medusae</i>	U
<i>Citrus glauca</i>	O						2	<i>Aristida latifolia</i>	U
<i>Geijera parviflora</i>	O						2	<i>Epaltes australis</i>	U
<i>Brachychiton populneus ssp populneus</i>	O					8		<i>Calypochloa gracillima</i>	U
<i>Carissa ovata</i>	P						2	<i>Abutilon auritum</i>	O
<i>Alstonia constricta</i>	P						5	<i>Acacia leiocalyx ssp leiocalyx</i>	U
<i>Erythroxylum australe</i>	P					5			
<i>Petalostigma pubescens</i>	P					8			
Canopy stratum (%)									
Mid stratum (%)									
Ground stratum (%)									
Rock cover (%)									
Bare ground cover (%)									
Litter cover (%)									

Species annotations: C Collected * Exotic Species ** Declared Species E = Edge or Outside but adjoining 50m x 10m plot Relative Numbers within stratum (D = dominant; A = Abundant C = Common; O = Occasional; U = Uncommon; P = Present R = Rare)
Strata: E = Emergent; T1-3 = Tree strata 1-3; S1-2 = Shrub strata 1-2; G = Ground stratum\|

Scheduled flora possibilities: No

Additional notes on pest plants

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Weed Cover (%): <5

Disturbance (% of site affected): 0

Health: Average

Slope: Flat

Soils: Surface observation Reliability: Low

Soil Colour: yellow

Soil Texture: clay loam

	Description	Plants per plot
D	Dominant	>100
A	Abundant	50 - 100
C	Common	20 - 50
O	Occasional	10 - 20
U	Uncommon	5 - 10
P	Present	3 - 5
R	Rare	1 - 3

Particular sensitivities to proposed impacts (incl. fragmentation):.....

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Special conservation significance:.....

Other notes such as Health, Condition:

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Landuse Predominantly grazing.....

observed or Horticultural Crops

Over fence or opposite sides road

Job Number:

GPS Projection: UTM Datum: GDA94; Easting: 239595.. Northing: 7203252

Total remnant Area: >50ha

	RE code	EPBC status	VMA status
DNRW RE map	11.12.1 / 11.12.2		Not of Concern / Not of Concern
Survey result	11.12.1		Not of Concern

Structural Code: Woodland.....

[illegible]

Strata: E = Emergent; T1-3 = Tree strata 1-3; S1-2 = Shrub strata 1-2; G = Ground stratum\|

Scheduled flora possibilities: No

Additional notes on pest plants

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Weed Cover (%): <5

Disturbance (% of site affected): <1

Health: Average

Slope: Flat

Soils: Surface observation Reliability: Low

Soil Colour: brown

Soil Texture: silty clay

	Description	Plants per plot
D	Dominant	>100
A	Abundant	50 - 100
C	Common	20 - 50
O	Occasional	10 - 20
U	Uncommon	5 - 10
P	Present	3 - 5
R	Rare	1 - 3

Particular sensitivities to proposed impacts (incl. fragmentation):.....

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Special conservation significance:.....

Other notes such as Health, Condition: Average condition.

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Landuse Grazing

observed or Horticultural Crops

Over fence or opposite sides road

Job Number:

Location: South West Cracow..... Photo #: 2.....

Width of RE: 35-75m

Total RE Area: <1ha

Total remnant Area: <1ha

	RE code	EPBC status	VMA status
DNRW RE map	11.12.1/11.12.2		Not of Concern
Survey result	11.12.2		Not of Concern

Canopy Crown Cover: 70%

Structural Code: Woodland.....

[illegible]

Species annotations: C = Collected * Exotic Species ** Declared Species E = Edge or Outside but adjoining 50m x 10m plot
Numbers within stratum (D = dominant; A = Abundant C = Common; O = Occasional; U = Uncommon; P = Present R = Rare)
Strata: E = Emergent; T1-3 = Tree strata 1-3; S1-2 = Shrub strata 1-2; G = Ground stratum||

Scheduled flora possibilities: No

Additional notes on pest plants *Verbena aristigera* (maynes pest) was found along the roadside.

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	Description	Plants per plot
D	Dominant	>100
A	Abundant	50 - 100
C	Common	20 - 50
O	Occasional	10 - 20
U	Uncommon	5 - 10
P	Present	3 - 5
R	Rare	1 - 3

Weed Cover (%): <5

Disturbance (% of site affected): 0

Health: Degraded

Slope: Flat

Soils: Surface observation Reliability: Low

Soil Colour: brown

Soil Texture: silty clay

Particular sensitivities to proposed impacts (incl. fragmentation):.....

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Special conservation significance:.....

Other notes such as Health, Condition: Condition considered to be degraded as a result of regular fires in the area.

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Landuse: Predominantly grazing areas

observed or Horticultural Crops

Over fence or opposite sides road

Tertiary Site Vegetation Assessment Data Sheet

Job Number:

Site Number: 23..... KP: 149.1 Assessor: Ann..... Date : 28/11/2008

Location: BERRI BERRI CREEK..... Photo #:

GPS Projection: UTM Datum: GDA94; Easting: 234790..... Northing: 7186124

Width of RE: <35m wide

Width of total remnant: <35m wide

Total RE Area: <1ha

Total remnant Area: <1ha

	RE code	EPBC status	VMA status
DNRW RE map	Non remnant		
Survey result	Non remnant		Of Concern

Canopy stratum form: Tree

Canopy Crown Cover:%

Canopy Median Height:m.

Structural Code: Non remnant regrowth resembles 11.3.4.

All woody species present within 50m x 10m plot (plus dominant and EVR non-woody species)

Name	Rel. No.	Height Ocular estimate (m)						Ground Cover	
		E	T1	T2	T3	S1	S2	Ground Layer	No.
<i>Eucalyptus tereticornis</i>	A	30	25	20				<i>Aristida latifolia</i>	O
<i>Eucalyptus crebra</i>	C			20				<i>Maireana microcarpa</i>	O
<i>Corymbia erythrophloia</i>	E			20				<i>Sida rhombifolia</i>	P
<i>Eucalyptus melanophloia</i>	O			20				<i>Sida subspicata</i>	P
<i>Melaleuca trichostachya</i>	O						2	<i>Lomandra longifolia</i>	P
<i>Angophora floribunda</i>	P		25	20				<i>Wahlenbergia gracilis</i>	P
<i>Acacia decora</i>	U						2	<i>Dianella brevipedunculata</i>	P
<i>Leptospermum polygalifolium</i>	---						2	<i>Glycine clandestina v clandestine</i>	U
								<i>Austrostipa ramosissima</i>	U
								<i>Gomphrena celosioides</i>	U
								<i>Chrysocephalum apiculatum</i>	U
								<i>Evolvulus alsinoides v decumbens</i>	U
								<i>Salsola kali</i>	U
Canopy stratum (%)									
Mid stratum (%)									
Ground stratum (%)									
Rock cover (%)									
Bare ground cover (%)									
Litter cover (%)									

Species annotations: C Collected * Exotic Species ** Declared Species E = Edge or Outside but adjoining 50m x 10m plot Relative Numbers within stratum (D = dominant; A = Abundant C = Common; O = Occasional; U = Uncommon; P = Present R = Rare)
Strata: E = Emergent; T1-3 = Tree strata 1-3; S1-2 = Shrub strata 1-2; G = Ground stratum\|

Scheduled flora possibilities: No

Additional notes on pest plants *Verbena aristigera* (Maynes Pest), *Plantago lanceolata* (Ink weed), *Senna obtusifolia* (Sicklepod),.....

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Weed Cover (%): <5

Disturbance (% of site affected): <1

Health: Degraded

Slope: Open depression

Soils: Surface observation Reliability: Low

Soil Colour: yellow

Soil Texture: sandy loam; sand

	Description	Plants per plot
D	Dominant	>100
A	Abundant	50 - 100
C	Common	20 - 50
O	Occasional	10 - 20
U	Uncommon	5 - 10
P	Present	3 - 5
R	Rare	1 - 3

Particular sensitivities to proposed impacts (incl. fragmentation): Removal of four large *Eucalyptus tereticornis* trees.

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Special conservation significance:.....

Other notes such as Health, Condition:

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Landuse: Predominantly grazing areas.

observed or Horticultural Crops

Over fence or opposite sides road

Tertiary Site Vegetation Assessment Data Sheet

Job Number:

Site Number: 24..... KP: 282.1..... Assessor: Ann..... Date : 29/11/2008

Location: CALLIDE CREEK..... Photo #:

GPS Projection: UTM Datum: GDA94; Easting: 265610..... Northing: 7308353

	RE code	EPBC status	VMA status
DNRW RE map	11.3.4/11.3.25/11.3.6		Of Concern/Not of Concern/Not of Concern
Survey result	11.3.25		Not of Concern

Canopy stratum form: Tree Canopy Crown Cover: 30...%
Canopy Median Height: 30.m. Structural Code: .Tall open forest.

All woody species present within 50m x 10m plot (plus dominant and EVR non-woody species)

Name	Rel. No.	Height Ocular estimate (m)						Ground Cover	
		E	T1	T2	T3	S1	S2	Ground Layer	No.
<i>Casuarina cunninghamiana</i>	C		20	15				<i>Austrostipa ramosissima</i>	C
<i>Eucalyptus tereticornis</i>	C	30		15					
<i>Melaleuca bracteata</i>	C					5		<i>Lantana montevidensis</i>	O
<i>Corymbia tessellaris</i>	E	30	25					<i>Cyanthillium cinereum</i>	O
<i>Melaleuca leucadendra</i>	O			15	10			<i>Microlaena stipoides</i>	P
<i>Alchornea ilicifolia</i>	P						2	<i>Tragus australianus</i>	P
<i>Callistemon viminalis</i>	P					5		<i>Cynodon dactylon</i>	U
								<i>Verbena rigida</i>	U
								<i>Oxalis corniculata</i>	---
								<i>Ricinus communis</i>	---
Canopy stratum (%) 30									
Mid stratum (%) --									
Ground stratum (%) 80									
Rock cover (%) --									
Bare ground cover (%) --									
Litter cover (%) 20									

Species annotations: C Collected * Exotic Species ** Declared Species E = Edge or Outside but adjoining 50m x 10m plot Relative Numbers within stratum (D = dominant; A = Abundant C = Common; O = Occasional; U = Uncommon; P = Present R = Rare)
Strata: E = Emergent; T1-3 = Tree strata 1-3; S1-2 = Shrub strata 1-2; G = Ground stratum\|

Scheduled flora possibilities: No / Yes

Additional notes on pest plants *Parthenium hysterophorus*, *Cryptostegia grandiflora* (Rubber vine) *Macfadyena unguis-cati* (Cats claw), *Lantana camara*, *Lantana montevidensis* (creeping lantana), *Senna barclayana* (Pepper Leaf Senna), *Abutilon grandifolium* (Hairy Indian mallow) *Oxalis corniculata* (Yellow wood sorrel), *Argemone ochroleuca* (Mexican Poppy) were all found within the site area.

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Weed Cover (%): 5-25

Disturbance (% of site affected): 1-5

Health: Degraded

Slope: Open depression

Soils: Surface observation **Reliability:** Low

Soil Colour: black

Soil Texture: clay

	Description	Plants per plot
D	Dominant	>100
A	Abundant	50 - 100
C	Common	20 - 50
O	Occasional	10 - 20
U	Uncommon	5 - 10
P	Present	3 - 5
R	Rare	1 - 3

Particular sensitivities to proposed impacts (incl. fragmentation):.....

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Special conservation significance:.....

Other notes such as Health, Condition:

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Landuse: Predominantly grazing area...

observed or Horticultural Crops

Over fence or opposite sides road

Job Number:

GPS Projection: UTM Datum: GDA94; Easting: 279410..... Northing: 7330938

	RE code	EPBC status	VMA status
DNRW RE map	Non remnant		
Survey result	Non remnant		

Canopy stratum form: Tree Canopy Crown Cover: 30%
Canopy Median Height: 25m. Structural Code: Tall open forest

[illegible]

Species annotations: C = Collected * Exotic Species ** Declared Species E = Edge or Outside but adjoining 50m x 10m plot Relative Numbers within stratum (D = dominant; A = Abundant C = Common; O = Occasional; U = Uncommon; P = Present R = Rare)
Strata: E = Emergent; T1-3 = Tree strata 1-3; S1-2 = Shrub strata 1-2; G = Ground stratum||

Scheduled flora possibilities: No

Additional notes on pest plants *Cenchrus ciliaris* (Buffel Grass) was observed on the site

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Weed Cover (%):5-25

Disturbance (% of site affected): <1

Health: Degraded

Slope: Depression

Soils: Surface observation Reliability: Low

Soil Colour: brown

Soil Texture: sandy clay

	Description	Plants per plot
D	Dominant	>100
A	Abundant	50 - 100
C	Common	20 - 50
O	Occasional	10 - 20
U	Uncommon	5 - 10
P	Present	3 - 5
R	Rare	1 - 3

Particular sensitivities to proposed impacts (incl. fragmentation):.....

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Special conservation significance:.....

Other notes such as Health, Condition: Degraded Health due to erosion and siltation of waterway.....

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Landuse Grazing

observed or Horticultural Crops

Over fence or opposite sides road

Tertiary Site Vegetation Assessment Data Sheet

Job Number:

Site Number: 26.. KP:289.4 Assessor: Ann..... Date : 29/11/2008

Location: SILVER LEAVED IRONBARK Photo #:

GPS Projection: UTM Datum: GDA94; Easting: 267384 Northing: 7314651

	RE code	EPBC status	VMA status
DNRW RE map	11.3.4 /11.3.25		Of Concern / Not of Concern
Survey result	11.3.6		Not of Concern

Canopy stratum form: Tree; Canopy Crown Cover:%
 Canopy Median Height: 20.m. Structural Code: .Woodland.....

All woody species present within 50m x 10m plot (plus dominant and EVR non-woody species)

Name	Rel. No.	Height Ocular estimate (m)						Ground Cover	
		E	T1	T2	T3	S1	S2	Ground Layer	No.
<i>Eucalyptus melanophloia</i>	A		20					<i>Zinnia peruviana</i>	P
<i>Corymbia tessellaris</i>	C				15	5	2	<i>Stylosanthes humilis</i>	E
<i>Acacia juncifolia</i>	E						2	<i>Acacia decora</i>	O
<i>Casuarina cunninghamiana</i>	E				15				
<i>Ficus opposita v opposita</i>	E					5			
<i>Eucalyptus crebra</i>	E				15				
<i>Sida subspicata</i>	O						1		
<i>Acacia salicina</i>	O					5			
<i>Bursaria spinosa sp spinosa</i>	P					5			
<i>Erythrina vespertilio</i>	P					5			
<i>Acacia bidwillii</i>	P					5			
<i>Acacia falciformis</i>	P				15				
<i>Corymbia clarksoniana</i>	P				10				
<i>Corymbia erythrophloia</i>	P				15				
<i>Eucalyptus tereticornis</i>	U				15				
<i>Alchornea ilicifolia</i>	---	25	20		15				
<i>Hibiscus heterophyllus ssp heterophyllus</i>	---								
Canopy stratum (%)									
Mid stratum (%)									
Ground stratum (%)									
Rock cover (%)									
Bare ground cover (%)									
Litter cover (%)									

Species annotations: C Collected * Exotic Species ** Declared Species E = Edge or Outside but adjoining 50m x 10m plot Relative Numbers within stratum (D = dominant; A = Abundant C = Common; O = Occasional; U = Uncommon; P =Present R = Rare)
 Strata: E = Emergent; T1-3 = Tree strata 1-3; S1-2 = Shrub strata 1-2; G = Ground stratum\

Scheduled flora possibilities: No

Additional notes on pest plants *Gomphocarpus physocarpus* (balloon cotton), and *Ricinus communis* (castor oil bush), *Stylosanthes humilis* (Townsville stylo), *Eragrostis cilianensis* (African Love Grass) and *Hyparrhenia rufa* (thatch grass) were observed on the site.

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Weed Cover (%): 5-25

Disturbance (% of site affected): 1-5

Health: Degraded

Slope: Open depression

Soils: Surface observation Reliability: Low

Soil Colour: yellow

Soil Texture: sandy loam

	Description	Plants per plot
D	Dominant	>100
A	Abundant	50 - 100
C	Common	20 - 50
O	Occasional	10 - 20
U	Uncommon	5 - 10
P	Present	3 - 5
R	Rare	1 - 3

Particular sensitivities to proposed impacts (incl. fragmentation):.....

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Special conservation significance:.....

Other notes such as Health, Condition:

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Landuse Grazing

observed or Horticultural Crops

Over fence or opposite sides road

Job Number: Main Line

Site Number: M27 KP:294.2

Assessor: Ann

Date : 25/11/2008

Location: Diagonal crossing

Photo #: 2GPS Projection: UTM

Datum: GDA94; Easting: 266003.837 Northing: 7318970.57

Width of RE: >300

Width of total remnant: >300

Total RE Area: >50ha

Total remnant Area: >50ha

	RE code	EPBC status	VMA status
DNRW RE map	11.8.4		Not of Concern
Survey result	11.8.4		Not of Concern

Canopy stratum form: Tree

Canopy Crown Cover: 30%

Canopy Median Height: 20m

Structural Code: Disturbed Woodland

All woody species present within 50m x 10m plot (plus dominant and EVR non-woody species)

[illegible]

Species annotations: C = Collected * Exotic Species ** Declared Species E = Edge or Outside but adjoining 50m x 10m plot
Numbers within stratum (D = dominant; A = Abundant C = Common; O = Occasional; U = Uncommon; P = Present R = Rare)
Strata: E = Emergent; T1-3 = Tree strata 1-3; S1-2 = Shrub strata 1-2; G = Ground stratum||

Scheduled flora possibilities: No

Additional notes on pest plants

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Weed Cover (%): <5

Disturbance (% of site affected): 0,

Health: Good

Slope: Flat

Soils: Surface observation **Reliability:** Low,

Soil Colour: Pale yellow;

Soil Texture: silty clay;

	Description	Plants per plot
D	Dominant	>100
A	Abundant	50 - 100
C	Common	20 - 50
O	Occasional	10 - 20
U	Uncommon	5 - 10
P	Present	3 - 5
R	Rare	1 - 3

Particular sensitivities to proposed impacts;

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Special conservation significance:.....

Other notes such as Health, Condition:

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Landuse Grazing

observed or Horticultural Crops

Over fence or opposite sides road

Tertiary Site Vegetation Assessment Data Sheet

Job Number:

Site Number: 28..... KP: 308.8..... Assessor: Ann..... Date : 30/11/2008

Location: Dawson Rd / Duckhole Creek .. Photo #:

GPS Projection: UTM Datum: GDA94; Easting: 272331..... Northing: 7330938

	RE code	EPBC status	VMA status
DNRW RE map	11.3.28		Of Concern
Survey result	11.8.4		Not of Concern

Canopy stratum form: Tree

Canopy Crown Cover: 20.....%

Canopy Median Height: 20.m.

Structural Code: Woodland.....

All woody species present within 50m x 10m plot (plus dominant and EVR non-woody species)

Name	Rel. No.	Height Ocular estimate (m)						Ground Cover	
		E	T1	T2	T3	S1	S2	Ground Layer	No.
<i>Eucalyptus melanophloia</i>	C			20				<i>Brunoniella australis</i>	E
<i>Melia azedarach</i>	E						2	<i>Grewia retusifolia</i>	E
<i>Acacia bidwillii</i>	O					2	<1	<i>Brachyscome sp</i>	O
<i>Corymbia clarksoniana</i>	O				8			<i>Gahnia aspera</i>	O
<i>Eucalyptus crebra</i>	O			20	8	2		<i>Scleria mackaviensis</i>	O
<i>Eucalyptus tereticornis</i>	O		25	20				<i>Neptunia gracilis forma gracilis</i>	P
<i>Ficus opposita v opposita</i>	P					2		<i>Glycine clandestina</i>	U
<i>Corymbia tessellaris</i>	U				8			<i>Macroptilium atropurpureum</i>	U
							<1	<i>Rhynchosia minima v minima</i>	U
								<i>Zornia dyctiocarpa v dyctiocarpa</i>	U
								<i>Calotis lappulacea</i>	U
Canopy stratum (%) 20									
Mid stratum (%)									
Ground stratum (%)									
Rock cover (%)									
Bare ground cover (%)									
Litter cover (%)									

Species annotations: C = Collected * Exotic Species ** Declared Species E = Edge or Outside but adjoining 50m x 10m plot Relative Numbers within stratum (D = dominant; A = Abundant C = Common; O = Occasional; U = Uncommon; P = Present R = Rare)
Strata: E = Emergent; T1-3 = Tree strata 1-3; S1-2 = Shrub strata 1-2; G = Ground stratum\

Scheduled flora possibilities: No.....

Additional notes on pest plants *Lantana camara*, *Opuntia tomentosa*, *Stylosanthes humilis* (Townsville stylo) and *Hyparrhenia rufa* (thatch grass).were observed on the site.

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Weed Cover (%): <5

Disturbance (% of site affected): <1

Health: Degraded

Slope: Open depression

Soils: Surface observation Reliability: Low

Soil Colour: orange

Soil Texture: sandy clay

	Description	Plants per plot
D	Dominant	>100
A	Abundant	50 - 100
C	Common	20 - 50
O	Occasional	10 - 20
U	Uncommon	5 - 10
P	Present	3 - 5
R	Rare	1 - 3

Particular sensitivities to proposed impacts (incl. fragmentation):.....

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Special conservation significance:.....

Other notes such as Health, Condition:

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Landuse: Predominantly grazing area

observed or Horticultural Crops

Over fence or opposite sides road

Job Number:

Site Number: 29..... KP: Alt route..... Assessor: Ann..... Date : 30/11/2008

Location: DOUBTFUL CREEK (Alternative Route) . Photo #:

GPS Projection: UTM Datum: GDA94; Easting: 279714.7 Northing: 7333631.88

	RE code	EPBC status	VMA status
DNRW RE map			
Survey result	11.3.25 / 11.3.4		Not of Concern / Of Concern

Canopy stratum form: Tree

Canopy Crown Cover:%

Canopy Median Height: 25.m.

Structural Code: Riparian Open Forest.

All woody species present within 50m x 10m plot (plus dominant and EVR non-woody species)

[illegible]

Species annotations: C = Collected * Exotic Species ** Declared Species E = Edge or Outside but adjoining 50m x 10m plot Relative
Numbers within stratum (D = dominant; A = Abundant C = Common; O = Occasional; U = Uncommon; P = Present R = Rare)
Strata: E = Emergent; T1-3 = Tree strata 1-3; S1-2 = Shrub strata 1-2; G = Ground stratum||

Scheduled flora possibilities: No

Additional notes on pest plants: *Optuntia tomentosa* was present

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Weed Cover (%): <5

Disturbance (% of site affected): 0

Health: Average

Slope: Open depression

Soils:Surface observation Reliability: Low

Soil Colour: yellow

Soil Texture: sand

	Description	Plants per plot
D	Dominant	>100
A	Abundant	50 - 100
C	Common	20 - 50
O	Occasional	10 - 20
U	Uncommon	5 - 10
P	Present	3 - 5
R	Rare	1 - 3

Particular sensitivities to proposed impacts (incl. fragmentation):.....

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Special conservation significance:.....

Other notes such as Health, Condition:

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Landuse Grazing

observed or Horticultural Crops

Over fence or opposite sides road

Job Number:

GPS Projection: UTM Datum: GDA94; Easting: 284692.546.. Northing: 7335569.2

	RE code	EPBC status	VMA status
DNRW RE map	11.3.25		Not of Concern
Survey result	11.3.25		Not of Concern

Canopy stratum form: Tree Canopy Crown Cover: 70 %
Canopy Median Height: 25.m. Structural Code: Tall Open Forest

[illegible]

Species annotations: C = Collected * Exotic Species ** Declared Species E = Edge or Outside but adjoining 50m x 10m plot Relative Numbers within stratum (D = dominant; A = Abundant C = Common; O = Occasional; U = Uncommon; P = Present R = Rare)
Strata: E = Emergent; T1-3 = Tree strata 1-3; S1-2 = Shrub strata 1-2; G = Ground stratum||

Scheduled flora possibilities: No

Additional notes on pest plants *Urochloa mutica* (para grass).

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Weed Cover (%): <5

Disturbance (% of site affected): <1

Health: Average

Slope: Open depression

Soils: Surface observation Reliability: Low

Soil Colour: yellow

Soil Texture: silty clay

	Description	Plants per plot
D	Dominant	>100
A	Abundant	50 - 100
C	Common	20 - 50
O	Occasional	10 - 20
U	Uncommon	5 - 10
P	Present	3 - 5
R	Rare	1 - 3

Particular sensitivities to proposed impacts (incl. fragmentation):.....

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Special conservation significance:.....

Other notes such as Health, Condition:

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Landuse Grazing and infrastructure

observed or Horticultural Crops

Over fence or opposite sides road

Tertiary Site Vegetation Assessment Data Sheet

Job Number:

Site Number: ...31..... KP: 371..... Assessor: Ann..... Date : 30/11/2008

Location: GREYBOX WOODLAND..... Photo #: 3.....

GPS Projection: UTM Datum: GDA94; Easting: 308224..... Northing: 7372553

	RE code	EPBC status	VMA status
DNRW RE map	11.9.13		Of concern
Survey result	11.9.13		Of concern

Canopy stratum form: Tree Canopy Crown Cover: 50.....%
Canopy Median Height: 20.m. Structural Code: Woodland.....

All woody species present within 50m x 10m plot (plus dominant and EVR non-woody species)

Name	Rel. No.	Height Ocular estimate (m)						Ground Cover	
		E	T1	T2	T3	S1	S2	Ground Layer	No.
<i>Eucalyptus moluccana</i>	A		20	15	10			<i>Eragrostis cilianensis</i>	E
<i>Petalostigma pubescens</i>	O					5		<i>Cymbopogon refractus</i>	O
<i>Melaleuca nervosa</i>	P						<1	<i>Themeda triandra</i>	O
<i>Acacia leiocalyx ssp leicalyx</i>	U					2		<i>Eremophila debilis</i>	O
<i>Lophostemon suaveolens</i>	U				8			<i>Stylosanthes humilis</i>	U
<i>Alphitonia excelsa</i>	U				8	5		<i>Pseuderanthemum variabile</i>	U
								<i>Parsonsia eucalyptophylla</i>	P
								<i>Gahnia aspera</i>	U
								<i>Passiflora suberosa</i>	U
								<i>Fimbristylis dichotoma</i>	U
								<i>Sarcostemma viminalis ssp brunonianum</i>	O
Canopy stratum (%) 50									
Mid stratum (%)									
Ground stratum 10									
Rock cover (%)									
Bare ground cover (%) 10									
Litter cover (%) 80									

Species annotations: C Collected * Exotic Species ** Declared Species E = Edge or Outside but adjoining 50m x 10m plot Relative Numbers within stratum (D = dominant; A = Abundant C = Common; O = Occasional; U = Uncommon; P = Present R = Rare)
Strata: E = Emergent; T1-3 = Tree strata 1-3; S1-2 = Shrub strata 1-2; G = Ground stratum\l

Scheduled flora possibilities: No.....

Additional notes on pest plants *Cryptostegia grandiflora* (rubber vine) and *Eragrostis curvula* (African Love Grass) were both observed in the area.

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Weed Cover (%): 5-25

Disturbance (% of site affected): <1

Health: Average

Slope: Flat

Soils Surface observation Reliability: Low

Soil Colour: orange

Soil Texture: sandy loam

	Description	Plants per plot
D	Dominant	>100
A	Abundant	50 - 100
C	Common	20 - 50
O	Occasional	10 - 20
U	Uncommon	5 - 10
P	Present	3 - 5
R	Rare	1 - 3

Particular sensitivities to proposed impacts (incl. fragmentation):.....

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Special conservation significance:.....

Other notes such as Health, Condition: Many fallen logs were observed in the area.

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Landuse Predominantly grazing areas

observed or Horticultural Crops

Over fence or opposite sides road

Tertiary Site Vegetation Assessment Data Sheet

Job Number:

Site Number: 32..... KP: 182..... Assessor: Ann..... Date : 01/12/2008

Location: MIX WOODLAND..... Photo #:

GPS Projection: UTM Datum: GDA94; Easting: 241453..... Northing: 7217616

	RE code	EPBC status	VMA status
DNRW RE map	11.12.1		Not of Concern
Survey result	11.12.1		Not of Concern

Canopy stratum form: Tree

Canopy Crown Cover: 30.....%

Canopy Median Height: 20-25m

Structural Code: Mix Woodland.....

All woody species present within 50m x 10m plot (plus dominant and EVR non-woody species)

Name	Rel. No.	Height Ocular estimate (m)						Ground Cover	
		E	T1	T2	T3	S1	S2	Ground Layer	No.
<i>Corymbia tessellaris</i>	C	25	20					<i>Aristida latifolia</i>	O
<i>Eucalyptus tereticornis</i>	C		25					<i>Cenchrus ciliaris</i>	O
<i>Acacia harpophylla</i>	E						1	<i>Heteropogon contortus</i>	U
<i>Solanum nemophilum</i>	O					5		<i>Brunoniella australis</i>	O
<i>Eucalyptus crebra</i>	O			15				<i>Gomphrena celosioides</i>	U
<i>Eucalyptus melanophloia</i>	O				8	4		<i>Einadia hastata</i>	P
<i>Eucalyptus populnea</i>	O		20			5		<i>Lomandra longifolia</i>	U
<i>Maireana microphylla</i>	P						2	<i>Eremophila debilis</i>	U
<i>Salsola kali</i>	P						1	<i>Portulaca oleracea</i>	U
<i>Acacia excelsa ssp excelsa</i>	P					5		<i>Cymbidium canaliculatum</i>	O
<i>Geijera parviflora</i>	U						2	<i>Cyperus gracilis</i>	---
								<i>Verbena tenuisecta</i>	---
Canopy stratum (%) 30									
Mid stratum (%) 20									
Ground stratum (%) 50									
Rock cover (%) ---									
Bare ground cover (%) 30									
Litter cover (%) 20									

Species annotations: C = Collected * Exotic Species ** Declared Species E = Edge or Outside but adjoining 50m x 10m plot Relative Numbers within stratum (D = dominant; A = Abundant C = Common; O = Occasional; U = Uncommon; P = Present R = Rare)
Strata: E = Emergent; T1-3 = Tree strata 1-3; S1-2 = Shrub strata 1-2; G = Ground stratum\|

Scheduled flora possibilities: No.....

Additional notes on pest plants *Optuntia tomentosa* (velvety tree pear), *Verbena tenuisecta* (maynes pest) and *Gomphrena celosioides* (soft khaki weed) were observed on the site.

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Weed Cover (%): <5

Disturbance (% of site affected): 0

Health: Average

Slope: Simple slope

Soils: Surface observation Reliability: Low

Soil Colour: yellow

Soil Texture: sandy clay

	Description	Plants per plot
D	Dominant	>100
A	Abundant	50 - 100
C	Common	20 - 50
O	Occasional	10 - 20
U	Uncommon	5 - 10
P	Present	3 - 5
R	Rare	1 - 3

Particular sensitivities to proposed impacts (incl. fragmentation): Erodible soils

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Special conservation significance:.....

Other notes such as Health, Condition: Good cleared line along fence line.

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Landuse Predominantly grazing areas

observed or Horticultural Crops

Over fence or opposite sides road

Tertiary Site Vegetation Assessment Data Sheet

Job Number:

Site Number: 33..... KP: 183.6..... Assessor: Ann..... Date : 01/12/2008

Location: WATERCOURSE..... Photo #:

GPS Projection: UTM Datum: GDA94; Easting: 241220..... Northing: 7219325

	RE code	EPBC status	VMA status
DNRW RE map	Non remnant		
Survey result	Non remnant		

Canopy stratum form: Trees

Canopy Crown Cover:%

Canopy Median Height: 8-15.m.

Structural Code: .Linear watercourse

All woody species present within 50m x 10m plot (plus dominant and EVR non-woody species)

Name	Rel. No.	Height Ocular estimate (m)						Ground Cover	
		E	T1	T2	T3	S1	S2	Ground Layer	No.
<i>Melaleuca bracteata</i>	A		20	15	8	2	1	<i>Aristida latifolia</i>	O
<i>Eucalyptus crebra</i>	E		20					<i>Cenchrus ciliaris</i>	O
<i>Eucalyptus melanophloia</i>	E	25						<i>Themeda avenacea</i>	O
<i>Maireana microphylla</i>	O						1	<i>Crinum angustifolium</i>	P
<i>Alectryon oleifolius</i>	O					3		<i>Einadia hastata</i>	C
<i>Geijera parviflora</i>	P					2		<i>Dianella revoluta v revoluta</i>	O
<i>Geijera salicifolia</i>	R					2		<i>Verbena tenuisecta</i>	O
								<i>Sida subspicata</i>	O
								<i>Abutilon grandifolium</i>	P
Canopy stratum (%)									
Mid stratum (%)									
Ground stratum (%)									
Rock cover (%)									
Bare ground cover (%)									
Litter cover (%)									

Species annotations: C Collected * Exotic Species ** Declared Species E = Edge or Outside but adjoining 50m x 10m plot Relative Numbers within stratum (D = dominant; A = Abundant C = Common; O = Occasional; U = Uncommon; P =Present R = Rare)
Strata: E = Emergent; T1-3 = Tree strata 1-3; S1-2 = Shrub strata 1-2; G = Ground stratum\|

Scheduled flora possibilities: No

Additional notes on pest plants: *Cenchrus ciliaris* (Buffel Grass) was observed on the site.

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Weed Cover (%): <5

Disturbance (% of site affected): 0

Health: Degraded

Slope: Lower slope

Soils: Surface observation Reliability: Low

Soil Colour: yellow

Soil Texture: sandy loam

	Description	Plants per plot
D	Dominant	>100
A	Abundant	50 - 100
C	Common	20 - 50
O	Occasional	10 - 20
U	Uncommon	5 - 10
P	Present	3 - 5
R	Rare	1 - 3

Particular sensitivities to proposed impacts (incl. fragmentation): Fragmentation of Malaleuca's and there was evidence of erosion on the banks of the watercourse.

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Special conservation significance:.....

Other notes such as Health, Condition:

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Landuse: Predominantly grazing areas.

observed or Horticultural Crops

Over fence or opposite sides road

Tertiary Site Vegetation Assessment Data Sheet

Job Number:

Site Number: 34..... KP: 219.9..... Assessor: Ann..... Date : 01/12/2008

Location: DRAINAGE LINE..... Photo #: 4.....

GPS Projection: UTM Datum: GDA94; Easting: 253490.. Northing: 7252305

	RE code	EPBC status	VMA status
DNRW RE map	Non remnant		
Survey result	Non remnant		Not of Concern

Canopy stratum form: Tree Canopy Crown Cover: 30...%
Canopy Median Height: 20.m. Structural Code: Linear non remnant.

All woody species present within 50m x 10m plot (plus dominant and EVR non-woody species)

Name	Rel. No.	Height Ocular estimate (m)						Ground Cover	
		E	T1	T2	T3	S1	S2	Ground Layer <1	No.
<i>Corymbia tessellaris</i>	C		25		10			<i>Aristida latifolia</i>	O
<i>Eucalyptus tereticornis</i>	C		25	20	10	5		<i>Themeda triandra</i>	O
<i>Acacia salicina</i>	E					5		<i>Carthamus lanatus</i>	O
<i>Gomphocarpus physocarpus</i>	O					5		<i>Cyanthillium cinereum</i>	O
<i>Melaleuca trichostachya</i>	O						2	<i>Argemone ochroleuca</i>	O
<i>Acacia glaucocarpa</i>	P						1	<i>Verbena tenuisecta</i>	O
								<i>Bothriochloa bladhii</i>	P
								<i>Megathyrsus maximus v trichgume</i>	P
								<i>Heteropogon contortus</i>	U
								<i>Sonchus oleraceus</i>	U
								<i>Ajuga australis</i>	U
								<i>Wahlenbergia graniticola</i>	U
								<i>Cymbidium canaliculatum</i>	U
								<i>Aristida latifolia</i>	O
								<i>Themeda triandra</i>	O
								<i>Sida cordifolia</i>	P
								<i>Maireana microphylla</i>	O
								<i>Eustrephus latifolius</i>	O
								<i>Sesbania brachycarpa</i>	P
Canopy stratum (%) 30									
Mid stratum (%) ---									
Ground stratum (%) 50									
Rock cover (%) ---									
Bare ground cover (%) 30									
Litter cover (%) 20									

Species annotations: C Collected * Exotic Species ** Declared Species E = Edge or Outside but adjoining 50m x 10m plot Relative Numbers within stratum (D = dominant; A = Abundant C = Common; O = Occasional; U = Uncommon; P =Present R = Rare)
Strata: E = Emergent; T1-3 = Tree strata 1-3; S1-2 = Shrub strata 1-2; G = Ground stratum\|

Scheduled flora possibilities: No.....

Additional notes on pest plants *Gomphocarpus physocarpus* (balloon cotton), *Carthamus lanatus* (saffron thistle), *Argemone ochroleuca* (mexican poppy), *Verbena tenuisecta* (maynes pest) and *Sonchus oleraceus* (milk thistle) were observed on the site.

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	Description	Plants per plot
D	Dominant	>100
A	Abundant	50 - 100
C	Common	20 - 50
O	Occasional	10 - 20
U	Uncommon	5 - 10
P	Present	3 - 5
R	Rare	1 - 3

Weed Cover (%): 5-25

Disturbance (% of site affected): <1

Health: Degraded

Slope: Flat

Soils: Surface observation Reliability: Low

Soil Colour: yellow

Soil Texture: sandy clay

Particular sensitivities to proposed impacts (incl. fragmentation):.....

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Special conservation significance:.....

Other notes such as Health, Condition: Would be a suitable site for the alignment due to the lack of vegetation.

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Landuse: predominantly grazing and timber getting.....

observed or Horticultural Crops

Over fence or opposite sides road

Tertiary Site Vegetation Assessment Data Sheet

Job Number:

Site Number: 35..... KP: 227.2..... Assessor: Ann..... Date : 02/12/2008

Location: Open Forest..... Photo #:

GPS Projection: UTM Datum: GDA94; Easting: 256080..... Northing: 7259189

	RE code	EPBC status	VMA status
DNRW RE map	11.8.4/11.12.4		Not of Concern / Not of Concern
Survey result	11.8.4		Not of Concern

Canopy stratum form: Tree Canopy Crown Cover: 70 %
Canopy Median Height: 20.m. Structural Code: .Woodland

All woody species present within 50m x 10m plot (plus dominant and EVR non-woody species)

Name	Rel. No.	Height Ocular estimate (m)						Ground Cover	
		E	T1	T2	T3	S1	S2	Ground Layer	No.
<i>Eucalyptus moluccana</i>	A		20	15	8			<i>Grewia retusifolia</i>	C
<i>Carissa ovata</i>	O						1	<i>Capparis lasiantha</i>	C
<i>Eremophila mitchellii</i>	O						2	<i>Eremochloa bimaculata</i>	O
<i>Dodonaea viscosa ssp spatulata</i>	O						1	<i>Panicum decompositum</i>	O
<i>Casuarina cristata</i>	O		20	15				<i>Eustrephus latifolius</i>	O
<i>Denhamia pittosporoides ssp pittosporoides</i>	O						2	<i>Passiflora aurantia</i>	O
<i>Backhousia angustifolia</i>	O			15				<i>Arundinella nepalensis</i>	P
<i>Corymbia intermedia</i>	O		20					<i>Cyperus gracilis</i>	P
<i>Eucalyptus crebra</i>	O		20			5		<i>Jasminum simplicifolium ssp austrealense</i>	P
<i>Melaleuca bracteata</i>	O					5		<i>Aristida caput-medusae</i>	U
<i>Geijera parviflora</i>	O						2	<i>Cenchrus ciliaris</i>	U
<i>Solanum nemophilum</i>	P						2	<i>Enteropogon acicularis</i>	U
<i>Eucalyptus melanophloia</i>	P		20					<i>Cyanthillium cinereum</i>	U
<i>Brachychiton populneus</i>	P		20					<i>Lomandra longifolia</i>	U
<i>Maytenus cunninghamii</i>	U						2	<i>Jasminum didymum ssp racemosum</i>	U
<i>Alectryon diversifolius</i>	U						2	<i>Nyssanthus erecta</i>	O
<i>Alstonia constricta</i>	U					3		<i>Abutilon otocarpum</i>	O
<i>Erythroxylum australe</i>	U					3			
<i>Notelaea microcarpa</i>	U						1		
<i>Maireana microphylla</i>	---					3			
<i>Alphitonia excelsa</i>	---					3			
Canopy stratum (%) 70									
Mid stratum (%) 30									
Ground stratum (%) 50									
Rock cover (%) ---									
Bare ground cover 30(%)									
Litter cover (%) 20									

Species annotations: C = Collected * Exotic Species ** Declared Species E = Edge or Outside but adjoining 50m x 10m plot Relative Numbers within stratum (D = dominant; A = Abundant C = Common; O = Occasional; U = Uncommon; P = Present R = Rare)
Strata: E = Emergent; T1-3 = Tree strata 1-3; S1-2 = Shrub strata 1-2; G = Ground stratum\l

Scheduled flora possibilities: No

Additional notes on pest plants *Optuntia tomentosa* (velvety tree pear), was observed on the site.....

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Weed Cover (%): <5

Disturbance (% of site affected): 0

Health: Average

Slope: Upper slope

Soils: Surface observation Reliability: Low

Soil Colour: brown

Soil Texture: silty clay

	Description	Plants per plot
D	Dominant	>100
A	Abundant	50 - 100
C	Common	20 - 50
O	Occasional	10 - 20
U	Uncommon	5 - 10
P	Present	3 - 5
R	Rare	1 - 3

Particular sensitivities to proposed impacts (incl. fragmentation):.....

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Special conservation significance:.....

Other notes such as Health, Condition:

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Landuse Grazing

observed or Horticultural Crops *Leucaena leucocephala* (Leucanena).

Over fence or opposite sides road

Job Number:

Location: Photo #:

	RE code	EPBC status	VMA status
DNRW RE map	11.12.14		Of Concern
Survey result	Unknown		

All woody species present within 50m x 10m plot (plus dominant and EVR non-woody species)

[illegible]

Ground stratum (%)									
Rock cover (%)									
Bare ground cover (%)									
Litter cover (%)									

Species annotations: C Collected * Exotic Species ** Declared Species E = Edge or Outside but adjoining 50m x 10m plot Relative
Numbers within stratum (D = dominant; A = Abundant C = Common; O = Occasional; U = Uncommon; P =Present R = Rare)
Strata: E = Emergent; T1-3 = Tree strata 1-3; S1-2 = Shrub strata 1-2; G = Ground stratum\\

Scheduled flora possibilities: Yes the tree *Cadellia pentastylis* (ooline) was found to be present on the site. Owner of property to verify.

Additional notes on pest plants: *Lantana camara* (lantana) and *Lantana montevidensis* (creeping lantana) was observed on the site.

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	Description	Plants per plot
D	Dominant	>100
A	Abundant	50 - 100
C	Common	20 - 50
O	Occasional	10 - 20
U	Uncommon	5 - 10
P	Present	3 - 5
R	Rare	1 - 3

Weed Cover (%): <5
Disturbance (% of site affected): 0
Health: Good
Slope: Simple slope
Soils: Surface observation Reliability: Low
Soil Colour: black
Soil Texture: stony

Particular sensitivities to proposed impacts (incl. fragmentation):.....

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Special conservation significance:.....

Other notes such as Health, Condition:

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Landuse Grazing.....culturalcommercialrecreational.....
observed or Horticultural Crops
Over fence or opposite sides road

Tertiary Site Vegetation Assessment Data Sheet

Job Number:

Site Number: 37..... KP: 280.3..... Assessor: Ann..... Date : 02/12/2008

Location: WATERCOURSE..... Photo #:

GPS Projection: UTM Datum: GDA94; Easting: 263964..... Northing: 7307953

	RE code	EPBC status	VMA status
DNRW RE map	11.3.4/11.3.25/11.3.6		Of Concern/Not of Concern/ Not of Concern
Survey result	11.3.25		Not of Concern

Canopy stratum form: Tree Canopy Crown Cover: 80%
Canopy Median Height: 25.m. Structural Code: Open Forest.

All woody species present within 50m x 10m plot (plus dominant and EVR non-woody species)

Name	Rel. No.	Height Ocular estimate (m)						Ground Cover	
		E	T1	T2	T3	S1	S2	Ground Layer	No.
<i>Casuarina cunninghamiana</i>	C				10			<i>Bryophyllum delagoense</i>	O
<i>Eucalyptus tereticornis</i>	C	30	25					<i>Lomandra longifolia</i>	O
<i>Melaleuca bracteata</i>	C				10	8	5	<i>Macfadyena unguis-cati</i>	O
<i>Melaleuca fluviatilis</i>	C			15	10			<i>Macroptilium atropurpureum</i>	P
<i>Callistemon viminalis</i>	O					8	5	<i>Bidens pilosa</i>	P
<i>Acacia salicina</i>	O					8	5	<i>Lactuca serriola</i>	P
<i>Opuntia tomentosa</i>	P					5	2	<i>Opuntia tomentosa</i>	P
<i>Ficus opposita v opposita</i>	P					5		<i>Glycine clandestina v clandestina</i>	U
<i>Senna barclayana</i>	U					5		<i>Arundinella nepalensis</i>	U
<i>Erythrina vespertilio</i>	U					8		<i>Austrostipa ramosissima</i>	U
<i>Melia azedarach</i>	U					5		<i>Tridax procumbens</i>	U
								<i>Plectranthus parviflorus</i>	U
								<i>Juncus usitatus</i>	U
								<i>Arundinella nepalensis</i>	U
								<i>Austrostipa ramosissima</i>	U
								<i>Plectranthus parviflorus</i>	U
								<i>Sida subspicata</i>	U
								<i>Glycine clandestina v clandestina</i>	U
Canopy stratum (%) 80									
Mid stratum (%) 20									
Ground stratum (%) 70									
Rock cover (%) 20									
Bare ground cover (%) 5									
Litter cover (%) 5									

Species annotations: C = Collected * Exotic Species ** Declared Species E = Edge or Outside but adjoining 50m x 10m plot Relative Numbers within stratum (D = dominant; A = Abundant C = Common; O = Occasional; U = Uncommon; P = Present R = Rare)
Strata: E = Emergent; T1-3 = Tree strata 1-3; S1-2 = Shrub strata 1-2; G = Ground stratum\l

Scheduled flora possibilities: No

Additional notes on pest plants: *Asclepias curassavica* (red head cottonbush), *Bidens pilosa* (cobblers pegs), *Lactuca serriola* (prickly lettuce), *Tridax procumbens* (tridax daisy), *Macfadyena unguis-cati* (cats claw creeper), *Opuntia tomentosa* (velvety tree pear), *Senna barclayana* (pepper leaf senna) and *Bryophyllum delagoense* (mother of millions) were all observed on the site.

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	Description	Plants per plot
D	Dominant	>100
A	Abundant	50 - 100
C	Common	20 - 50
O	Occasional	10 - 20
U	Uncommon	5 - 10
P	Present	3 - 5
R	Rare	1 - 3

Weed Cover (%): 5-25

Disturbance (% of site affected): 1-5

Health: Good-Average

Slope: Open depression

Soils: Surface observation Reliability: Low

Soil Colour: brown

Soil Texture: sandy loam

Particular sensitivities to proposed impacts (incl. fragmentation): Watercourse fragmentation.....

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Special conservation significance:.....

Other notes such as Health, Condition:

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Landuse Grazing.....culturalcommercialrecreational.....

observed or Horticultural Crops

Over fence or opposite sides road

Job Number:

Location: GREVILLEA CREEK..... Photo #: 4.....

	RE code	EPBC status	VMA status
DNRW RE map	Non remnant		
Survey result	Non remnant		

Canopy stratum form: Tree; Canopy Crown Cover:%
Canopy Median Height: 20.m. Structural Code: .Watercourse.....

[illegible]

Species annotations: C = Collected * Exotic Species ** Declared Species E = Edge or Outside but adjoining 50m x 10m plot
Numbers within stratum (D = dominant; A = Abundant C = Common; O = Occasional; U = Uncommon; P = Present R = Rare)
Strata: E = Emergent; T1-3 = Tree strata 1-3; S1-2 = Shrub strata 1-2; G = Ground stratum||

Scheduled flora possibilities: No.....

Additional notes on pest plants: *Macfadyena unguis-cati* (cats claw creeper), *Cenchrus ciliaris* (Buffel Grass) and *Megathyrsus maximus v trichoglume* (green panic) were observed in the site area.

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Weed Cover (%): <5

Disturbance (% of site affected): <1

Health: Degraded

Slope: Open depression

Soils: Surface observation Reliability: Low

Soil Colour: orange

Soil Texture: silty clay

	Description	Plants per plot
D	Dominant	>100
A	Abundant	50 - 100
C	Common	20 - 50
O	Occasional	10 - 20
U	Uncommon	5 - 10
P	Present	3 - 5
R	Rare	1 - 3

Particular sensitivities to proposed impacts (incl. fragmentation):.....

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Special conservation significance:.....

Other notes such as Health, Condition:

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Landuse: Predominantly grazing areas

observed or Horticultural Crops

Over fence or opposite sides road

Job Number:

Site Number: 39..... KP: 317.7..... Assessor: Ann..... Date : 03/11/2008

Location: CALLIOPE RIVER..... Photo #:

GPS Projection: UTM Datum: GDA94; Easting: 279410..... Northing: 7335964

Width of RE: 35-75m

Width of total remnant: 35-75m

Total RE Area: <1ha

Total remnant Area: <1ha

	RE code	EPBC status	VMA status
DNRW RE map	Non remnant		
Survey result	11.3.25		Not of Concern

Canopy stratum form: Tree

Canopy Crown Cover: nil%

Canopy Median Height: 20.m.

Structural Code: Wide watercourse with pools

All woody species present within 50m x 10m plot (plus dominant and EVR non-woody species)

[illegible]

Species annotations: C = Collected * Exotic Species ** Declared Species E = Edge or Outside but adjoining 50m x 10m plot Relative Numbers within stratum (D = dominant; A = Abundant C = Common; O = Occasional; U = Uncommon; P = Present R = Rare)
Strata: E = Emergent; T1-3 = Tree strata 1-3; S1-2 = Shrub strata 1-2; G = Ground stratum||

Scheduled flora possibilities: No.....

Additional notes on pest plants: *Cascabela thevetia* (yellow oleander), *Cryptostegia grandiflora* (rubber vine) and *lantana camara* (lantana) were all observed in the site area.

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Weed Cover (%): 25-50

Disturbance (% of site affected): 1-5

Health: Average

Slope: Open depression

Soils: Surface observation Reliability: Low

Soil Colour: whitish; grayish; mottled; yellow; orange; brown; red; black; dark; grey; pale

Soil Texture: clay; clay loam; silty loam; loam; sandy loam; sand; stony; silty clay; sandy clay; silty clay loam; sandy clay loam; loam sand

	Description	Plants per plot
D	Dominant	>100
A	Abundant	50 - 100
C	Common	20 - 50
O	Occasional	10 - 20
U	Uncommon	5 - 10
P	Present	3 - 5
R	Rare	1 - 3

Particular sensitivities to proposed impacts (incl. fragmentation): Bank erosion and siltation of the watercourse

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Special conservation significance:.....

Other notes such as Health, Condition: Wide pooling.

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Landuse: Predominantly grazing areas

observed or Horticultural Crops

Over fence or opposite sides road: was found to have a high weed density.

Tertiary Site Vegetation Assessment Data Sheet

Job Number: Main Line

Site Number: M40 KP:

Assessor: Ann

Date : 3/12/2008

Location: Realignment

Photo #: 4

GPS Projection: UTM

Datum: GDA94; Easting: 265073 Northing: 7296274

	RE code	EPBC status	VMA status
DNRW RE map	11.4.3	Endangered	Endangered
Survey result	Non-remnant		

Canopy stratum form: Tree;
Canopy Median Height: 20m

Canopy Crown Cover: 30%
Structural Code: Woodland

All woody species present within 50m x 10m plot (plus dominant and EVR non-woody species)

Name	Rel. No.	Height Ocular estimate (m)						Ground Cover	
		E	T1	T2	T3	S1	S2	Ground Layer <1m	No.
<i>Eucalyptus moluccana</i>	P			10	6			<i>Portulaca oleracea</i>	U
<i>Carissa ovata</i>	O						2	<i>Pseuderanthemum variabile</i>	P
<i>Eremophila mitchellii</i>	O						2	<i>Heteropogon contortus</i>	P
<i>Hovea longipes</i>	O						1	<i>Vittadinia cuneata v hirsuta</i>	P
<i>Alectryon diversifolius</i>	P						2	<i>Enchylaena tomentosa</i>	U
<i>Bursaria spinosa</i>	P						2		
<i>Eucalyptus crebra</i>	P				6				
<i>Notelaea microcarpa</i>	P					5			
<i>Acacia harpophylla</i>	R						1		
<i>Alectryon oleifolius</i>	U					5	2		
<i>Corymbia erythrophloia</i>	U				8				
<i>Diospyros humilis</i>	U					5	2		
<i>Eucalyptus populnea</i>	U								
<i>Grewia retusifolia</i>	U				8		1		
<i>Lysiphyllum hookeri</i>	U					5			
<i>Melaleuca bractacae</i>	P					5			
Canopy stratum (%)									
Mid stratum (%)									
Ground stratum (%) 50%									
Rock cover (%) 20%									
Bare ground cover (%) 20%									
Litter cover (%) 10%									

Species annotations: C Collected * Exotic Species ** Declared Species E = Edge or Outside but adjoining 50m x 10m plot Relative Numbers within stratum (D = dominant; A = Abundant C = Common; O = Occasional; U = Uncommon; P = Present R = Rare)
Strata: E = Emergent; T1-3 = Tree strata 1-3; S1-2 = Shrub strata 1-2; G = Ground stratum\

Scheduled flora possibilities: No

Additional notes on pest plants

- *Cenchrus ciliaris
- *Lantana camara
- *Lantana montevidensis

Weed Cover (%): <5

Disturbance (% of site affected): 0

Health: Degraded

Slope: Flat;

Soils: Surface observation Reliability: Low,

Soil Colour: black;

Soil Texture: silty clay loam;

	Description	Plants per plot
D	Dominant	>100
A	Abundant	50 - 100
C	Common	20 - 50
O	Occasional	10 - 20
U	Uncommon	5 - 10
P	Present	3 - 5
R	Rare	1 - 3

Particular sensitivities to proposed impacts (incl. fragmentation):.....

Special conservation significance:.....

Other notes such as Health, Condition: Recently burnt

Landuse: Grazing

observed or Horticultural Crops

Over fence or opposite sides road

Job Number:

Site Number: 41..... KP: 372..... Assessor: Ann..... Date : 03/12/2008

Location: Mangroves-Viewed from nearest road due to access restrictions..... Photo #: ...

GPS Projection: UTM Datum: GDA94; Easting: 297707. Northing: 7440811

	RE code	EPBC status	VMA status
DNRW RE map	11.1.4a		Not of Concern
Survey result	11.1.4.a		Not of Concern

Canopy stratum form: Tree; Shrub; Herb; Grass; Aquatic

Canopy Crown Cover:%

Canopy Median Height:m.

Structural Code:

All woody species present within 50m x 10m plot (plus dominant and EVR non-woody species)

[illegible]

Species annotations: C = Collected * Exotic Species ** Declared Species E = Edge or Outside but adjoining 50m x 10m plot
Numbers within stratum (D = dominant; A = Abundant C = Common; O = Occasional; U = Uncommon; P = Present R = Rare)
Strata: E = Emergent; T1-3 = Tree strata 1-3; S1-2 = Shrub strata 1-2; G = Ground stratum||

Scheduled flora possibilities: No.....

Additional notes on pest plants nil.....
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Weed Cover (%): 0
Disturbance (% of site affected): 0
Health: Average
Slope: Flat
Soils: Surface observation **Reliability:** Low
Soil Colour: brown
Soil Texture: marine silt

	Description	Plants per plot
D	Dominant	>100
A	Abundant	50 - 100
C	Common	20 - 50
O	Occasional	10 - 20
U	Uncommon	5 - 10
P	Present	3 - 5
R	Rare	1 - 3

Particular sensitivities to proposed impacts (incl. fragmentation):.....
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Special conservation significance:.....
Other notes such as Health, Condition:
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Landuse .recreational fishing
observed or Horticultural Crops
Over fence or opposite sides road

Tertiary Site Vegetation Assessment Data Sheet

Job Number:

Site Number: M42 KP: Assessor: Ann Moran

Date : 20/07/2008

Location: Beelbee Road

Photo #: GPS

GPS Projection: UTM Datum: GDA94;

Zone: 56

Easting: 283522 Northing: 6991721

Waypoint #: ..

Width of RE: >300

Width of total remnant: >300

Total RE Area: >50ha

Total remnant Area: >50ha

	RE code	EPBC status	VMA status
DNRW RE map	11.7.6/11.5.4	N/A	Not of Concern
Survey result	11.7.6/11.5.4	N/A	Not of Concern

Canopy stratum form: Tree; Canopy Crown Cover: 80%

Canopy Median Height: 25 m Structural Code: Tall open forest

All woody species present within 50m x 10m plot (plus dominant and EVR non-woody species)

Name	Rel. Dom.	Height						
		Ocular estimate (m)						
		E	T1	T2	T3	S1	S2	G
<i>Corymbia citriodora ssp variegata</i>	A	30	25	20				
<i>Calotis dentex</i>	O							1
<i>Allocasuarina luehmanna</i>	O				15	5		
<i>Gahnia aspera</i>	O							1
<i>Lomandra longifolia</i>	O							1
<i>Sida subspicata</i>	O						2	
<i>Acacia bancroftiorum</i>	O						2	
<i>Acacia decora</i>	O						2	
<i>Eucalyptus crebra</i>	O				15			
<i>Ancistrachne uncinulata</i>	O							1
<i>Enneapogon nigricans</i>	O							1
<i>Panicum effusum v effusum</i>	O							1
<i>Solanum nemophilum</i>	O						1	
<i>Carissa ovata</i>	P						2	
<i>Acacia deanei ssp deanei</i>	P						2	
<i>Geijera parviflora</i>	P						2	
<i>Cheilanthes sieberi</i>	U							1
<i>Daviesia ulicifolia</i>	U						2	
<i>Acacia leiocalyx ssp leiocalyx</i>	U					4		
<i>Pimelea neoanglica</i>	U						1	
<i>Eucalyptus populnea</i>	E			15				
<i>Triodia longiceps</i>	E							1
Canopy stratum (%)								80
Mid stratum (%)								10
Ground stratum (%)								70
Rock cover (%)								
Bare ground cover (%)								10
Litter cover (%)								20

Strata: E = Emergent; T1-3 = Tree strata 1-3; S1-2 = Shrub strata 1-2; G = Ground stratum

Scheduled flora possibilities: No
Additional notes on pest plants

Verbena tenuisecta

Weed Cover (%): <5

Disturbance (% of site affected): <1

Health: Good

Slope: Flat;

Soils: Surface observation **Reliability:** Low

Soil Colour: yellow

Soil Texture: sandy loam

Legend	Description	Plants per plot
D	Dominant	>100
A	Abundant	50 - 100
C	Common	20 - 50
O	Occasional	10 - 20
U	Uncommon	5 - 10
P	Present	3 - 5
R	Rare	1 - 3
E	Edge not inside community	1 - 10
*	Weed or Garden escapee	

Particular sensitivities to proposed impacts (incl. fragmentation):.....

Cliff crest susceptible to erosion

Special conservation significance:.....

cultural

commercial

recreational

observed or Horticultural Crops Forestry Management

Other notes: Heavily logged in the past

Tertiary Site Vegetation Assessment Data Sheet

Job Number:

Site Number: M43 KP: Assessor: Ann Moran

Date : 6/08/08

Location: Baemar SF

GPS Projection: UTM

Datum: GDA94;

Zone: 56

Easting: 232882 Northing: 7023606

Width of RE: >330m

Width of total remnant: >300m

Total RE Area: >50ha

Total remnant Area: >50ha

	RE code	EPBC status	VMA status
DNRW RE map	11.7.6/11.5.4	No of Concern at present	Not of Concern
Survey result	11.7.6/11.5.4	No of Concern at present	Not of Concern

Canopy stratum form: Tree;

Canopy Crown Cover: 80%

Canopy Median Height: 20m

Structural Code: Shrubby Woodland

All woody species present within 50m x 10m plot (plus dominant and EVR non-woody species)

Name	Rel. Dom.	Height Ocular estimate (m)						
		E	T1	T2	T3	S1	S2	G
<i>Corymbia citriodora ssp variegata</i>	A	30	25	20				
<i>Brunoniella australis</i>	O							<1
<i>Acacia bancroftiorum</i>	O						2	
<i>Acacia burrowii</i>	O					5		
<i>Acacia leiocalyx ssp leiocalyx</i>	O					5		
<i>Calypochloa gracillima</i>	O							<1
<i>Dodonaea triangularis</i>	O						1	
<i>Podolepis longipedata</i>	U							<1
<i>Gahnia aspera</i>	U							<1
<i>Laxmannia gracilis</i>	U							<1
<i>Lomandra longifolia</i>	U							<1
<i>Acacia conferta</i>	U						2	
<i>Acacia muelleriana</i>	U						2	
<i>Aristida caput-medusae</i>	U							<1
<i>Aristida leptopoda</i>	U							<1
<i>Pomax umbellata</i>	U							<1
<i>Dianella revoluta v revoluta</i>	U							<1
<i>Callitris glaucophylla</i>	P				8			
<i>Scleria sphacelata</i>	P							<1
<i>Hibbertia stricta</i>	P							<1
<i>Eucalyptus decorticans</i>	P			10				
<i>Themeda triandra</i>	P							<1
Canopy stratum (%)								80%
Mid stratum (%)								
Ground stratum (%)								20%
Rock cover (%)								
Bare ground cover (%)								
Litter cover (%)								80%

Strata: E = Emergent; T1-3 = Tree strata 1-3; S1-2 = Shrub strata 1-2; G = Ground stratum

Scheduled flora possibilities: No

Additional notes on pest plants

Salsola kali

Weed Cover (%): <1 Edge only

Disturbance (% of site affected):

Health: Good

Slope: Flat;

Soils: Surface observation **Reliability:** Low

Soil Colour: Orange brown

Soil Texture: stony

Legend	Description	Plants per plot
D	Dominant	>100
A	Abundant	50 - 100
C	Common	20 - 50
O	Occasional	10 - 20
U	Uncommon	5 - 10
P	Present	3 - 5
R	Rare	1 - 3
E	Edge not inside community	1 - 10
*	Weed or Garden escapee	

Particular sensitivities to proposed impacts (incl. fragmentation):.....

Special conservation significance:.....

 cultural
 commercial
 recreational

observed or Horticultural Crops ...Forestry/ Timber industry

Other notes: Logged in the past - Many different Acacia species

Tertiary Site Vegetation Assessment Data Sheet

Job Number:

Site Number: M44 Assessor: Ann Moran Date : 6/08/08

Location: Baemar SF GPS Projection: UTM Datum: GDA94; Zone: 56

Easting: 281889 Northing: 6990039

Width of RE: >330m

Width of total remnant: >300m

Total RE Area: >50ha

Total remnant Area: >50ha

	RE code	EPBC status	VMA status
DNRW RE map	11.9.5	Endangered	Endangered
Survey result	11.9.5	Endangered	Endangered

Canopy stratum form: Tree; Canopy Crown Cover: 80%

Canopy Median Height: 20m Structural Code: Woodland

All woody species present within 50m x 10m plot (plus dominant and EVR non-woody species)

Name	Rel. Dom.	Height Ocular estimate (m)						
		E	T1	T2	T3	S1	S2	G
<i>Casuarina cristata</i>	C		20	15	10			
<i>Acacia harpophylla</i>	C		20	15	10			
<i>Geijera parviflora</i>	C						2	
<i>Tetragonia tetragonioides</i>	O							<1
<i>Einadia nutans ssp nutans</i>	O							<1
<i>Enteropogon acicularis</i>	O							<1
<i>Portulaca oleracea</i>	P							<1
<i>Alectryon diversifolius</i>	P						3	
<i>Enchylaena tomentosa v glabra</i>	U							<1
<i>Callitris glaucophylla</i>	E			10		5		
<i>Eucalyptus piligaensis</i>	E			10				
<i>Brachychiton populneus ssp trilobus</i>	E					5		
<i>Wikstroemia indica</i>	E						1	
Canopy stratum (%)								80%
Mid stratum (%)								20%
Ground stratum (%)								70%
Bare ground cover (%)								10%
Litter cover (%)								20%

Strata: E = Emergent; T1-3 = Tree strata 1-3; S1-2 = Shrub strata 1-2; G = Ground stratum

Scheduled flora possibilities: No

Additional notes on pest plants

Salsola kali

Weed Cover (%): <1 Edge only

Disturbance (% of site affected): 0

Health: Very Good

Slope: Flat;

Soils: Surface observation **Reliability:** Low

Soil Colour: Brown

Soil Texture: silty clay

Legend	Description	Plants per plot
D	Dominant	>100
A	Abundant	50 - 100
C	Common	20 - 50
O	Occasional	10 - 20
U	Uncommon	5 - 10
P	Present	3 - 5
R	Rare	1 - 3
E	Edge not inside community	1 - 10
*	Weed or Garden escapee	

Particular sensitivities to proposed impacts (incl. fragmentation):.....

Special conservation significance:.....Forestry - Past logging

cultural

commercial

recreational

observed or Horticultural Crops ...Forestry/ Timber industry

Other notes: Edges with *Eucalyptus piligaensis*

Roadside ecotone with jumpups on one side and Brigalow Belah on the other

Tertiary Site Vegetation Assessment Data Sheet

Job Number:

Site Number: M45 Assessor: Ann Moran Date : 7/08/08

Location: NINE MILE CK GPS Projection: UTM Datum: GDA94; Zone: 56

Easting: 205796 Northing: 7062180

Width of RE: >330m

Width of total remnant: >300m

Total RE Area: >50ha

Total remnant Area: >50ha

	RE code	EPBC status	VMA status
DNRW RE map	11.5.1/11.7.7	N/A	Not of Concern
Survey result	11.5.1/11.7.7	N/A	Not of Concern

Canopy stratum form: Tree

Canopy Crown Cover: 80%

Canopy Median Height: 25m

Structural Code: Tall open forest

All woody species present within 50m x 10m plot (plus dominant and EVR non-woody species)

Name	Rel. Dom.	Height Ocular estimate (m)						
		E	T1	T2	T3	S1	S2	G
<i>Corymbia citriodora ssp variegata</i>	A	30	25	20				
<i>Callitris glaucophylla</i>	O				8			
<i>Acacia conferta</i>	O							
<i>Acacia semilunata</i>	O						3	
<i>Gahnia aspera</i>	U							<1
<i>Lomandra longifolia</i>	U							<1
<i>Angophora leiocarpa</i>	U			15				
<i>Calypochloa gracillima</i>	U							<1
<i>Boronia bipinnata v bipinnata</i>	U						1	
<i>Eucalyptus chloroclada</i>	P				8			
<i>Eucalyptus fibrosa ssp nubilis</i>	P			20				
<i>Eucalyptus piligaensis</i>	P				15			
<i>Aristida leptopoda</i>	P							<1
Canopy stratum (%)								80%
Mid stratum (%)								20%
Ground stratum (%)								10%
Rock Cover (%)								20%
Bare ground cover (%)								20%
Litter cover (%)								50%

Strata: E = Emergent; T1-3 = Tree strata 1-3; S1-2 = Shrub strata 1-2; G = Ground stratum

Scheduled flora possibilities: No
Additional notes on pest plants

No weeds

Weed Cover (%): Nil

Disturbance (% of site affected): 0

Health: Very Good

Slope: Flat;

Soils: Surface observation **Reliability:** Low

Soil Colour: Grayish

Soil Texture: stony

Legend	Description	Plants per plot
D	Dominant	>100
A	Abundant	50 - 100
C	Common	20 - 50
O	Occasional	10 - 20
U	Uncommon	5 - 10
P	Present	3 - 5
R	Rare	1 - 3
E	Edge not inside community	1 - 10
*	Weed or Garden escapee	

Particular sensitivities to proposed impacts (incl. fragmentation):.....

Special conservation significance:.....Forestry - Past logging
cultural
commercial
recreational

observed or Horticultural Crops ...Forestry/ Timber industry

Other notes: Stony - lots of dead timber –
Little in ground layer to shady

Tertiary Site Vegetation Assessment Data Sheet

Job Number:

Site Number: M46 KP: 80 Assessor: Ann Moran Date : 28/08/2008

Location: NINE MILE CREEK Photo #:

GPS Projection: UTM Datum: GDA94; Zone: 56

Easting: 252013..... Northing: 7016652.....Waypoint #:

Width of RE: <35m

Width of total remnant: <35m

Total RE Area: Does not extend beyond site; <1ha

Total remnant Area: Does not extend beyond site; <1ha

	RE code	EPBC status	VMA status
DNRW RE map	11.3.25	N/A	Not of Concern
Survey result	11.3.25	N/A	Not of Concern

Canopy stratum form: Tree ;

Canopy Crown Cover: 50%

Canopy Median Height:. 20m Structural Code: Open Forest

All woody species present within 50m x 10m plot (plus dominant and EVR non-woody species)

Name	Rel. Dom.	Height Ocular estimate (m)						
		E	T1	T2	T3	S1	S2	G
<i>Eucalyptus coolabah</i>	C		20	15				
<i>Eucalyptus populnea</i>	O			15				
<i>Eucalyptus tereticornis</i>	C		20	15				
<i>Allocasuarina deichorami</i>	P					8		
<i>Acacia leiocalyx</i>	P						3	
<i>Opuntia tomentosa</i>	P							
<i>Senna aciphylla</i>	P						2	
<i>Megathyrsus maximus v pubiglumis</i>	P							1
<i>Eremophila mitchellii</i>	O						2	1
Canopy stratum (%)								50
Mid stratum (%)								40
Ground stratum (%)								60
Rock cover (%)								
Bare ground cover (%)								20
Litter cover (%)								20

Strata: E = Emergent; T1-3 = Tree strata 1-3; S1-2 = Shrub strata 1-2; G = Ground stratum

Scheduled flora possibilities: No

Additional notes on pest plants
Optuntia tomentosa

Weed Cover (%): <5
Disturbance (% of site affected): 0

Health: Average
Slope: ; Open Depression
Soils: Surface observation Reliability: Low
Soil Colour: Yellow
Soil Texture: Sandy Loam

Legend	Description	Plants per plot
D	Dominant	>100
A	Abundant	50 - 100
C	Common	20 - 50
O	Occasional	10 - 20
U	Uncommon	5 - 10
P	Present	3 - 5
R	Rare	1 - 3
E	Edge not inside community	1 - 10
*	Weed or Garden escapee	

Particular sensitivities to proposed impacts (incl. fragmentation): Erodible
soils.....
.....
.....

Special conservation significance:
cultural
commercial
recreational
observed or Horticultural Crops

Other notes:

Tertiary Site Vegetation Assessment Data Sheet

Job Number: Main Line

Site Number: M47

KP: 0

Assessor: Ann

Date : 3/12/2008

Location: Condamine Power Station

Photo #:

GPS Projection: UTM

Datum: GDA94; Easting: 228351

Northing: 7046395

Width of RE: >300

Width of total remnant: >300

Total RE Area: >50ha

Total remnant Area: >50ha

	RE code	EPBC status	VMA status
DNRW RE map	11.7.4/11.7.7/11.7.5/11.7.2		Not of Concern
Survey result	11.7.7		Not of Concern

Canopy stratum form: Tree; Shrub;

Canopy Crown Cover: 40%

Canopy Median Height: 20m.

Structural Code: Woodland/Shrubland

All woody species present within 50m x 10m plot (plus dominant and EVR non-woody species)

Name	Rel. No.	Height Ocular estimate (m)						Ground Cover	
		E	T1	T2	T3	S1	S2	Ground Layer <1m	No.
<i>Callitris glaucophylla</i>	C			10				<i>Aristida holathera</i>	U
<i>Acacia crassa ssp crassa</i>	P					5		<i>Aristida leptopoda</i>	P
<i>Acacia ixiophylla</i>	O						2	<i>Thyridolepis mitchelliana</i>	O
<i>Acacia triptera</i>	P						2	<i>Aristida caput-medusae</i>	O
<i>Angophora leiocarpa</i>	O		20	15				<i>Gahnia aspera</i>	O
<i>Babingtonia jucunda</i>	P						1	<i>Goodenia delicata</i>	P
<i>Micromyrtus sessilis</i>	P						1	<i>Laxmannia gracilis</i>	P
<i>Alphitonia excelsa</i>	P					3		<i>Wahlenbergia communis</i>	O
<i>Solanum nemophilum</i>	O						1	<i>Sida rohlenae ssp rohlenae</i>	P
<i>Brachychiton populneus</i>	P				6			<i>Cheilanthes distans</i>	P
								<i>Cyanthillium cinereum</i>	P
								<i>Bulbostylis barbata</i>	O
								<i>Fimbristylis dichotoma</i>	P
								<i>Oxalis exilis</i>	P
Canopy stratum (40%)									
Mid stratum (%)									
Ground stratum (%)									
Rock cover (%)									
Bare ground cover (%)									
Litter cover (%)									

Species annotations: C = Collected * Exotic Species ** Declared Species E = Edge or Outside but adjoining 50m x 10m plot Relative Numbers within stratum (D = dominant; A = Abundant C = Common; O = Occasional; U = Uncommon; P = Present R = Rare) Strata: E = Emergent; T1-3 = Tree strata 1-3; S1-2 = Shrub strata 1-2; G = Ground stratum\

Scheduled flora possibilities: Yes

Additional notes on pest plants *Opuntia stricta*

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.....
.....
.....

Weed Cover (%): <5

Disturbance (% of site affected): 0,

Health: Average

Slope: Flat; Open depression;

Soils: Surface observation **Reliability:** Low,

Soil Colour: orange;

Soil Texture: stony; sandy clay;

	Description	Plants per plot
D	Dominant	>100
A	Abundant	50 - 100
C	Common	20 - 50
O	Occasional	10 - 20
U	Uncommon	5 - 10
P	Present	3 - 5
R	Rare	1 - 3

Particular sensitivities to proposed impacts (incl. fragmentation):.....

.....

Special conservation significance:.....

Other notes such as Health, Condition: Erosion

.....
.....
.....
.....

Landuse Grazing.....

observed or Horticultural Crops

.....

Over fence or opposite sides road

Tertiary Site Vegetation Assessment Data Sheet

Job Number:

Site Number: M48 Assessor: Ann Moran Date : 14/08/08

Location: Old Moonie Road GPS Projection: UTM Datum: GDA94; Zone: 56

Easting: 275393 Northing: 6974105

Width of RE: >300m

Width of total remnant: >300m

Total RE Area: >50ha

Total remnant Area: >50ha

	RE code	EPBC status	VMA status
DNRW RE map	11.3.2/11.3.25		Of Concern/Not of Concern
Survey result	11.3.1	Endangered	Endangered

Canopy stratum form: Trees Canopy Crown Cover: 70%

Canopy Median Height: 20m Structural Code: Woodland

All woody species present within 50m x 10m plot (plus dominant and EVR non-woody species)

Name	Rel. Dom.	Height Ocular estimate (m)						
		E	T1	T2	T3	S1	S2	G
<i>Casuarina cristata</i>	D		20	15				
<i>Geijera parviflora</i>	C						2	
<i>Nyssanthus erecta</i>	O							1
<i>Enteropogon acicularis</i>	O							1
<i>Capparis loranthifolia</i> v <i>loranthifolia</i>	P						2	
<i>Einadia nutans</i> ssp <i>nutans</i>	P							1
<i>Cyperus gracilis</i>	P							1
<i>Eucalyptus piligaensis</i>	P			15				
<i>Brunoniella australis</i>	U							1
<i>Enchylaena tomentosa</i> v <i>glabra</i>	U							1
<i>Citrus glauca</i>	U						2	
<i>Eucalyptus populnea</i>	E			15				
Canopy stratum (%)								70%
Mid stratum (%)								30%
Ground stratum (%)								10%
Rock Cover (%)								
Bare ground cover (%)								
Litter cover (%)								90%

Strata: E = Emergent; T1-3 = Tree strata 1-3; S1-2 = Shrub strata 1-2; G = Ground stratum

Scheduled flora possibilities: No

Additional notes on pest plants None

Weed Cover (%): 0

Disturbance (% of site affected): 0

Health: Very Good

Slope: Flat

Soils: Surface observation Reliability: Low

Soil Colour: Brown

Soil Texture: Sandy loam

Legend	Description	Plants per plot
D	Dominant	>100
A	Abundant	50 - 100
C	Common	20 - 50
O	Occasional	10 - 20
U	Uncommon	5 - 10
P	Present	3 - 5
R	Rare	1 - 3
E	Edge not inside community	1 - 10
*	Weed or Garden escapee	

Particular sensitivities to proposed impacts (incl. fragmentation):
Many small birds Heard; Logs lying throughout, Mistletoes on *Acacia shirleyi*

Special conservation significance: All Roadside vegetation
cultural
commercial
recreational

observed Horticultural Crops: Forestry Area

Other notes: Good Condition Habitat for fauna
Both sides the road agreeing with mapping of RE 11.3.2
Except for this Patch of Belah RE 11.3.1

Tertiary Site Vegetation Assessment Data Sheet

Job Number:

Site Number: M49 KP: 369 Assessor: Ann

Date : 1/04/2009

Location: Phillipies Landing Junction

Photo #:.51-55

Projection: UTM Datum: GDA94; Zone: 56 Easting: 306346 Northing: 7372821

	RE code	EPBC status	VMA status
DNRW RE map	11.11.3		Not of Concern
Survey result	11.11.4		Not of Concern

Canopy stratum form: Tree; Canopy Crown Cover: 70%

Canopy Median Height: 20m Structural Code: Woodland

All woody species present within 100m x 10m plot (plus dominant and EVR non-woody species)

Name	Rel. No.	Height								No.
		Ocular estimate (m)								
		E	T1	T2	T3	S1	S2	Ground Layer <1 m		
<i>Eucalyptus crebra</i>	A		20		8		2	<i>Brunoniella australis</i>	P	
<i>Dodonaea viscosa ssp burmanniana</i>	O						2	<i>Crotalaria montana</i>	P	
<i>Eucalyptus exserta</i>	O			15				<i>Cyanthillium cinereum</i>	P	
<i>Eucalyptus moluccana</i>	O			15				<i>Eragrostis elongata</i>	P	
<i>Acacia disparrima</i>	P					4	2	<i>Eustrephus latifolius</i>	C	
<i>Corymbia citriodora</i>	E		20					<i>Arundinella nepalensis</i>	C	
<i>Alphitonia excelsa</i>	P				8		2	<i>Grewia retusifolia</i>	O	
<i>Alstonia constricta</i>	P					4		<i>Heteropogon contortus</i>	O	
<i>Breynia oblongifolia</i>	P						2	<i>Bothriochloa bladhii</i>	O	
<i>Cyclophyllum coprosmoides</i>	P					4		<i>Chrysopogon fallax</i>	O	
<i>Diospyros geminata</i>	P						2	<i>Fimbristylis dichotoma</i>	P	
<i>Eucalyptus acmenoides</i>	P			15				<i>Hybanthus stellarioides</i>	P	
<i>Cupaniopsis anacardioides</i>	R						1	<i>Lomandra filiformis ssp</i>	P	
<i>Hibiscus heterophyllus</i>	O					4	2	<i>Pterocaulon redolens</i>	P	
<i>Maytenus cunninghamii</i>	P						2	<i>Sida subspicata</i>	P	
<i>Melaleuca quinquenervia</i>	R						1	<i>Vittadinia cuneata v hirsuta</i>	P	
<i>Lophostemon suaveolens</i>	O			10	8	4		<i>Glycine clandestina</i>	U	
<i>Petalostigma pubescens</i>	O				8	4	2	<i>Panicum decompositum</i>	U	
<i>Pogonolobus reticulatus</i>	C						2	<i>Spermacoce brachystema</i>	U	
								<i>Themeda triandra</i>	U	
								<i>Ajuga australis</i>	P	
							D	Dominant = >100		
Canopy stratum (70%)							A	Abundant = 50-100		
Mid stratum (20%)							C	Common = 20-50		
Ground stratum (90%)							O	Occasional = 10-20		
Rock cover (5%)							U	Uncommon = 5 -10		
Bare ground cover (%)							P	Present = 3-5		
Litter cover (5%)							R	Rare = 1-3		

Relative Numbers within stratum (D = dominant; A = Abundant C = Common; O = Occasional; U = Uncommon; Present R = Rare)

Strata: E = Emergent; T1-3 = Tree strata 1-3; S1-2 = Shrub strata 1-2; G = Ground stratum

Scheduled flora possibilities: No

Additional notes on pest plants

* <i>Sida cordifolia</i>	flannel weed
* <i>Stachytarpheta jamaicensis</i>	light-blue snakeweed
* <i>Passiflora suberosa</i>	corky passionflower
* <i>Melinis repens</i>	red natal grass

Weed Cover (%): <5

Disturbance (% of site affected): 0

Health: Average

Slope: Flat;

Soils: Surface observation **Reliability:** Low,

Soil Colour: brown;

Soil Texture: silty clay;

Particular sensitivities to proposed impacts (incl. fragmentation): Fragmentation of Remnant more edge effect

.....

Special conservation significance:.....

Other notes such as Health, Condition: Good Habitat value for marsupials such as Sugar Gliders

Comments

Tertiary Site Vegetation Assessment Data Sheet

Job Number: Main Line

Site Number: M50 KP: Assessor: Ann

Date : 1/04/2009

Location: Cullens Road

Photo #: .56-58

Projection: UTM Datum: GDA94; Zone: 56 Easting: 301529 Northing: 7368546

	RE code	EPBC status	VMA status
DNRW RE map	Non Remnant		
Survey result	Non Remnant		

Canopy stratum form: Tree; Canopy Crown Cover: Linear strip

Canopy Median Height: 20m Structural Code: Riparain

All woody species present within 100m x 10m plot (plus dominant and EVR non-woody species)

Name	Rel. No.	Height Ocular estimate (m)							No.
		E	T1	T2	T3	S1	S2	Ground Layer <1 m	
<i>Acacia fasciculifera</i>	O					5		<i>Polymeria calycina</i>	U
<i>Pleiogynium timorense</i>	C			15	8	5		<i>Arundinella nepalensis</i>	C
<i>Bridelia leichhardtii</i>	U							<i>Bothriochloa bladhii</i>	P
<i>Casuarina cunninghamiana</i>	O		20					<i>Heteropogon contortus</i>	C
<i>Corymbia tessellaris</i>	U				8	5		<i>Leersia hexandra</i>	O
<i>Cryptocarya triplinervis</i>	P							<i>Oplismenus aemulus</i>	O
<i>Cupaniopsis anacardioides</i>	U			10				<i>Panicum decompositum</i>	U
<i>Diospyros geminata</i>	P						2	<i>Eclipta prostrata</i>	P
<i>Eucalyptus crebra</i>	E			15				<i>Grewia retusifolia</i>	O
<i>Eucalyptus tereticornis</i>	E		20		8			<i>Pterocaulon redolens</i>	P
<i>Euroschinus falcatus</i>	P				8				
<i>Ficus opposita</i> v <i>opposita</i>	U					5	2		
<i>Geijera salicifolia</i>	P					5	2		
<i>Hibiscus heterophyllus</i>	P						2		
<i>Grewia reticulata</i>	P						2		
<i>Mallotus claoxyloides</i>	P						2		
<i>Mallotus phillippensis</i>	P				8	5	2		
<i>Alchornia ilicifolia</i>	P						2		
<i>Bridelia exaltata</i>	P					6			
<i>Pittosporum ferrugineum</i>	U						2		
<i>Terminalia sericocarpa</i>	P					6			
<i>Carissa ovata</i>	P						2		
							D	Dominant = >100	
Canopy stratum (%) N/A							A	Abundant = 50-100	
Mid stratum (%) N/A							C	Common = 20-50	
Ground stratum (%) N/A							O	Occasional = 10-20	
Rock cover (%) N/A							U	Uncommon = 5 -10	
Bare ground cover (%) N/A							P	Present = 3-5	
Litter cover (%) N/A							R	Rare = 1-3	

Relative Numbers within stratum (D = dominant; A = Abundant C = Common; O = Occasional; U = Uncommon; Present R = Rare)

Strata: E = Emergent; T1-3 = Tree strata 1-3; S1-2 = Shrub strata 1-2; G = Ground stratum

Scheduled flora possibilities: No

Additional notes on pest plants

- * *Senna obtusifolia*
- **Passiflora suberosa*
- **Melinis repens*
- **Cryptostegia grandiflora*
- **Aster subulatus*
- **Emilia sonchifolia*
- **Cyperus brevifolius*
- **Euphorbia cyathophora*
- **Abutilon grandifolium*
- **Malvastrum americanum*
- **Portulaca pilosa*
- **Lantana camara*

Weed Cover (%): <5

Disturbance (% of site affected): 0

Health: Average

Slope: Flat;

Soils: Surface observation Reliability: Low,

Soil Colour: brown;

Soil Texture: silty clay;

Particular sensitivities to proposed impacts (incl. fragmentation): Fragmentation of Remnant more edge effect

.....

Special conservation significance:.....

Other notes such as Health, Condition: Good Habitat value for Mammals such as Sugar Gliders

.....

.....

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Comments

Tertiary Site Vegetation Assessment Data Sheet

Job Number: Main Line

Site Number: M51 KP: Assessor: Ann

Date : 1/04/2009

Location: Vine thicket Regrowth

Photo #:

Projection: UTM Datum: GDA94; Zone: 56 Easting: 301895 Northing: 7369579

	RE code	EPBC status	VMA status
DNRW RE map	11.11.15/11.11.18	No Status/Endangered	Not of Concern/Endangered
Survey result	11.11.18	Endangered	Endangered

Canopy stratum form: Tree; Canopy Crown Cover: Linear strip 90%
Canopy Median Height: 15m Structural Code: Semi-evergreen Vine Thicket

All woody species present within 100m x 10m plot (plus dominant and EVR non-woody species)

Name	Rel. No.	Height							No.
		Ocular estimate (m)							
		E	T1	T2	T3	S1	S2	Ground Layer <1 m	
<i>Cupaniopsis wadsworthii</i>	C					5	2	<i>Austrosteenisia blackii</i>	P
<i>Ficus opposita</i> v <i>opposita</i>	C					5	2	<i>Cissus oblonga</i>	U
<i>Alyxia ruscifolia</i>	C					5	2	<i>Jasminum racemosa</i>	U
<i>Acacia fasciculifera</i>	O					5	2	<i>Melodorum leichhardtii</i>	O
<i>Bridelia leichhardtii</i>	O			10				<i>Trophis scandens</i>	O
<i>Drypetes deplanchei</i>	O		15					<i>Aristida benthamii</i> v <i>spinulifera</i>	P
<i>Elattostachys xylocarpa</i>	O				8			<i>Oplismenus aemulus</i>	U
<i>Melia azedarach</i>	O					5		<i>Paspalidium caespitosum</i>	E
<i>Murraya ovatifoliolata</i>	O					5		<i>Dianella longifolia</i>	P
<i>Notelaea microcarpa</i>	O						2	<i>Dianella revoluta</i> v <i>revoluta</i>	O
<i>Pleiogynium timorens</i>	O			10	8			<i>Grewia retusifolia</i>	O
<i>Carissa ovata</i>	O						2	<i>Cassytha pubescens</i>	U
<i>Pittosporum revolutum</i>	O						2	<i>Gahnia aspera</i>	U
<i>Alphitonia excelsa</i>	P					5	2	<i>Scleria mackaviensis</i>	U
<i>Elaeodendron australe</i>	P					5	2	<i>Jasminum simplicifolium</i> ssp <i>australiense</i>	U
<i>Ficus virens</i> v <i>virens</i>	P		15						
<i>Geijera salicifolia</i>	P					5			
<i>Litsea reticulata</i>	P					5			
<i>Micromelum minutum</i>	P					5			
<i>Atalaya collina</i>	R		15						
<i>Hernandia bivalvis</i>	R						2		
<i>Hibiscus heterophyllus</i>	U					5	2		
<i>Mallotus discolor</i>	U				8				
<i>Mallotus claoxyloides</i>	U						2		
<i>Acacia disparrima</i>	E					5	2		
<i>Eucalyptus tereticornis</i>	E		20					D Dominant = >100	
<i>Livistona decora</i>	E					5		A Abundant = 50-100	
<i>Sida subspicata</i>	E						2	C Common = 20-50	
								O Occasional = 10-20	
Canopy stratum (%)								U Uncommon = 5 -10	
Mid stratum (%) 90%								P Present = 3-5	
Ground stratum (%) 5%								R Rare = 1-3	
Rock cover (%) 95%									

Relative Numbers within stratum (D = dominant; A = Abundant C = Common; O = Occasional; U = Uncommon; Present R = Rare)

Strata: E = Emergent; T1-3 = Tree strata 1-3; S1-2 = Shrub strata 1-2; G = Ground stratum

Scheduled flora possibilities: Yes:

Additional notes on pest plants

**Lantana camara*

**Rivina humilis*

**Solanum seaforthianum*

Weed Cover (%): <5

Disturbance (% of site affected): 0

Health: Degraded

Slope: Rock Scree

Soils: Surface observation **Reliability:** Low,

Soil Colour: Rock only

Soil Texture: N/A

Particular sensitivities to proposed impacts (incl. fragmentation):

Special conservation significance:

Other notes such as Health, Condition:

Comments

Tertiary Site Vegetation Assessment Data Sheet

Job Number: Main line

Site Number: M52 KP: Assessor: Ann

Date : 1/04/2009

Location: Ephemeral Creekline (Narrow linear Remnant)

Photo #:66-68

Projection: UTM Datum: GDA94; Zone: 56 Easting: 298188 Northing:7366162

	RE code	EPBC status	VMA status
DNRW RE map	Non remnant		-
Survey result	11.3.25		Not of Concern

Canopy stratum form: Tree; Canopy Crown Cover: 70%

Canopy Median Height: 20m Structural Code: Woodland

All woody species present within 100m x 10m plot (plus dominant and EVR non-woody species)

Name	Rel. No.	Height							
		Ocular estimate (m)							
		E	T1	T2	T3	S1	S2	Ground Layer <1 m	No.
<i>Casuarina cunninghamiana</i>	C		20					<i>Parsonsia eucalyptophylla</i>	U
<i>Eucalyptus tereticornis</i>	E		20					<i>Bothriochloa bladhii</i>	O
<i>Acacia disparrima</i>	P				8			<i>Heteropogon contortus</i>	A
<i>Corymbia tessellaris</i>	P		20					<i>Panicum decompositum</i>	U
<i>Diospyros geminata</i>	P						2	<i>Themeda triandra</i>	P
<i>Drypetes deplanchei</i>	P						2	<i>Cyanthillium cinereum</i>	P
<i>Melaleuca bracteata</i>	P				8	5		<i>Lomandra longifolia</i>	U
<i>Myrsine variabilis</i>	P						2	<i>Oxalis chnoodes</i>	P
<i>Petalostigma pubescens</i>	P				8	5		<i>Cyperus difformis</i>	P
<i>Pittosporum ferrugineum</i>	P					5		<i>Fimbristylis dichotoma</i>	P
<i>Breynia oblongifolia</i>	P						2	<i>Parsonsia eucalyptophylla</i>	U
<i>Melaleuca fluviatilis</i>	R					5		<i>Bothriochloa bladhii</i>	O
<i>Ficus opposita v opposita</i>	U						2	<i>Heteropogon contortus</i>	A
<i>Sida subspicata</i>	U						2	<i>Panicum decompositum</i>	U
							D	Dominant = >100	
Canopy stratum (70%)							A	Abundant = 50-100	
Mid stratum (20%)							C	Common = 20-50	
Ground stratum (95%)							O	Occasional = 10-20	
Rock cover (%)							U	Uncommon = 5 -10	
Bare ground cover (5%)							P	Present = 3-5	
Litter cover (%)							R	Rare = 1-3	

Relative Numbers within stratum (D = dominant; A = Abundant C = Common; O = Occasional; U = Uncommon; Present R = Rare)

Strata: E = Emergent; T1-3 = Tree strata 1-3; S1-2 = Shrub strata 1-2; G = Ground stratum

Scheduled flora possibilities: No

Additional notes on pest plants **Lantana camara*

Weed Cover (%): <5

Disturbance (% of site affected): 0,

Health: Degraded

Slope: Creek banks Open depression

Soils: Surface observation **Reliability:** Low,

Soil Colour: brown;

Soil Texture: sandy loam; stony;

Particular sensitivities to proposed impacts (incl. fragmentation):Erosion

Special conservation significance:.....

Other notes such as Health, Condition:

.....
Comments

Job Number: Main Line

Site Number: M53 KP: Assessor: Ann

Date : 1/04/2009

Location: Larcom Creek (Narrow linear Remnant)

Photo #:72-83

Projection: UTM Datum: GDA94; Zone: 56 Easting: 295834 Northing:7353069

	RE code	EPBC status	VMA status
DNRW RE map	11.3.4/11.3.25		Of Concern/Not of Concern
Survey result	11.3.25		Not of Concern

Canopy stratum form: Tree;

Canopy Crown Cover: 70%

Canopy Median Height: 20m

Structural Code: Woodland

All woody species present within 100m x 10m plot (plus dominant and EVR non-woody species)

Name	Rel. No.	Height							
		Ocular estimate (m)							
		E	T1	T2	T3	S1	S2	Ground Layer <1 m	No.
<i>Casuarina cunninghamiana</i>	A			15	10			<i>Bacopa monnieri</i>	P
<i>Melaleuca trichostachya</i>	A				10	8	3	<i>Commelina diffusa</i>	U
<i>Corymbia tessellaris</i>	C		20	15	10			<i>Dichondra repens</i>	O
<i>Callistemon viminalis</i>	O						3	<i>Indigofera linnaei</i>	O
<i>Eucalytus tereticornis</i>	E	25	20	15				<i>Lobelia purpurascens</i>	O
								<i>Chrysopogon fallax</i>	O
								<i>Dactyloctenium radulans</i>	E
								<i>Potamogeton tricarinatus</i>	P
								<i>Oplismenus aemulus</i>	U
								<i>Sporobolus australasicus</i>	P
								<i>Tragus australianus</i>	P
								<i>Pseuderanthemum variabile</i>	U
								<i>Eremophila debilis</i>	P
								<i>Lomandra hystrix</i>	O
								<i>Persicaria strigosa</i>	O
								<i>Cyperus exaltatus</i>	U
								<i>Leersia hexandra</i>	P
							D	Dominant = >100	
Canopy stratum (70%)							A	Abundant = 50-100	
Mid stratum (20%)							C	Common = 20-50	
Ground stratum (95%)							O	Occasional = 10-20	
Rock cover (%)							U	Uncommon = 5 -10	
Bare ground cover (5%)							P	Present = 3-5	
Litter cover (%)							R	Rare = 1-3	

Relative Numbers within stratum (D = dominant; A = Abundant C = Common; O = Occasional; U = Uncommon; Present R = Rare)

Strata: E = Emergent; T1-3 = Tree strata 1-3; S1-2 = Shrub strata 1-2; G = Ground stratum

Scheduled flora possibilities: No

Additional notes on pest plants **Lantana camara*
**Ruellia tweediana*
**Achyranthes aspera*
**Asclepias curassavica*
**Cryptostegia grandiflora*
**Cyperus flavescens*

Weed Cover (%): <5

Disturbance (% of site affected): 0,

Health: Degraded

Slope: Creek banks Open depression

Soils: Surface observation Reliability: Low,

Soil Colour: brown;

Soil Texture: sandy loam; stony;

Particular sensitivities to proposed impacts (incl. fragmentation):Erosion

Special conservation significance:.....

Other notes such as Health, Condition:

Comments

Job Number: Main Line

Photo #: 85-88

	RE code	EPBC status	VMA status
DNRW RE map	11.12.6/11.12.1		Not of Concern/Not of Concern
Survey result	11.12.6/11.12.1		Not of Concern/Not of Concern

All woody species present within 50m x 10m plot (plus dominant and EVR non-woody species)

[illegible]

Strata: E = Emergent; T1-3 = Tree strata 1-3; S1-2 = Shrub strata 1-2; G = Ground stratum

Scheduled flora possibilities: Yes *Cycas megacarpa* (Photo and sample to Herbarium)

Additional notes on pest plants

- **Bidens bipinnata*
- **Opuntia stricta v stricta*
- **Opuntia tomentosa*
- **Melinis repens*
- **Lantana camara*
- **Lantana montevidensis*

Weed Cover (%): <5

Disturbance (% of site affected): 0,

Health: Average

Slope: Crest; Ridge; Soils: Surface observation Reliability: Low,

Soil Colour: brown

Soil Texture: clay; clay loam; silty loam; loam; sandy loam; sand; stony; silty clay; sandy clay; silty clay loam; sandy clay loam; loam sand

Particular sensitivities to proposed impacts (incl. fragmentation):.....

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Special conservation significance:.....

Other notes such as Health, Condition:

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Comments

Tertiary Site Vegetation Assessment Data Sheet

Job Number: Main Line

Site Number: M55

KP: Assessor: Ann Moran

Date : 3/04/2009

Location: Coal Road Ridgeline down to Dawson Highway

Photo #:88-91

Projection: UTM Datum: GDA94; Zone: 56 Easting: 267644 Northing: 7320444

	RE code	EPBC status	VMA status
DNRW RE map	Non-remnant		
Survey result	11.12.6/11.12.1		Not of Concern/Not of Concern

Canopy stratum form: Tree; Canopy Crown Cover: 70%

Canopy Median Height: 20m Structural Code: Woodland

All woody species present within 100m x 10m plot (plus dominant and EVR non-woody species)

Name	Rel. No.	Height Ocular estimate (m)							No.
		E	T1	T2	T3	S1	S2	Ground Layer <1 m	
<i>Acacia glaucocarpa</i>	U					6		<i>Desmodium rhytidophyllum</i>	O
<i>Corymbia citriodora</i>	C		20	15				<i>Hardenbergia violacea</i>	U
<i>Eucalyptus crebra</i>	C			15				<i>Arundinella nepalensis</i>	E
<i>Eucalyptus melanophloia</i>	O			15				<i>Cymbopogon refractus</i>	P
<i>Alphitonia excelsa</i>	U						2	<i>Enneapogon nigricans</i>	C
<i>Psydrax odorata</i>	P				10			<i>Eragrostis elongata</i>	U
<i>Exocarpos cupressiformis</i>	O					6	2	<i>Eremochloa bimaculata</i>	O
<i>Cassinia laevis</i>	E						2	<i>Themeda triandra</i>	U
<i>Cycas megacarpa</i>	R						2	<i>Cyanthillium cinereum</i>	U
<i>Jacksonia scoparia</i>	U						2	<i>Eremophila debilis</i>	U
<i>Tephrosia filipes</i>	O						1	<i>Eustrephus latifolius</i>	U
<i>Acacia decora</i>	O						2	<i>Cycas megacarpa</i>	R
<i>Breynia oblongifolia</i>	O						1		
<i>Bursaria incana</i>	P					6			
							D	Dominant = >100	
Canopy stratum (70%)							A	Abundant = 50-100	
Mid stratum (10%)							C	Common = 20-50	
Ground stratum (75%)							O	Occasional = 10-20	
Rock cover (15%)							U	Uncommon = 5 -10	
Bare ground cover (10%)							P	Present = 3-5	
Litter cover (%)							R	Rare = 1-3	

Relative Numbers within stratum (D = dominant; A = Abundant C = Common; O = Occasional; U = Uncommon; Present R = Rare)

Strata: E = Emergent; T1-3 = Tree strata 1-3; S1-2 = Shrub strata 1-2; G = Ground stratum

Scheduled flora possibilities: Yes *Cycas megacarpa*: 1 adult, 2 juvenile

Additional notes on pest plants

- **Achyranthes aspera*
- **Alternanthera pungens*
- **Gomphocarpus physocarpus*
- **Emilia sonchifolia* v
- **Opuntia stricta* v *stricta*
- **Chamaesyce hirta*
- **Stylosanthes humilis*
- **Urochloa mosambicensis*
- **Portulaca pilosa*
- **Lantana camara*
- **Lantana montevidensis*
- **Malvastrum americanum*

Weed Cover (%): <5

Disturbance (% of site affected): 0,

Health: Degraded

Slope: Crest; Ridge; **Soils:** Surface observation **Reliability:** Low,

Soil Colour: brown;

Soil Texture: stony; silty clay;

Particular sensitivities to proposed impacts (incl. fragmentation): Erosion down the cliff side and Sunday Creek crossing

Special conservation significance: SEVT at creek possible EVR species

Other notes such as Health, Condition:

Comments Pipeline goes through the middle of the creek in some sections

Tertiary Site Vegetation Assessment Data Sheet

Job Number: Main Line

Site Number: M56 KP: Assessor: Ann

Date : 3/04/2009

Location: Cattle Yards

Photo #:98-100

Projection: UTM Datum: GDA94; Zone: 56 Easting: 267449 Northing: 7314517

	RE code	EPBC status	VMA status
DNRW RE map	11.3.4/11.3.25/11.3.6		Of Concern/Not of Concern/Not of Concern
Survey result	11.3.6		Not of Concern

Canopy stratum form: Tree; Canopy Crown Cover: 70%

Canopy Median Height: 20m Structural Code: Woodland

All woody species present within 100m x 10m plot (plus dominant and EVR non-woody species)

Name	Rel. No.	Height							No.
		Ocular estimate (m)							
		E	T1	T2	T3	S1	S2	Ground Layer <1 m	
<i>Casuarina cunninghamiana</i>	E				8		2	<i>Aristida benthamii</i>	O
<i>Corymbia erythrophloia</i>	P				10			<i>Aristida latifolia</i>	O
<i>Corymbia tessellaris</i>	O			15				<i>Dichanthium sericeum ssp</i>	U
<i>Eucalyptus melanophloia</i>	A		20	15			20	<i>Enteropogon acicularis</i>	O
<i>Eucalyptus tereticornis</i>	C	30	20	15			2	<i>Eragrostis elongata</i>	U
<i>Acacia decora</i>							2	<i>Pterocaulon redolens</i>	O
<i>Melaleuca liniarifolia</i>					8	4	2	<i>Wahlenbergia gracilis</i>	P
<i>Callistemon viminalis</i>						4		<i>Cyperus gracilis</i>	P
								<i>Sida subspicata</i>	C
							D	Dominant = >100	
Canopy stratum (70%)							A	Abundant = 50-100	
Mid stratum (30%)							C	Common = 20-50	
Ground stratum (80%)							O	Occasional = 10-20	
Rock cover (10%)							U	Uncommon = 5 -10	
Bare ground cover (10%)							P	Present = 3-5	
Litter cover (%)							R	Rare = 1-3	

Relative Numbers within stratum (D = dominant; A = Abundant C = Common; O = Occasional; U = Uncommon; Present R = Rare)

Strata: E = Emergent; T1-3 = Tree strata 1-3; S1-2 = Shrub strata 1-2; G = Ground stratum

Scheduled flora possibilities: No

Additional notes on pest plants

- **Achyranthes aspera*
- **Alternanthera pungens*
- **Gomphocarpus physocarpus*
- **Emilia sonchifolia*
- **Opuntia stricta* v *stricta*
- **Chamaesyce hirta*
- **Stylosanthes humilis*
- **Urochloa mosambicensis*
- **Portulaca pilosa*
- **Lantana camara*

Weed Cover (%): <5

Disturbance (% of site affected): 0,

Health: Average

Slope: Flood plains; **Soils:** Surface observation **Reliability:** Low,

Soil Colour: brown;

Soil Texture: Sandy

Particular sensitivities to proposed impacts (incl. fragmentation): Erosion

Special conservation significance: Fauna habitat excellent

Other notes such as Health, Condition: Good

Comments Three enormous 30m Eucalyptus tereticornis (habitat to many animals on alignment

Tertiary Site Vegetation Assessment Data Sheet

Job Number: Main Line

Site Number: M57 KP: Assessor: Ann

Date : 3/04/2009

Location: National Trail

Photo #:92-95

Projection: UTM Datum: GDA94; Zone: 56 Easting: 266205 Northing: 7318807

	RE code	EPBC status	VMA status
DNRW RE map	11.11.15/11.11.4		Not of Concern/Not of Concern
Survey result	11.11.15/11.11.4		Not of Concern/Not of Concern

Canopy stratum form: Tree; Canopy Crown Cover: 70%

Canopy Median Height: 20m Structural Code: Woodland

All woody species present within 100m x 10m plot (plus dominant and EVR non-woody species)

Name	Rel. No.	Height							No.
		Ocular estimate (m)							
		E	T1	T2	T3	S1	S2	Ground Layer <1 m	
<i>Alyxia ruscifolia</i>	E						2	<i>Indigofera linnaei</i>	O
<i>Cycas megacarpa</i>	O					4	2	<i>Cheilanthes sieberi</i>	P
<i>Jacksonia scorparia</i>	U						2	<i>Aristida benthamii</i> v <i>benthamii</i>	O
<i>Lespedeza juncea</i> ssp <i>sericea</i>	O						2	<i>Heteropogon contortus</i>	O
<i>Acacia disparrima</i>	O					4	2	<i>Eremophila debilis</i>	P
<i>Acacia excelsa</i> ssp <i>excelsa</i>	O						2	<i>Evolvulus alsinoides</i> v <i>decumbens</i>	U
<i>Acacia salicina</i>	P					4		<i>Goodenia glabra</i>	U
<i>Atalaya hemiglauca</i>	P						2	<i>Vittadinia cuneata</i> v <i>hirsuta</i>	U
<i>Brachychiton populneus</i> ssp <i>trilobus</i>	R				8			<i>Exocarpos cupressiformis</i>	O
<i>Corymbia erythrophloia</i>	O		15					<i>Cyperus gracilis</i>	U
<i>Erythrina vespertilio</i>	E			10		4			
<i>Eucalyptus crebra</i>	C		15						
<i>Eucalyptus melanophloia</i>	C		15						
<i>Jasminum didymum</i> ssp <i>racemosum</i>	P						1		
<i>Jasminum simplicifolium</i> ssp <i>australiense</i>	P						1		
							D	Dominant = >100	
Canopy stratum (70%)							A	Abundant = 50-100	
Mid stratum (10%)							C	Common = 20-50	
Ground stratum (75%)							O	Occasional = 10-20	
Rock cover (15%)							U	Uncommon = 5 -10	
Bare ground cover (10%)							P	Present = 3-5	
Litter cover (%)							R	Rare = 1-3	

Relative Numbers within stratum (D = dominant; A = Abundant C = Common; O = Occasional; U = Uncommon; Present R = Rare)

Strata: E = Emergent; T1-3 = Tree strata 1-3; S1-2 = Shrub strata 1-2; G = Ground stratum

Scheduled flora possibilities: Yes *Cycas megacarpa*: 4 adults and 30 juveniles

Additional notes on pest plants

- **Achyranthes aspera*
- **Alternanthera pungens*
- **Gomphocarpus physocarpus*
- **Emilia sonchifolia* v
- **Opuntia stricta* v *stricta*
- **Chamaesyce hirta*
- **Stylosanthes humilis*
- **Urochloa mosambicensis*
- **Portulaca pilosa*
- **Lantana camara*
- **Lantana montevidensis*

Weed Cover (%): <5

Disturbance (% of site affected): 0,

Health: Degraded

Slope: Crest; Ridge; **Soils:** Surface observation **Reliability:** Low,

Soil Colour: brown;

Soil Texture: stony; silty clay;

Particular sensitivities to proposed impacts (incl. fragmentation): Erosion down the cliff side and Sunday Creek crossing

Special conservation significance: SEVT at creek, could possibly provide habitat for EVR species

Other notes such as Health, Condition:

Comments Pipeline goes through the middle of the creek in some sections

Tertiary Site Vegetation Assessment Data Sheet

Job Number:

Site Number: M58 KP: Assessor: Martin / Ann

Date : 12/02/2009

Location: Lairds Point (Pipe and Roads)

GPS Lat-Long; Datum: GDA94; Zone: 56 Latitude: 23.44.89.77 Longitude: 151.10.50.33

	RE code	EPBC status	VMA status
DNRW RE map	12.11.6/12.11.14		Not of Concern / Of concern
Survey result	12.11.14		Of Concern

Canopy stratum form: Tree; Canopy Crown Cover: 70%
Canopy Median Height: 18m. Structural Code:Woodland

All woody species present within 50m x 10m plot (plus dominant and EVR non-woody species)

Name	Rel. No.	Height Ocular estimate (m)						Ground Cover	
		E	T1	T2	T3	S1	S2	Ground Layer <1m	No.
<i>Eucalyptus crebra</i>	C		18	15	8			<i>Phyllanthus virgatus</i>	C
<i>Eucalyptus exserta</i>	C			15	8			<i>Boerhavia sp</i>	E
<i>Alphitonia excelsa</i>	E						2	<i>Digitaria ammophila</i>	E
<i>Acacia leiocalyx ssp leiocalyx</i>	O						2	<i>Enneapogon nigricans</i>	E
<i>Dodonaea viscosa ssp spatulata</i>	O						2	<i>Eriochloa procera</i>	E
<i>Corymbia clarksoniana</i>	P		18					<i>Perotis rara</i>	E
<i>Pogonolobus reticulatus</i>	P						2	<i>Tephrosia filipes</i>	E
<i>Psydrax attenuata forma attenuata</i>	P						2	<i>Chrysopogon sylvaticus</i>	O
<i>Acacia disparrima ssp disparrima</i>	C					5		<i>Cymbopogon refractus</i>	O
<i>Clerodendrum floribundum</i>	O						1	<i>Cyanthillium cinereum</i>	O
<i>Petalostigma pubescens</i>	P					5		<i>Cyperus gracilis</i>	O
								<i>Scleria mackaviensis</i>	O
								<i>Desmodium rhytidophyllum</i>	P
								<i>Glycine clandestina</i>	P
								<i>Eustrephus latifolius</i>	P
								<i>Capparis canescens</i>	R
								<i>Brunoniella acaulis ssp acaulis</i>	U
								<i>Crotalaria montana</i>	U
								<i>Zornia dyctiocarpa</i>	U
								<i>Hardenbergia violacea</i>	O
								<i>Sida subspicata</i>	O
								<i>Dianella brevipedunculata</i>	P
								<i>Dianella caerulea v caerulea</i>	P
								<i>Dianella longifolia v longifolia</i>	P
Canopy stratum 70%								<i>Breynia oblongifolia</i>	P
Mid stratum 20%								<i>Spermacoce spp</i>	P
Ground stratum 50%								<i>Pseuderanthemum variabile</i>	P
Rock cover 20%								<i>Commelina ensifolia</i>	P
Bare ground cover 10%								<i>Galactia tenuiflora</i>	O
Litter cover 20%									

Species annotations: C Collected * Exotic Species E = Edge or Outside but adjoining 50m x 10m plot

Relative Numbers within stratum (D = dominant; A = Abundant C = Common; O = Occasional; U = Uncommon; P =Present R = Rare)

Strata: E = Emergent; T1-3 = Tree strata 1-3; S1-2 = Shrub strata 1-2; G = Ground stratum

Scheduled flora possibilities: No

Additional notes on pest plants

Achyranthes aspera (Chaff Weed), *Gomphocarpus physocarpus* (Balloon Weed), *Emilia sonchifolia*
Opuntia stricta, *Opuntia tomentosa*
Sida cordifolia, *Passiflora suberosa*

	Description	Plants per plot
D	Dominant	>100
A	Abundant	50 - 100
C	Common	20 - 50
O	Occasional	10 - 20
U	Uncommon	5 - 10
P	Present	3 - 5
R	Rare	1 - 3

Weed Cover (%): <5 ;

Disturbance (% of site affected): 0,

Health: Average

Slope: Hillock;

Soils: Surface observation **Reliability:** Low

Soil Colour: mottled;

Soil Texture: stony;



Particular sensitivities to proposed impacts;

Observation large number of Fabaceae in flower and butterflies

Special conservation significance:.....

Other notes such as Health, Condition: Dead trees found on site possibly due to hot fires

Tertiary Site Vegetation Assessment Data Sheet

Job Number:

Site Number: M59 KP: 52

Assessor: Martin/Ann Date : 12/02/2009

Location: Blue Gum Hill

Photo #: 4 taken

GPS Datum: GDA94; Zone: 56 Latitude: 23.448610 Longitude: 151.107398

	RE code	EPBC status	VMA status
DNRW RE map	12.11.6		Not of Concern
Survey result	12.11.6		Not of Concern

Canopy stratum form: Tree;

Canopy Crown Cover: 30%

Canopy Median Height: 18 m

Structural Code: Regrowth Woodland

All woody species present within 50m x 10m plot (plus dominant and EVR non-woody species)

Name	Rel. No.	Height Ocular estimate (m)						Ground Cover	
		E	T1	T2	T3	S1	S2	Ground Layer <1m	No.
<i>Eucalyptus tereticornis</i>	C		20		6		2	<i>Sida subspicata</i>	C
<i>Acacia crassa ssp crassa</i>	P						3	<i>Breynia oblongifolia</i>	C
<i>Alphitonia excelsa</i>	P						2	<i>Pogonolobus reticulatus</i>	P
<i>Corymbia clarksoniana</i>	P		18					<i>Eustrephus latifolius</i>	P
<i>Corymbia intermedia</i>	P			15				<i>Crotalaria medicaginea v neglecta</i>	P
<i>Eucalyptus crebra</i>	P		18	10				<i>Rhynchosia minima</i>	O
<i>Mallotus philippensis</i>	P					4		<i>Boerhavia spp</i>	U
<i>Livistona decora</i>	R				6			<i>Heteropogon contortus</i>	U
<i>Planchonia careya</i>	R					4		<i>Imperata cylindrica</i>	O
<i>Corymbia trachyphloia</i>	U			15				<i>Panicum decompositum</i>	P
<i>Acacia julifera ssp julifera</i>	A				6	4	2	<i>Paspalidium gausum</i>	P
<i>Acacia disparrima ssp disparrima</i>	C				7	4	2	<i>Cyanthillium cinereum</i>	O
<i>Acacia leiocalyx ssp leiocalyx</i>	C						3	<i>Euphorbia tannensis ssp eremophila</i>	P
<i>Pogonolobus reticulatus</i>	P						2	<i>Galactia tenuiflora</i>	P
								<i>Lomandra longifolia</i>	P
								<i>Dianella caerulea</i>	P
								<i>Grewia retusifolia</i>	U
								<i>Cyperus cyperoides</i>	P
								<i>Gahnia aspera</i>	O
								<i>Scleria mackaviensis</i>	O
								<i>Sida subspicata</i>	C
								<i>Jasminum simplicifolium ssp australiense</i>	O
Canopy stratum	30%								
Mid stratum	10%								
Shrub stratum	90%								
Ground stratum	40%								
Rock cover	20%								
Bare ground cover	10%								
Litter cover	30%								

Species annotations: C = Collected * Exotic Species ** Declared Species E = Edge or Outside but adjoining 50m x 10m plot Relative Numbers within stratum (D = dominant; A = Abundant C = Common; O = Occasional; U = Uncommon; P = Present R = Rare) Strata: E = Emergent; T1-3 = Tree strata 1-3; S1-2 = Shrub strata 1-2; G = Ground stratum\)

Scheduled flora possibilities: No

Additional notes on pest plants

Emilia sonchifolia, *Sigesbeckia orientalis*
Opuntia tomentosa, *Malvastrum coromandelianum*
Sida cordifolia, *Passiflora suberosa*, *Setaria sphacelata*
Urochloa mosambicensis, *Solanum americanum*

Weed Cover (%): 5-25 ;

Disturbance (% of site affected): <1;

Health: Degraded

Slope: Hillock;

Soils: Surface observation **Reliability:** Low,

Soil Colour: brown;

Soil Texture: stony;

	Description	Plants per plot
D	Dominant	>100
A	Abundant	50 - 100
C	Common	20 - 50
O	Occasional	10 - 20
U	Uncommon	5 - 10
P	Present	3 - 5
R	Rare	1 - 3



Thick wattle regrowth

Particular sensitivities to proposed impacts; Praxelis very invasive weed along most track which will spread there is a excellent educational fact sheet which will be need hand pull and spraying to control

Special conservation significance: No *Corymbia citriodora* at this site but other species within the Regional Ecosystem were present

Other notes such as Health, Condition: Dead trees and fallen timber, Large amount of growth due to fires

Job Number:

Site Number M60 Assessor: Martin Bennett & Sandrine Martinez Date : 20/02/2009

Location: Lemon Scented Hill (Lairds Point)

..... Photo #:2662-2663.

Projection: UTM Datum: GDA94; Zone: 56 Easting: 23.74805 ...Northing:151.180417

	RE code	EPBC status	VMA status
DNRW RE map	12.11.6		Not of concern
Survey result	12.11.6		Not of concern

Canopy stratum form: Tree; Shrub; Herb; Grass; Aquatic

Canopy Crown Cover:70%

Canopy Median Height: 20m.

Structural Code: .Woodland

All woody species present within 50m x 10m plot (plus dominant and EVR non-woody species)

[illegible]

Relative Numbers within stratum (D = dominant; A = Abundant C = Common; O = Occasional; U = Uncommon; Present R = Rare)

Strata: E = Emergent; T1-3 = Tree strata 1-3; S1-2 = Shrub strata 1-2; G = Ground stratum

Scheduled flora possibilities: No / Yes ...

Additional notes on pest plants: Passiflora suberosa

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Weed Cover (%): <5 ; 5-25 ; 25-50 ; >50

Disturbance (% of site affected): 0, <1; 1-5; >5

Health: Pristine / Excellent / Very Good / Good / Average / Degraded / Completely Degraded (almost without natives)

Slope: Crest; Ridge; Hillock; Simple slope; Upper slope; Mid slope; Lower slope; Flat; Open depression; Closed depression

Soils: Map; Cutting, Core; Surface observation **Reliability:** Low, Medium, High

Soil Colour: whitish; grayish; mottled; yellow; orange; brown; red; black; dark; grey; pale

Soil Texture: clay; clay loam; silty loam; loam; sandy loam; sand; stony; silty clay; sandy clay; silty clay loam; sandy clay loam; loam sand

Particular sensitivities to proposed impacts (incl. fragmentation): Some hollow bearing trees.....

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Special conservation significance:.....

Other notes such as Health, Condition: Good condition, although evidence of fires.

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Comments:

Currently used for Cattle grazing.

Job Number:

Site Number: M 61 KP: Assessor: Martin Bennett & Sandrine Martin Martinez Date : 20/02/2008

Location: Lemon Scented between hills

..... Photo #:2649-2650....

Projection: UTM Datum: GDA94; Zone: 56 Easting: 23.747247 ...Northing:151.184832

	RE code	EPBC status	VMA status
DNRW RE map	12.11.6		Not of concern
Survey result	12.11.6		Not of concern

Canopy stratum form: Tree; Shrub; Herb; Grass; Aquatic

Canopy Crown Cover: 70%

Canopy Median Height: 20m. Structural Code: Woodland

All woody species present within 50m x 10m plot (plus dominant and EVR non-woody species)

[illegible]

Relative Numbers within stratum (D = dominant; A = Abundant C = Common; O = Occasional; U = Uncommon; Present R = Rare)

Strata: E = Emergent; T1-3 = Tree strata 1-3; S1-2 = Shrub strata 1-2; G = Ground stratum

Scheduled flora possibilities: No / Yes ...

Additional notes on pest plants: NONE

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Weed Cover (%): <5 ; 5-25 ; 25-50 ; >50

Disturbance (% of site affected): 0, <1; 1-5; >5

Health: Pristine / Excellent / Very Good / Good / Average / Degraded / Completely Degraded (almost without natives)

Slope: Crest; Ridge; Hillock; Simple slope; Upper slope; Mid slope; Lower slope; Flat; Open depression; Closed depression

Soils: Map; Cutting, Core; Surface observation Reliability: Low, Medium, High

Soil Colour: whitish; grayish; mottled; yellow; orange; brown; red; black; dark; grey; pale

Soil Texture: clay; clay loam; silty loam; loam; sandy loam; sand; stony; silty clay; sandy clay; silty clay loam; sandy clay loam; loam sand

Particular sensitivities to proposed impacts (incl. fragmentation): Lots of Hollow bearing trees.....

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Special conservation significance:.....

Other notes such as Health, Condition: Good general condition, but thick regrowth due to fires.....

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Comments:

Currently Cattle grazed

Job Number: ...

Site Number: M 62 KP: Assessor: Martin Bennett & Sandrine Martinez Date : 20/02/2009

Location: Mixed Forest Photo #:2646-2647

Projection: UTM Datum: GDA94; Zone: 56 Easting: 23.747408 Northing:151.192315.....

	RE code	EPBC status	VMA status
DNRW RE map	12.3.7 / 12.3.11		Not of concern / Of concern
Survey result	12.3.11		Of concern

Canopy stratum form: **Tree**; Shrub; Herb; Grass; Aquatic

Canopy Crown Cover: 60%

Canopy Median Height: 20m. Structural Code: Woodland

All woody species present within 50m x 10m plot (plus dominant and EVR non-woody species)

[illegible]

Relative Numbers within stratum (D = dominant; A = Abundant C = Common; O = Occasional; U = Uncommon; Present R = Rare)

Strata: E = Emergent; T1-3 = Tree strata 1-3; S1-2 = Shrub strata 1-2; G = Ground stratum

Scheduled flora possibilities: No / Yes ...

Additional notes on pest plants: Passiflora suberosa

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Weed Cover (%): <5 ; 5-25 ; 25-50 ; >50

Disturbance (% of site affected): 0, <1; 1-5; >5

Health: Pristine / Excellent / Very Good / Good / Average / Degraded / Completely Degraded (almost without natives)

Slope: Crest; Ridge; Hillock; Simple slope; Upper slope; Mid slope; Lower slope; Flat; Open depression; Closed depression

Soils: Map; Cutting, Core; Surface observation **Reliability:** Low, Medium, High

Soil Colour: whitish; grayish; mottled; yellow; orange; brown; red; black; dark; grey; pale

Soil Texture: clay; clay loam; silty loam; loam; sandy loam; sand; stony; silty clay; sandy clay; silty clay loam; sandy clay loam; loam sand

Particular sensitivities to proposed impacts (incl. fragmentation):.....

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Special conservation significance:.....

Other notes such as Health, Condition: Some hollow bearing trees

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Comments:

Currently Cattle grazing

Job Number: ...

Site Number: M 63 KP: ... Assessor: Martin Bennett & Sandrine Martinez Date : 20/02/2009

Location: Lemon Scented 2 (Laird Point end)

..... Photo #: 2641-2642-2643

Projection: UTM Datum: GDA94; Zone: 56 Easting:23.748057 ... Northing:151.193958

	RE code	EPBC status	VMA status
DNRW RE map	12.11.6		Not of concern
Survey result	12.11.6		Not of concern

Canopy stratum form: **Tree**; Shrub; Herb; Grass; Aquatic

Canopy Crown Cover: 70%

Canopy Median Height: 20m. Structural Code: Woodland

All woody species present within 50m x 10m plot (plus dominant and EVR non-woody species)

Name	Rel. No.	Height Ocular estimate (m)							No.
		E	T1	T2	T3	S1	S2	Ground Layer <1 m	
Eucalyptus exerta	P		18	8	6			Aristida calycina	C
Corymbia citriodora	C		20	8		2		Cyanthillium cinereum	P
Lophostemon suaveolens	P			8				Lomandra confertifolia spp. pallida	P
Eucalyptus crebra	R			12				Lomandra filiformis	C
Acacia julifera	C				5	3	1	Eustrephus latifolius	P
Acacia disparrima	C				6	3	1	Brunoniella acaulis spp. acaulis	P
Pogonolobus reticulatus	C					2		Glycine tabacina	C
Alphitonia excelsa	P					2		Pterocaulon redolens	P
Acacia leiocalyx	C					3		Sida subspicata	P
								Heteropogon contortus	P
								Parsonsia straminea	P

Relative Numbers within stratum (D = dominant; A = Abundant C = Common; O = Occasional; U = Uncommon; Present R = Rare)

Strata: E = Emergent; T1-3 = Tree strata 1-3; S1-2 = Shrub strata 1-2; G = Ground stratum

Scheduled flora possibilities: No / Yes ...

Additional notes on pest plants: Sida rhombifolia

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Weed Cover (%): <5 ; 5-25 ; 25-50 ; >50

Disturbance (% of site affected): 0, <1; 1-5; >5

Health: Pristine / Excellent / Very Good / Good / Average / Degraded / Completely Degraded (almost without natives)

Slope: Crest; Ridge; Hillock; Simple slope; Upper slope; Mid slope; Lower slope; Flat; Open depression; Closed depression

Soils: Map; Cutting, Core; Surface observation Reliability: Low, Medium, High

Soil Colour: whitish; grayish; mottled; yellow; orange; brown; red; black; dark; grey; pale

Soil Texture: clay; clay loam; silty loam; loam; sandy loam; sand; stony; silty clay; sandy clay; silty clay loam; sandy clay loam; loam sand

Particular sensitivities to proposed impacts (incl. fragmentation):.....

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Special conservation significance:.....

Other notes such as Health, Condition: Fire affected, thick understorey

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Comments:

Currently Cattle grazing.

Job Number:

Site Number: M 64 KP: Assessor: Martin Bennett & Sandrine Martinez... Date : 20/02/2009

Location: Blue Gum Flat (Laird Point end)

..... Photo #.....

Projection: UTM Datum: GDA94; Zone: 56 Easting: 23.747777 ...Northing:151.199772

	RE code	EPBC status	VMA status
DNRW RE map	12.3.3/12.3.7		Endangered/Not of concern
Survey result	12.3.3		Endangered

Canopy stratum form: **Tree**; Shrub; Herb; Grass; Aquatic

Canopy Crown Cover: 60%

Canopy Median Height: 20m.

Structural Code: Woodland.....

All woody species present within 50m x 10m plot (plus dominant and EVR non-woody species)

[illegible]

Relative Numbers within stratum (D = dominant; A = Abundant C = Common; O = Occasional; U = Uncommon; Present R = Rare)

Strata: E = Emergent; T1-3 = Tree strata 1-3; S1-2 = Shrub strata 1-2; G = Ground stratum

Scheduled flora possibilities: No ...

Additional notes on pest plants *Passiflora suberosa*, *Gomphocarpus physocarpus*, *Asclepias curassavica*, *Praxelis clematidea*, *Cirsium vulgare*

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Weed Cover (%): <5 ; 5-25 ; 25-50 ; >50

Disturbance (% of site affected): 0, <1; 1-5; >5

Health: Pristine / Excellent / Very Good / Good / Average / Degraded / Completely Degraded (almost without natives)

Slope: Crest; Ridge; Hillock; Simple slope; Upper slope; Mid slope; Lower slope; Flat; Open depression; Closed depression

Soils: Map; Cutting, Core; Surface observation Reliability: Low, Medium, High

Soil Colour: whitish; grayish; mottled; yellow; orange; brown; red; black; dark; grey; pale

Soil Texture: clay; clay loam; silty loam; loam; sandy loam; sand; stony; silty clay; sandy clay; silty clay loam; sandy clay loam; loam sand

Particular sensitivities to proposed impacts (incl. fragmentation): Some hollow bearing trees.....

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Special conservation significance:.....

Other notes such as Health, Condition: Average condition, Evidence of fires, thick understorey.....

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Comments:

Currently used for Cattle grazing

Job Number:

Site Number: M 65 KP: Assessor: Martin Bennett & Sandrine Martinez Date : 21/02/2009

Location: Alternate Route (besides creek)

..... Photo #:2684-2685.....

Projection: UTM Datum: GDA94; Zone: 56 Easting: 23.761447 Northing:151.208122

	RE code	EPBC status	VMA status
DNRW RE map	12.11.6		Not of concern
Survey result	12.11.6		Not of concern

Canopy stratum form: **Tree**; Shrub; Herb; Grass; Aquatic

Canopy Crown Cover: 70%

Canopy Median Height: 25m.

Structural Code: Woodland

All woody species present within 50m x 10m plot (plus dominant and EVR non-woody species)

Name	Rel. No.	Height Ocular estimate (m)							
		E	T1	T2	T3	S1	S2	Ground Layer <1 m	No.
Eucalyptus tereticornis	P	25						Sida subspicata	c
Corymbia citriodora	P	20						Oplismenus aemulus	c
Eucalyptus crebra	P	20						Capillipedium spicigerum	p
Corymbia clarksoniana	P		18					Lomandra longifolia	p
Corymbia trachyphloia	R		18					Oxalis sp.	c
Lophostemon suaveolens	P		15	8		2			
Planchonia careya	P					2			
Alphitonia excelsa	P					2	1		
Mallotus philippensis	P				6	2	1		
Acacia disparrima	C				5	2	1		
Glochidion lobocarpum	C				5	2			
							D	Dominant = >100	
Canopy stratum (70%)							A	Abundant = 50-100	
Mid stratum 30(%)							C	Common = 20-50	
Ground stratum (%)							O	Occasional = 10-20	
Rock cover 10(%)							U	Uncommon = 5 -10	
Bare ground cover 5(%)							P	Present = 3-5	
Litter cover 85(%)							R	Rare = 1-3	

Relative Numbers within stratum (D = dominant; A = Abundant C = Common; O = Occasional; U = Uncommon; Present R = Rare)
Strata: E = Emergent; T1-3 = Tree strata 1-3; S1-2 = Shrub strata 1-2; G = Ground stratum

Scheduled flora possibilities: No...

Additional notes on pest plants: *Passiflora suberosa*, *Urena lobata*, *Praxelis clematidea*, *Bidens pilosa*, *Sida rhombifolia*, *Lantana camara*.

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Weed Cover (%): <5 ; 5-25 ; 25-50 ; >50

Disturbance (% of site affected): 0, <1; 1-5; >5

Health: Pristine / Excellent / Very Good / Good / Average / Degraded / Completely Degraded (almost without natives)

Slope: Crest; Ridge; Hillock; Simple slope; Upper slope; Mid slope; Lower slope; Flat; Open depression; Closed depression

Soils: Map; Cutting, Core; Surface observation **Reliability:** Low, Medium, High

Soil Colour: whitish; grayish; mottled; yellow; orange; brown; red; black; dark; grey; pale

Soil Texture: clay; clay loam; silty loam; loam; sandy loam; sand; stony; silty clay; sandy clay; silty clay loam; sandy clay loam; loam sand

Particular sensitivities to proposed impacts (incl. fragmentation): Large old trees with hollows.....

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Special conservation significance:.....

Other notes such as Health, Condition: Average condition, fires have caused thick understorey of wattles. Very wet ground.

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Comments:
Currently used for Cattle grazing.

Job Number:

Site Number: M 66 KP: Assessor: Martin Bennett & Sandrine Martinez Date : 21/02/2009

Location: Alternate Route end..... Photo #:2695-2696.....

Projection: UTM Datum: GDA94; Zone: 56 Easting:23.764453 ...Northing:151.205462

	RE code	EPBC status	VMA status
DNRW RE map	12.3.3/12.3.7		Endangered / Not of Concern
Survey result	12.3.3		Endangered

Canopy stratum form: **Tree**; Shrub; Herb; Grass; Aquatic

Canopy Crown Cover: 70%

Canopy Median Height: 20m.

Structural Code: Woodland

All woody species present within 50m x 10m plot (plus dominant and EVR non-woody species)

Name	Rel. No.	Height Ocular estimate (m)							No.
		E	T1	T2	T3	S1	S2	Ground Layer <1 m	
Lophostemon suaveolens	C		15		6	2	1	Bothriochloa decipiens	C
Eucalyptus tereticornis	P		20					Capillipedium spicigerum	P
Eucalyptus crebra	P		20					Cyperus gracilis	C
Corymbia citriodora	P		20			2		Glycine tabacina	P
Eucalyptus exerta	P			10				Galactia tenuiflora	P
Corymbia clarksoniana	P			10	6			Imperata cylindrica	C
Planchonia careya	P					2	1	Cymbopogon refractus	P
Acacia julifera	C					3			
Mallotus philippensis	P				6	2	1		
Acacia disparrima	C					2			
Tephrosia filipes	P						1		
							D	Dominant = >100	
Canopy stratum 70(%)							A	Abundant = 50-100	
Mid stratum 30(%)							C	Common = 20-50	
Ground stratum 15(%)							O	Occasional = 10-20	
Rock cover 0(%)							U	Uncommon = 5 -10	
Bare ground over 15(%)							P	Present = 3-5	
Litter cover 70(%)							R	Rare = 1-3	

Relative Numbers within stratum (D = dominant; A = Abundant C = Common; O = Occasional; U = Uncommon; Present R = Rare)

Strata: E = Emergent; T1-3 = Tree strata 1-3; S1-2 = Shrub strata 1-2; G = Ground stratum

Scheduled flora possibilities: No ...

Additional notes on pest plants: *Gomphocarpus physocarpus*, *Urena lobata*

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Weed Cover (%): <5 ; 5-25 ; 25-50 ; >50

Disturbance (% of site affected): 0, <1; 1-5; >5

Health: Pristine / Excellent / Very Good / Good / Average / Degraded / Completely Degraded (almost without natives)

Slope: Crest; Ridge; Hillock; Simple slope; Upper slope; Mid slope; Lower slope; Flat; Open depression; Closed depression

Soils: Map; Cutting, Core; Surface observation Reliability: Low, Medium, High

Soil Colour: whitish; grayish; mottled; yellow; orange; brown; red; black; dark; grey; pale

Soil Texture: clay; clay loam; silty loam; loam; sandy loam; sand; stony; silty clay; sandy clay; silty clay loam; sandy clay loam; loam sand

Particular sensitivities to proposed impacts (incl. fragmentation): Large amount of birdlife, parrots, Dollar birds, Kookaburras etc. Very swampy ground.....

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Special conservation significance:.....

Other notes such as Health, Condition: Average condition, quite a few hollows. Evidence of fires with thick undergrowth.

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Comments:

Currently used for Cattle grazing.

ATTACHMENT 4 - COMPLETE FLORA LIST

Species Name	Common Name	Option 1 Export Pipeline	UIC
<i>Abutilon andrewsianum</i>		M32,M35	
<i>Abutilon auritum</i>		M13,M20	
<i>Abutilon otocarpum</i>		M35	
<i>Abutilon oxycarpum</i>			
<i>Acacia amblygona</i>	Scrambling Wattle		
<i>Acacia bancroftiorum</i>	Bancroft's Wattle	M19	M42
<i>Acacia bidwillii</i>		M26,M28,M29	
<i>Acacia blakei ssp blakei</i>	Blake's Wattle	M3,M7	
<i>Acacia buxifolia</i>	Box-leaf Wattle		
<i>Acacia caroleae</i>		M7	
<i>Acacia chinchillensis</i>	Chinchilla Wattle		
<i>Acacia complanata</i>	Flat-stem Wattle		
<i>Acacia conferta</i>	Crowded-leaf Wattle	M1,M6,M13	
<i>Acacia crassa ssp crassa</i>	Curracabah	M5,M19	
<i>Acacia curranii</i>	Curran's Wattle		
<i>Acacia deanei ssp deanei</i>	Deanes Wattle	M1	
<i>Acacia debilis</i>	Wattle		
<i>Acacia decora</i>	Pretty Wattle	M17,M23,M26	M42
<i>Acacia disparrima ssp disparrima</i>		M39	
<i>Acacia everistii</i>	Wattle	M19	
<i>Acacia excelsa</i>	Ironwood	M11,M12,M14,16,	
<i>Acacia falcate</i>	Sickle Wattle	M31	
<i>Acacia falciformis</i>		M26	
<i>Acacia farnesiana*</i>		M17	
<i>Acacia fasciculifera</i>		M36	
<i>Acacia glaucocarpa</i>		M33,M34	
<i>Acacia hakeoides</i>	Western Hakea Wattle		
<i>Acacia harpophylla</i>		M4,M9,M10,M12,M14,M25,M31,M36,	
<i>Acacia implexa</i>		M40	
<i>Acacia ixiophylla</i>	Umbrella Wattle	M18	
<i>Acacia julifera ssp julifera</i>	Catkin Wattle	M5	
<i>Acacia juncifolia</i>	Rush-leaf Wattle	M10	
<i>Acacia leiocalyx ssp leiocalyx</i>	Early-flowering Wattle	M26	
<i>Acacia longispicata</i>	Wattle	M1,M13,18,20,22,	M42
<i>Acacia melvillei</i>	Yarran	M30	
<i>Acacia neriifolia</i>	Oleander Wattle		
<i>Acacia omalophylla</i>			
<i>Acacia pendula</i>	Weeping Myall		
<i>Acacia penninervis</i>	Mountain Hickory		
<i>Acacia podalyriifolia</i>		M13	
<i>Acacia salicina</i>	Sally Wattle	M25,M26,M19,M33	
<i>Acacia semilunata</i>		,M34,M37,M38	
<i>Acacia semirigida</i>		M2,M4	
<i>Acacia shirleyi</i>	Stony-ridge Wattle		
<i>Acacia sparsiflora</i>	Lancewood	M1,M4,M9	
<i>Acacia spectabilis</i>	Currawong		
<i>Acacia striatifolia</i>	Glory Wattle	M1	
<i>Acacia triptera</i>	Wattle		
<i>Acacia wardellii</i>	Spur-wing Wattle	M5	
	Vulnerable Wattle		M47

<i>Acalypha capillipes</i>		M36,M39	
<i>Adiantum aethiopicum</i>	Common Maidenhair		
<i>Aegiceras corniculatum</i>		M40,M41	
<i>Ajuga australis</i>		M33,M34	
<i>Alchornea ilicifolia</i>		M24,26	
<i>Alectryon connatus</i>		M36	
<i>Alectryon diversifolius</i>		M35,M36,M40	
<i>Alectryon oleifolius ssp oleifolius</i>		M11,M16,M31,M32,M40	
<i>Allocasuarina inophloia</i>	Thready-barked Sheoak	M6	
<i>Allocasuarina luehmannii</i>	Bull Oak	M2,M6,M9,M13,M20	M42
<i>Alloteropsis semialata</i>		M3,M12	
		M1,M5,M9,M10,M13,M20,M22,M26,M30,M35	
<i>Alphitonia excelsa</i>	Soapy or Red Ash		
<i>Alstonia constricta</i>	Bitter Bark Quinine Tree	M4,M13,M20,M35	
<i>Amyema cambagei</i>	Needle-leaved mistletoe		
<i>Amyema linophyllum</i>	Bulloak Mistletoe		
<i>Amyema quandang v quandang</i>			
<i>Ancistrachne uncinulata</i>		M4,M10,M14,M36	M42
<i>Angophora floribunda</i>		M1,M8,M11,M23	
<i>Angophora leiocarpa</i>	Smooth-barked Apple	M5,M6,M27,M38	M45
<i>Anthobolus leptomerioides</i>	Desert Broom Bush		
<i>Archidendropsis basaltica</i>		M11	
<i>Argemone ochroleuca*</i>		M17,M33,M34	
<i>Aristida benthamii v spinulifera</i>			
<i>Aristida calycina v calycina</i>		M6	
<i>Aristida caput-medusae</i>	Many Headed Wire-Grass	M1,M2,M4,M5,M12,M19,M20,M35	
<i>Aristida holathera v holathera</i>		M2,M4,M5,M8	
<i>Aristida inaequiglumis</i>	Feathertop Three-awn		
		M4,M13,M17,M20,M21,M22,M23,M31,M32,33,M34	
<i>Aristida latifolia</i>	White Spear-grass	M5	M45
<i>Aristida leptopoda</i>		M8	
<i>Aristida ramosa v ramosa</i>			
<i>Aristida vagans</i>			
<i>Arundinella nepalensis</i>		M35,M37	
<i>Asclepias curassavica*</i>		M37	
<i>Atalaya hemiglauc</i>		M26,M29	
<i>Atalaya salicifolia</i>		M36	
<i>Atriplex muelleri*</i>		M12	
<i>Austrostipa ramosissima</i>	Stout Bamboo Grass	M11,M14,M23,M24,M37	
<i>Avicennia marina ssp australasica</i>		M41	
<i>Babingtonia densifolia</i>	Cluster-leaf Myrtle		
<i>Babingtonia jucunda</i>	Rare Twiggy Myrtle	M5	
<i>Backhousia angustifolia</i>		M35	
<i>Bidens pilosa*</i>		M37	
<i>Boerhavia dominii*</i>		M12	
<i>Boronia bipinnata v bipinnata</i>	Rock Boronia	M3	M45
<i>Boronia glabra</i>	Sandstone Boronia		
<i>Boronia splendida</i>	Splendid Boronia		
<i>Bothriochloa bladhii</i>		M29,M33,M34,M37	
<i>Brachychiton australis</i>		M15,M17,M36,M38	
		M5,M20,M26,M35,36	
<i>Brachychiton populneus</i>			
<i>Brachychiton rupestris</i>		M4,M12,M14,M19,	

		M22,M36	
<i>Brachyscome microcarpa</i>	Bright Eyes		
<i>Brachyscome</i> sp		M13,M28	
<i>Bruguiera exaristata</i>		M41	
<i>Brunonia australis</i>	Blue Pincushion		
<i>Brunoniella acaulis</i>		M4	
<i>Brunoniella australis</i>	Blue Trumpet	M2M4,M9,M21,M2	
<i>Bryophyllum delagoense*</i>	Mother of Millions	8,M31,M39	M41
<i>Bryophyllum tubilforum</i>		M37	
<i>Bulbostylis barbata</i>		M5	
<i>Bursaria incana</i>		M10,M14,M36	
<i>Bursaria spinosa</i> sp <i>spinosa</i>		M7,M13,M26,M40	
<i>Cadellia pentastylis</i>		M36	
<i>Caladenia caerulea</i>	Blue Fingers	M3,M7	
<i>Caladenia carnea</i>	Pink Fingers		
<i>Caleana minor</i>	Small Duck Orchid		
<i>Callistemon viminalis</i>		M8,M24,M37,M39	
<i>Callitris endlicheri</i>	Black Cypress	M6	
		M2,M5,M6,M8,M11	
<i>Callitris glaucophylla</i>	White Cypress Pine	,M13,M15,M17,M1	
<i>Calochilus campestris</i>	Copper Beard-Orchid	8,M19	M45
<i>Calotis lappulacea</i>		M4,M8,M28	
<i>Calyptochloa gracillima</i>		M9,M13,M20	
<i>Calytrix gurlumundensis</i>	Yellow Fringed Myrtle		
<i>Calytrix longiflora</i>	Fringed Myrtle	M3,M7	
<i>Calytrix tetragona</i>	Common Fringed Myrtle		
<i>Capparis canescens</i>		M13	
<i>Capparis lasiantha</i>		M12,M17,M22,M35	
<i>Capparis loranthifolia</i>	Narrow-leafed Bumble		M41
<i>Capparis mitchellii</i>		M13	
<i>Capparis spinosa</i> v <i>nummularia</i>		M36	
<i>Cardiospermum halicacabum*</i>		M37	
<i>Carissa ovata</i>	Currant Bush	M10,M13,M20,M35	
<i>Carthamus lanatus*</i>		,M40	M42
<i>Cascabela thevetia*</i>		M33,M34	
<i>Cassia tomentella</i>		M39	
<i>Cassytha filiformis</i>		M36	
<i>Cassytha pubescens</i>		M3	
<i>Casuarina cristata</i>		M29	
<i>Casuarina cunninghamiana</i>		M10,M12,M35,M36	
		M24,M26,M37,M38	
		,M39	
<i>Cenchrus ciliaris*</i>		M11,M12,M13,M18	
<i>Ceriops tagal</i>		,M19,M25,M31,M3	
<i>Cheilanthes distans</i>		2,M35,M38,M40	
		M41	
	Bristly Cloak Fern	M1,M5	
<i>Cheilanthes sieberi</i>		M4,M8,M9,M13,M2	
<i>Cheilanthes tenuifolia</i>	Mulga Fern	0,M22,M36	M42
<i>Chenopodium murale*</i>	Rock Fern		
<i>Chorizema parviflorum</i>		M1	
	Eastern Flame Pea		
<i>Chrysocephalum apiculatum</i>		M1,M2,M8,M9,M17	
<i>Chrysopogon sylvaticus</i>		,M20,M23	
<i>Citrus glauca</i>		M8	
<i>Clerodendrum floribundum</i>	Inland Lime	M20	M41
<i>Commelina ensifolia</i>		M29	
		M8	

<i>Commersonia pedleyi</i>	Pink Commersonia		
<i>Corymbia bloxsomei</i>	Yellow Jacket	M1,M3	
<i>Corymbia citriodora ssp variegata</i>	Spotted Gum	M9,M18,M20	M42
<i>Corymbia clarksoniana</i>	Clarkson's Bloodwood	M1,M26,M26,M28,M29,M39	
<i>Corymbia erythrophloia</i>		M17,,M19,M21,M23,M26,M27,29,M40	
<i>Corymbia intermedia</i>		M35	
<i>Corymbia polycarpa</i>		M12,M24,M25,M26,M27,M28,M29,M31,M33,M34M38,M39	
<i>Corymbia tessellaris</i>	Moreton Bay Ash		
<i>Corymbia trachyphloia</i>	Brown Bloodwood		
<i>Crinum angustifolium</i>		M32	
<i>Crotalaria montana</i>		M8	
<i>Croton insularis</i>		M36	
<i>Croton phebaloides</i>		M36	
<i>Cryptandra armata</i>	Prickly Bitter Cryptandra		
<i>Cryptandra ciliata</i>	Rare Cryptandra		
<i>Cryptandra longistaminea</i>	New England Cryptandra		
<i>Cryptostegia grandiflora*</i>		M24,M30,M39	
		M5,M14,M22,M23,M24,M33,M34,M35,M39	
<i>Cyanthillium cinereum</i>		M8,,M31,M33,M34	
<i>Cymbidium canaliculatum</i>	Black Orchid	M13,M14,M20,M22,M30,M36,M39	
<i>Cymbopogon refractus</i>	Barbwire Grass	M24	
<i>Cynodon dactylon*</i>			
<i>Cyperus bifax</i>			
<i>Cyperus concinnus</i>			
<i>Cyperus gracilis</i>			
<i>Cyperus polystachyos</i>		M31,M35,M36,M39	M41
<i>Dampiera adpressa</i>	Bushy Dampiera		
<i>Dampiera discolor</i>	Fanflower		
<i>Dampiera stricta</i>	Wallum Dampiera	M6	
<i>Daviesia genistifolia</i>	Broom Bitter-pea		
<i>Daviesia ulicifolia</i>			M42
<i>Daviesia villifera</i>	Golden Pea		
<i>Denhamia pittosporoides</i>		M35	
<i>Desmodium brachypodum</i>	Large Ticktrefoil		
<i>Desmodium rhytidophyllum</i>		M8	
<i>Dianella brevipedunculata</i>	Clumping Flax Lily	M23	
<i>Dianella longifolia v longifolia</i>	Pale Flax Lily		
<i>Dianella rara</i>		M8	
<i>Dianella revoluta v revoluta</i>		M1,M2,M9,M13,M32,M36	
<i>Dianella sp</i>		M14	
<i>Dichanthium sericeum</i>		M13,M14,M17,M21,M23,M37	
<i>Digitaria divaricatissima</i>	Umbrella Grass		
<i>Dillwynia retorta</i>	Twisted Parrot Pea		
<i>Diospyros humilis</i>		M36,M40	
<i>Dipodium hamiltonianum</i>	Yellow Hyacinth Orchid		
<i>Dodonaea biloba</i>	Rare Hop-bush		
<i>Dodonaea boroniifolia</i>	Fern-leaf Hop-bush		
<i>Dodonaea macrossanii</i>	Inland Hop-bush		
<i>Dodonaea triangularis</i>	Fan Hop-bush	M7	
<i>Dodonaea vestita</i>	Hop-bush		

<i>Dodonaea viscosa ssp spatulata</i>	Sticky Hop-bush	M12,M13,M20,M35	
<i>Drosera auriculata</i>	Tall Sundew		
<i>Drosera binata</i>	Forked Sundew		
<i>Drosera burmanni</i>	Tropical Sundew		
<i>Drosera glanduligera</i>	Pimpernel Sundew		
<i>Drosera peltata</i>	Pale Sundew		
<i>Einadia hastata</i>		M30,M31,M32,M36	
<i>Einadia nutans ssp nutans</i>	Climbing Saltbush	M1	M41
<i>Emilia sonchifolia*</i>		M8	
<i>Enchylaena tomentosa</i>		M4,M9,M11,M12,M25,M40	
<i>Enchylaena tomentosa v glabra</i>	Ruby Saltbush		M41
<i>Enneapogon nigricans</i>		M1,M10	M42
<i>Enteropogon acicularis</i>		M13,M17,M35	
<i>Entolasia stricta</i>	Wiry Panic	M2,M4,M8,M13	
<i>Epaltes australis</i>		M20	
<i>Eragrostis cilianensis*</i>		M1,M21,M26,M30,M37,M39	
<i>Eragrostis elongata</i>	Clustered Love Grass	M2,	
<i>Eragrostis leptocarpa</i>			
<i>Eragrostis leptostachya</i>			
<i>Eragrostis sororia</i>	Love Grass	M39	
<i>Eremochloa bimaculata</i>		M2,M8,M14,M35	
<i>Eremophila debilis</i>	Winter Apple	M20,M30,M31,M39	
<i>Eremophila deserti</i>	Turkey Bush		
<i>Eremophila mitchellii</i>		M11,M12,M14,M16,M18,M35,M36,M40	
<i>Erythrina vespertilio</i>	False Sandalwood	M15M36,M37	
<i>Erythroxylum sp (Splityard Ck L Pedley 5360)</i>		M20,M35	
<i>Eucalyptus apothalassica</i>	Gum		
<i>Eucalyptus camaldulensis</i>	River Red Gum		
<i>Eucalyptus chloroclada</i>	Dirty Gum	M6	M45
<i>Eucalyptus coolabah</i>	Coolibah		
<i>Eucalyptus crebra</i>		M1,M2,M6,M12,M13,M15,M17,M18,M19,M20,M22,M23,M26,M27,M28,M29,M31,M35	
<i>Eucalyptus curtisii</i>	Plunkett Mallee		
<i>Eucalyptus exserta</i>	Qld Peppermint	M1,M3,M7	
<i>Eucalyptus fibrosa ssp nubilis</i>	Blue-top Ironbark		M45
<i>Eucalyptus fibrosa ssp nubilis</i>		M2,M4	
<i>Eucalyptus melanophloia</i>		M11,M14,M17,M19,M21,M23,M25,M26,M27,M28,M29,M31,M32,M35,M38,M39	
<i>Eucalyptus moluccana</i>		M18,M20,M22,M30,M35,M40	
<i>Eucalyptus populnea</i>	Bimble Box	M2,M8,M10,M11,M12,M14,M16,M21,M29,M31,M40	
<i>Eucalyptus sideroxylon</i>		M13	M42
<i>Eucalyptus tenuipes</i>	Narrow-leaved Mahogany		
<i>Eucalyptus tereticornis</i>	Qld Blue Gum	M6,M8,M11,M16,M23,M24,M25,M26,M28,M29,M31,M33	

<i>Euroschinus falcatus v falcatus</i>		,M34,M37	
<i>Eustrephus latifolius</i>		M15	
<i>Evolvulus alsinoides v</i>		M33,M34,M35,M39	
<i>decumbens</i>		M4,M9,M13,M23	
<i>Exocarpos cupressiformis</i>		M13,M26	
<i>Ficus opposita v opposita</i>		M26,M28,M29,M37	
<i>Fimbristylis bisumbellata</i>	Fringe-rush	M5,M8,M13,M30	
<i>Fimbristylis dichotoma</i>		M36	
<i>Flindersia australis</i>		M36	
<i>Flindersia collina</i>		M1,M5,M14,M28,M	
<i>Gahnia aspera</i>	Sword-sedge	30	M42,M45
		M4,M11,M12,M16,	
		M17,M19,M20,M22	
		,M25,M31,M32,M3	
		5	
<i>Geijera parviflora</i>		M32,M36	
<i>Geijera salicifolia</i>			
<i>Glycine clandestina v</i>			
<i>clandestina</i>		M23,M28,M37	
<i>Gomphocarpus physocarpus*</i>	Balloon Cotton	M26,M33,M34	
<i>Gomphrena celosioides*</i>	Soft Khaki Weed	M1,M23,M31	
<i>Goodenia boormanii</i>	Fan Flower		
		M4,M5,M9,M23,M3	
<i>Goodenia delicata</i>		6	
<i>Goodenia disperma</i>		M1	
<i>Goodenia glabra</i>	Smooth Goodenia		
<i>Goodenia paniculata</i>	Branched Goodenia		
<i>Goodenia rotundifolia</i>	Star Goodenia		
<i>Grevillea floribunda</i>	Seven Dwarfs Grevillea		
<i>Grevillea longistyla</i>	Elegant Grevillea		
<i>Grevillea striata</i>	Beefwood	M4,M17,M21,M26,	
<i>Grewia latifolia</i>		M29	
		M36	
<i>Grewia retusifolia</i>		M12,M22,M28,M35	
		,M40	
<i>Hakea leucoptera ssp</i>			
<i>leucoptera</i>	Silver Needlewood		
<i>Hakea lorea ssp lorea</i>	Corkwood	M13,M14,M21	
<i>Hakea purpurea</i>	Crimson Hakea	M3	
<i>Hakea tephrosperma</i>	Hooked Needlewood		
<i>Hardenbergia violacea</i>	False Sarsparilla		
<i>Hedychium coronarium</i>			
<i>Heteropogon contortus</i>	Bunch Speargrass	M8,M22,M23,M31,	
<i>Hibbertia acicularis</i>	Prickly Guinea Flower	M33,M34,M40	
<i>Hibbertia cistoidea</i>	Guinea Flower		
<i>Hibbertia stricta</i>	Erect Guinea Flower		
<i>Hibiscus heterophyllus ssp</i>			
<i>heterophyllus</i>		M26	
<i>Hibiscus sturtii v sturtii</i>	Sturts Hibiscus	M8,M13,M36	
<i>Homalocalyx polyandrus</i>	Homalocalyx	M3,M7	
<i>Homoranthus melanostictus</i>	Inland Mouse Plant	M3	
<i>Hovea lanceolata</i>	Lance-leaf Hovea		
<i>Hovea longipes</i>		M3,M13,M15,M40	
<i>Hoya australis ssp australis</i>		M36	
<i>Hybanthus enneaspermus</i>	Spade Flower		
<i>Hybanthus stellarioides</i>		M1,M8	
<i>Hyparrhenia rufa*</i>		M26,M28,M39	
<i>Hypoxis hygrometrica v</i>	Golden Weather Glass		

<i>villosisepala</i>		
<i>Imperata cylindrica</i>		M8,M37
<i>Indigofera australis v australis</i>	Austral Indigo	M36
<i>Indigofera linifolia</i>		M29
<i>Indigofera linnaei</i>		M29
<i>Isoetopsis graminifolia</i>	Grass Cushions	
	Turner's or Miles	
<i>Jacksonia rhadinoclona</i>	Dogwood	
<i>Jacksonia scoparia</i>	Broome	M6
<i>Jacksonia stackhousii</i>	Wallum Dogwood	
<i>Jasminum didymum ssp</i>		
<i>didymum</i>		
<i>Jasminum didymum ssp</i>		
<i>racemosum</i>		M35
<i>Jasminum simplicifolium ssp</i>		
<i>australiense</i>		M35
<i>Juncus planifolius</i>		
<i>Juncus usitatus</i>		M37
<i>Korthalsella taenioides</i>	Ribbon-semmed Mistletoe	
<i>Kunzea opposita</i>	Mauve Flowered Kunzea	
<i>Lactuca serriola*</i>		M37
		M24,M28,M29,M37
<i>Lantana camara*</i>		,M39,M40
<i>Lantana montevidensis*</i>		M24,M39,M40
<i>Laxmannia gracilis</i>	Slender Wire-lily	M3,M5,M7,M8
<i>Leersia hexandra</i>		M37
<i>Leptochloa decipiens</i>	Slender Cane Grass	
<i>Leptochloa digitata</i>		
<i>Leptospermum polygalifolium</i>	Yellow Tea-tree	M8,M23
<i>Leucopogon biflorus</i>	Twin-flowered Heath	
<i>Leucopogon blakei</i>	Beard-heath	
<i>Leucopogon muticus</i>		M7
<i>Leucopogon pleiospermus</i>	Beard-heath	
<i>Lindernia alsinoides</i>		M3
<i>Lissanthe pluriloculata</i>	Lissanthe	
<i>Lobelia andrewsii</i>	Trailing Lobelia	
<i>Lomandra confertifolia ssp</i>		
<i>pallida</i>		M1
<i>Lomandra filiformis ssp</i>		
<i>filiformis</i>		M1
<i>Lomandra leucocephala</i>		M1,M8
		M8,M13,M22,M23,
		M29,M31,M35,M37
<i>Lomandra longifolia</i>		,M39
<i>Lomandra multiflora</i>	Many Flowered Matrush	
<i>Lomandra multiflora ssp</i>		
<i>multiflora</i>		M1
<i>Lophostemon suaveolens</i>		M30
<i>Lumnitzera racemosa</i>		M40
<i>Lysiana exocarpi ssp tenuis</i>	Harlequin Mistletoe	
<i>Lysicarpus angustifolius</i>	Tom Russell's Mahogany	M3,M7
<i>Lysiphyllum hookeri</i>		M25,M40
<i>Macfadyena unguis-cati*</i>		M24,M37,M38
<i>Macroptilium atropurpureum*</i>		M14,M28M37
		M4,M12,M13,M15,
		M19,M23,M31,M32
<i>Maireana microphylla</i>		,M33,M34,M35,
<i>Mallotus philippensis</i>		M39
<i>Malvastrum americanum*</i>		M14
<i>Marsilea hirsuta</i>		

<i>Maytenus cunninghamii</i>		M4,M12,M13,M35	
<i>Maytenus disperma</i>		M32	
<i>Megathyrsus maximus v pubiglumis</i>			
<i>Megathyrsus maximus v trichoglume*</i>		M1,M25,M33,M34,M38	
<i>Melaleuca bracteata</i>		M17,M24,M32,M35,M37,M38,M39,M40	
<i>Melaleuca fluviatilis</i>		M29,M37,M38	
<i>Melaleuca leucadendra</i>		M24	
<i>Melaleuca nervosa</i>		M30	
<i>Melaleuca nodosa</i>		M2,M3	
<i>Melaleuca thymifolia</i>	Thyme-leaved Paperbark		
<i>Melaleuca trichostachya</i>		M23,M33,M34	
<i>Melaleuca uncinata</i>	Broombush	M3	
<i>Melia azedarach</i>		M28,M29,M37,M38	
<i>Melichrus erubescens</i>	Ruby Urn Heath		
<i>Melichrus urceolatus</i>	Cream Urn heath		
<i>Melinis repens*</i>		M22,M36,M37,M38	
<i>Microlaena stipoides</i>		M12,M29	
<i>Micromyrtus albicans</i>	Heath-myrtle		
<i>Micromyrtus carinata</i>	Gurulmundi myrtle		
<i>Micromyrtus ciliata</i>	Fringed Heath-myrtle		
<i>Micromyrtus hexamera</i>			
<i>Micromyrtus patula</i>	Endangered Heath-myrtle		
<i>Micromyrtus sessilis</i>	Heath-myrtle	M3,M5,M7	
<i>Micromyrtus striata</i>			
<i>Mimulus gracilis</i>	Slender Monkey Flower		
<i>Mirbelia aotoides</i>	Northern Mirbelia		
<i>Mirbelia pungens</i>	Prickly Mirbelia		
<i>Myoporum acuminatum</i>		M11	
<i>Neptunia gracilis forma gracilis</i>		M28	
<i>Notelaea microcarpa</i>		M1,M35,M36,M40	
<i>Notelaea microcarpa v microcarpa</i>	Small-fruit Mock-olive		
<i>Nymphaea caerulea*</i>		M39	
<i>Nyssanthus erecta</i>	Nyssanthus		M41
<i>Nyssanthus erecta</i>		M35	
<i>Olearia canescens</i>	New England Daisy-bushes		
<i>Olearia ramosissima</i>	Moss Daisy-bushes		
<i>Opuntia stricta v stricta*</i>	Prickly Pear	M1	
		M1,M8,M13,M15,M17,M18,M19,M20,M28,M31,M37	
<i>Opuntia tomentosa*</i>	Velvety Tree Pear	M36	
<i>Owenia acidula</i>		M15	
<i>Owenia venosa</i>		M24	
<i>Oxalis corniculata*</i>	Creeping Oxalis	M1,M4,M5,M9,M10,M13	
<i>Oxalis exilis</i>			
<i>Ozothamnus diosmifolius</i>	Sago Flower		
<i>Ozothamnus diotophyllus</i>	Heath Everlasting		
<i>Panicum decompositum</i>		M1,M3,M8,M35	
<i>Panicum effusum v simile</i>		M9,M13,M23	
<i>Panicum subxerophilum</i>			
<i>Parsonsia eucalyptophylla</i>		M30	
<i>Parthenium hysterophorus*</i>		M24	
<i>Paspalidium caespitosum</i>		M1,M4,M13	
<i>Passiflora aurantia v aurantia</i>		M35	

<i>Passiflora suberosa*</i>		M30	
<i>Perotis rara</i>		M8	
<i>Petalostigma pubescens</i>	Hairy Quinine Tree	M12,M13,M15,M20	
<i>Phaius australis</i>		,M30,M39	
<i>Philotheca sporadica</i>	Vulnerable Waxflower	M29	
<i>Phragmites australis</i>	Common Reed		
<i>Phyllanthus maderaspatensis</i>		M4,M10	
<i>Phyllanthus virgatus</i>		M4,M8	
<i>Pimelea linifolia</i>	Common Rice-flower		
<i>Pimelea linifolia ssp collina</i>	Swamp Rice-flower		
<i>Pimelea linifolia ssp linifolia</i>		M14	
<i>Pimelea neoanglica</i>	Scanty Rice-flower		M42
<i>Pittosporum angustifolium</i>		M36	
<i>Platysace ericoides</i>	Platysace		
<i>Plectranthus parviflorus</i>		M3,M37	
<i>Pleiogynium timorens</i>		M15,M39,M40	
<i>Podolepis longipedata</i>	Tall Copper-wire Daisy	M1,M3,M8,M13,M17	
<i>Pogonolobus reticulatus</i>		M30	
<i>Polygala linariifolia</i>	Milkwort		
<i>Pomaderris queenslandica</i>	Qld Pomaderris		
<i>Pomax umbellata</i>	Pomax		
<i>Poranthera microphylla</i>		M3	
<i>Portulaca oleracea</i>	Common Pigweed	M31,M40	
<i>Portulaca pilosa*</i>		M39	
<i>Prostanthera aspalathoides</i>	Scarlet Mint Bush		
<i>Prostanthera euphrasioides</i>	Eye Bright Mint Bush		
<i>Prostanthera parvifolia</i>	Small-leaved Mint Bush		
<i>Prostanthera ringens</i>	Leichhardt's Mint Bush		
<i>Pseuderanthemum variabile</i>	Love Flower	M4,M12,M30,M40	
<i>Psydrax attenuata</i>		M4,M10,M20,M36	
<i>Psydrax odorata</i>		M10,M12,M13,M36	
<i>Psydrax oleifolia</i>	Myrtle Tree		
<i>Pterocaulon redolens</i>		M39	
<i>Pterocaulon sphacelatum</i>		M20	
<i>Pterostylis bicolor</i>	Midget Greenhood		
<i>Pultenaea microphylla</i>			
<i>Pultenaea petiolaris</i>	Small Rayed Bush-pea		
<i>Rhizophora stylosa</i>		M41	
<i>Rhynchosia minima</i>		M28	
<i>Ricinus communis*</i>		M24,M26	
<i>Rostellularia adscendens</i>	Pink Tongues	M1,M8,M12	
<i>Rubus parvifolius</i>		M29	
<i>Rulingia sp(Westmar L Pedley518)</i>	Kerrawang		
<i>Rutidosis lanata</i>	Endangered Wrinklewort		Qld Herbarium Records only
<i>Salsola kali*</i>		M15,M17,M23,M31	
<i>Santalum lanceolatum</i>	Plumbush	M37	
<i>Sarcostemma viminalis ssp australe</i>		M30,M36	
<i>Sarcostemma viminalis ssp brunonianum</i>			
<i>Schoenus apogon</i>	Fluke Bogrush		
<i>Scleria</i>			
<i>Scleria mackaviensis</i>		M14,M28	
<i>Scleria sphacelata</i>		M3	

<i>Sclerolaena glabra</i>		M1	
<i>Senecio amygdalifolius</i>		M36	
<i>Senna aciphylla</i>	Sprawling Cassia		
<i>Senna barclayana</i> *	Pepper-leaved Senna	M24,M37	
<i>Senna occidentalis</i>			
<i>Seringia corollata</i>	Kerauderenia		
<i>Sesbania brachycarpa</i>		M17,M33,M34	
<i>Sesbania cannabina</i>		M29	
<i>Setaria pumila ssp pallide-fusca</i>			
<i>Sida cordifolia</i> *		M4,M33,M34	
<i>Sida fibulifera</i>	Silver Sida		
<i>Sida rhombifolia</i> *		M13,M23,M33,M34	
<i>Sida rohlenae ssp rohlenae</i>		M5,M17	
<i>Sida spinosa</i> *	Spiny Sida		
<i>Sida subspicata</i>		M1,M23,M26,M32,	
<i>Sida trichopoda</i>	Qld Hemp	M37	M42
<i>Solanum americanum</i> *		M26	
<i>Solanum esuriale</i>		M4,M8,	
<i>Solanum jucundum</i>	Nightshade		
<i>Solanum nemophilum</i>		M1,M5,M8,M9,M10	
<i>Sonchus oleraceus</i> *	Forest Nightshade	,M31,M35	M42
<i>Sporobolus fertilis</i>		M8,M33,M34	
<i>Sporobolus virginicus</i>			
<i>Stackhousia viminea</i>		M41	
<i>Sterculia quadrifida</i>		M4,M13	
		M36	
<i>Stylidium eglandulosum</i>	Woolly-stemmed		
<i>Stylosanthes humilis</i> *	Triggerplant		
<i>Suaeda arbusculoides</i>		M26,M28,M30	
<i>Themeda avenacea</i>		M41	
		M12,M14,M21,M32	
<i>Themeda triandra</i>	Kangaroo Grass	M1,M4,M6,M14,23,	
		M30,M33,M34	
<i>Thyridolepis mitchelliana</i>		M2,M4,M5,M7,M9,	
<i>Trachymene ochracea</i>		M36	
<i>Tragus australianus</i>	White Parsnip		
<i>Trema tomentosa v viridis</i>		M24	
<i>Tricoryne elatior</i>	Poison Peach		
<i>Tridax procumbens</i> *		M1,M8,M9	
<i>Triodia longiceps</i>		M37	
<i>Triodia scariosa</i>			M42
<i>Typha orientalis</i> *	Porcupine Grass	M3	
<i>Urochloa mosambicensis</i> *		M39	
<i>Urochloa mutica</i> *		M1	
<i>Velleia lyrata</i>		M29,M39	
<i>Velleia paradoxa</i>	Velleia		
<i>Ventilago viminalis</i>	Spur Velleia		
<i>Verbena tenuisecta</i> *	Vine Tree		
<i>Viscum articulatum</i>	Mayne's Pest		M42
<i>Vittadinia hispidula v hispidula</i>	Leafless Jointed Mistletoe		
<i>Wahlenbergia communis</i>		M13	
<i>Wahlenbergia gracilis</i>	Grass-leaf Bluebells	M5	
<i>Wahlenbergia graniticola</i>		M22,M23	
<i>Westringia cheelii</i>	Granite Bluebells	M33,M34	
<i>Wikstroemia indica</i>	Westringia		
<i>Wurmbea dioica ssp dioica</i>	Tie Bush		
<i>Xanthorrhoea johnsonii</i>	Early Nancy		
<i>Xylomelum cunninghamianum</i>	Forest Grass Tree	M3	
	Woody Pear		

<i>Zieria aspalathoides</i>	Whorled Heathy Zieria		
<i>Zieria sp (White Mt)</i>	White Mt Zieria		
<i>Zinnia peruviana*</i>		M26	
<i>Zornia dyctiocarpa v</i>			
<i>dyctiocarpa</i>		M8,M28	
<i>Zygophyllum apiculatum</i>			
<i>Abutilon andrewsianum</i>		M32,M35	UIC

**ATTACHMENT 5 – VEGETATION COMMUNITIES / RES WITHIN THE
PIPELINE ALIGNMENTS**

Attachment 5: Ecological Communities / REs Within the Pipeline Alignments

Ecological Communities / RE		Status*		Sites	Area within Option 1 (ha)	Area within Option 2 (ha)^	Area within Lateral (ha)	Area within UIC (ha)	Total Area (ha)
RE	Description	VM	EP BC						
11.1.2	<i>Samphire</i> forbland on marine clay plains	NOC			8.46	8.46			8.46
11.1.4	Mangrove forest/woodland on marine clay plains	NOC		M41, Q192	6.42	6.42			6.42
11.3.1	<i>Acacia harpophylla</i> and / or <i>Casuarina cristata</i> open forest on alluvial plains	E	E					0.96	0.96
11.3.2	<i>Eucalyptus populnea</i> woodland on alluvial plains	OC			1.46	1.48	5.54	48.63	55.65
11.3.3	<i>Eucalyptus coolabah</i> woodland on alluvial plains	OC					2.92	0.23	3.15
11.3.4	<i>Eucalyptus tereticornis</i> and/or <i>Eucalyptus</i> spp. tall woodland on alluvial plains	OC		M8, M29 M58, Q138, Q139 Q188	16.08	15.76		1.81	17.57
11.3.6	<i>Eucalyptus melanophloia</i> woodland on alluvial plains	NOC		M26, Q176	2.21	2.21			2.21
11.3.14	<i>Eucalyptus</i> spp., <i>Angophora</i> spp., <i>Callitris</i> spp. woodland on alluvial plains.	NOC		M6	7.02	7.02		3.17	10.19
11.3.17	<i>Eucalyptus populnea</i> woodland with <i>Acacia harpophylla</i> and/or <i>Casuarina cristata</i> on alluvial plains	OC						2.10	2.10
11.3.18	<i>Eucalyptus populnea</i> , <i>Callitris glaucophylla</i> , <i>Allocasuarina luehmannii</i> shrubby woodland on alluvium	NOC						3.57	3.57

Ecological Communities / RE		Status*		Sites	Area within Option 1 (ha)	Area within Option 2 (ha)^	Area within Lateral (ha)	Area within UIC (ha)	Total Area (ha)
RE	Description	VM	EP BC						
11.3.25	<i>Eucalyptus tereticornis</i> or <i>E. camaldulensis</i> woodland fringing drainage lines	NOC		M24, M25, M29, M30, M37, M39, M54, M55, M58, Q125, Q132, Q133, Q134, Q135, Q136, Q143, Q154,	13.25	11.03	2.12	33.48	46.63
11.3.26	<i>Eucalyptus moluccana</i> or <i>E. microcarpa</i> woodland to open forest on margins of alluvial plains	NOC			10.22	11.37		0.12	11.48
11.3.27	Freshwater wetlands	NOC			1.09	1.09			1.09
11.3.39	<i>Eucalyptus melanophloia</i> ± <i>E. chloroclada</i> woodland on undulating ,plains and valleys with sandy soils	NOC					0.35		0.35
11.4.3	<i>Acacia harpophylla</i> and/or <i>Casuarina cristata</i> shrubby open forest on Cainozoic clay plains	E	E	M40	3.31	3.31		1.83	5.14
11.5.1	<i>Eucalyptus crebra</i> , <i>Callitris glaucophylla</i> , <i>Angophora leiocarpa</i> , <i>Allocasuarina luehmannii</i> woodland on Cainozoic sand	NOC		Q75	10.30	67.39		237.79	305.18

Ecological Communities / RE		Status*		Sites	Area within Option 1 (ha)	Area within Option 2 (ha)^	Area within Lateral (ha)	Area within UIC (ha)	Total Area (ha)
RE	Description	VM	EP BC						
	plains/remnant surfaces								
11.5.4	<i>Eucalyptus crebra</i> , <i>Callitris glaucophylla</i> , <i>C. endlicheri</i> , <i>E. chloroclada</i> , <i>Angophora leiocarpa</i> on Cainozoic sand plains/remnant surfaces. Deep sands	NOC			9.70	16.37		22.59	38.97
11.5.5	<i>Eucalyptus melanophloia</i> , <i>Callitris glaucophylla</i> woodland on Cainozoic sand plains/remnant surfaces. Deep red sands	NOC						8.91	8.91
11.5.13	<i>Eucalyptus populnea</i> and/or <i>E. melanophloia</i> and/or <i>Corymbia clarksoniana</i> on Cainozoic sand plains/remnant surfaces	NOC				3.63			3.63
11.5.20	<i>Eucalyptus moluccana</i> and/or <i>E. microcarpa</i> / <i>E. pilligaensis</i> ± <i>E. crebra</i> woodland on Cainozoic sand plains	NOC				49.06		12.10	61.16
11.5.21	<i>Corymbia bloxsomei</i> ± <i>Callitris glaucophylla</i> ± <i>Eucalyptus crebra</i> ± <i>Angophora leiocarpa</i> woodland on Cainozoic sand	NOC			24.78	31.07			31.07

Ecological Communities / RE		Status*		Sites	Area within Option 1 (ha)	Area within Option 2 (ha)^	Area within Lateral (ha)	Area within UIC (ha)	Total Area (ha)
RE	Description	VM	EP BC						
	plains/remnant surfaces								
11.7.2	<i>Acacia</i> spp. woodland on Cainozoic lateritic duricrust. Scarp retreat zone	NOC			13.66	16.74		3.02	19.76
11.7.4	<i>Eucalyptus decorticans</i> and/or <i>Eucalyptus</i> spp., <i>Corymbia</i> spp., <i>Acacia</i> spp., <i>Lysicarpus angustifolius</i> on Cainozoic lateritic duricrust	NOC		M1, M2, M4, M	96.77	101.72		182.63	284.35
11.7.5	Shrubland on natural scalds on deeply weathered coarse-grained sedimentary rocks	NOC		M3, M7	7.78	12.69		15.46	28.15
11.7.6	<i>Corymbia citriodora</i> or <i>Eucalyptus crebra</i> woodland on Cainozoic lateritic duricrust	NOC		M9	25.06	63.04		60.83	123.86
11.7.7	<i>Eucalyptus fibrosa</i> subsp. <i>nubila</i> ± <i>Corymbia</i> spp. ± <i>Eucalyptus</i> spp. on Cainozoic lateritic duricrust	NOC		M5	22.83	26.47		116.11	142.58
11.8.4	<i>Eucalyptus melanophloia</i> woodland on Cainozoic igneous rocks. Hillsides	NOC		M27, M28, M35, Q177	1.08				0.00
11.9.1	<i>Acacia harpophylla</i> - <i>Eucalyptus cabbageana</i> open forest to woodland on fine-grained sedimentary rocks	E	E		0.39				0.00
11.9.2	<i>Eucalyptus melanophloia</i> ± <i>E.</i>	NOC					0.70		0.70

Ecological Communities / RE		Status*		Sites	Area within Option 1 (ha)	Area within Option 2 (ha)^	Area within Lateral (ha)	Area within UIC (ha)	Total Area (ha)
RE	Description	VM	EP BC						
	<i>orgadophila</i> woodland on fine-grained sedimentary rocks								
11.9.4	Semi-evergreen vine thicket or <i>Acacia harpophylla</i> with a semi-evergreen vine thicket understorey on fine grained sedimentary rocks	E	E		0.78	0.08	2.24		2.32
11.9.5	<i>Acacia harpophylla</i> and/or <i>Casuarina cristata</i> open forest on fine-grained sedimentary rocks	E	E	M10, Q152	8.18	3.28	0.89	4.14	8.31
11.9.6	<i>Acacia melvillei</i> ± <i>A. harpophylla</i> open forest on fine-grained sedimentary rocks	E	E		0.68				0.00
11.9.7	<i>Eucalyptus populnea</i> , <i>Eremophila mitchellii</i> shrubby woodland on fine-grained sedimentary rocks	OC		M11, M12, M16	11.26	6.85	0.70	12.85	20.40
11.9.10	<i>Acacia harpophylla</i> , <i>Eucalyptus populnea</i> open forest on fine-grained sedimentary rocks	OC			1.02	0.33	0.53	0.25	1.12
11.9.12	<i>Dichanthium sericeum</i> grassland with clumps of <i>Acacia harpophylla</i> on fine-grained	E	E		2.21				0.00

Ecological Communities / RE		Status*		Sites	Area within Option 1 (ha)	Area within Option 2 (ha)^	Area within Lateral (ha)	Area within UIC (ha)	Total Area (ha)
RE	Description	VM	EP BC						
	sedimentary rocks								
11.10.1	<i>Corymbia citriodora</i> open forest on coarse-grained sedimentary rocks	NOC			3.56		56.42	9.54	65.96
11.10.4	<i>Eucalyptus decorticans</i> , <i>Lysicarpus angustifolius</i> ± <i>Eucalyptus</i> spp., <i>Corymbia</i> spp., <i>Acacia</i> spp. woodland on coarse-grained sedimentary rocks. Crests and scarps	NOC				0.20			0.20
11.10.7	<i>Eucalyptus crebra</i> woodland on coarse-grained sedimentary rocks	NOC			4.29	0.80	22.72		23.52
11.10.9	<i>Callitris glaucophylla</i> woodland on coarse-grained sedimentary rocks	NOC		M14, M17, Q144	22.57	1.73	27.11		28.84
11.10.13	<i>Eucalyptus</i> spp. and/or <i>Corymbia</i> spp. open forest on scarps and sandstone tablelands	NOC		M13, Q145, Q180	27.17				0.00
11.11.3	<i>Corymbia citriodora</i> , <i>Eucalyptus crebra</i> , <i>E. acmenoides</i> open forest on old sedimentary rocks with varying degrees of metamorphism and folding. Coastal ranges	NOC			7.48	7.48			7.48
11.11.4	<i>Eucalyptus crebra</i> woodland on old sedimentary rocks	NOC		M51	0.65	0.65			0.65

Ecological Communities / RE		Status*		Sites	Area within Option 1 (ha)	Area within Option 2 (ha)^	Area within Lateral (ha)	Area within UIC (ha)	Total Area (ha)
RE	Description	VM	EP BC						
	with varying degrees of metamorphism and folding. Coastal ranges								
11.11.9	<i>Eucalyptus populnea</i> or <i>E. brownii</i> woodland on deformed and metamorphosed sediments and interbedded volcanics	NOC			0.66	0.66			0.66
11.11.15	<i>Eucalyptus crebra</i> woodland on deformed and metamorphosed sediments and interbedded volcanics. Undulating plains	NOC		Q124	23.27	33.42			33.42
11.11.18	Semi-evergreen vine thicket on old sedimentary rocks with varying degrees of metamorphism and folding. Lowlands	E	E	M53	0.15	0.15			0.15
11.12.1	<i>Eucalyptus crebra</i> woodland on igneous rocks	NOC		M19, M21, M32, M56, M57, Q160, Q169, Q199, Q204	52.99	16.78			16.78
11.12.2	<i>Eucalyptus melanophloia</i> woodland on igneous rocks	NOC		M15, M22	5.42	2.69			2.69
11.12.3	<i>Eucalyptus crebra</i> , <i>E. tereticornis</i> ,	NOC		Q141, Q168	0.32	0.32			0.32

Ecological Communities / RE		Status*		Sites	Area within Option 1 (ha)	Area within Option 2 (ha)^	Area within Lateral (ha)	Area within UIC (ha)	Total Area (ha)
RE	Description	VM	EP BC						
	<i>Angophora leiocarpa</i> woodland on igneous rocks especially granite								
11.12.4	Semi-evergreen vine thicket and microphyll vine forest on igneous rocks	NOC				0.72			0.72
11.12.6	<i>Corymbia citriodora</i> open forest on igneous rocks (granite)	NOC		M18, M56, M57, Q164	1.47	4.44			4.44
11.12.17	<i>Eucalyptus populnea</i> woodland on igneous rocks. Colluvial lower slopes	E			0.18				0.00
11.12.21	<i>Acacia harpophylla</i> open forest on igneous rocks. Colluvial lower slopes	E	E	Q165	1.21	0.01			0.01
12.3.3	<i>Eucalyptus tereticornis</i> woodland to open forest on alluvial plains	E		M48	0.97	0.97			0.97
12.3.7	<i>Eucalyptus tereticornis</i> , <i>Melaleuca viminalis</i> , <i>Casuarina cunninghamiana</i> fringing forest	NOC							0.00
12.3.11	<i>Eucalyptus siderophloia</i> , <i>E. tereticornis</i> , <i>Corymbia intermedia</i> open forest on alluvial plains usually near coast	OC		M46	0.75	0.75			0.75
12.11.6	<i>Corymbia citriodora</i> ,	NOC		M43, M44,	18.60	18.60			18.60

Ecological Communities / RE		Status*		Sites	Area within Option 1 (ha)	Area within Option 2 (ha)^	Area within Lateral (ha)	Area within UIC (ha)	Total Area (ha)
RE	Description	VM	EP BC						
	<i>Eucalyptus crebra</i> open forest on metamorphics ± interbedded volcanics			M45, M47					
12.11.14	<i>Eucalyptus crebra</i> , <i>E. tereticornis</i> woodland on metamorphics ± interbedded volcanics	OC		M42	0.41	0.41			0.41

^All calculations based on areas within Option 2 Export Pipeline

* E = Endangered under both EPBC Act and VM Act; OC = Of Concern; N = Not of Concern under the VM Act

**ATTACHMENT 6 – APPROXIMATE LOCATION OF NOT OF CONCERN RES
LOCATED ALONG THE PIPELINE CORRIDORS**

RE	Approximate KP				Survey Sites
	Export Pipeline	Export Pipeline Option 2	Lateral	UIC	
11.1.2 (dominant RE in mosaic)	372.2-372.4 373.3-373.7 374-375	372.2-372.4 373.3-373.7 374-375			
11.1.4 (dominant RE in mosaic)	372-372.2 372.4-372.7 372.9-373.3 373.7-374 375-375.2	372-372.2 372.4-372.7 372.9-373.3 373.7-374 375-375.2			M41
11.3.2 (sub-dominant RE in mosaic)				77.4-77.7	
11.3.6 (dominant RE in mosaic)					
11.3.6 (sub-dominant RE in mosaic)					M58
11.3.14 (dominant RE in mosaic)	8.7-9.1 10-10.3 18.2-18.4 20.6-20.8 34.5-34.7	8.7-9.1 10-10.3 18.2-18.4 20.6-20.8 34.5-34.7			M6
11.3.18 (dominant RE in mosaic)				54.4-55 77.4-77.7	
11.3.25 (dominant RE in mosaic)		219.6-220		95.2-95.3	M11, M29, M30 M55 M54

RE	Approximate KP				Survey Sites
	Export Pipeline	Export Pipeline Option 2	Lateral	UIC	
11.3.25(sub-dominant RE in mosaic)	203.9-204.5 205.4-206.8 207.8-208.2 209-211.4 213.9-214.5 247.6-248.2	173.5-173.7 216.3-216.8 217.7-218.4 218.8-219.6 220-220.8 247.6-248.2		34.6-35.1 35.7-36.2 37.8-38.1 40-40.3 42.6-43.3 49.8-50.4 51.2-51.4 54.4-55	M58
11.3.26(sub-dominant RE in mosaic)	134-137.3 138.8-139.4 160.2-161 352.2-352.7	352.2-352.7	139.6-146.6		
11.3.27(sub-dominant RE in mosaic)					
11.3.39(dominant RE in mosaic)					
11.5.1 (dominant RE in mosaic)	49.4-49.9 50.5-52.3	49.3-53.4 64.3-64.4 65.5-65.6 150.9-152 156-159.7 161-162.5 163.4-165.5 177.1-177.9 178-186.5		26.5-27 28.3-28.6 30.2-30.8 32.6-33.3 34-34.6 34.6-35.1 35.1-35.7 35.7-36.2 37.8-38.1 43.6-44.5 49-49.8 49.8-50.4 51.2-51.4 68.3-68.5 75.5-76 78.3-79.4 81-81.5 84.3-84.6 85.8-86.5	

RE	Approximate KP				Survey Sites
	Export Pipeline	Export Pipeline Option 2	Lateral	UIC	
				87.1-87.5 89.4-89.6 100.5-101.1 102.4-102.6 109.3-109.9 112.6-113.1 113.5-115 149.2-152.5 153.4-156.8	
11.5.1 (sub-dominant RE in mosaic)				39-39.6 54.4-55 127.4-128.7 129-130.2 144.9-148.9 189.4-194.9 196.2-196.5 196.2-196.5 196.9-197	
11.5.4 (dominant RE in mosaic)		75.5-77.5		24-25 40-40.3 42.6-43.3	
11.5.4 (sub-dominant RE in mosaic)	28.8-29.5 29.9-30.4 31-31.8 34-34.5 34.7-40.2 49.4-49.9 50.5-52.3	28.8-29.5 29.9-30.4 31-31.8 34-34.5 34.7-40.2 49.3-53.4		30.2-30.8 32.6-33.3 34-34.6 35.1-35.7 40-40.3 44.5-49 50.8-51.2	
11.5.20 (dominant RE in mosaic)		173.5-173.7			
11.5.20 (sub-dominant RE in mosaic)		135-136.9 137.4-138.3 150.9-152 152-153.4 155.5-156 156-159.7 161-162.5 163.4-165.5 177.1-177.9 178-186.5		24-25 78.3-79.4 81-81.5 84.3-84.6 85.8-86.5 87.1-87.5	
11.5.21(dominant RE in mosaic)	28.8-29.5 30.5-31 31-31.8 31.8-34	28.8-29.5 30.5-31 31-31.8 31.8-34			

RE	Approximate KP				Survey Sites
	Export Pipeline	Export Pipeline Option 2	Lateral	UIC	
	34-34.5 34.7-40.2	34-34.5 34.7-40.2			
11.5.21(sub-dominant RE in mosaic)	29.9-30.4	29.9-30.4 66-67.7 69-69.8 71.5-72 75.5-77.5			
11.7.2 (dominant RE in mosaic)	43.4-45.2 46.4-47.3	43.4-45.2 46-47.2 48.5-49.3			M9
11.7.2 (sub-dominant RE in mosaic)	0-1.2 2-4.7 7.9-8.7 11.2-12.4 13.1-18.2 18.4-19.2 20.2-20.5 20.8-21 22-22.2 25.8-28.8 45.2-46.4	0-1.2 2-4.7 7.9-8.7 11.2-12.4 13.1-18.2 18.4-19.2 20.2-20.5 20.8-2122- 22.2 25.8-28.8 45.2-46.4 47.2-48.5		109.3-109.9 112.6-113.1 113.5-115 131.2-131.8 132.7-133 133.7-136 137.9-138	M1, M5, M6
11.7.4 (dominant RE in mosaic)	0-1.2 2-4.7 7.9-8.7 9.1-10 11.2-12.4 13.1-18.2 18.4-19.2 20.2-20.5 20.8-21 22-22.2 22.7-23.7 24.5-25.1 25.8-28.8	0-1.2 2-4.7 7.9-8.7 9.1-10 11.2-12.4 13.1-18.2 18.4-19.2 20.2-20.5 20.8-21 22-22.2 22.7-23.7 24.5-25.1 25.8-28.8 47.2-48.5		19.9-20.7 22.1-24 31.8-32.6 33.3-34 39-39.6 40.3-42.6 81.5-84.3 127.4-128.7 129-130.2 131.2-131.8 132.7-133 133.7-136 137.9-138 144.9-148.9 199.5-199.7	M1,M2, M5, M6
11.7.4 (sub-dominant RE in mosaic)	28.8-29.5 29.9-30.4 31-31.8 31.8-34 34-34.5 34.7-40.2	28.8-29.5 29.9-30.4 31-31.8 31.8-34 34-34.5 34.7-40.2		62.5-62.8 63.3-63.6 64.8-65.5 68.5-69.7 70.2-71.6 71.9-72.7 189.4-194.9 196.2-196.5	

RE	Approximate KP				Survey Sites
	Export Pipeline	Export Pipeline Option 2	Lateral	UIC	
				196.9-197	
11.7.5 (dominant RE in mosaic)	29.5-29.9	29.5-29.9 64.4-65.5 65.6-66			M3
11.7.5 (sub-dominant RE in mosaic)	0-1.2 2-4.7 7.9-8.7 11.2-12.4 13.1-18.2 18.4-19.2 20.2-20.5 20.8-21 22-22.2 25.8-28.8 140.6-142.2	0-1.2 2-4.7 7.9-8.7 11.2-12.4 13.1-18.2 18.4-19.2 20.2-20.5 20.8-21 22-22.2 25.8-28.8 95.4-95.6		19.9-20.7 22.1-24 33.3-34 40.3-42.6 59.2-59.6 61-62.5 62.5-62.8 63.3-63.6 64.8-65.5 68.5-69.7 70.2-71.6 71.9-72.7 100.5-101.1 102.4-102.6 109.3-109.9 112.6-113.1 113.5-115 131.2-131.8 132.7-133 133.7-136 137.9-138	M1, M5, M6
11.7.6 (dominant RE in mosaic)	134-137.3 138.8-139.4 140.6-142.2 160.2-161	66-67.7 69-69.8 71.5-72 135-136.9 137.4-138.3 139.6-146.6 152-153.4 155.5-156		44.5-49 57.4-57.8 59.2-59.6 61-62.5	
11.7.6 (sub-dominant RE in mosaic)	30.5-31	30.5-31 75.5-77.5 177.1-177.9 178-186.5		50.8-51.2 181.5-183	
11.7.7 (dominant RE in mosaic)	10.3-11.2	10.3-11.2 135-136.9		62.5-62.8 63.3-63.6 64.8-65.5 68.5-69.7 70.2-71.6 71.9-72.7 178.5-179.5	

RE	Approximate KP				Survey Sites
	Export Pipeline	Export Pipeline Option 2	Lateral	UIC	
				189.4-194.9 196.2-196.5 196.9-197	
11.7.7 (sub-dominant RE in mosaic)	0-1.2 2-4.7 7.9-8.7 11.2-12.4 13.1-18.2 18.4-19.2 20.2-20.5 20.8-21 22-22.2 25.8-28.8 43.4-45.2 45.2-46.4 46.4-47.3 134-137.3 138.8-139.4 160.2-161	0-1.2 2-4.7 7.9-8.7 11.2-12.4 13.1-18.2 18.4-19.2 20.2-20.5 20.8-21 22-22.2 25.8-28.8 43.4-45.2 45.2-46.4 46-47.2 48.5-49.3 137.4-138.3 139.6-146.6		31.8-32.6 81.5-84.3 100.5-101.1 102.4-102.6 131.2-131.8 132.7-133 133.7-136 137.9-138 149.2-152.5 152.5-153.4 153.4-156.8 181.5-183	M1, M5, M6, M9
11.8.4 (dominant RE in mosaic)	293.9-294.1				M27, M35,
11.10.1 (dominant RE in mosaic)	130.1-130.2 130.7-130.9 131-131.6		109.8-113 113.5-115.7 130.5-131 133-133.6 135.5-135.8 139-139.5 146-147.4 147.6-150	181.5-183	
11.10.7(dominant RE in mosaic)		95.4-95.6	14 128-128.2 128.6-128.8 139.5-140 142-145		
11.10.7(sub-dominant RE in mosaic)	130.1-130.2 130.7-130.9 131-131.6 131.6-131.8 132.4-134 137.3-138.8 139.4-140.6 142.2-144.5				
11.10.9 (dominant RE in mosaic)	85.5-85.6 86.1-86.2 89.4-91.3	80.4-80.6	115.7-117 117.2-118.5 119.2-121.5		M13

RE	Approximate KP				Survey Sites
	Export Pipeline	Export Pipeline Option 2	Lateral	UIC	
			123.3-123.8		
11.10.9 (sub-dominant RE in mosaic)	131.6-131.8 132.4-134 137.3-138.8 139.4-140.6 142.2-144.5 144.5-145 145.7-146.5 147.5-147.7				M17
11.10.13 (dominant RE in mosaic)	131.6-131.8 132.4-134 137.3-138.8 139.4-140.6 142.2-144.5				
11.10.13 (sub-dominant RE in mosaic)			146-147.4 147.6-150		
11.11.3 (dominant RE in mosaic)	352.7-353.1 368.9-369.5 369.7-370.3	352.7-353.1 368.9-369.5 369.7-370.3			
11.11.4 (sub-dominant RE in mosaic)	291.2-292.6 293.3-293.9 294.2-294.3	291.2-292.6 293.3-293.9 294.2-294.3			M51 M59
11.11.15 (dominant RE in mosaic)	266.9-267.5 281.4-281.8 291.2-292.6 293.3-293.9 294.2-294.3 352.2-352.7	217.7-218.4 218.8-219.6 220-220.8 266.9-267.5 281.4-281.8 291.2-292.6 293.3-293.9 294.2-294.3 352.2-352.7			M59
11.11.15 (sub-dominant RE in mosaic)	352.7-353.1	352.7-353.1			
11.12.1 (dominant RE in mosaic)	144.5-145 145.7-146.5 147.5-147.7 161-161.5 162.3-162.9 163.7-164.1 164.7-164.9 165.3-165.6 168.1-168.2	133-133.4 189.5-189.7 216.3-216.8 247.6-248.2			M17, M19, M20, M21, M22, M32

RE	Approximate KP				Survey Sites
	Export Pipeline	Export Pipeline Option 2	Lateral	UIC	
	173.1-173.4 175-175.9 194.5-194.7 203.9-204.5 205.4-206.8 207.8-208.2 209-211.4 213.9-214.5 247.6-248.2				
11.12.1 (sub-dominant RE in mosaic)	305.8-306.2	305.8-306.2			M57
11.12.2 (sub-dominant RE in mosaic)	161-161.5 162.3-162.9 163.7-164.1 164.7-164.9 165.3-165.6 168.1-168.2 173.1-173.4 175-175.9 247.6-248.2	247.6-248.2			M18, M19, M20, M21, M22
11.12.4 (dominant RE in mosaic)		238.8-239			
11.12.6 (dominant RE in mosaic)	305.8-306.2	216.8-217.7 305.8-306.2			
12.3.7 (dominant RE in mosaic)	378.4-378.6	378.4-378.6			
12.11.6 (dominant RE in mosaic)	376.8-376.9 376.9-377 377-378.4 378.6-379.3 379.4-380.5 380.5-380.9	376.8-376.9 376.9-377 377-378.4 378.6-379.3 379.4-380.5 380.5-380.9			M57

**ATTACHMENT 7 - DATABASE SEARCH RESULTS – EVR FLORA AND
ANALYSIS OF PREFERRED HABITAT**

Common Name	Scientific Name	NCA	EP BC	Preferred Habitat	Source ^	Preferred habitat present				Comments
						Option 1 Export Pipeline	Option 2 Export Pipeline	Lateral	UIC	
Isla Gorge Wattle	<i>Acacia argentina</i>	V	-	Only known in Isla Gorge	2	No	No	No	No	
Waajie Wattle	<i>Acacia barakulensis</i>	V	-	Only known in Barakula SF	2,3,4	No	Yes	No	No	Rapid assessment in Barukula SF indicated no / low numbers likely but detailed survey required to confirm
Brown Wattle	<i>Acacia brunioides</i>	R	-	In SEQ, restricted to some mountain peaks in the southern Moreton district (Stanley and Ross, 1983). Commonly found sandy, poor soils derived from Granite geology (PlantNET)	2,3	No	No	No	No	
Rare wattle	<i>Acacia calantha</i>	R	-	Found Monto, Taroom and Dawson River. Record by L. Pedley 18km South of Cracow, Qld, 17 Dec. 1976 (<i>Qld Herbarium Records</i>)	2,3	Yes	Yes	Yes	No	
Chinchilla Wattle	<i>Acacia chinchillensis</i>	V	V	Occurs in south-eastern Qld N of Chinchilla and near Tara. Grows in ironbark <i>Eucalyptus</i> , <i>Callitris columellaris</i> , <i>Casuarina</i> woodland, in sandy or gravelly soils (ABRS, 2001).	1,2,3,4	Yes	Yes	No	Yes	Suitable habitat in RE 11.5.1
Curly-bark Wattle	<i>Acacia curranii</i>	V	V	Only known in Gurulmundi wildflower area north of Miles.	1,2,3,4	Yes	Yes	No	Yes	Field surveys did identify potential habitat in the vicinity of the UIC, in

Common Name	Scientific Name	NCA	EP BC	Preferred Habitat	Source ^	Preferred habitat present				Comments
						Option 1 Export Pipeline	Option 2 Export Pipeline	Lateral	UIC	
										particular areas of landzone 7
Eremophila Wattle	<i>Acacia eremophiloides</i>	V	V	On exposed rocky granite ridges in shallow, sandy, well-drained, weakly acidic soils (Pedley & Forster 1986).	1,2	No	No	No	No	
Large-leaved Wattle	<i>Acacia grandifolia</i>		V	Recorded at Barambah Ck, Mundubbera, Coalstoun Lakes, Proston (Qld Herbarium)	1	No	No	No	No	
Hando's Wattle	<i>Acacia handonis</i>	V	V	Understorey plant in <i>Eucalyptus</i> forests on sandstone ridges. Restricted to Barakula State Forest.	1,2,3	No	Yes	No	No	Rapid assessment in Barukula SF indicated no / low numbers likely but detailed survey required to confirm
Hockings Wattle	<i>Acacia hockingsii</i>	R	-	Restricted to Isla Gorge	2	No	No	No	No	
Isla Gorge Wattle	<i>Acacia islana</i>	R	-	Restricted to Isla Gorge	2,3	No	No	No	No	
Tara Wattle	<i>Acacia lauta</i>	V	V	Found from Tara to Inglewood 1) Property "Marron Glen", 2) 15km nth of Tara and 3) 16km east of Tara.	1,2,3	No	No	No	Yes	
Pedley's Wattle	<i>Acacia pedleyi</i>	R	-	Recorded in Biloela Area (KP 290).	2,3	Yes	Yes	No	No	Potential in Biloela Area
Rare Wattle	<i>Acacia pubicosta</i>	R	-	Confined to rocky slopes (Maslin, 2001). Recorded in Biloela Area	2,3	Yes	Yes	No	No	

Common Name	Scientific Name	NCA	EP BC	Preferred Habitat	Source ^	Preferred habitat present				Comments
						Option 1 Export Pipeline	Option 2 Export Pipeline	Lateral	UIC	
				(KP 290).						
Wyberba Wattle	<i>Acacia pubifolia</i>	V	-	Restricted to Wyberba region (Stanley and Ross, 1983).	2,3	No	No	No	No	
Blackdown Wattle	<i>Acacia storyi</i>	R	-	On the Blackdown Tableland and adjacent lower land on the west side. Grows on sandstone plateau in open forest (Maslin, 2001). One Qld Herbarium record for Curtis Island.	2,3	No	No	No	No	
Scrub Wattle	<i>Acacia tenuinervis</i>	R	-	Found in Brigalow Woodland, Dry Vine Scrub, Also along Gullies, Creeks from Wandoan to Mundubbera	2,3	Yes	Yes	No	Yes	Due to access constraints potential habitat areas not visited to date.
Wardell's Wattle	<i>Acacia wardellii</i>	V	V	Ridge crests with loamy or gravelly soil. Coloniser of disturbed areas – Thomby Range and a few ridges east of the Condamine.	1,2,3,4	No	No	No	Yes	Qld Herbarium records indicate potential habitat may occur along the UIC between KP 70-90. Verified Qld Herbarium record and found one other very large population 1 km long along an existing pipeline easement. Identified two trees with large numbers of seedlings spreading along recent disturbances. Appears to like disturbance and/or fire.

Common Name	Scientific Name	NCA	EP BC	Preferred Habitat	Source ^	Preferred habitat present				Comments
						Option 1 Export Pipeline	Option 2 Export Pipeline	Lateral	UIC	
Scrub Daphne	<i>Actephila sessilifolia</i>	R	-	Recorded from Bundaberg north to Yarrol; Known within locations RE 11.3.11, RE 11.3.26, RE 11.5.15 and RE 11.12.4. Occurs in vine thicket and dry rainforest communities along creeks and drainage lines.	3	Yes	Yes	No	No	Potential near Mt Larcom
Large-leaf Chainfruit	<i>Alyxia magnifolia</i>	R	-	Occurs in eastern Queensland, from Eungella in the north to the NSW border in the south. It generally grows in rainforests and also tall open forest with a rainforest understorey. It has been recorded from 130-180 m altitude, usually on granitic substrates (DNR 1999)	3	Yes	Yes	No	No	Potential near Mt Larcom
Rough Alyxia	<i>Alyxia sharpei</i>	R	-	Central Queensland, in Araucarian Microphyll Vineforests, Complex Notophyll Vineforests, Notophyll Scrub, or in tall open woodlands (DNR, 1999).	2,3	Yes	Yes	No	No	Potential near Biloela
sandstone prickly-bush	<i>Apatophyllum terefolium</i>	R	-	Prickly 40 cm herb found in woodland within RE 11.7.5, RE 11.10.1 and RE 11.10.13. Burnett and Leichhardt Pastoral Districts	2,3	Yes	Yes	Yes	No	Herbarium records within Barukula State Forest in close proximity to Option 2 Export Pipeline.

Common Name	Scientific Name	NCA	EP BC	Preferred Habitat	Source ^	Preferred habitat present				Comments
						Option 1 Export Pipeline	Option 2 Export Pipeline	Lateral	UIC	
Queensland Lace Plant	<i>Aponogeton queenslandicus</i>	R	-	A seasonally emergent aquatic plant found in throughout much of coastal Queensland. In rivers, streams and temporary freshwater pools to 30-60cm depth. Not usually found in permanent waters (Stephens and Dowling, 2002).	2,3	Yes	Yes	Yes	Yes	
None Known	<i>Atalaya calicola</i>	R		In dry rainforest and deciduous vine thicket on boulder-strewn slopes, and on hills with granite, limestone, sandstone and basaltic rock outcrops (DNR, 1999).	3	Yes	Yes	No	No	Potential near Mt Larcom
None known	<i>Atalaya collina</i>	E	E	Grows on hillsides, in remnant dry scrubs, together with <i>A. salicifolia</i> , but is not as common as that species (Reynolds, 1991)	3	Yes	Yes	No	No	Potential near Mt Larcom
None known	<i>Atalaya rigida</i>	R		Restricted to eastern Qld from Mt Aberdeen near Bowen, south to Mt Glastonbury south west of Gympie. Occurs in vine thicket and araucarian microphyll notophyll vineforest on red clay soil or black clay loam (DNR, 1999)	3	Yes	Yes	No	No	Potential near Mt Larcom
None known	<i>Bertya pedicellata</i>	R		Restricted to central Queensland. Associated with <i>Corymbia trachypholia</i> (brown bloodwood), <i>Acacia catenulata</i> , <i>A. curvinervia</i> ,	3	Yes	Yes	No	No	

Common Name	Scientific Name	NCA	EP BC	Preferred Habitat	Source ^	Preferred habitat present				Comments
						Option 1 Export Pipeline	Option 2 Export Pipeline	Lateral	UIC	
				and <i>A. shirleyi</i> (lancewood) (Qld Herb., 2001).						
Ooline	<i>Cadellia pentastylis</i>	V	V	Clay plains, sandstone and residual ridges in association with vine thickets, brigalow, belah and red bauhinia.	1,2,3,4	Yes	Yes	Yes	Yes	Initial field survey identified trees around KP 185 along the UIC and at KP 230 On the Option 1 Export Pipeline.
Bailey's Cypress Pine	<i>Callitris baileyi</i>	R	-	Hilly or mountainous areas often in the vicinity of dry vine forests. One Qld Herbarium record near Gurulmundi SF.	2,3	Yes	Yes	No	Yes	
Yellow Fringed Myrtle	<i>Calytrix gurulmundensis</i>	V	V	Found on lateritic sandstone ridges. Localised and patchy distribution.	1,2,3,4	Yes	Yes	No	Yes	Known records within Gurulmundi and Barakula SF. Field surveys recorded small isolated patches spreading throughout the Gurulmundi SF. Plants were dense in disturbed sunlit areas.
Isla Gorge Fringed Myrtle	<i>Calytrix islensis</i>	R	-	Only known in Isla Gorge	2	No	No	No	No	
Endangered Capparis	<i>Capparis humistrata</i>	E	-	Endemic to south east Qld between Rockhampton and Port Curtis (Hewson, 1982)	2,3	No	No	No	No	
Native Frangipani	<i>Cerbera dumicola</i>	R	-	Widespread in central Qld. Grows in vine thickets and lancewood	2,3	Yes	Yes	Yes	No	

Common Name	Scientific Name	NCA	EP BC	Preferred Habitat	Source ^	Preferred habitat present				Comments
						Option 1 Export Pipeline	Option 2 Export Pipeline	Lateral	UIC	
				(<i>Acacia shirley</i>) thickets (Forster, 1996).						
Silver Commersonia	<i>Commersonia argentea</i> syn <i>Commersonia</i> sp. (Cadarga G.P. Guymer 1642)	-	V	Stony ridges, north of Chinchilla	1	Yes	Yes	No	No	Potential habitat possible north of Chinchilla
Canooka Bloodwood	<i>Corymbia xanthope</i>	V	V	Restricted between Rockhampton and Marlborough and on South Percy Island. Occurring on soils derived from serpentinite (Brooker & Kleinig, 2004).	1,2	No	No	No	No	
Cossinia	<i>Cossinia australiana</i>	E	E	Small tree up to 7 m found in depauperate rainforest relicts, usually on volcanic soil (Stanley and Ross, 1986). Recorded at Kingaroy, Gympie, Munholme Ck, Burnett River (Qld Herbarium)	1,2,3	Yes	Yes	No	No	
None known	<i>Cryptandra ciliata</i>	R	-	Tiny leaved plant which are not easily observed if not in flower. Known record at Gurulmundi State Forest (Qld Herbarium)	2,3	Yes	Yes	Yes	Yes	
Wedge-leaf Tuckeroo	<i>Cupaniopsis shirleyana</i>	V	V	Depauperate rainforests (Stanley and Ross, 1983).	1,2,3	Yes	Yes	No	No	Known in Mt Larcom area

Common Name	Scientific Name	NCA	EP BC	Preferred Habitat	Source ^	Preferred habitat present				Comments
						Option 1 Export Pipeline	Option 2 Export Pipeline	Lateral	UIC	
Large-fruited Zamia	<i>Cycas megacarpa</i>	E	E	Stony clay loams on hill tops and steep slopes. Commonly in spotted gum and ironbark open forest and woodland with a grassy understorey (DNR, 1999). Known from KP 280-380.	1,2,3	Yes	Yes	Yes	No	Herbarium records close to Options 1 Option 2 Export Pipeline. Field surveys observed on range spurs at KP 296.5-298.5, KP 301 and KP 305 of the Option 1 and Option 2 Export Pipeline.
Endangered Zamia	<i>Cycas ophiolitica</i>	E	E	Tall open forest dominated by Lophostemon confertus and on complex notophyll vine forest margins. Grows on rocky soils derived from tertiary basalts on hill slopes and crests from 250-730m altitude. Often on steep, southfacing hillsides (DNR, 1999)	1,2	No	No	No	No	
Vulnerable Sedge	<i>Cyperus clarus</i>	V	-	Found in Wet creek/drainage lines (Qld Herbarium)	2,3	Yes	Yes	Yes	Yes	
None known	<i>Dansiea elliptica</i>	R	-	Sandy, granitic soils on rainforest margins in north eastern Queensland, and in low elevation dry rainforest and semi evergreen vine thickets in south eastern Queensland (DNR, 1999).	2,3	Yes	Yes	No	No	Potential in Mt Larcom area
Small-leaved Denhamia	<i>Denhamia parvifolia</i>	V	V	Found in semi-evergreen vine thickets. Brown loam or clay loam soils.	1,2,3	No	No	Yes	Yes	

Common Name	Scientific Name	NCA	EP BC	Preferred Habitat	Source ^	Preferred habitat present				Comments
						Option 1 Export Pipeline	Option 2 Export Pipeline	Lateral	UIC	
Pentland Pea	<i>Desmodium macrocarpum</i>	R		Semi-evergreen Vine Thicket	2,3	Yes	Yes	Yes	Yes	
King Blue Grass	<i>Dichanthium queenslandicum</i>	V	V	Endemic to Qld black soil plains. Occurs in RE's 11.8.11, 11.3.21	1,2,3	Yes	Yes	No	No	
Finger Panic	<i>Digitaria porrecta</i>	R	E	Grasslands and forests with grassy understorey. Known from RE 11.3.21. Heavy black soils (Stanley and Ross, 1989).	1,2,3	No	No	No	No	
Tricolour Diuris	<i>Diuris tricolor (sheaffiana)</i>	-	V	Sandy soils, often in Callitris woodlands. Primarily a NSW species with scattered records in Qld.	1	Yes	Yes	No	Yes	
Blake's Spikerush	<i>Eleocharis blakeana</i>	R	-	Known in wet poorly drained soils; Records along Auburn Rd Chinchilla and Lake Broadwater	2,3	Yes	Yes	Yes	Yes	
Salt Pipewort, Button Grass	<i>Eriocaulon carsonii</i> subsp. <i>orientale</i>	E	E	Known in wet poorly drained soils. Mound Springs areas near Injune.	1,2,3	Yes	Yes	Yes	No	
Queensland Western White Gum	<i>Eucalyptus argophloia</i>	V	V	Restricted to Chinchilla area (Stanley and Ross, 1986).	1,2,3	No	No	No	No	
Tony's ironbark	<i>Eucalyptus beaniana</i>	V	V	Rocky Areas such as Isla Gorge Robinson Gorge and Mundubbera	1,2,3	Yes	Yes	Yes	No	
Plunkett	<i>Eucalyptus</i>	R	-	Eucalypt forests, woodlands and	2,3,4	Yes	Yes	No	Yes	

Common Name	Scientific Name	NCA	EP BC	Preferred Habitat	Source ^	Preferred habitat present				Comments
						Option 1 Export Pipeline	Option 2 Export Pipeline	Lateral	UIC	
Mallee	<i>curtisii</i>			shrub lands on rocky slopes or on low poorly drained sites (Qld Herb., 2001).						
Northern Blue Box	<i>Eucalyptus magnificata</i>	V	-	Small population in Queensland south of Dalveen (Brooker and Kleinig, 1994).	2,3	No	No	No	No	
Pumpkin Gum	<i>Eucalyptus pachycalyx</i>	E	E	On skeletal sandy soils (Botanic Gardens Trust, 2009)	1,2,3	Yes	Yes	Yes	Yes	
Black Ironbox	<i>Eucalyptus raveretiana</i>	V	-	Always along creek beds and riverbanks in coastal and subcoastal areas from Ayr and Charters Towers south to Duringa in central Queensland (Brooker and Kleinig, 1994).	2,3	No	No	No	No	Generally expected in more northern areas.
Woollybark	<i>Eucalyptus rubiginosa</i>	R	-	Type was collected within Ironbark and Yellow Bloodwood community (Brooker, 1984)	2,3	Yes	Yes	Yes	Yes	
Shiny-leaved Ironbark	<i>Eucalyptus virens</i>	V	V	Sandstone ridges. Four populations – 1) Coolmunda Conservation Park 2) Tara, 3) NE of Eidsvold and 4) Maranoa River near Mt Moffatt.	1,2,3	No	No	No	Yes	
Rare Fringe-rush	<i>Fimbristylis vagans</i>	R	-	Wet creek/drainage lines Wetland plant recorded in the nearby Lake Broadwater Area	2,3	Yes	Yes	Yes	Yes	
None	<i>Gonocarpus</i>	V	-	Recorded near Chinchilla on	2,3	Yes	Yes	No	Yes	

Common Name	Scientific Name	NCA	EP BC	Preferred Habitat	Source ^	Preferred habitat present				Comments
						Option 1 Export Pipeline	Option 2 Export Pipeline	Lateral	UIC	
known	<i>urceolatus</i>			heavy loam soils.						
Sturt's Desert Rose	<i>Gossypium sturtianum</i>	R	-	Recorded at Expedition Range, Fairview	2,3	Yes	Yes	Yes	No	
None known	<i>Graptophyllum excelsum</i>	R	-	Restricted to Qld, extending from near Mt Larcom north to the Chillagoe- Mt Mungana area. Occurs on rocky hillsides in Semi-evergreen Vine Thickets. Also recorded growing in grassy eucalypt woodland (DNR, 1999).	2,3	Yes	Yes	No	No	Potential near Mt Larcom
None known	<i>Grevillea hockingsii</i>	V	-	Found on slopes in hilly sandstone country on shallow sandy to sandy loam soils in woodland and open forest communities. Restricted to southern Queensland from Mt Morgan south to Monto (DNR 1999)	2,3	Yes	Yes	No	No	Potential in Biloela Area
None known	<i>Grevillea singuliflora</i>	R	-	Sandy, sandstone and rocky areas.	2,3,4	Yes	Yes	Yes	Yes	
Cudgerie	<i>Hernandia bivalvis</i>	R	-	Vine forests on rocks with shallow soils (DNR, 1999)).	2,3	Yes	Yes	No	No	Potential near Mt Larcom
None known	<i>Homopholis belsonii</i>	E	V	Known from near Gurulmundi, 30km north of Miles in the Darling Downs district (Stanley and Ross, 1989).	1,2,3	Yes	Yes	No	Yes	
Isla Gorge	<i>Homoranthus</i>	R	-	Newly named plant from the Isla	2	No	No	No	No	

Common Name	Scientific Name	NCA	EP BC	Preferred Habitat	Source ^	Preferred habitat present				Comments
						Option 1 Export Pipeline	Option 2 Export Pipeline	Lateral	UIC	
mouse plant	<i>decasetus</i>			Gorge Area						
None known	<i>Homoranthus decumbens</i>	V	V	Found in two separate locations 1) Blackdown Tablelands and 2) State Forest 302, north of Chinchilla.	1,2,3	Yes	Yes	Yes	Yes	
None known	<i>Indigofera baileyi</i>	R	-	On clay soil derived from sandstone. Associated with <i>Eucalyptus crebra</i> (narrow-leaved ironbark), <i>E. orgadophila</i> (mountain coolibah) or <i>Corymbia erythrophloia</i> (red-barked bloowood) (DNR, 1999).	2,3	Yes	Yes	Yes	Yes	
None known	<i>Kunzea bracteolata</i>	R	-	Known from the Stanthorpe - Wallangarra area (Stanley and Ross, 1986).	2,3	No	No	No	No	
Basalt Pepper- cress	<i>Lepidium hyssopifolium</i>	-	E	Occurs beneath large trees in grassy woodlands where trees are restricting groundlayer competition. Also known in grasslands. Absent where vegetation groundcover is complete and in areas subject to heavy grazing (DPIWE, undated). Known from well south east of the UIC.	1	No	No	No	No	
None known	<i>Leucopogon cuspidatus</i>	-	V	Mainly on rocky slopes, cliffs and rocky outcrops. Commonly in	1	Yes	Yes	Yes	No	

Common Name	Scientific Name	NCA	EP BC	Preferred Habitat	Source ^	Preferred habitat present				Comments
						Option 1 Export Pipeline	Option 2 Export Pipeline	Lateral	UIC	
				woodland or open woodland and sometimes in heath or shrubland communities (M. Edginton, pers. comm.).						
None known	<i>Leucopogon grandiflorus</i>	R	-	Is found at 200 to 720 m altitude and occurs in eucalypt forest or woodland on sandstone cliffs or sandy valley floors. It grows on skeletal to deep sands. Restricted to central and south central Queensland, its distribution extends from the Mt Percy region east to Nathan Gorge, and from the Expedition Range, south to Robinson Gorge (DNR 1999).	2,3	No	No	Yes	No	
Dawson River cabbage tree	<i>Livistona nitida</i>	R	-	Around Dawson River Taroom	2	No	No	No	No	
None known	<i>Macarthuria ephedroides</i>	R	-	In small patches in rocky sandstone hills (White, 1946)	2,3	Yes	Yes	Yes	Yes	
None known	<i>Macropteranthus fitzalanii</i>	R	-	Found in coastal notophyll vine forest, microphyll vine forest and littoral rainforest on rocky outcrops with poor soil. Restricted to coastal areas of central Queensland from	2,3	Yes	Yes	No	No	Potential near Mt Larcom

Common Name	Scientific Name	NCA	EP BC	Preferred Habitat	Source ^	Preferred habitat present				Comments
						Option 1 Export Pipeline	Option 2 Export Pipeline	Lateral	UIC	
				the western slopes of Mt Dryander, north of Proserpine down to Rockhampton (DNR 1999).						
None known	<i>Macropteranthus leiocaulis</i>	R	-	Deciduous vine thickets, semi-evergreen vine thickets and Araucarian Microphyll Vine Forests on red euchrozems or sandstone talus (DNR, 1999).	2,3	Yes	Yes	No	No	Potential near Mt Larcom
None known	<i>Macrozamia crassifolia</i>	V	V	Restricted to the Eidsvold – Mundubbera district in Queensland. Found on sandy soils over granite (DEW 2007).	2,3	Yes	Yes	No	No	
None known	<i>Macrozamia fearnsidei</i>	V	V	Grows in open forest on sandy soils of sandstone origin either on rocky slopes or in gullies near ephemeral streams at approx 300-400m altitude. Restricted to central Qld (DNR 1999)	2,3	No	No	Yes	No	
None known	<i>Marsdenia hemiptera</i>	R	-	Notophyll vine forests in gorges or low lying areas near watercourses (DNR, 1999).	2,3	No	No	No	No	
None known	<i>Melaleuca groveana</i>	R	-	Occurs on ridges, high mountain slopes and mountain summits in heaths and eucalypt woodland and	2,3	Yes	Yes	Yes	Yes	

Common Name	Scientific Name	NCA	EP BC	Preferred Habitat	Source ^	Preferred habitat present				Comments
						Option 1 Export Pipeline	Option 2 Export Pipeline	Lateral	UIC	
				forests with heath under-stories (DNR, 1999).						
None known	<i>Melaleuca irbyana</i>	R	-	On silty clay soils often in low lying areas subject to occasional inundation. Usually in association with <i>Eucalyptus moluccana</i>	2,3	No	No	Yes	No	
Gurulmundi Heath-myrtle	<i>Micromyrtus carinata</i>	E	-	Type collected from Gurulmundi State Forest and it is the only known location	2,3,4	Yes	Yes	No	Yes	Field surveys observed many hectares of this species within Gurulmundi SF around edges of REs 11.7.6 and 11.7.5. Thousands of plants, densely spaced. Scolds.
None known	<i>Micromyrtus patula</i>	E	-	Laterised sandstone areas. Type collected in Barakula SF	2,3	Yes	Yes	Yes	Yes	Difficult to observe when not in flower
Artesian Milfoil	<i>Myriophyllum artesium</i>	E	-	Mound springs and bore drains	2,3	Yes	Yes	Yes	No	
None known	<i>Notelaea pungens</i>	R	-	Known herbarium records Barakula S F Chinchilla in open eucalypt forest (Guymer, 1987).	2,3	Yes	Yes	Yes	Yes	
None known	<i>Parsonsia kroombitensis</i>	V	-	Occurs on escarpments at the edges of deep valleys and among outcrops of acidic volcanic rocks in low shrubby woodland. Restricted to central east Queensland (DNR 1999)	2	No	No	No	No	

Common Name	Scientific Name	NCA	EP BC	Preferred Habitat	Source ^	Preferred habitat present				Comments
						Option 1 Export Pipeline	Option 2 Export Pipeline	Lateral	UIC	
None known	<i>Parsonsia larcomensis</i>	V	V	Recorded from 350-750 m elevation. It occurs in open heathland and shrubland at or near the summits of mountain peaks growing in shallow, loamy soils. Restricted to central east and south east Queensland and is confined to the Mt Perry area near Rockhampton (DRN 1999)	1,2,3	Yes	Yes	No	No	Potential near Mt Larcom
narrow-leaved parsonsia	<i>Parsonsia lenticellata</i>	R	-	Coastal districts in drier rainforests and transitional zone to open forest from Mackay to Port Douglas. Previous records of this species in SE Queensland are now considered <i>P. paulforsteri</i> (Forster, 1996; Stanley and Ross, 1986).	2	No	No	No	No	
None known	<i>Paspalidium scabrifolium</i>	R	-	In Brigalow communities	2,3	Yes	Yes	Yes	Yes	
None known	<i>Persoonia amaliae</i>	R	-	Small tree to 8 m tall growing in creek-lines	2	No	No	No	No	
None known	<i>Phyllothea sporadica</i>	V	V	On residual lateritic rises. Known as widespread in patches in UIC area.	1,2,3,4	No	No	No	Yes	
None known	<i>Phyllanthus brassii</i>	R	-	Montane rainforest and montane heath on granite, usually along streams at altitudes of 1200 to	2,3	Yes	Yes	No	No	Potential in Mt Larcom area

Common Name	Scientific Name	NCA	EP BC	Preferred Habitat	Source ^	Preferred habitat present				Comments
						Option 1 Export Pipeline	Option 2 Export Pipeline	Lateral	UIC	
				1260m (DNR, 1999).						
None known	<i>Phyllanthus sauropodoides</i>	R	-	Araucarian Microphyll Vine Forest and Araucarian Notophyll Vine Forest on alluvium soils (DNR, 1999).	2	Yes	Yes	No	No	Potential in Mt Larcom area
None known	<i>Picris evae</i>	V	V	Small daisy in rocky areas	2,3	Yes	Yes	Yes	Yes	
None known	<i>Pimelea leptospermoides</i>	R	V	Restricted from near Marlborough to Balnagowan near Yeppoon in central Qld, in tall to low open forests and woodland growing on serpentine soils (DNR, 1999).	1,2	No	No	No	No	
None known	<i>Polianthion minutiflorum</i>		V	Known from five areas in eastern Queensland, from Redcliffe Vale south to Kingaroy, usually in forest and woodland on sandstone slopes and gullies with skeletal soil, or sometimes deeper sands adjacent to deeply weathered laterite (Kellerman et al 2006)	3	Yes	Yes	No	No	Potential in Biloela Area
None known	<i>Prostanthera</i> sp. (Dunmore D.M.Gordon 8A)	V	V	Restricted to three sites near Millmerran. Open forest on stony ridges.	1,2,3	No	No	No	No	
Cobar Greenhood Orchid	<i>Pterostylis cobarensis</i>		V	Stony ridges. Nyngan-Cobar-Burke region.	1,2	No	No	No	No	

Common Name	Scientific Name	NCA	EP BC	Preferred Habitat	Source ^	Preferred habitat present				Comments
						Option 1 Export Pipeline	Option 2 Export Pipeline	Lateral	UIC	
None known	<i>Pultenaea setulosa</i>	V	V	Growing in wet to dry sclerophyll forest, subalpine woodland to heaths (often dominated by <i>Eucalyptus albens</i> , <i>E. crebra</i> , <i>E. macrphyncha</i> , <i>E. mannifera</i> , <i>E. polyanthemos</i> or <i>E. rossii</i>). Sandy loam on sedimentary rock, granite, porphyry, volcanic substrates, siliceous soil or serpentine (Kok & West, 2002)	1,2	No	No	No	No	
Quassia	<i>Quassia bidwillii</i>	V	V	Below 650m in rainforests, open forest, woodland and mangroves (DNR, 1999).	1,2,3	Yes	Yes	No	No	
Native Thistle	<i>Rhaponticum australe</i> (syn <i>Stemmacantha australis</i>)	V	V	On heavy clays derived from basalt (DNR, 1999).	1,2,3	Yes	Yes	No	No	
None known	<i>Rutidosia crispata</i>	R	-	The species is presently only known from Glenmoral Gap in the Dawson Range. It occurs on ridge tops, in shallow soils on sandstone in open eucalypt forests (Holland 1994).	2,3	Yes	Yes	Yes	Yes	
None known	<i>Rutidosia glandulosa</i>	R	-	Recorded from Barakula State Forest (Kokubugata & Holland 2002)	2,3	Yes	Yes	No	No	Potential habitat in the Barakula SF area.
None	<i>Rutidosia</i>	E	-	Occurs in Eucalypt and Acacia	2,3	Yes	Yes	No	Yes	

Common Name	Scientific Name	NCA	EP BC	Preferred Habitat	Source ^	Preferred habitat present				Comments
						Option 1 Export Pipeline	Option 2 Export Pipeline	Lateral	UIC	
known	<i>lanata</i>			forests. Two populations known 1) near Jackson and 2) near Meandarra.						
None known	<i>Sannantha brachypoda</i> Syn <i>Babingtonia brachypoda</i>	R	-	Found at Isla Gorge nearby only	2	No	No	No	No	
None known	<i>Sarcochilus roseus</i>	V	V	Orchid found in Dry rainforest and/or vine thickets	1,2	No	No	No	No	
None known	<i>Senna acclinis</i>	R	-	Rainforest margins and adjacent open forest between 100-660 m altitude and in association with <i>Pleiogynium timorense</i> , <i>Elatostachys</i> spp., <i>Eucalyptus grandis</i> and <i>Syncarpia glomulifera</i> (DNR, 1999).	2,3	Yes	Yes	No	No	
None known	<i>Solanum stenopterum</i>	V	-	Cracking clay soils in vine thickets, woodlands and grassy plains.	2,3	No	No	No	No	
None known	<i>Solanum papaverifolium</i>	E	-	Heavy black soils (Stanley and Ross, 1986).	2,3	Yes	Yes	Yes	No	
None known	<i>Sophora fraseri</i>	V	V	Wet and dry sclerophyll forest particularly near margins with rainforests and a range of rainforest types (DNR, 1999).	1,2	No	No	No	No	

Common Name	Scientific Name	NCA	EP BC	Preferred Habitat	Source ^	Preferred habitat present				Comments
						Option 1 Export Pipeline	Option 2 Export Pipeline	Lateral	UIC	
None known	<i>Sporobolus partimpatens</i>	R	-	Open grasslands on black soil. Locally common in undisturbed grasslands. Occurs in RE 11.3.21 (DNR 1999)	2,3	Yes	Yes	Yes	No	
Minute Orchid	<i>Taeniophyllum muelleri</i>	-	V	Coastal Rainforest, Vine thickets	1	No	No	No	No	
None known	<i>Thelypteris confluent</i>	V	-	Occurs in swampy areas or mound springs (Chaffey, 2002).	2	No	No	No	No	
Toadflax	<i>Thesium australe</i>	V	V	Grasslands and dry sclerophyll forests often in damp areas (Stanley and Ross, 1983).	1,2	No	No	No	No	
None known	<i>Trymalium minutiflorum</i>	V	V	Found up to an altitude of 340 m on sandy soil or light brown gravelly loam derived from sedimentary rocks. Been recorded in Callide Ranges, Goodger and Bileola areas (DNR 1999).	1,2	Yes	Yes	No	No	
Isla Gorge Blue Bells	<i>Wahlenbergia islensis</i>	R	-	Gorge with Rocky outcrops, Crevices	2,3	No	No	Yes	No	
None known	<i>Westringia parvifolia</i>	V	V	Stony and gravelly soils. Mallee forests, Woodlands Occurs with Eucalyptus bakeri, Euc viridis, Triodia sp (Edginton 2006)	2	No	No	No	No	
Durong Sage	<i>Xerothamnella herbacea</i>	E	E	Found in Brigalow, Low chenopod shrubland Records Pelican Back Rd Chinchilla, Theodore S F (Qld Herbarium)	1,2,3	Yes	Yes	No	No	

Common Name	Scientific Name	NCA	EP BC	Preferred Habitat	Source ^	Preferred habitat present				Comments
						Option 1 Export Pipeline	Option 2 Export Pipeline	Lateral	UIC	
Mt Larcom Zieria	<i>Zieria actites</i>	V	-	Margins of Woodlands	2,3	Yes	Yes	No	No	Potential near Mt Larcom

*Status: NCA: State listed E = Endangered; V = Vulnerable; R = Rare

EPBC: Australian Government listed: E = Endangered; V = Vulnerable

^: Source: 1 = EPBC Protected Matters search; 2 = WildNet; 3 = Herbreccs

ATTACHMENT 8 – FAUNA LIST

Common Name	Scientific Name	Record**
Insects		
Imperial Hairstreak Butterfly	<i>Jalmenus evagoras eubulus</i>	1,2
Fish		
Agassiz's Glassfish	<i>Ambassis agassizii</i>	1
Yellow Fin Bream	<i>Acanthopagrus australis</i>	1,4
Estuary Perchlet	<i>Ambassis marianus</i>	4
Banded Grunter	<i>Amniataba percoides</i>	4
Long Finned Eel	<i>Anguilla reinhardtii</i>	4
Salmon Catfish	<i>Arius graeffei</i>	4
Snubnose Garfish	<i>Arrhamphus sclerolepis</i>	4
Silver Perch	<i>Bidyanus biyanus</i>	4
	<i>Caragobius sp</i>	4
Goldfish	<i>Carassius auratus</i>	1,4
Darling River Hardyhead	<i>Cratercephalus amnicularis</i>	4
Marjorie's Hardyhead	<i>Craterocephalus marjoriae</i>	4
Flyspecked Hardyhead	<i>Craterocephalus stercusmuscarum</i>	1,4
Spotted Sickie Fish	<i>Drepane punctata</i>	4
Mosquitofish	<i>Gambusia holbrooki</i>	1,4
None known	<i>Geophagus brasiliensis*</i>	4
Mouth Almighty	<i>Glossamia aprion</i>	4
Castelnau's Herring	<i>Herklotsichthys castelnaui</i>	4
Empire Gudgeon	<i>Hypseleotris compressus</i>	4
Firetailed Gudgeon	<i>Hypseleotris galii</i>	4
Western Carp Gudgeon	<i>Hypseleotris klunzingeri</i>	1,4
Gudgeon Species	<i>Hypseleotris sp</i>	4
Bottlenose Jewfish	<i>Johnius australis</i>	4
Sharpnose Hammer Croaker	<i>Johnius borneensis</i>	4
Common Ponyfish	<i>Leiognathus equulus</i>	4
Spangled Perch	<i>Leiopotherapon unicolor</i>	1,4
Greenback Mullet	<i>Liza subviridis*</i>	4
Tade Mullet	<i>Liza tade</i>	4
Diamond-tail Mullet	<i>Liza vaigiensis</i>	4
Murray Cod	<i>Maccullochella peelii peelii</i>	1,3,4
Golden Perch	<i>Macquaria ambigua</i>	1,4
Duboulay's Rainbowfish	<i>Melanotaenia duboulayi</i>	4
Murray River Rainbowfish	<i>Melanotaenia fluviatilis</i>	4
Eastern Rainbowfish	<i>Melanotaenia splendida</i>	4
Southern Purple-spotted Gudgeon	<i>Mogurnda adspersa^</i>	4
Bony Bream	<i>Nematalosa erebi</i>	4
Australian Lung Fish	<i>Neoceratodus forsteri</i>	4
Eeltail Catfish	<i>Neosilurus hyrtlil^</i>	4
Bullrout	<i>Notesthes robusta</i>	4
Northern Mud Gudgeon	<i>Ophiocara porocephala</i>	4
Sleepy Cod	<i>Oxyeleotris lineolatus</i>	4
Silver Mullet	<i>Paramugil georgii</i>	4

Common Name	Scientific Name	Record**
Mottled Sole	<i>Pardachirus rautheri</i>	4
Flathead Gudgeon	<i>Philypnodon grandiceps</i>	4
Guppy	<i>Poecilia reticulata</i> *	4
Not Known	<i>Polydactylus sp</i>	4
Rendah's Catfish	<i>Porochilus rendahli</i>	4
Not Known	<i>Pseudogobius sp</i>	4
Pacific Blue Eye	<i>Pseudomugil signifer</i>	4
Australian Smelt	<i>Retropinna semoni</i>	1
Spotted Arowana	<i>Scleropages leichardti</i>	4
Southern Saratoga	<i>Scortum hillii</i>	4
Freshwater Catfish	<i>Tandanus tandanus</i>	1,4
Long-arm Mullet	<i>Valamugil cunnesius</i>	4
Green Swordtail	<i>Xiphophorus helleri</i> *	4
Crustaceans		
Shrimp	<i>Alpheus sp.</i>	4
Brine Shrimp	<i>Artemia salina</i>	4
Shrimp	<i>Atyidae sp</i>	4
Fairy Shrimp	<i>Branchinella australiensis</i>	4
Shrimp	<i>Caridina indistincta</i>	4
Orange-fingered Yabby	<i>Cherax depressus</i>	4
Common Yabby	<i>Cherax destructor</i>	4
Waterbug	<i>Lepidurus viridus</i>	4
Long-arm Shrimp	<i>Macrobrachium australiense</i>	4
Shrimp	<i>Macrobrachium novaehollandiae</i>	4
Crayfish	<i>Notodelphyidae sp.</i>	4
Glass Shrimp	<i>Paratya australiensis</i>	4
Waterbug	<i>Tachaea caridophaga</i>	4
Amphibians		
Beeping Froglet	<i>Crinia parinsignifera</i>	1
Greenstripe Frog	<i>Cyclorana alboguttata</i>	1,2
Superb Collared Frog	<i>Cyclorana brevipes</i>	1
Eastern Snapping Frog	<i>Cyclorana novaehollandiae</i>	1,2
Barking Frog	<i>Limnodynastes fletcheri</i>	1
Salmon Striped Frog	<i>Limnodynastes salmini</i>	1,2
Spotted Grassfrog	<i>Limnodynastes tasmaniensis</i>	1,2
Scarlet Sided Pobblebonk	<i>Limnodynastes terraereginae</i>	1,2
Common Green Treefrog	<i>Litoria caerulea</i>	1,2
Broad Palmed Rocketfrog	<i>Litoria latopalmata</i>	1,2
Emerald Spotted Treefrog	<i>Litoria peronii</i>	1,2
Ruddy Treefrog	<i>Litoria rubella</i>	1,2
Ornate Burrowing Frog	<i>Opisthodon ornatus</i>	2
Cane Toad*	<i>Rhinella marina</i>	1,2
Dusky Gungan	<i>Uperoleia fusca</i>	1
Eastern Gungan	<i>Uperoleia laevigata</i>	2
Chubby Gungan	<i>Uperoleia rugosa</i>	1,2
Reptiles		

Common Name	Scientific Name	Record**
	<i>Amphibolurus burnsi</i>	1
Jacky Lizard	<i>Amphibolurus muricatus</i>	2
	<i>Amphibolurus nobbi</i>	1
	<i>Anomalopus leuckartii</i>	1,2
Five-clawed Worm Skink	<i>Anomalopus mackayi</i>	1,3
Woma	<i>Anomalopus verreauxii</i>	1
Spotted Python	<i>Antaresia maculosa</i>	1
Stimson's Python	<i>Antaresia stimsoni</i>	1
	<i>Aspidites ramsayi</i>	1
Brown Tree Snake	<i>Boiga irregularis</i>	1,2
	<i>Carlia foliorum</i>	1,2
	<i>Carlia mundivensis</i>	1
	<i>Carlia pectoralis</i>	1,2
	<i>Carlia schmeltzii</i>	1
	<i>Carlia vivax</i>	1
Eastern Snake-necked Turtle	<i>Chelodina longicollis</i>	1
	<i>Cryptoblepharus metallicus</i>	1
Ragged Snake-eyed Skink	<i>Cryptoblepharus pannosus</i>	1
Elegant Snake-eyed Skink	<i>Cryptoblepharus pulcher pulcher</i>	1
Striped Snake-eyed Skink	<i>Cryptoblepharus virgatus</i>	2
	<i>Ctenotus robustus</i>	1
Copper-tailed Skink	<i>Ctenotus taeniolatus</i>	1
Yellow-faced Whip Snake	<i>Demansia psammophis</i>	1,2
Common Tree Snake	<i>Dendrelaphis punctulata</i>	1
DeVis's Snake	<i>Denisonia devisi</i>	1
Wood Gecko	<i>Diplodactylus vittatus</i>	1,2
	<i>Egernia modesta</i>	1
Yakka Skink	<i>Egernia rugosa</i>	1,3
Tree Skink	<i>Egernia striolata</i>	1
Broad-banded Sand Swimmer	<i>Eremiascincus richardsonii</i>	1
Red-naped Snake	<i>Furina diadema</i>	1
Dunmall's Snake	<i>Furina dunmali</i>	3
	<i>Gehyra dubia</i>	1,2
Tree Dtella	<i>Gehyra variegata</i>	1
Grey Snake	<i>Hemiaspis damelii</i>	1
Bynoe's Gecko	<i>Heteronotia binoei</i>	1,2
Pale-headed Snake	<i>Hoplocephalus bitorquatus</i>	1
	<i>Lerista fragilis</i>	1
	<i>Lerista muelleri</i>	2
	<i>Lerista punctatovittata</i>	1,2
	<i>Lerista sp.</i>	1
Burton's Legless Lizard	<i>Lerista timida</i>	1
Brigalow Scaly-foot	<i>Lialis burtonis</i>	1
Steindachner's Gecko	<i>Lucasium steindachneri</i>	1,2
	<i>Menetia greyii</i>	1,2
	<i>Menetia timlowi</i>	1

Common Name	Scientific Name	Record**
Carpet Python	<i>Morelia spilota</i>	2
	<i>Morethia boulengeri</i>	1
	<i>Underwoodisaurus milii</i>	1
	<i>Nephrurus milii</i>	1
	<i>Oedura monilis</i>	1
	<i>Oedura robusta</i>	1
Brigalow Scaly-foot	<i>Paradelma orientalis</i>	1,3
Bearded Dragon	<i>Pogona barbata</i>	1,2
	<i>Pseudechis australis</i>	1
Spotted Black Snake	<i>Pseudechis guttatus</i>	1
Red-Bellied Black Snake	<i>Pseudechis porphyriacus</i>	1
Eastern Brown Snake	<i>Pseudonaja textilis</i>	2
	<i>Pygopus schraderi</i>	1
Tree Skink	<i>Ramphotyphlops affinis</i>	1
Eastern Blue-tongued Lizard	<i>Ramphotyphlops proximus</i>	1
	<i>Ramphotyphlops wiedii</i>	1
Fitzoy Turtle	<i>Rheodytes leukops</i>	3
	<i>Cryptophis boschmai</i>	1
Eastern Small-eyed Snake	<i>Cryptophis nigrescens</i>	1,2
Coral Snake	<i>Simoselaps australis</i>	1
Golden-tailed Gecko	<i>Strophurus taenicauda</i>	1,2,3
	<i>Suta dwyeri</i>	1
Curl Snake	<i>Suta suta</i>	1
	<i>Tiliqua rugosa</i>	1,2
Shingle-back (Eastern Subspecies)	<i>Tiliqua rugosa aspera</i>	1
Eastern Blue-tongued Lizard	<i>Tiliqua scincoides</i>	1
Freshwater Snake	<i>Tropidonophis mairii</i>	1
Grassland Earless Dragon	<i>Tympanocryptus pinguicollis</i>	3
Thick-tailed Gecko	<i>Underwoodisaurus millii</i>	2
Sand Monitor	<i>Varanus gouldii</i>	1,2
Yellow-spotted Monitor	<i>Varanus panoptes</i>	1,2
Lace Monitor	<i>Varanus varius</i>	1,2
Bandy Bandy	<i>Vermicella annulata</i>	1
Birds		
Spiny-cheeked Honeyeater	<i>Acanthagenys rufogularis</i>	1,2
Inland Thornbill	<i>Acanthiza apicalis</i>	1
Yellow-rumped Thornbill	<i>Acanthiza chrysorrhoa</i>	1,2
Striated Thornbill	<i>Acanthiza lineata</i>	2
Yellow Thornbill	<i>Acanthiza nana</i>	1,2
Brown Thornbill	<i>Acanthiza pusilla</i>	2
Buff-Rumped Thornbill	<i>Acanthiza reguloides</i>	1,2
Chestnut-rumped Thornbill	<i>Acanthiza uropygialis</i>	1,2
Collared Sparrowhawk	<i>Accipiter cirrocephalus</i>	2
Brown Goshawk	<i>Accipiter fasciatus</i>	1,2
Clamorous Reed-warbler	<i>Acrocephalus australis</i>	2

Common Name	Scientific Name	Record**
Australian Owlet-nightjar	<i>Aegotheles cristatus</i>	1,2
Green Catbird	<i>Ailuroedus crassirostris</i>	1
Australian Brush-turkey	<i>Alectura lathami</i>	1,2
Australian King-parrot	<i>Alisterus scapularis</i>	2
Chestnut Teal	<i>Anas castanea</i>	1
Grey Teal	<i>Anas gracilis</i>	1,2
Garganey	<i>Anas querquedula</i>	1
Australasian Shoveler	<i>Anas rhynchotis</i>	1
Pacific Black Duck	<i>Anas superciliosa</i>	1,2
Darter	<i>Anhinga novaehollandiae</i>	1,2
Magpie Goose	<i>Anseranus semipalmata</i>	1,2,3
Regent Honeyeater	<i>Anthochaera phrygia</i>	3
Richard's Pipit	<i>Anthus novaeseelandiae</i>	1,2
Southern Whiteface	<i>Aphelocephala leucopsis</i>	1
Red-Winged Parrot	<i>Aprosmictus erythropterus</i>	1,2
Fork-Tailed Swift	<i>Apus pacificus</i>	1,2,3
Wedge-Tailed Eagle	<i>Aquila audax</i>	1,2
Great Egret	<i>Ardea alba</i>	1,3
Cattle Egret	<i>Ardea ibis</i>	1,2,3
Intermediate Egret	<i>Ardea intermedia</i>	1
Wandering Whistling-duck	<i>Ardea modesta</i>	1
White-necked Heron	<i>Ardea pacifica</i>	1,2
Australian Bustard	<i>Ardeotis australis</i>	1,2
Black-faced Woodswallow	<i>Artamus cinereus</i>	1
Dusky Woodswallow	<i>Artamus cyanopterus</i>	1
White-breasted Woodswallow	<i>Artamus leucorhynchus</i>	1
Little Woodswallow	<i>Artamus minor</i>	2
Masked Woodswallow	<i>Artamus personatus</i>	1
White-browed Woodswallow	<i>Artamus superciliosus</i>	1
Pacific Baza	<i>Aviceda subcristata</i>	1
Hardhead	<i>Aythya australis</i>	2
Mallee Ringneck	<i>Barnardius zonarius barnardi</i>	2
Musk Duck	<i>Biziura lobata</i>	1
Bush thick-knee	<i>Burhinus grallarius</i>	1
Sulphur-Crested Cockatoo	<i>Cacatua galerita</i>	2
Little Corella	<i>Cacatua sanguinea</i>	2
Fan-Tailed Cuckoo	<i>Cacomantis flabelliformis</i>	2
Pallid Cuckoo	<i>Cacomantis pallidus</i>	2
Brush Cuckoo	<i>Cacomantis variolosus</i>	2
Sharp-tailed Sandpiper	<i>Calidris acuminata</i>	1
Red-tailed Black-cockatoo	<i>Calyptorhynchus banksii</i>	1
Yellow-tailed Black-cockatoo	<i>Calyptorhynchus funereus</i>	2
Glossy Black-cockatoo	<i>Calyptorhynchus lathami</i>	1,2
Pheasant Coucal	<i>Centropus phasianinus</i>	2
Horsfield's Bronze-cuckoo	<i>Chalcites basalis</i>	2
Shining Bronze-cuckoo	<i>Chalcites lucidus</i>	2

Common Name	Scientific Name	Record**
Gould's Bronze-cuckoo	<i>Chalcites minutillus russatus</i>	1
Black-eared Cuckoo	<i>Chalcites osculans</i>	2
Emerald Dove	<i>Chalcophaps indica</i>	1
Australian Wood Duck	<i>Chenonetta jubata</i>	2
Whiskered Tern	<i>Chlidonias hybrida</i>	2
Speckled Warbler	<i>Chthonicola sagittata</i>	2
Brown Songlark	<i>Cincloramphus cruralis</i>	1
Rufous Songlark	<i>Cincloramphus mathewsi</i>	2
Spotted Harrier	<i>Circus assimilis</i>	2
Golden-headed Cisticola	<i>Cisticola exilis</i>	1
Brown Treecreeper	<i>Climacteris picumnus</i>	2
Grey Shrike-thrush	<i>Colluricincla harmonica</i>	2
White-headed Pigeon	<i>Columba leucomela</i>	1
Rock Dove*	<i>Columba livia</i>	2
Ground Cuckoo-shrike	<i>Coracina maxima</i>	1
Black-faced Cuckoo-shrike	<i>Coracina novaehollandiae</i>	2
White-bellied Cuckoo-shrike	<i>Coracina papuensis</i>	2
Red-tailed Black-Cockatoo	<i>Coracina tenuirostris</i>	1
White-winged Chough	<i>Corcorax melanorhamphos</i>	2
White-throated Treecreeper	<i>Cormobates leucophaea</i>	2
Little Crow	<i>Corvus bennetti</i>	1
Australian Raven	<i>Corvus coronoides</i>	1
Torresian Crow	<i>Corvus orru</i>	2
Stubble Quail	<i>Coturnix pectoralis</i>	1
Brown Quail	<i>Coturnix ypsilophora</i>	2
Pied Butcherbird	<i>Cracticus nigrogularis</i>	2
Australian Magpie	<i>Gymnorhina tibicen</i>	2
Grey Butcherbird	<i>Cracticus torquatus</i>	2
Black Swan	<i>Cygnus atratus</i>	1
Laughing Kookaburra	<i>Dacelo novaeguineae</i>	2
Varied Sittella	<i>Daphoenositta chrysoptera</i>	2
Wandering Whistling Duck	<i>Dendrocygna arcuata</i>	1
Plumed Whistling-Duck	<i>Dendrocygna eytoni</i>	2
Mistletoebird	<i>Dicaeum hirundinaceum</i>	2
Spangled Drongo	<i>Dicrurus bracteatus</i>	1
Emu	<i>Dromaius novaehollandiae</i>	2
Little Egret	<i>Egretta garzetta</i>	1
White-faced Heron	<i>Ardea novaehollandiae</i>	2
Black-shouldered Kite	<i>Elanus axillaris</i>	2
Letter-winged Kite	<i>Elanus scriptus</i>	1
Black-fronted Dotterel	<i>Elseya melanops</i>	2
Blue-faced Honeyeater	<i>Entomyzon cyanotis</i>	2
Galah	<i>Cacatua roseicapillus</i>	2
Eastern Yellow Robin	<i>Eopsaltria australis</i>	2
Black-necked Stork	<i>Ephippiorhynchus asiaticus</i>	1
Crimson Chat	<i>Epthianura tricolor</i>	1

Common Name	Scientific Name	Record**
Red Goshawk	<i>Erythrotriorchis radiatus</i>	1,3
Common Koel	<i>Eudynamys orientalis</i>	2
Spotted Nightjar	<i>Eurostopodus argus</i>	1
White-throated Nightjar	<i>Eurostopodus mystacalis</i>	2
Dollarbird	<i>Eurystomus orientalis</i>	2
	<i>Excalfactoria chinensis</i>	1
Brown Falcon	<i>Falco berigora</i>	2
Nankeen Kestrel	<i>Falco cenchroides</i>	2
Australian Hobby	<i>Falco longipennis</i>	1
Peregrine Falcon	<i>Falco peregrinus</i>	1
Black Falcon	<i>Falco subniger</i>	1
Crested Shrike-tit	<i>Falcunculus frontatus</i>	1
	<i>Fregata ariel</i>	1
Eurasian Coot	<i>Fulica atra</i>	2
Latham's Snipe	<i>Gallinago hardwickii</i>	1,3
	<i>Gallinula tenebrosa</i>	1
	<i>Gallirallus philippensis</i>	1
	<i>Gelochelidon nilotica</i>	1
	<i>Geopelia cuneata</i>	1
Bar-shouldered Dove	<i>Geopelia humeralis</i>	2
Peaceful Dove	<i>Geopelia striata</i>	2
Squatter Pigeon (Southern)	<i>Geophaps scripta scripta</i>	1,3
White-throated Gerygone	<i>Gerygone albogularis</i>	2
	<i>Gerygone fusca</i>	1
Little Lorikeet	<i>Glossopsitta pusilla</i>	2
Magpie-lark	<i>Grallina cyanoleuca</i>	2
	<i>Grantiella picta</i>	1
	<i>Grus rubicunda</i>	1
White-bellied Sea Eagle	<i>Haliaeetus leucogaster</i>	1,3
	<i>Haliastur indus</i>	1
	<i>Haliastur sphenurus</i>	1
	<i>Hamirostra melanosternon</i>	1
Little Eagle	<i>Hieraaetus morphnoides</i>	2
Black-winged Stilt	<i>Himantopus himantopus</i>	2
White-throated Needletail	<i>Hirundapus caudacutus</i>	2,3
Welcome Swallow	<i>Hirundo neoxena</i>	2
	<i>Hydroprogne caspia</i>	1
	<i>Irediparra gallinacea</i>	1
	<i>Lalage leucomela</i>	1
	<i>Lalage sueurii</i>	1
Swift Parrot	<i>Lathamus discolor</i>	1,3
	<i>Leucosarcia picata</i>	1
	<i>Leucosarcia picata</i>	1
Yellow-faced Honeyeater	<i>Lichenostomus chrysops</i>	2
Fuscous Honeyeater	<i>Lichenostomus fuscus</i>	2
White-eared Honeyeater	<i>Lichenostomus leucotis</i>	2

Common Name	Scientific Name	Record**
	<i>Lichenostomus melanops</i>	1
White-plumed Honeyeater	<i>Lichenostomus penicillatus</i>	2
	<i>Lichenostomus virescens</i>	1
Brown Honeyeater	<i>Lichmera indistincta</i>	2
	<i>Lonchura castaneothorax</i>	1
	<i>Lophoictinia isura</i>	1
	<i>Lopholaimus antarcticus</i>	1
	<i>Macropygia amboinensis</i>	1
Pink-Eared Duck	<i>Malacorhynchus membranaceus</i>	2
Superb Fairy-wren	<i>Malurus cyaneus</i>	2
	<i>Malurus lamberti</i>	1
	<i>Malurus leucopterus</i>	1
Red-Backed Fairy-Wren	<i>Malurus melanocephalus</i>	2
	<i>Malurus splendens melanotis</i>	1
	<i>Manorina flavigula</i>	1
Noisy Miner	<i>Manorina melanocephala</i>	2
	<i>Megalurus timoriensis</i>	1
Hooded Robin	<i>Melanodryas cucullata</i>	1
	<i>Meliphaga lewinii</i>	1
White-Throated Honeyeater	<i>Melithreptus albogularis</i>	2
	<i>Melithreptus brevirostris</i>	1
	<i>Melithreptus gularis</i>	1
White-naped Honeyeater	<i>Melithreptus lunatus</i>	2
Rainbow Bee-eater	<i>Merops ornatus</i>	1,2,3
Little Pied Cormorant	<i>Microcarbo melanoleucos</i>	2
Jacky Winter	<i>Microeca fascinans</i>	2
Black Kite	<i>Milvus migrans</i>	1
Singing Bushlark	<i>Mirafra javanica</i>	2
Black-faced Monarch	<i>Monarcha melanopsis</i>	3
	<i>Myiagra cyanoleuca</i>	1,3
Restless Flycatcher	<i>Myiagra inquieta</i>	2
Leaden Flycatcher	<i>Myiagra rubecula</i>	2
	<i>Myzomela sanguinolenta</i>	1
Star Finch	<i>Neochima ruficauda ruficauda</i>	1,3
	<i>Neochmia modesta</i>	1
	<i>Neochmia temporalis</i>	1
	<i>Neophema pulchella</i>	1
Australian Cotton Pygmy-Goose	<i>Nettapus coromandelianus albipennis</i>	1,3
Barking Owl	<i>Ninox connivens</i>	2
Southern Boobook	<i>Ninox novaeseelandiae</i>	2
	<i>Northiella haematogaster</i>	1
	<i>Nycticorax caledonicus</i>	1
Cockatiel	<i>Nymphicus hollandicus</i>	2
Crested Pigeon	<i>Ocyphaps lophotes</i>	2
	<i>Oreoica gutturalis</i>	1

Common Name	Scientific Name	Record**
Olive-backed Oriole	<i>Oriolus sagittatus</i>	2
Domestic Pigeon	<i>Oxyura australis</i>	1
Golden Whistler	<i>Pachycephala pectoralis</i>	2
Rufous Whistler	<i>Pachycephala rufiventris</i>	2
Spotted Pardalote	<i>Pardalotus punctatus</i>	2
Striated Pardalote	<i>Pardalotus striatus</i>	2
	<i>Passer domesticus</i>	1
Plains-wanderer	<i>Pedionomus torquatus</i>	1,2,3
Australian Pelican	<i>Pelecanus conspicillatus</i>	2
Fairy Martin	<i>Petrochelidon ariel</i>	2
	<i>Petrochelidon nigricans</i>	1
Red-Capped Robin	<i>Petroica goodenovii</i>	2
Rose Robin	<i>Petroica rosea</i>	1
Great Cormorant	<i>Phalacrocorax carbo</i>	2
Little Black Cormorant	<i>Phalacrocorax sulcirostris</i>	2
Pied Cormorant	<i>Phalacrocorax varius</i>	2
Common Bronzewing	<i>Phaps chalcoptera</i>	2
Little Friarbird	<i>Philemon citreogularis</i>	2
Noisy Friarbird	<i>Philemon corniculatus</i>	2
Yellow-billed Spoonbill	<i>Platalea flavipes</i>	2
Royal Spoonbill	<i>Platalea regia</i>	2
Pale-headed Rosella	<i>Platycercus adscitus</i>	2
Crimson Rosella	<i>Platycercus elegans</i>	1
Striped Honeyeater	<i>Plectorhyncha lanceolata</i>	2
	<i>Pluvialis fulva</i>	1
Tawny Frogmouth	<i>Podargus strigoides</i>	2
Hoary-headed Grebe	<i>Poliiocephalus poliocephalus</i>	2
Superb Parrot	<i>Polytelsi swainsonii</i>	3
	<i>Pomatostomus superciliosus</i>	1
Grey-Crowned Babbler	<i>Pomatostomus temporalis</i>	2
Purple Swamphen	<i>Porphyrio porphyrio</i>	2
	<i>Porzana pusilla</i>	1
Red-Rumped Parrot	<i>Psephotus haematonotus</i>	2
Paradise Parrot	<i>Psephotus pulcherrimus</i>	1,3
	<i>Psophodes olivaceus</i>	1
Spotted Bowerbird	<i>Ptilonorhynchus maculatus</i>	2
Satin Bowerbird	<i>Ptilonorhynchus violaceus</i>	1
Grey Fantail	<i>Rhipidura albiscapa</i>	2
Willie Wagtail	<i>Rhipidura leucophrys</i>	2
Rufous Fantail	<i>Rhipidura rufifrons</i>	1,3
Australian Painted Snipe	<i>Rostratula australis</i>	1,3
Painted Snipe	<i>Rostratula benghalensis</i>	1,3
Channel-billed Cuckoo	<i>Scythrops novaehollandiae</i>	2
	<i>Sericornis frontalis</i>	1
	<i>Sericulus chrysocephalus</i>	1
Weebill	<i>Smicrornis brevirostris</i>	2

Common Name	Scientific Name	Record**
Figbird	<i>Sphecotheres vieilloti</i>	2
	<i>Stagonopleura guttata</i>	1
Freckled Duck	<i>Stictonetta naevosa</i>	1
Pied Currawong	<i>Strepera graculina</i>	2
Apostlebird	<i>Struthidea cinerea</i>	2
	<i>Sturnus tristis</i>	1
Common Starling*	<i>Sturnus vulgaris</i>	2
	<i>Sugomel niger</i>	1
Australasian Grebe	<i>Tachybaptus novaehollandiae</i>	2
Double-barred Finch	<i>Taeniopygia bichenovii</i>	2
	<i>Taeniopygia guttata</i>	1
Australian White Ibis	<i>Threskiornis molucca</i>	2
Straw-Necked Ibis	<i>Threskiornis spinicollis</i>	2
	<i>Todiramphus macleayii</i>	1
	<i>Todiramphus pyrrhopygius</i>	1
Sacred Kingfisher	<i>Todiramphus sanctus</i>	1,2
	<i>Tregellasia capito</i>	1
Scaly-breasted Lorikeet	<i>Trichoglossus chlorolepidotus</i>	2
Rainbow Lorikeet	<i>Trichoglossus haematodus moluccanus</i>	2
	<i>Tringa stagnatilis</i>	1
Red-backed Button-Quail	<i>Turnix maculosus</i>	2
Black-breasted Button-Quail	<i>Turnix melanogaster</i>	2,3
	<i>Turnix varius</i>	1
	<i>Turnix velox</i>	1
	<i>Tyto javanica</i>	1
	<i>Tyto novaehollandiae novaehollandiae</i>	1
Masked Lapwing	<i>Vanellus miles</i>	1,2
	<i>Vanellus miles novaehollandiae</i>	1
	<i>Vanellus tricolor</i>	1
Silvereye	<i>Zosterops lateralis</i>	1
Mammals		
Rufous Bettong	<i>Aepyprymnus rufescens</i>	1,2
Yellow-footed Antechinus	<i>Antechinus flavipes</i>	1
Dog	<i>Canis familiaris</i>	1
Dingo	<i>Canis lupus dingo</i>	2
Goat	<i>Capra hircus</i>	1
Large-eared Pied Bat	<i>Chalinolobus dwyeri</i>	1,3
Gould's Wattled Bat	<i>Chalinolobus gouldii</i>	2
Little Pied Bat	<i>Chalinolobus picatus</i>	2
Spotted-tailed Quoll	<i>Dasyurus maculatus maculatus</i>	3
Cat*	<i>Felis catus</i>	1
Bandicoot	<i>Isodon sp.</i>	1
Brown Hare	<i>Lepus capensis</i>	1
Black-striped Wallaby	<i>Macropus dorsalis</i>	1
Eastern Grey Kangaroo	<i>Macropus giganteus</i>	2

Common Name	Scientific Name	Record**
Whiptail Wallaby	<i>Macropus parryi</i>	1
Common Wallaroo	<i>Macropus robustus</i>	1
Red-necked Wallaby	<i>Macropus rufogriseus</i>	2
Red Kangaroo	<i>Macropus rufus</i>	1
Beccari's Freetail Bat	<i>Mormopterus beccarii</i>	1
Freetail Bat	<i>Mormopterus sp.</i>	1
Eastern Freetail Bat	<i>Mormopterus sp. 2</i>	1
Inland Freetail Bat	<i>Mormopterus sp. 3</i>	2
House Mouse	<i>Mus musculus</i>	1
Lesser Long-eared Bat	<i>Nyctophilus geoffroyi</i>	2
Gould's Long-eared Bat	<i>Nyctophilus gouldi</i>	2
Eastern Long-eared Bat	<i>Nyctophilus timoriensis</i>	2,3
Rabbit*	<i>Oryctolagus cuniculus</i>	2
Greater Glider	<i>Petauroides volans</i>	2
Yellow-bellied Glider	<i>Petaurus australis</i>	2
Sugar Glider	<i>Petaurus breviceps</i>	2
Squirrel Glider	<i>Petaurus norfolcensis</i>	1
Koala	<i>Phascolarctos cinereus</i>	2
Narrow-nosed Planigale	<i>Planigale tenuirostris</i>	2
Eastern Chestnut Mouse	<i>Pseudomys gracilicaudatus</i>	1
Eastern Pebble-mound Mouse	<i>Pseudomys patrius</i>	1,2
Black Flying-fox	<i>Pteropus alecto</i>	1
Grey-headed Flying-fox	<i>Pteropus poliocephalus</i>	3
Little Red Flying-fox	<i>Pteropus scapulatus</i>	2
Black Rat	<i>Rattus rattus</i>	1
Yellow-bellied Sheath-tail Bat	<i>Saccolaimus flaviventris</i>	2
Inland Broad-nosed Bat	<i>Scotorepens balstoni</i>	1
Little Broad-nosed Bat	<i>Scotorepens greyii</i>	2
Stripe-faced Dunnart	<i>Sminthopsis macroura</i>	2
Pig*	<i>Sus scrofa</i>	2
Short-beaked Echidna	<i>Tachyglossus aculeatus</i>	2
White-striped Freetail Bat	<i>Tadarida australis</i>	2
Troughton's Sheath-tail Bat	<i>Taphozous troughtoni</i>	2
Common Brushtail Possum	<i>Trichosurus vulpecula</i>	2
Eastern Cave Bat	<i>Vespadelus troughtoni</i>	2
Little Forest Bat	<i>Vespadelus vulturnus</i>	2
Red Fox*	<i>Vulpes vulpes</i>	2
Swamp Wallaby	<i>Wallabia bicolor</i>	2

* Introduced species

** Record: 1 = Wildlife Online; 2 = Field Survey; 3 = EPBC Act, 4 = Queensland Museum

**ATTACHMENT 9 – DATABASE SEARCH RESULTS – EVR FAUNA AND
ANALYSIS OF PREFERRED HABITAT**

Common Name	Scientific Name	Status		Source	Preferred Habitat	Preferred habitat present				Comments
		NC Act	EPBC Act			ML	ML 2	CL	UIC	
Molluscs										
Boggomoss Snail	<i>Adclarkia dawsonensis</i>		CE	1	One subpopulation occurs on private property near Taroom. The second at a camping and water reserve at the Isla-Delusion crossing on the Dawson River. Possible occurrence on Cockatoo Creek.	yes	yes	yes	no	Highly restricted distribution. Population estimated at less than 600.
Insects										
Pale Imperial Hairstreak	<i>Jalmenus eubulus evagoras</i>	V		1	Mature Brigalow communities, often near low rocky hills.	yes	yes	yes	yes	Uncommon but widespread in the region
Amphibians										
Kroombit Tinker Frog	<i>Taudactylus pleione</i>		V	3	12 small rainforest patches above 500m at Kroombit Tops	yes	yes	no	no	Highly restricted distribution
Fish										
Murray Cod	<i>Maccullochella peelii peelii</i>		V	3	Found in the Murray-Darling river system	no	no	no	yes	
Australian Lung Fish	<i>Neoceratodus forsteri</i>		V	3	Found in the Burnett and Mary river systems	no	yes	no	no	Generally found in the lower reaches of these river basins
Reptiles										
Common Death Adder	<i>Acanthophis antarcticus</i>	R		1	Widespread in woodlands and forest habitats.	yes	yes	yes	yes	Numbers have declined dramatically due to fire/ cane toad ingestion and land degradation
Short-necked worm-skink	<i>Anomalopus brevicollis</i>	R		1	Rainforest to dry sclerophyll forest . Cracow to Finch-Hatton.	yes	yes	no	no	
Five-clawed Worm-skink	<i>Anomalopus mackayi</i>		V	3	Grasslands on cracking clay soils. Darling Downs area.	no	no	no	yes	
Woma	<i>Aspidites ramsayi</i>	R		1	Found in the Brigalow Belt, but patchily distributed due to habitat degradation. Brigalow to Spinifex sandplain habitats.	yes	yes	yes	yes	
Collared Delma	<i>Delma torquata</i>		V	3	Brigalow and Eucalypt communities – SE	yes	yes	yes	yes	

Common Name	Scientific Name	Status		Source	Preferred Habitat	Preferred habitat present				Comments
		NC Act	EPBC Act			ML	ML 2	CL	UIC	
					Qld but disjunct occurrences elsewhere.					
Ornamental Snake	<i>Denisonia maculata</i>		V	3	Found in cracking clay soils in open forests, woodlands and riparian habitats. Shelters under fallen timber and in soil cracks.	yes	yes	yes	no	
Yakka Skink	<i>Egernia rugosa</i>		V	1,3	Dry open forests or woodland with dense ground vegetation, rocky areas, fallen timber and other debris.	yes	yes	yes	yes	
Dunmall's Snake	<i>Furina dunmalli</i>	V	V	1,3	Dry sclerophyll forest and woodland and Brigalow scrub on floodplains of cracking soils.	yes	yes	yes	yes	
Brigalow Scaly-foot	<i>Paradelma orientalis</i>	V	V	1,3	Eucalypt and Acacia woodlands, usually found under logs and debris.	yes	yes	yes	yes	
Fitzroy River Turtle	<i>Rheodytes leukops</i>	V	V	1,3	Confined to fast flowing waters in the Fitzroy River and tributaries.	yes	yes	no	no	Unlikely to occur in the study area.
Golden-tailed Gecko	<i>Strophurus taenicauda</i>	R		1	Dry sclerophyll forest, especially mixed brigalow, ironbark and Callitris.	yes	yes	yes	yes	Found in a broad range of habitats including degraded areas.
Grassland Earless Dragon	<i>Tympanocryptis pinguicollis</i>		E	3	Black, cracking clay soils of the Darling Downs where it is often found in agricultural cropping and grazing areas.	no	no	no	yes	
Birds										
Grey Goshawk	<i>Accipiter novaehollandiae</i>	R		1	Broadly distributed in taller forests and riverine environments, often in mountainous or steeply undulating country.	yes	yes	no	no	
Glossy Black-cockatoo	<i>Calyptorhynchus lathami</i>	V		1	Coastal forest and open inland woodland. Feeds only on she-oak seeds from species such as Black She-oak, Forest Oak or Belah.	yes	yes	yes	yes	
Black-necked Stork	<i>Ephippiorhynchus asiaticus</i>	R		1	Predominantly coastal and sub-coastal lakes, swamps, freshwater pools and mangroves.	yes	yes	no	no	Widespread but uncommon.

Common Name	Scientific Name	Status		Source	Preferred Habitat	Preferred habitat present				Comments
		NC Act	EPBC Act			ML	ML 2	CL	UIC	
Yellow Chat (Dawson)	<i>Epthianura crocea macgregori</i>		CE	3	Samphire and low shrublands in the northern parts of Curtis Island. May occur in a very limited area in proximity to the main line.	yes	yes	no	no	
Red Goshawk	<i>Erythroriorchis radiatus</i>		V	3	In association with large tracts of intact forest and woodland. Fringes of rainforest and mountainous forest along the Great Dividing Range.	yes	yes	yes	no	More likely to occur in the northern parts of the study area. Doubtful records from the south.
Squatter Pigeon (Southern Subspecies)	<i>Geophaps scripta scripta</i>	V	V	1,3	Forests and woodlands in proximity to water courses.	yes	yes	yes	no	Now absent from the southern parts of the study area but may occur to the north.
Swift Parrot	<i>Lathamus discolor</i>		E/Ma	3	Seasonal vagrant from Tasmania where it breeds.	yes	yes	yes	yes	
Square-tailed Kite	<i>Lophoictinia isura</i>	R		1	Woodlands and forests – uncommon but widespread through the study area.	yes	yes	yes	yes	
Southern Giant-Petrel	<i>Macronectes giganteus</i>		E/Mi	3	Marine species, not recorded from the study area.	no	no	no	no	
Black-chinned Honeyeater	<i>Melithreptus gularis</i>	R		1	Seasonally nomadic and patchy distribution throughout the study area. Woodlands and forests.	yes	yes	yes	yes	
Star Finch (eastern), Star Finch (southern)	<i>Neochmia ruficauda ruficauda</i>		E	3	Sparsely distributed along well vegetated watercourses. Possibly more abundant in the northern parts of the study area. No recent records from the south.	yes	yes	yes	no	
Turquoise Parrot	<i>Neophema pulchella</i>	R		1	Coastal and sub-coastal forests and woodlands with grassy understorey in southern Qld and NSW.	yes	yes	yes	yes	Occurrence in the study area unlikely.
Cotton Pygmy-Goose	<i>Nettapus coromandelianus</i>	R	Ma/Mi	1,3	Freshwater lakes, swamps and impoundments.	yes	yes	yes	yes	
Plains-wanderer	<i>Pedionomus torquatus</i>	V	V	1	Open woodlands and grasslands in western Qld. Not recorded in the study area.	no	no	no	no	
Superb Parrot	<i>Polytelis swainsonii</i>		V	3	Not known from the study area. Found in NSW.	no	no	no	no	

Common Name	Scientific Name	Status		Source	Preferred Habitat	Preferred habitat present				Comments
		NC Act	EPBC Act			ML	ML 2	CL	UIC	
Australian Painted Snipe	<i>Rostratula australis</i>	V	V	1,3	Freshwater swamps, marshes and seasonally inundated grasslands.	yes	yes	yes	yes	
Black-breasted Button-quail	<i>Turnix melanogaster</i>		V	3	Vine thickets and rainforest habitats. Sometimes in adjacent, disturbed but well vegetated habitats. SE Qld and northern NSW.	yes	yes	yes	yes	
Mammals										
Large-eared Pied Bat, Large Pied Bat	<i>Chalinolobus dwyeri</i>		V	3	Cave or tree-roosting bat usually found in association with sandstone escarpments and gorges. Kroombit Tops, Carnarvon Ranges, Cania Gorge.	yes	yes	yes	yes	
Little Pied Bat	<i>Chalinolobus picatus</i>	R		1	Arid woodlands and forests. Widespread but patchily distributed.	yes	yes	yes	yes	
Northern Quoll	<i>Dasyurus hallucatus</i>		E	3	Patchy occurrence in northern parts of the study area in forests and woodlands. Records from Carnarvon Range and parts of the Great Dividing Range.	yes	yes	yes	no	
Spotted-tailed Quoll (Southern Subspecies)	<i>Dasyurus maculatus maculatus</i>	V	E	1,3	Rainforest and wet sclerophyll forest habitats is south east Qld. Possibly a patchy distribution in the study area.	yes	yes	yes	no	
Semon's Leaf-nosed Bat	<i>Hipposideros semoni</i>		E	3	Dubious records from St Mary's Forest. Otherwise only known from northern Qld.	no	no	no	no	
Eastern Long-eared Bat	<i>Nyctophilus timoriensis</i>	R	V	2	Arid woodlands in the southern parts of the study area.	no	no	no	yes	
Grey-headed Flying-Fox	<i>Pteropus poliocephalus</i>		V	1,3	Coastal forests, mangroves and woodlands.	yes	yes	no	no	
False Water Rat	<i>Xeromys myoides</i>		V	3	Coastal mangroves and samphire habitats. Patchy distribution along the Qld coast.	yes	yes	no	No	

**ATTACHMENT 10 – ESTIMATED CLEARING EXTENT BY REGIONAL
ECOSYSTEM**

Ecological Communities / RE		Status*		Total Area (ha)	Area within 5 km Buffer	% within 5 km Buffer	Area within Bioregion (ha)	% within Bioregion
RE	Description	VM	EPBC					
11.1.2	<i>Samphire</i> forbland on marine clay plains	NOC		8.46	666.19	1.2702%	108,487.81	0.0078%
11.1.4	Mangrove forest/woodland on marine clay plains	NOC		6.42	911.15	0.7047%	84,459.93	0.0076%
11.3.1	<i>Acacia harpophylla</i> and / or <i>Casuarina cristata</i> open forest on alluvial plains	E	E	0.96	73.58	1.3007%	77,206.61	0.0012%
11.3.2	<i>Eucalyptus populnea</i> woodland on alluvial plains	OC		55.65	6297.73	0.8837%	535,750.16	0.0104%
11.3.3	<i>Eucalyptus coolabah</i> woodland on alluvial plains	OC		3.15	889.21	0.3539%	283,128.91	0.0011%
11.3.4	<i>Eucalyptus tereticornis</i> and/or <i>Eucalyptus</i> spp. tall woodland on alluvial plains	OC		17.57	3444.02	0.5102%	193,636.89	0.0091%
11.3.6	<i>Eucalyptus melanophloia</i> woodland on alluvial plains	NOC		2.21	147.01	1.5021%	30,650.30	0.0072%
11.3.14	<i>Eucalyptus</i> spp., <i>Angophora</i> spp., <i>Callitris</i> spp. woodland on alluvial plains.	NOC		10.19	1913.78	0.5324%	80,992.53	0.0126%
11.3.17	<i>Eucalyptus populnea</i> woodland with <i>Acacia harpophylla</i> and/or <i>Casuarina cristata</i> on alluvial plains	OC		2.10	49.83	4.2234%	36,891.71	0.0057%
11.3.18	<i>Eucalyptus populnea</i> ,	NOC		3.57	1121.65	0.3185%	82,220.04	0.0043%

Ecological Communities / RE		Status*		Total Area (ha)	Area within 5 km Buffer	% within 5 km Buffer	Area within Bioregion (ha)	% within Bioregion
RE	Description	VM	EPBC					
	<i>Callitris glaucophylla</i> , <i>Allocasuarina luehmannii</i> shrubby woodland on alluvium							
11.3.25	<i>Eucalyptus tereticornis</i> or <i>E. camaldulensis</i> woodland fringing drainage lines	NOC		46.63	6950.72	0.6709%	488,209.38	0.0096%
11.3.26	<i>Eucalyptus moluccana</i> or <i>E. microcarpa</i> woodland to open forest on margins of alluvial plains	NOC		11.48	3060.79	0.3752%	44,679.77	0.0257%
11.3.27	Freshwater wetlands	NOC		1.09	28.44	3.8479%	15,605.17	0.0070%
11.3.39	<i>Eucalyptus melanophloia</i> ± <i>E. chloroclada</i> woodland on undulating ,plains and valleys with sandy soils	NOC		0.35	519.70	0.0670%	144,227.67	0.0002%
11.4.3	<i>Acacia harpophylla</i> and/or <i>Casuarina cristata</i> shrubby open forest on Cainozoic clay plains	E	E	5.14	860.24	0.5971%	76,888.21	0.0067%
11.5.1	<i>Eucalyptus crebra</i> , <i>Callitris glaucophylla</i> , <i>Angophora leiocarpa</i> , <i>Allocasuarina luehmannii</i> woodland on Cainozoic sand plains/remnant surfaces	NOC		305.18	43603.57	0.6999%	482,867.12	0.0632%

Ecological Communities / RE		Status*		Total Area (ha)	Area within 5 km Buffer	% within 5 km Buffer	Area within Bioregion (ha)	% within Bioregion
RE	Description	VM	EPBC					
11.5.4	<i>Eucalyptus crebra</i> , <i>Callitris glaucophylla</i> , <i>C. endlicheri</i> , <i>E. chloroclada</i> , <i>Angophora leiocarpa</i> on Cainozoic sand plains/remnant surfaces. Deep sands	NOC		38.97	6151.38	0.6335%	109,277.51	0.0357%
11.5.5	<i>Eucalyptus melanophloia</i> , <i>Callitris glaucophylla</i> woodland on Cainozoic sand plains/remnant surfaces. Deep red sands	NOC		8.91	495.80	1.7963%	134,878.61	0.0066%
11.5.13	<i>Eucalyptus populnea</i> and/or <i>E. melanophloia</i> and/or <i>Corymbia clarksoniana</i> on Cainozoic sand plains/remnant surfaces	NOC		3.63	1009.58	0.3593%	102,166.37	0.0036%
11.5.20	<i>Eucalyptus moluccana</i> and/or <i>E. microcarpa</i> / <i>E. pilligaensis</i> ± <i>E. crebra</i> woodland on Cainozoic sand plains	NOC		61.16	16021.37	0.3817%	154,248.42	0.0397%
11.5.21	<i>Corymbia bloxsomei</i> ± <i>Callitris glaucophylla</i> ± <i>Eucalyptus crebra</i> ± <i>Angophora leiocarpa</i> woodland on Cainozoic sand plains/remnant surfaces	NOC		31.07	7746.78	0.4010%	72,274.15	0.0430%
11.7.2	<i>Acacia</i> spp.	NOC		19.76	2270.46	0.8703%	374,752.74	0.0053%

Ecological Communities / RE		Status*		Total Area (ha)	Area within 5 km Buffer	% within 5 km Buffer	Area within Bioregion (ha)	% within Bioregion
RE	Description	VM	EPBC					
	woodland on Cainozoic lateritic duricrust. Scarp retreat zone							
11.7.4	<i>Eucalyptus decorticans</i> and/or <i>Eucalyptus</i> spp., <i>Corymbia</i> spp., <i>Acacia</i> spp., <i>Lysicarpus angustifolius</i> on Cainozoic lateritic duricrust	NOC		284.35	33037.00	0.8607%	226,997.83	0.1253%
11.7.5	Shrubland on natural scalds on deeply weathered coarse-grained sedimentary rocks	NOC		28.15	3649.01	0.7715%	63,554.47	0.0443%
11.7.6	<i>Corymbia citriodora</i> or <i>Eucalyptus crebra</i> woodland on Cainozoic lateritic duricrust	NOC		123.86	25177.47	0.4920%	344,574.96	0.0359%
11.7.7	<i>Eucalyptus fibrosa</i> subsp. <i>nubila</i> ± <i>Corymbia</i> spp. ± <i>Eucalyptus</i> spp. on Cainozoic lateritic duricrust	NOC		142.58	18234.27	0.7819%	172,437.24	0.0827%
11.8.4	<i>Eucalyptus melanophloia</i> woodland on Cainozoic igneous rocks. Hillsides	NOC		0.00	1986.63	0.0000%	152,412.29	0.0000%
11.9.1	<i>Acacia harpophylla</i> - <i>Eucalyptus cambageana</i> open forest to woodland on fine-grained sedimentary rocks	E	E	0.00	214.16	0.0000%	55,909.00	0.0000%

Ecological Communities / RE		Status*		Total Area (ha)	Area within 5 km Buffer	% within 5 km Buffer	Area within Bioregion (ha)	% within Bioregion
RE	Description	VM	EPBC					
11.9.2	<i>Eucalyptus melanophloia</i> ± <i>E. orgadophila</i> woodland on fine-grained sedimentary rocks	NOC		0.70	319.58	0.2179%	151,247.22	0.0005%
11.9.4	Semi-evergreen vine thicket or <i>Acacia harpophylla</i> with a semi-evergreen vine thicket understorey on fine grained sedimentary rocks	E	E	2.32	1729.59	0.1344%	56,887.60	0.0041%
11.9.5	<i>Acacia harpophylla</i> and/or <i>Casuarina cristata</i> open forest on fine-grained sedimentary rocks	E	E	8.31	3181.73	0.2612%	145,843.83	0.0057%
11.9.6	<i>Acacia melvillei</i> ± <i>A. harpophylla</i> open forest on fine-grained sedimentary rocks	E	E	0.00	8.11	0.0000%	377.83	0.0000%
11.9.7	<i>Eucalyptus populnea</i> , <i>Eremophila mitchellii</i> shrubby woodland on fine-grained sedimentary rocks	OC		20.40	2471.30	0.8255%	108,832.10	0.0187%
11.9.10	<i>Acacia harpophylla</i> , <i>Eucalyptus</i>	OC		1.12	225.42	0.4967%	84,260.40	0.0013%

Ecological Communities / RE		Status*		Total Area (ha)	Area within 5 km Buffer	% within 5 km Buffer	Area within Bioregion (ha)	% within Bioregion
RE	Description	VM	EPBC					
	<i>populnea</i> open forest on fine-grained sedimentary rocks							
11.9.12	<i>Dichanthium sericeum</i> grassland with clumps of <i>Acacia harpophylla</i> on fine-grained sedimentary rocks	E	E	0.00	4.36	0.0000%	4,344.61	0.0000%
11.10.1	<i>Corymbia citriodora</i> open forest on coarse-grained sedimentary rocks	NOC		65.96	12254.60	0.5382%	888,060.03	0.0074%
11.10.4	<i>Eucalyptus decorticans</i> , <i>Lysicarpus angustifolius</i> ± <i>Eucalyptus</i> spp., <i>Corymbia</i> spp., <i>Acacia</i> spp. woodland on coarse-grained sedimentary rocks. Crests and scarps	NOC		0.20	355.58	0.0555%	476,810.79	0.0000%
11.10.7	<i>Eucalyptus crebra</i> woodland on coarse-grained sedimentary rocks	NOC		23.52	3747.81	0.6275%	287,854.07	0.0082%
11.10.9	<i>Callitris glaucophylla</i> woodland on coarse-grained sedimentary rocks	NOC		28.84	10321.88	0.2794%	391,293.43	0.0074%
11.10.13	<i>Eucalyptus</i> spp. and/or <i>Corymbia</i> spp. open forest on scarps and sandstone	NOC		0.00	1250.44	0.0000%	392,649.76	0.0000%

Ecological Communities / RE		Status*		Total Area (ha)	Area within 5 km Buffer	% within 5 km Buffer	Area within Bioregion (ha)	% within Bioregion
RE	Description	VM	EPBC					
	tablelands							
11.11.3	<i>Corymbia citriodora</i> , <i>Eucalyptus crebra</i> , <i>E. acmenoides</i> open forest on old sedimentary rocks with varying degrees of metamorphism and folding. Coastal ranges	NOC		7.48	1625.12	0.4603%	97,542.15	0.0077%
11.11.4	<i>Eucalyptus crebra</i> woodland on old sedimentary rocks with varying degrees of metamorphism and folding. Coastal ranges	NOC		0.65	1733.49	0.0376%	69,242.45	0.0009%
11.11.9	<i>Eucalyptus populnea</i> or <i>E. brownii</i> woodland on deformed and metamorphosed sediments and interbedded volcanics	NOC		0.66	76.97	0.8590%	54,082.58	0.0012%
11.11.15	<i>Eucalyptus crebra</i> woodland on deformed and metamorphosed sediments and interbedded volcanics. Undulating plains	NOC		33.42	15059.99	0.2219%	531,492.78	0.0063%
11.11.18	Semi-evergreen vine thicket on old sedimentary rocks with varying degrees of metamorphism	E	E	0.15	537.12	0.0279%	4,705.52	0.0032%

Ecological Communities / RE		Status*		Total Area (ha)	Area within 5 km Buffer	% within 5 km Buffer	Area within Bioregion (ha)	% within Bioregion
RE	Description	VM	EPBC					
	and folding. Lowlands							
11.12.1	<i>Eucalyptus crebra</i> woodland on igneous rocks	NOC		16.78	9957.69	0.1685%	849,014.05	0.0020%
11.12.2	<i>Eucalyptus melanophloia</i> woodland on igneous rocks	NOC		2.69	1148.05	0.2343%	194,603.63	0.0014%
11.12.3	<i>Eucalyptus crebra</i> , <i>E. tereticornis</i> , <i>Angophora leiocarpa</i> woodland on igneous rocks especially granite	NOC		0.32	428.99	0.0748%	54,545.01	0.0006%
11.12.4	Semi-evergreen vine thicket and microphyll vine forest on igneous rocks	NOC		0.72	269.42	0.2672%	56,163.87	0.0013%
11.12.6	<i>Corymbia citriodora</i> open forest on igneous rocks (granite)	NOC		4.44	4112.43	0.1080%	157,186.73	0.0028%
11.12.17	<i>Eucalyptus populnea</i> woodland on igneous rocks. Colluvial lower slopes	E		0.00	157.90	0.0000%	2,254.88	0.0000%
11.12.21	<i>Acacia harpophylla</i> open forest on igneous rocks. Colluvial lower slopes	E	E	0.01	234.35	0.0043%	6,721.24	0.0001%
12.3.3	<i>Eucalyptus tereticornis</i> woodland to open forest on alluvial plains	E		0.97	199.20	0.4870%	44,751.92	0.0022%
12.3.7	<i>Eucalyptus tereticornis</i> , <i>Melaleuca</i>	NOC		0.00	264.32	Field survey found	36,134.22	Field survey found none

Ecological Communities / RE		Status*		Total Area (ha)	Area within 5 km Buffer	% within 5 km Buffer	Area within Bioregion (ha)	% within Bioregion
RE	Description	VM	EPBC					
	<i>viminalis</i> , <i>Casuarina cunninghamiana</i> fringing forest					none present		present
12.3.11	<i>Eucalyptus siderophloia</i> , <i>E. tereticornis</i> , <i>Corymbia intermedia</i> open forest on alluvial plains usually near coast	OC		0.75	89.02	0.8425%	61,174.21	0.0012%
12.11.6	<i>Corymbia citriodora</i> , <i>Eucalyptus crebra</i> open forest on metamorphics ± interbedded volcanics	NOC		18.60	3899.39	0.4770%	239,062.26	0.0078%
12.11.14	<i>Eucalyptus crebra</i> , <i>E. tereticornis</i> woodland on metamorphics ± interbedded volcanics	OC		0.41	269.51	0.1533%	29,588.20	0.0014%

ATTACHMENT 11 – POTENTIAL IMPACTS ON EVR FLORA SPECIES

Common Name	Scientific Name	NCA	EPBC	Habitat	Potential to be Impacted Without Mitigation Measures [^]	Mitigation Measures	Potential to be Significantly Impacted with Mitigation Measures
Waajie Wattle	<i>Acacia barakulensis</i>	V		Only known in Barakula SF	Moderate on Option 2	Planning Survey and Clearance Surveys	Low (easily avoidable)
Rare wattle	<i>Acacia calantha</i>	R		Found Monto, Taroom and Dawson River Record by L. Pedley 18km South of Cracow, Qld, 17 Dec. 1976 (<i>Qld Herbarium Records</i>)	Moderate on Option 1, Option 2 and Lateral	Clearance Survey	Low (easily avoidable)
Chinchilla Wattle	<i>Acacia chinchillensis</i>	V	V	Occurs in south-eastern Qld N of Chinchilla and near Tara. Grows in ironbark <i>Eucalyptus</i> , <i>Callitris columellaris</i> , <i>Casuarina</i> sp. woodland, in sandy or gravelly soils (ABRS, 2001).	Moderate on Option 1, Option 2 and UIC	Clearance Survey	Low (easily avoidable)
Curly-bark Wattle	<i>Acacia curranii</i>	V	V	Only known in Gurulmundi wildflower area north of Miles.	High at and near Gurulmundi State Forest (restricted species)	Clearance Surveys. Exclusion area in Gurulmundi SF and area to north west	Low (Potentially High in Gurulmundi area without exclusion areas)
Hando's Wattle	<i>Acacia handonis</i>	V	V	Understorey plant in <i>Eucalyptus</i> forests on sandstone ridges. Restricted to Barakula State Forest.	Moderate on Option 2	Planning Survey and Clearance Surveys	Low (easily avoidable)
Tara Wattle	<i>Acacia lauta</i>	V	V	Found from Tara to Inglewood 1) Property "Marron Glen", 2) 15km nth of Tara and 3) 16km east of Tara.	Moderate on UIC	Clearance Survey	Low (easily avoidable)
Pedley's Wattle	<i>Acacia pedleyi</i>	R	-	Recorded in Biloela Area (KP 290.)	High on Export Pipeline (Options 1 and 2) (restricted	Clearance Survey	Low (easily avoidable)

Common Name	Scientific Name	NCA	EPBC	Habitat	Potential to be Impacted Without Mitigation Measures [^]	Mitigation Measures	Potential to be Significantly Impacted with Mitigation Measures
					species)		
Rare Wattle	<i>Acacia pubicosta</i>	R	-	Confined to rocky slopes (Maslin, 2001). Recorded in Biloela Area (KP 290).	Moderate on Export Pipeline (Options 1 and 2) (restricted species)	Clearance Survey	Low (easily avoidable)
Scrub Wattle	<i>Acacia tenuinervis</i>	R		Found in Brigalow Woodland, Dry Vine Scrub, Also along Gullies, Creeks from Wandoan to Mundubbera	Moderate on UIC (Options 1 and 2 and UIC)	Clearance Survey	Low (restricted habitat type, easily avoidable)
Wardell's Wattle	<i>Acacia wardellii</i>	V	V	Ridge crests with loamy or gravely soil. Coloniser of disturbed areas – Thomby Range and a few ridges east of the Condamine.	Moderate on UIC	Clearance Survey	Low (restricted habitat type, easily avoidable)
Scrub Daphne	<i>Actephila sessilifolia</i>	R	-	Recorded from Bundaberg north to Yarrol; Known within locations RE 11.3.11, RE 11.3.26, RE 11.5.15 and RE 11.12.4. Occurs in vine thicket and dry rainforest communities along creeks and drainage lines.	Moderate on Options 1 and 2	Clearance Survey	Low (restricted habitat type, easily avoidable)
Large-leaf Chainfruit	<i>Alyxia magnifolia</i>	R	-	Occurs in eastern Queensland, from Eungella in the north to the NSW border in the south. It generally grows in rainforests and also tall open forest with a rainforest understorey. It has been recorded from 130-180 m altitude, usually on granitic substrates (DNR 1999)	Moderate on Options 1 and 2	Clearance Survey	Low (restricted habitat type, easily avoidable)

Common Name	Scientific Name	NCA	EPBC	Habitat	Potential to be Impacted Without Mitigation Measures [^]	Mitigation Measures	Potential to be Significantly Impacted with Mitigation Measures
Rough Alyxia	<i>Alyxia sharpei</i>	R	-	Central Queensland, in Araucarian Microphyll Vineforests, Complex Notophyll Vineforests, Notophyll Scrub, or in tall open woodlands (DNR, 1999).	Moderate on Options 1 and 2	Clearance Survey	Low (restricted habitat type, easily avoidable)
sandstone prickly-bush	<i>Apatophyllum terefolium</i>	R	-	Prickly 40 cm herb found in woodland within RE 11.7.5, RE 11.10.1 and RE 11.10.13. Burnett and Leichhardt Pastoral Districts	Moderate on Options 1 and 2 and Lateral	Clearance Survey	Low (easily avoidable)
Queensland Lace Plant	<i>Aponogeton queenslandicus</i>	R	-	A seasonally emergent aquatic plant found in throughout much of coastal Queensland. In rivers, streams and temporary freshwater pools to 30-60cm depth. Not usually found in permanent waters (Stephens and Dowling, 2002).	Moderate	Clearance Survey, Erosion and Sedimentation Controls near watercourse crossings. Contamination controls.	Low (easily avoidable)
None known	<i>Atalaya calicola</i>	R		In dry rainforest and deciduous vine thicket on boulder-strewn slopes, and on hills with granite, limestone, sandstone and basaltic rock outcrops (DNR, 1999).	Moderate on Options 1 and 2	Clearance Survey	Low (restricted habitat type, easily avoidable)
Roadside Wallaby Grass	<i>Atalaya collina</i>	E	E	Grows on hillsides, in remnant dry scrubs, together with <i>A. salicifolia</i> , but is not as common as that species (Reynolds, 1991)	Moderate on Options 1 and 2	Clearance Survey	Low (restricted habitat type, easily avoidable)
None known	<i>Atalaya rigida</i>	R		Restricted to eastern Qld from Mt	Moderate on Options	Clearance Survey	Low (restricted habitat

Common Name	Scientific Name	NCA	EPBC	Habitat	Potential to be Impacted Without Mitigation Measures [^]	Mitigation Measures	Potential to be Significantly Impacted with Mitigation Measures
				Aberdeen near Bowen, south to Mt Glastonbury south west of Gympie. Occurs in vine thicket and araucarian microphyll notophyll vineforest on red clay soil or black clay loam (DNR, 1999)	1 and 2		type, easily avoidable)
None known	<i>Bertya pedicellata</i>	R		Restricted to central Queensland. Associated with <i>Corymbia trachypholia</i> (brown bloodwood), <i>Acacia catenulata</i> , <i>A. curvinervia</i> , and <i>A. shirleyi</i> (lancewood) (Qld Herb., 2001).	Moderate on Options 1 and 2	Clearance Survey	Low (easily avoidable)
Ooline	<i>Cadellia pentastylis</i>	V	V	Clay plains, sandstone and residual ridges in association with vine thickets, brigalow, belah and red bauhinia.	Moderate	Clearance Survey	Low (low numbers anticipated, easily avoided)
Bailey's Cypress Pine	<i>Callitris baileyi</i>	R	-	Hilly or mountainous areas often in the vicinity of dry vine forests. One Qld Herbarium record near Gurulmundi SF.	Moderate	Clearance Survey	Low (low numbers anticipated, easily avoided)
Yellow Fringed Myrtle	<i>Calytrix gurulmundensis</i>	V	V	Found on lateritic sandstone ridges. Localised and patchy distribution.	High at and near Gurulmundi State Forest (restricted species)	Clearance Surveys. Exclusion area in Gurulmundi SF and area to north west	Low (Potentially High in Gurulmundi area without exclusion areas)
Native Frangipani	<i>Cerbera dunicola</i>	R	-	Widespread in central Qld. Grows in vine thickets and lancewood (<i>Acacia shirleyi</i>) thickets (Forster,	High on Options 1 and 2 and Lateral (restricted species)	Clearance Survey, potential requirement for more significant	Low (assuming ability to realign >0.5 km if necessary)

Common Name	Scientific Name	NCA	EPBC	Habitat	Potential to be Impacted Without Mitigation Measures^	Mitigation Measures	Potential to be Significantly Impacted with Mitigation Measures
				1996).		realignment (e.g. >0.5 km) to avoid populations (if any)	
Silver Commersonia	<i>Commersonia argentea</i> syn <i>Commersonia</i> sp. (<i>Cadarga</i> G.P. Guymer 1642)	-	V	Stony ridges, north of Chinchilla	High on Option 2 (restricted species)	Clearance Survey	Low (low numbers anticipated, restricted habitat type, easily avoided)
Cossinia	<i>Cossinia australiana</i>	E	E	Small tree up to 7 m found in depauperate rainforest relicts, usually on volcanic soil (Stanley and Ross, 1986). Recorded at Kingaroy, Gympie, Munholme Ck, Burnett River (Qld Herbarium)	Moderate on Options 1 and 2	Clearance Survey	Low (restricted habitat type, easily avoidable)
None known	<i>Cryptandra ciliata</i>	R		Known record at Gurulmundi State Forest (Qld Herbarium)	Moderate on Options 1 and 2 and Lateral	Clearance Survey	Low (low numbers anticipated, restricted habitat type, easily avoided)
Wedge-leaf Tuckeroo	<i>Cupaniopsis shirleyana</i>	V	V	Depauperate rainforests (Stanley and Ross, 1983).	Moderate on Options 1 and 2	Clearance Survey	Low (low numbers anticipated, restricted habitat type, easily avoided)
Large-fruited Zamia	<i>Cycas megacarpa</i>	E	E	Stony clay loams on hill tops and steep slopes. Commonly in spotted gum and ironbark open forest and woodland with a grassy understorey (DNR, 1999).	High on Options 1 and 2	Clearance Survey	Moderate (populations expected on rocky slopes near KP 290 and near Mt Larcom, potential inability to avoid to be confirmed by detailed field assessment))

Common Name	Scientific Name	NCA	EPBC	Habitat	Potential to be Impacted Without Mitigation Measures^	Mitigation Measures	Potential to be Significantly Impacted with Mitigation Measures
Vulnerable Sedge	<i>Cyperus clarus</i>	V	-	Found in Wet creek/drainage lines (Qld Herbarium)	Moderate	Clearance Survey	Low (low numbers anticipated, restricted habitat type, easily avoided)
None known	<i>Dansiea elliptica</i>	R	-	Sandy, granitic soils on rainforest margins in north eastern Queensland, and in low elevation dry rainforest and semi evergreen vine thickets in south eastern Queensland (DNR, 1999).	Moderate on Opitons 1 and 2	Clearance Survey	Low (low numbers anticipated, restricted habitat type, easily avoided)
Small-leaved Denhamia	<i>Denhamia parvifolia</i>	V	V	Found in semi-evergreen vine thickets. Brown loam or clay loam soils.	Moderate on UIC and Lateral	Clearance Survey	Low (low numbers anticipated, restricted habitat type, easily avoided)
Pentland Pea	<i>Desmodium macrocarpum</i>	R		Recorded Semi-evergreen Vine Thicket	Moderate	Clearance Survey	Low (low numbers anticipated, restricted habitat type, easily avoided)
King Blue Grass	<i>Dichanthium queenslandicum</i>	V	V	Endemic to Qld black soil plains. Occurs in RE's 11.8.11, 11.3.21	Moderate on Options 1 and 2	Clearance Survey	Low (restricted habitat type, easily avoided)
Tricolour Diuris	<i>Diuris tricolor (sheaffiana)</i>	-	V	Sandy soils, often in Callitris woodlands. Primarily a NSW species with scattered records in Qld.	Moderate on Options 1 and 2 and UIC	Clearance Survey	Low (low numbers anticipated, easily avoidable).
Blake's Spikerush	<i>Eleocharis blakeana</i>	R	-	Known in wet poorly drained soils; Records along Auburn Rd Chinchilla and Lake Broadwater	Moderate	Clearance Survey, Erosion and Sedimentation Controls near watercourse crossings. Contamination	Low (low numbers anticipated, restricted habitat type, easily avoided)

Common Name	Scientific Name	NCA	EPBC	Habitat	Potential to be Impacted Without Mitigation Measures^	Mitigation Measures	Potential to be Significantly Impacted with Mitigation Measures
						controls.	
Salt Pipewort, Button Grass	<i>Eriocaulon carsonii subsp. orientale</i>	E	E	Known in Wet poorly drained soils. Mound Springs areas near Injune Area	High (restricted species)	Clearance Survey, Erosion and Sedimentation Controls near watercourse crossings. Contamination controls.	Low (restricted habitat type, easily avoided)
Tony's ironbark	<i>Eucalyptus beaniana</i>	V	V	Rocky Areas such as Isla Gorge Robinson Gorge and Mundubbera	Moderate on Options 1 and 2	Clearance Survey	Low (low numbers anticipated, restricted habitat type, easily avoided)
Plunkett Mallee	<i>Eucalyptus curtisii</i>	R	-	Eucalypt forests, woodlands and shrublands on rocky slopes or on low poorly drained sites (Qld Herb., 2001).	Moderate	Clearance Survey	Low (low numbers anticipated, restricted habitat type, easily avoided)
Pumpkin Gum	<i>Eucalyptus pachycalyx</i>	E	E	On skeletal sandy soils (Botanic Gardens Trust, 2009)	Moderate	Clearance Survey	Low (low numbers anticipated, restricted habitat type, easily avoided)
Woollybark	<i>Eucalyptus rubiginosa</i>	R	-	Type was collected within Ironbark and Yellow Bloodwood community (Brooker, 1984)	High (restricted species)	Clearance Survey	Low (low numbers anticipated, easily avoided)
Shiny-leaved Ironbark	<i>Eucalyptus virens</i>	V	V	Sandstone ridges. Four populations – 1) Coolmunda Conservation Park 2) Tara, 3) NE of Eidsvold and 4) Maranoa River near Mt Moffatt.	High on UIC (restricted species)	Clearance Survey	Low (low numbers anticipated, restricted habitat type, easily avoided)
Rare Fringe-	<i>Fimbristylis</i>	R	-	Wet creek/drainage lines Wetland	Moderate	Clearance Survey	Low (low numbers

Common Name	Scientific Name	NCA	EPBC	Habitat	Potential to be Impacted Without Mitigation Measures [^]	Mitigation Measures	Potential to be Significantly Impacted with Mitigation Measures
rush	<i>vagans</i>			plant recorded in the nearby Lake Broadwater Area			anticipated, restricted habitat type, easily avoided)
None known	<i>Gonocarpus urceolatus</i>	V	-	Recorded near Chinchilla on heavy loam soils.	Moderate on Options 1 and 2 and UIC	Clearance Survey	Low (low numbers anticipated, restricted habitat type, easily avoided)
Sturt's Desert Rose	<i>Gossypium sturtianum</i>	R	-	Recorded at Expedition Range, Fairview	Moderate on Options 1 and 2 and UIC	Clearance Survey	Low (low numbers anticipated, easily avoided)
None known	<i>Graptophyllum excelsum</i>	R	-	Restricted to Qld, extending from near Mt Larcom north to the Chillagoe- Mt Mungana area. Occurs on rocky hillsides in Semi-evergreen Vine Thickets. Also recorded growing in grassy eucalypt woodland (DNR, 1999).	Moderate on Options 1 and 2	Clearance Survey	Low (low numbers anticipated, restricted habitat type, easily avoided)
None known	<i>Grevillea hockingsii</i>	V	-	Found on slopes in hilly sandstone country on shallow sandy to sandy loam soils in woodland and open forest communities. Restricted to southern Queensland from Mt Morgan south to Monto (DNR 1999)	Moderate on Options 1 and 2	Clearance Survey	Low (low numbers anticipated, restricted habitat type, easily avoided)
-	<i>Grevillea singuliflora</i>	R	-	Sandy, sandstone and rocky areas.	Moderate	Clearance Survey	Low (low numbers anticipated, restricted habitat type, easily avoided)
Cudgerie	<i>Hernandia</i>	R	-	Vine forests on rocks with shallow	Moderate on Options 1 and 2	Clearance Survey	Low (low numbers anticipated, restricted

Common Name	Scientific Name	NCA	EPBC	Habitat	Potential to be Impacted Without Mitigation Measures [^]	Mitigation Measures	Potential to be Significantly Impacted with Mitigation Measures
	<i>bivalvis</i>			soils (DNR, 1999)).			habitat type, easily avoided)
None known	<i>Homopholis belsonii</i>	E	V	Known from near Gurulmundi, 30km north of Miles in the Darling Downs district (Stanley and Ross, 1989).	High (restricted species)	Clearance Survey	Low (low numbers anticipated, easily avoided)
None known	<i>Homoranthus decumbens</i>	V	V	Found in two separate locations 1) Blackdown Tablelands and 2) State Forest 302, north of Chinchilla.	Moderate	Clearance Survey	Low (low numbers anticipated, easily avoided)
None known	<i>Indigofera baileyi</i>	R	-	On clay soil derived from sandstone. Associated with <i>Eucalyptus crebra</i> (narrow-leaved ironbark), <i>E. orgadophila</i> (mountain coolibah) or <i>Corymbia erythrophloia</i> (red-barked bloowood) (DNR, 1999).	Moderate	Clearance Survey	Low (low numbers anticipated, easily avoided)
None known	<i>Leucopogon cuspidatus</i>	-	V	Mainly on rocky slopes, cliffs and rocky outcrops. Commonly in woodland or open woodland and sometimes in heath or shrubland communities (M. Edginton, pers. comm.).	Moderate on Options 1 and 2 and Lateral	Clearance Survey	Low (low numbers anticipated, restricted habitat type, easily avoided)
None known	<i>Leucopogon grandiflorus</i>	R	-	Is found at 200 to 720 m altitude and occurs in eucalypt forest or woodland on sandstone cliffs or sandy valley floors. It grows on skeletal to deep sands. Restricted to central and south	High	Clearance Survey	Low (low numbers anticipated, restricted habitat type, easily avoided)

Common Name	Scientific Name	NCA	EPBC	Habitat	Potential to be Impacted Without Mitigation Measures^	Mitigation Measures	Potential to be Significantly Impacted with Mitigation Measures
				central Queensland, its distribution extends from the Mt Percy region east to Nathan Gorge, and from the Expedition Range, south to Robinson Gorge (DNR 1999).			
None known	<i>Macarthuria ephedroides</i>	R	-	In small patches in rocky sandstone hills (White, 1947)	High (restricted species)	Clearance Survey	Low (low numbers anticipated, restricted habitat type, easily avoided)
None known	<i>Macropteranthes fitzalanii</i>	R	-	Found in coastal notophyll vine forest, microphyll vine forest and littoral rainforest on rocky outcrops with poor soil. Restricted to coastal areas of central Queensland from the western slopes of Mt Dryander, north of Proserpine down to Rockhampton (DNR 1999).	Moderate on Options 1 and 2	Clearance Survey	Low (low numbers anticipated, restricted habitat type, easily avoided)
None known	<i>Macropteranthes leiocaulis</i>	R	-	Deciduous vine thickets, semi-evergreen vine thickets and Araucarian Microphyll Vine Forests on red euchrozems or sandstone talus (DNR, 1999).	Moderate on Options 1 and 2	Clearance Survey	Low (low numbers anticipated, restricted habitat type, easily avoided)
None known	<i>Macrozamia crassifolia</i>	V	V	Restricted to the Eidsvold – Mundubbera district in Queensland. Found on sandy soils over granite (DEW 2007).	Moderate on Options 1 and 2	Clearance Survey	Low (low numbers anticipated, restricted habitat type, easily avoided)
None known	<i>Macrozamia</i>	V	V	Grows in open forest on sandy	Moderate on Lateral	Clearance Survey	Low (low numbers

Common Name	Scientific Name	NCA	EPBC	Habitat	Potential to be Impacted Without Mitigation Measures^	Mitigation Measures	Potential to be Significantly Impacted with Mitigation Measures
	<i>fearnsidei</i>			soils of sandstone origin either on rocky slopes or in gullies near ephemeral streams at approx 300-400m altitude. Restricted to central Qld (DNR 1999)			anticipated, restricted habitat type, easily avoided)
None known	<i>Melaleuca groveana</i>	R	-	Occurs on ridges, high mountain slopes and mountain summits in heaths and eucalypt woodland and forests with heath understories (DNR, 1999).	Moderate	Clearance Survey	Low (restricted habitat type, avoidable for well sites). Limited clearing may be required for linear infrastructure if large patches unavoidable
None known	<i>Melaleuca irbyana</i>	R	-	On silty clay soils often in low lying areas subject to occasional inundation. Usually in association with <i>Eucalyptus moluccana</i>	Moderate on Lateral	Clearance Survey	Low (low numbers anticipated, restricted habitat type, easily avoided)
Gurulmundi Heath-myrtle	<i>Micromyrtus carinata</i>	E	-	Type collected from Gurulmundi SF	High at and near Gurulmundi State Forest (restricted species)	Clearance Surveys. Exclusion area in Gurulmundi SF and area to north west	Low (Potentially High in Gurulmundi area without exclusion areas)
None known	<i>Micromyrtus patula</i>	E	-	Laterised sandstone areas. Type collected in Barakula SF	High (restricted species)	Clearance Survey	Moderate (restricted habitat type but locations and capacity to avoid to be confirmed by detailed field assessment)
Artesian Milfoil	<i>Myriophyllum artesium</i>	E	-	Mound springs and bore drains	High on Options 1 and 2 and UIC (restricted species)	Clearance Survey	Low (low numbers anticipated, restricted habitat type, easily avoided)

Common Name	Scientific Name	NCA	EPBC	Habitat	Potential to be Impacted Without Mitigation Measures^	Mitigation Measures	Potential to be Significantly Impacted with Mitigation Measures
	<i>Notelaea pungens</i>	R	-	Known herbarium records Barakula S F Chinchilla in open eucalypt forest (Guymer, 1987)	High (restricted species)	Clearance Survey	Low (low numbers anticipated, easily avoidable)
None known	<i>Parsonsia larcomensis</i>	V	V	Recorded from 350-750 m elevation. It occurs in open heathland and shrubland at or near the summits of mountain peaks growing in shallow, loamy soils. Restricted to central east and south east Queensland and is confined to the Mt Perry area near Rockhampton (DRN 1999)	Moderate on Options 1 and 2	Clearance Survey	Low (low numbers anticipated, restricted habitat type, easily avoided)
None known	<i>Paspalidium scabrifolium</i>	R	-	In Brigalow communities	Moderate	Clearance Survey	Low (low numbers anticipated, restricted habitat type, easily avoided)
None known	<i>Philotheca sporadica</i>	V	V	On residual lateritic rises. Known as widespread in patches in UIC area.	High	Planning and Clearance Survey, If necessary Threatened Species Management Plans as part of EPA permit and DEWHA approval process	Moderate (restricted habitat type, limited clearing may be required for linear infrastructure if large patches unavoidable)
None known	<i>Phyllanthus brassii</i>	R	-	Montane rainforest and montane heath on granite, usually along streams at altitudes of 1200 to 1260m (DNR, 1999).	Moderate on Options 1 and 2	Clearance Survey	Low (low numbers anticipated, restricted habitat type, easily avoided)

Common Name	Scientific Name	NCA	EPBC	Habitat	Potential to be Impacted Without Mitigation Measures [^]	Mitigation Measures	Potential to be Significantly Impacted with Mitigation Measures
None known	<i>Phyllanthus sauropodoides</i>	R	-	Araucarian Microphyll Vine Forest and Araucarian Notophyll Vine Forest on alluvium soils (DNR, 1999).	Moderate on Options 1 and 2	Clearance Survey	Low (low numbers anticipated, restricted habitat type, easily avoided)
None known	<i>Picris evae</i>	V	V	Small daisy in rocky areas	Moderate	Clearance Survey	Low (low numbers anticipated, easily avoided)
None known	<i>Polianthion minutiflorum</i>		V	Known from five areas in eastern Queensland, from Redcliffe Vale south to Kingaroy, usually in forest and woodland on sandstone slopes and gullies with skeletal soil, or sometimes deeper sands adjacent to deeply weathered laterite (Kellerman et al 2006)	Moderate	Clearance Survey	Low (low numbers anticipated, restricted habitat type, easily avoided)
Quassia	<i>Quassia bidwillii</i>	V	V	Below 650m in rainforests, open forest, woodland and mangroves (DNR, 1999).	Moderate on Options 1 and 2	Clearance Survey	Low (low numbers anticipated, restricted habitat type, easily avoided)
Native Thistle	<i>Rhaponticum australe</i> (syn <i>Stemmacantha australis</i>)	V	V	On heavy clays derived from basalt (DNR, 1999).	Moderate on Options 1 and 2 and Lateral	Clearance Survey	Low (low numbers anticipated, restricted habitat type, easily avoided)
None known	<i>Rutidosia crispata</i>	R	-	The species is presently only known from Glenmoral Gap in the Dawson Range. It occurs on ridge tops, in shallow soils on sandstone in open eucalypt forests (Holland 1994).	High (restricted species)	Clearance Survey	Low (low numbers anticipated, restricted habitat type, easily avoided)

Common Name	Scientific Name	NCA	EPBC	Habitat	Potential to be Impacted Without Mitigation Measures [^]	Mitigation Measures	Potential to be Significantly Impacted with Mitigation Measures
None known	<i>Rutidosia glandulosa</i>	R	-	Recorded from Barakula State Forest (Kokubugata & Holland 2002)	High (restricted species) on Options 1 and 2	Clearance Survey	Low (low numbers anticipated, easily avoided)
None known	<i>Rutidosia lanata</i>	E	-	Occurs in Eucalypt and Acacia forests. Two populations known 1) near Jackson and 2) near Meandarra.	High (restricted species) on Options 1 and 2 and Lateral	Clearance Survey	Low (low numbers anticipated, easily avoided)
None known	<i>Senna acclinis</i>	R	-	Rainforest margins and adjacent open forest between 100-660 m altitude and in association with <i>Pleiogynium timorense</i> , <i>Elattostachys</i> spp., <i>Eucalyptus grandis</i> and <i>Syncarpia glomulifera</i> (DNR, 1999).	Moderate on Options 1 and 2	Clearance Survey	Low (low numbers anticipated, restricted habitat type, easily avoided)
None known	<i>Solanum papaverifolium</i>	E	-	Heavy black soils (Stanley and Ross, 1986).	Moderate on Options 1 and 2 and Lateral	Clearance Survey	Low (low numbers anticipated, easily avoided)
None known	<i>Sporobolus partimpatens</i>	R	-	Open grasslands on black soil. Locally common in undisturbed grasslands. Occurs in RE 11.3.21 (DNR 1999)	Moderate on Options 1 and 2 and Lateral	Clearance Survey	Low (low numbers anticipated, restricted habitat type, easily avoided)
None known	<i>Trymalium minutiflorum</i>	V	V	Found up to an altitude of 340 m on sandy soil or light brown gravelly loam derived from sedimentary rocks. Recorded in Callide Ranges, Goodger and Bileola areas (DNR 1999).	High on Options 1 and 2 and Lateral (restricted species)	Clearance Survey	Low (low numbers anticipated, easily avoided)
Isla Gorge Blue Bells	<i>Wahlenbergia islensis</i>	R	-	Gorge with Rocky outcrops, Crevices	High on Lateral (restricted species)	Clearance Survey	Low (low numbers anticipated, restricted)

Common Name	Scientific Name	NCA	EPBC	Habitat	Potential to be Impacted Without Mitigation Measures^	Mitigation Measures	Potential to be Significantly Impacted with Mitigation Measures
							habitat type, easily avoided)
Durong sage	<i>Xerothamnella herbacea</i>	E	E	Found in Brigalow, Low chenopod shrubland. Records Pelican Back Rd Chinchilla, Theodore S F (Qld Herbarium)	High on Options 1 and 2 (restricted species)	Clearance Survey	Low (low numbers anticipated, restricted habitat type, easily avoided)
Mt Larcom Zieria	<i>Zieria actites</i>	V		Margins of Woodlands	High	Clearance Survey	Low (low numbers anticipated, restricted habitat type, easily avoided)

ATTACHMENT 12 – POTENTIAL IMPACTS ON EVR FAUNA SPECIES

Common Name	Scientific Name	Status		Source	Potential to be Impacted without Mitigation Measures				Mitigation Measures	Potential to be Impacted with Mitigation Measures			
		NC Act	EPBC Act		ML	ML 2	CL	UIC		ML	ML 2	CL	UIC
Molluscs													
Boggomoss Snail	<i>Adclarkia dawsonensis</i>		CE	1	high	high	mod	-	Field survey to determine if snail is present on the proposed pipeline route. Re-align to avoid populations	nil	nil	nil	-
Insects													
Pale Imperial Hairstreak	<i>Jalmenus eubulus evagoras</i>	V		1	high	high	high	high	Field survey for the butterfly. Avoidance of Brigalow communities	low	low	low	low
Amphibians													
Kroombit Tinker Frog	<i>Taudactylus pleione</i>		V	3	mod	mod	-	-	Survey rainforest patches – avoidance .	low	low	-	-
Fish													
Murray Cod	<i>Maccullochella peelii peelii</i>		V	3	-	-	-	mod	Avoid disturbance of aquatic habitats	-	-	-	low
Reptiles													
Common Death Adder	<i>Acanthophis antarcticus</i>	R		1	mod	mod	mod	mod	Fauna spotter to remove entrapped reptiles from pipeline trench. Prevention of fire during construction.	low	low	low	low
Short-necked worm-skink	<i>Anomalopus brevicollis</i>	R		1	mod	mod	-	-	Survey and avoid rainforest remnants in pipeline corridor	nil	nil	-	-
Five-clawed Worm-skink	<i>Anomalopus mackayi</i>		V	3	-	--	-	mod	Fauna spotter to remove entrapped reptiles from pipeline trench. Wildfire prevention during construction.	-	-	-	low
Woma	<i>Aspidites ramsayi</i>	R		1	mod	mod	mod	low	Fauna spotter to remove entrapped reptiles from pipeline trench.	low	low	low	low
Collared Delma	<i>Delma torquata</i>		V	3	mod	mod	mod	mod	Fauna spotter to remove entrapped reptiles from pipeline trench. Wildfire prevention during construction.	low	low	low	low

Common Name	Scientific Name	Status		Source	Potential to be Impacted without Mitigation Measures				Mitigation Measures	Potential to be Impacted with Mitigation Measures			
		NC Act	EPBC Act		ML	ML 2	CL	UIC		ML	ML 2	CL	UIC
Ornamental Snake	<i>Denisonia maculata</i>		V	3	mod	mod	mod	-	Fauna spotter to remove entrapped reptiles from pipeline trench. Wildfire prevention during construction.	low	low	low	-
Yakka Skink	<i>Egernia rugosa</i>		V	1,3	mod	mod	mod	mod	Fauna spotter to remove entrapped reptiles from pipeline trench. Wildfire prevention during construction. Respread cleared timber/vegetation over site.	low	low	low	low
Dunmall's Snake	<i>Furina dunmali</i>	V	V	1,3	mod	mod	mod	mod	Fauna spotter to remove entrapped reptiles from pipeline trench. Avoidance of Brigalow communities	low	low	low	low
Brigalow Scaly-foot	<i>Paradelma orientalis</i>	V	V	1,3	mod	mod	mod	mod	Fauna spotter to remove entrapped reptiles from pipeline trench. Wildfire prevention during construction. Respread cleared timber/vegetation over site.	low	low	low	low
Fitzroy River Turtle	<i>Rheodytes leukops</i>	V	V	1,3	low	low	-	-	Site inspections. Avoidance of major water holes. Minimal disturbance to riparian areas.	low	low	-	-
Golden-tailed Gecko	<i>Strophurus taenicauda</i>	R		1	mod	mod	mod	mod	Fauna spotter to remove entrapped reptiles from pipeline trench. Wildfire prevention during construction. Respread cleared timber/vegetation over site.	low	low	low	low
Grassland Earless Dragon	<i>Tympanocryptis pinguicolla</i>		E	3	-	-	-	mod	Fauna spotter to remove entrapped reptiles from pipeline trench. Wildfire prevention during construction.	low	low	low	low
Birds													

Common Name	Scientific Name	Status		Source	Potential to be Impacted without Mitigation Measures				Mitigation Measures	Potential to be Impacted with Mitigation Measures			
		NC Act	EPBC Act		ML	ML 2	CL	UIC		ML	ML 2	CL	UIC
Grey Goshawk	<i>Accipiter novaehollandiae</i>	R		1	low	low	-	-	Wildfire prevention during construction. Allow partial site regeneration.	low	low	-	-
Glossy Black-cockatoo	<i>Calyptorhynchus lathami</i>	V		1	low	low	low	low	Wildfire prevention during construction. Allow partial site regeneration.	low	low	low	low
Black-necked Stork	<i>Ephippiorhynchus asiaticus</i>	R		1	low	low	-	-	Minimise damage to riparian areas. Directional drilling on mangrove and samphire areas.	low	low	-	-
Yellow Chat (Dawson)	<i>Epthianura crocea macgregori</i>		CE	3	low	low	-	-	Minimise damage to riparian areas. Directional drilling on mangrove and samphire areas.	low	low	-	-
Red Goshawk	<i>Erythrorhynchus radiatus</i>		V	3	low	low	low	-	Wildfire prevention during construction. Allow partial site regeneration.	low	low	low	low
Squatter Pigeon (Southern Subspecies)	<i>Geophaps scripta scripta</i>	V	V	1,3	low	low	low	-	Site inspections. Avoidance of major water holes. Minimal disturbance to riparian areas. Wildfire prevention during construction.	low	low	low	-
Swift Parrot	<i>Lathamus discolor</i>		E/Ma	3	low	low	low	low	Wildfire prevention during construction. Allow partial site regeneration.	low	low	low	low
Square-tailed Kite	<i>Lophoictinia isura</i>	R		1	low	low	low	low	Wildfire prevention during construction. Allow partial site regeneration.	low	low	low	low
Black-chinned Honeyeater	<i>Melithreptus gularis</i>	R		1	low	low	low	low	Wildlife prevention during construction. Allow partial site regeneration.	low	low	low	low
Star Finch (eastern), Star Finch (southern)	<i>Neochmia ruficauda ruficauda</i>		E	3	low	low	low	-	Site inspections. Minimal disturbance to riparian areas. Wildfire prevention during	low	low	low	-

Common Name	Scientific Name	Status		Source	Potential to be Impacted without Mitigation Measures				Mitigation Measures	Potential to be Impacted with Mitigation Measures			
		NC Act	EPBC Act		ML	ML 2	CL	UIC		ML	ML 2	CL	UIC
									construction.				
Turquoise Parrot	<i>Neophema pulchella</i>	R		1	low	low	low	low	Wildlife prevention during construction. Allow partial site regeneration.	low	low	low	low
Cotton Pygmy-Goose	<i>Nettapus coromandelianus</i>	R	Ma/Mi	1,3	low	low	low	low	Site inspections. Avoidance of major water holes. Minimal disturbance to riparian areas. Wildfire prevention during construction.	low	low	low	low
Australian Painted Snipe	<i>Rostratula australis</i>	V	V	1,3	low	low	low	low	Minimal disturbance to riparian areas. Wildlife prevention during construction. Allow partial site regeneration.	low	low	low	low
Black-breasted Button-quail	<i>Turnix melanogaster</i>		V	3	low	low	low	low	Avoidance of SEVT habitats. Minimal disturbance to riparian areas.	low	low	low	low
Mammals													
Large-eared Pied Bat, Large Pied Bat	<i>Chalinolobus dwyeri</i>		V	3	low	low	low	-	Minimal disturbance in riparian areas. Prevention of wildfire during construction. Allow partial revegetation.	low	low	low	-
Little Pied Bat	<i>Chalinolobus picatus</i>	R		1	low	low	low	low	Minimal disturbance in riparian areas. Prevention of wildfire during construction. Allow partial revegetation after construction.	low	low	low	low
Northern Quoll	<i>Dasyurus hallucatus</i>		E	3	low	low	low	-	Allow partial revegetation after construction.	low	low	low	-
Spotted-tailed Quoll (Southern Subspecies)	<i>Dasyurus maculatus maculatus</i>	V	E	1,3	low	low	low	-	Avoidance of SEVT and rainforest habitats	low	low	low	-
Eastern Long-eared Bat	<i>Nyctophilus timoriensis</i>	R	V	2	low	low	low	mod	Minimal disturbance in riparian areas. Prevention of wildfire during construction. Allow partial revegetation after construction.	low	low	low	low
Grey-headed Flying-Fox	<i>Pteropus poliocephalus</i>		V	1,3	low	low	-	-	Minimal disturbance in riparian	low	low	-	-

Common Name	Scientific Name	Status		Source	Potential to be Impacted without Mitigation Measures				Mitigation Measures	Potential to be Impacted with Mitigation Measures			
		NC Act	EPBC Act		ML	ML 2	CL	UIC		ML	ML 2	CL	UIC
									areas. Prevention of wildfire during construction. Allow partial revegetation.				
False Water Rat	<i>Xeromys myoides</i>		V	3	low	low	-	-	Minimal disturbance to mangroves and coastal samphire habitats	low	low	-	-

* Source: 1 = Wildlife Online; 2 = Queensland Museum; 3 = EPBC Act Protected Matters Search. Mod = Moderate.