



10.0 FLORA AND FAUNA

10.1 METHODOLOGY

The methodology adopted for terrestrial flora and fauna study involved two stages:

- A desktop review of background information; and
- Field investigations.

10.1.1 Background Review

A number of documents, databases and relevant legislation (Federal, State and local) were considered during this ecological assessment and included:

- Department of Environmental and Resource Management (DERM) Wildlife Online records (DERM 2009);
- Queensland Herbarium (HERBRECS);
- Aerial photography;
- Environment Protection & Biodiversity Conservation (EPBC) Act Protected Matters Database (DEWHA 2009); and
- DERM Regional Ecosystem Mapping (V5.0) (DERM 2009).

In addition to this, the conservation status of flora and fauna species occurring on the Project site have been assessed in the Commonwealth and State context with reference to the EPBC Act and *Nature Conservation Act 1992* (NC Act).

10.1.2 Field Investigations

An ecological field survey was undertaken during the 9th, 10th and 11th of September by two ecologists. The survey included:

- Mapping and description of the vegetation communities present;
- Verification of DERM RE mapping;
- Determination of the likelihood of threatened species;
- Targeted searches for significant flora and fauna and associated habitat that may occur on the Project site;
- Preliminary assessment of fauna habitat and other ecological values;
- Bird searches at dawn and dusk (9 person hours);
- Flora inventory searches (16 person hours); and
- Active reptile searches (3 person hours).



10.2 EXISTING ENVIRONMENT

10.2.1 Terrestrial Flora

10.2.1.1 Vegetation Communities

Regional Ecosystems

A review of the RE mapping shows that there is mapped remnant vegetation within the Project study area. This mapped RE also is found across the proposed substation location. This remnant woodland that covers approximately half of the proposed substation site is mapped as a single polygon containing two Regional Ecosystems (see Figure 10.1). Table 10.1 provides a description of the REs and their VMA status. Vegetation Communities 1 and 3 (survey sites PSS2, 4, 5 and 6) with a minor portion of Vegetation Community 2 are included in the mapped RE area.

TABLE 10.1 RE 11.5.1/11.5.20 (60/40) MAPPED ON THE PROJECT SITE

RE CODE	RE DESCRIPTION	VMA STATUS
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	Not of Concern
11.5.20	<i>Eucalyptus moluccana</i> and/or <i>E. microcarpa</i> , <i>E. pilligaensis</i> with <i>E. crebra</i> woodland on Cainozoic sand plains.	Not of Concern

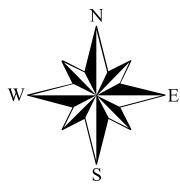
RE mapping for the site is generally accurate, however the remnant vegetation is more consistent with the description for 11.5.1 rather than 11.5.20. There are only minor discrepancies in the extent of remnant vegetation mapped on the site.

Powerlink Western Downs EIA

Mapped Remnant Vegetation

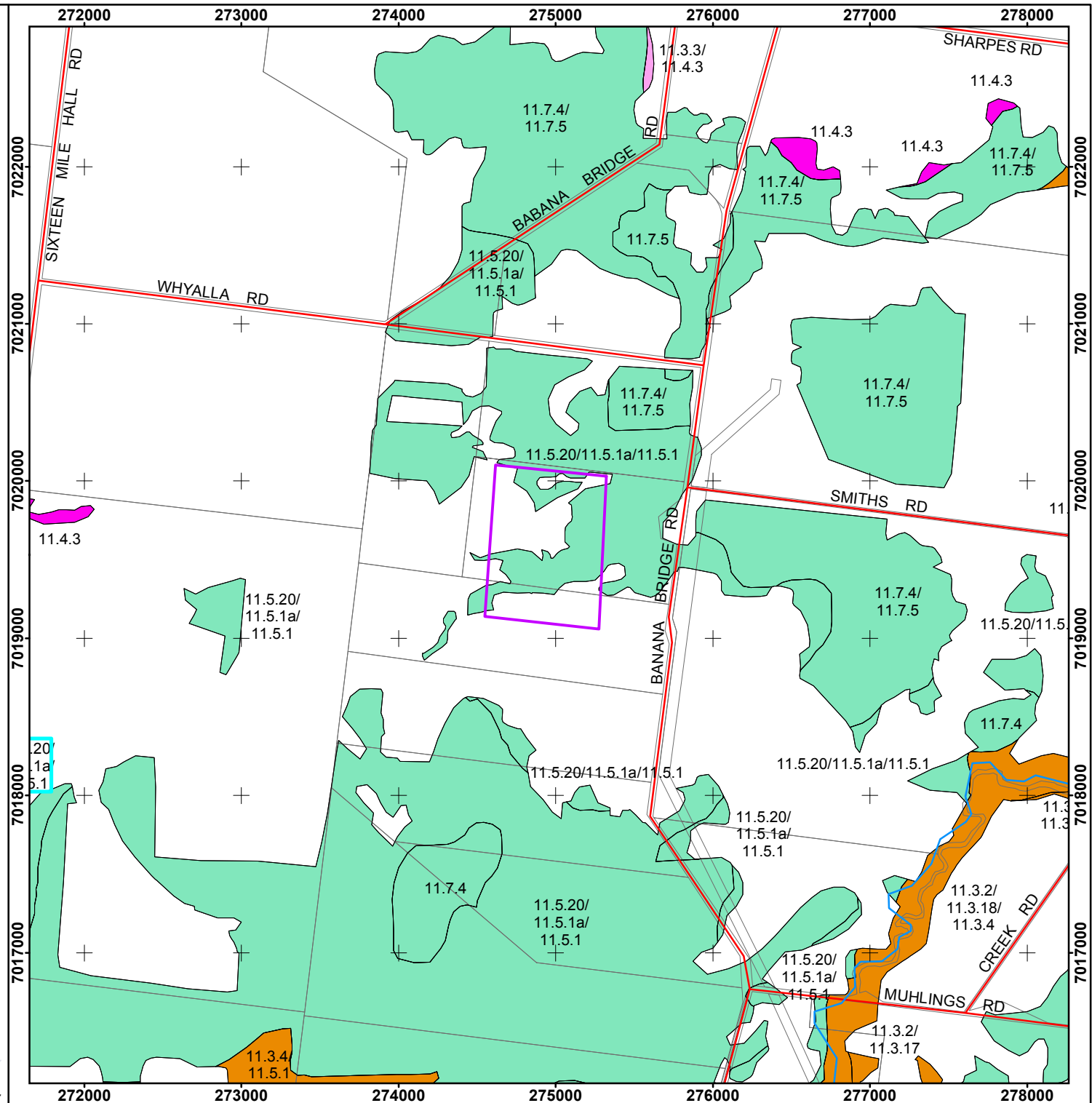
Figure 10.1

- Watercourse
 - Road
 - Sub-station
 - Cadastre
- Regional Ecosystems**
- Non-remnant / regrowth
 - Endangered - Sub-dominant
 - Endangered - Dominant
 - Of Concern - Sub-dominant
 - Of Concern - Dominant
 - Not Of Concern
 - Plantation forest



0 125 250 500 750 1,000 1,250 1,500
Meters

Scale 1: 35 000
Datum / Projection: GDA94 MGA Zone 56





Observed Vegetation Communities

Five vegetation communities were identified on the site by aerial photograph interpretation and ground-truthing (see Figure 10.1). Six sites were surveyed to describe the floristic composition and condition.

Vegetation Community 1

The proposed substation site is dominated by a Eucalypt Woodland that is contiguous with bushland to the north and east of the substation site. The canopy consists of Narrow-leaved Ironbark (*Eucalyptus crebra*), Rusty Gum (*Angophora leiocarpa*), Grey Box (*Eucalyptus microcarpa*) and Poplar Box (*Eucalyptus populnea*) with an average height of approximately 15m. Portions of this community appear to have been historically disturbed, with numerous fallen timber located throughout the area and dominance of immature regrowth vegetation in certain patches.

The mid-storey consists of dense layer of Bull-oak (*Allocasuarina luehmannii*) and White Cypress (*Callitris glaucophylla*) as well as immature canopy species, particularly Poplar Box. The shrub layer is sparse with scattered Cattle Bush (*Pittosporum angustifolium*), Black Wattle (*Acacia leiocalyx*), *Acacia ixiophylla*, False Sandalwood (*Eremophila mitchellii*) and Wilga (*Geijera parviflora*) occurring. The patchy groundcover is dominated by native grasses, particularly Dark Wiregrass (*Aristida calycina*), Native Millett (*Panicum decompositum*), *Aristida queenslandica*, Woodland Lovegrass (*Eragrostis sororia*) and Barbed-wire Grass (*Cymbopogon refractus*). Other common groundcovers include Sword-sedge (*Gahnia aspera*), Spiny-headed Mat Rush (*Lomandra longifolia*), Mulga Fern (*Cheilanthes sieberi*) and Blue Flax Lily (*Dianella caerulea* var. *producta*). Patches of regrowth dominated by Bull-oak and White Cyprus have a dense layer of leaf litter.

Occasional Prickly Pear (*Opuntia stricta*), a declared weed species, occur in this area.

This vegetation community is analogous with RE 11.5.1 (*Eucalyptus crebra*, *Callitris glaucophylla*, *Angophora leiocarpa*, *Allocasuarina luehmannii* woodland on Cainozoic sand plains/remnant surfaces).

PLATE 1

VEGETATION COMMUNITY 1





Vegetation Community 2

This community occurs in the southern portion of the proposed substation site and consists of a Poplar Box Open Woodland with a grassy understorey. Scattered Queensland Blue Gum (*Eucalyptus tereticornis*) and Grey Box also occur in the canopy. Scattered shrubs and small trees generally occur and include False Sandalwood, Sticky Hop Bush (*Dodonaea viscosa* subsp. *spatulata*) and Bull-oak. The western portion of this community has a moderately dense shrub cover.

The ground layer consists of a dense cover of native grasses such as Dark Wiregrass, Native Millett, Woodland Lovegrass, Browns Lovegrass (*Eragrostis brownii*), Barbed-wire Grass and Windmill Grass (*Chloris truncata*). Chenopods such as Black Roly-poly (*Sclerolaena muricata*), Soda Bush (*Neobassia proceriflora*) and Woolly-spined Burr (*Sclerolaena lanicuspis*) are also very common through this area. Other groundcovers include Yellow Buttons (*Chrysocephalum apiculatum*), Spiny-headed Mat Rush and Mulga Fern.

The declared weed species Fireweed (*Senecio madagascariensis*) occurs in this community.

This vegetation community is analogous with RE 11.5.1a (*Eucalyptus populnea* woodland with *Allocasuarina luehmannii* low tree layer).

PLATE 2

VEGETATION COMMUNITY 2



Vegetation Community 3

This area occurs in the south-west corner of the proposed substation site. The canopy is similar to that of Vegetation Community 1, however Rusty Gum and Grey Box are the dominant species and Blue-leaved Ironbark (*Eucalyptus fibrosa* subsp. *nubila*) replaces Narrow-leaved Ironbark. The mid-storey consists primarily of Poplar Box. This area has been recently disturbed with numerous trees felled and much of the understorey cleared.



Remaining shrubs in the area consist of *Acacia ixiophylla*, Broombrush (*Melaleuca uncinata*) and Sandalwood (*Santalum lanceolatum*). The ground layer is very sparse with heavy leaf litter present. Scattered native grasses include Dark Wiregrass and *Aristida queenslandica* with Spiny-headed Mat Rush and White Paper Daisy also occurring. This vegetation community is analogous with RE 11.5.1 (*Eucalyptus crebra*, *Callitris glaucophylla*, *Angophora leiocarpa*, *Allocasuarina luehmannii* woodland on Cainozoic sand plains/remnant surfaces).

PLATE 3

VEGETATION COMMUNITY 3



Vegetation Community 4

This vegetation community occurs in the western portion of the site and consists of retired grazing land and plantations. The canopy is absent in this area with only scattered Eucalypt regrowth occurring as well as a plantation of Date Palms (*Phoenix roebelinii*). The disturbed vegetation consists of grasses such as Dark Wiregrass, Barbed-wire Grass, *Aristida queenslandica* and Purple Wiregrass (*Aristida ramosa*) as well as White Paper Daisy, Spiny-headed Mat Rush. Bluebells (*Wahlenbergia gracilis*), Yellow Buttons, Mayne's Pest (*Verbena tenuisecta*) and Fireweed are also common.

This area is non-remnant and is not consistent with any Regional Ecosystem.



PLATE 4

VEGETATION COMMUNITY 4



Vegetation Community 5

This area occurs in the western portion of Lot 4 and is outside of the proposed substation site. The area appears to have been previously cleared as it is dominated by pioneering species, especially Bull-oak, with scattered regrowth Poplar Box and Grey Box evident. The low canopy is dominated by Bull-oak with White Cypress and scattered Rusty Gum present. The shrub layer consists of Black Wattle, False Sandalwood and dense patches of Sticky Hop Bush.

PLATE 5

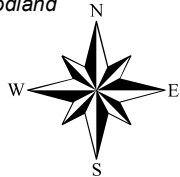
VEGETATION COMMUNITY 5



Powerlink Western Downs EIA Mapped Vegetation Communities

Figure 10.2

- Field Survey Site
 - Watercourse
 - Road
 - Sub-station
 - Cadastre
- Vegetation Communities**
- Cleared
 - Vegetation Community 1
Eucalyptus crebra and *Angophora leiocarpa* Woodland
 - Vegetation Community 2
Eucalyptus populnea
Open-woodland
 - Vegetation Community 3
Angophora leiocarpa and *Euc. fibrosa* subsp. *nubila* Woodland
 - Vegetation Community 4
Exotic Grassland and Retired Plantation
 - Vegetation Community 5
Allocasuarina leuhmannii and *Calltris glaucophylla* Open Woodland



0 50 100 200 300 400 500 600
Meters

Scale 1: 15 000
Datum / Projection: GDA94 MGA Zone 56





10.2.1.2 Threatened Species

The potential occurrence of significant flora and fauna species listed under the NCA and EPBC Act were identified through Wildlife Online and EPBC database searches. It should be noted that whilst the Wildlife Online database is based on records, the EPBC database is not. The review of both database sets identified 8 federally significant and 9 state significant flora species that may occur on the site. An assessment of the potential occurrence of these species within the Project site has been made on an understanding of the species preferred habitat and knowledge of type and condition of habitat present within the Project site (see Table 10.2).

No significant flora species listed under the EPBC or NCA were recorded during the field investigations undertaken by Conics. However, *Philothea sporadica* has been recorded in the vicinity of the project site and suitable habitat occurs on the site, particularly Vegetation Community 1. However extensive searches for the species failed to identify any individuals on the site.

The detectability of plants and ability to accurately identify plants to species level may vary greatly with the time of year, prevailing climatic conditions and the presence of reproductive material (e.g. flowers, fruit and/or seed capsules). Consequently, the survey conducted for the Project should not be regarded as conclusive evidence that certain species do not occur on the Project Site.

TABLE 10.2 LIKELIHOOD OF SIGNIFICANCE FLORA SPECIES OCCURRENCE

SPECIES	COMMON NAME	NCA STATUS	EPBC STATUS	HABITAT	LIKELIHOOD OF OCCURRENCE
<i>Eucalyptus curtisii</i>	Plunkett Mallee	R		Sandstone ridges in woodland / open forest	Unlikely due to lack of suitable habitat.
<i>Philothea sporadica</i>		V	V	Condamine River catchment on soils derived from low fertility laterised Cretaceous sandstones	Possible. Vegetation Community 1 contains suitable habitat, however none were observed on site.
<i>Solanum papaverifolium</i>		E		Grows in heavy clay soils, sometimes as a weed of crops	Unlikely due to lack of suitable habitat.
<i>Acacia chinchillensis</i>		NT	V	Confined to sandy or gravelly soil in the Chinchilla area.	Possible.
<i>Cadellia pentastylis</i>	Ooline	V	V	Occurs in vine thickets or dry rainforest, and more rarely woodlands. It is a relict rainforest species and tends to favour upper and mid slope positions, often with a northerly aspect. It commonly occurs on sandy-loam to clay soils of low to medium fertility	Unlikely due to lack of suitable habitat.
<i>Dichanthium queenslandicum</i>	King Blue-grass	V	V	Confined to black clay soils that support Bluegrass	Unlikely due to lack of suitable habitat.



SPECIES	COMMON NAME	NCA STATUS	EPBC STATUS	HABITAT	LIKELIHOOD OF OCCURRENCE
				communities.	
<i>Digitaria porrecta</i>	Finger Panic Grass	R	E	Grasslands and grassy woodlands, particularly Qld bluegrass communities	Possible however unlikely due to lack of suitable habitat.
<i>Diuris sheaffiana</i>	Tricolour Diuris		V	Dry sclerophyll woodland and forest among grass; often with <i>Callitris</i> . Soils are often sandy or lateritic and landform ranges from flat to low lateritic hills	Possible.
<i>Homopholis belsonii</i>	Belson's Panic	E	V	Dry woodlands including Mountain Coolibah, Wilga, Poplar Box and Belah, on basaltic and other soils.	Possible but unlikely due to lack of suitable habitat.
<i>Rhaponticum australe</i>	Austral Cornflower	V	V	Grasslands and grassy woodlands on heavy soils	Unlikely due to lack of suitable habitat.

(Source: Wildlife Online (EPA) & EPBC Database (DEWHA))

E = Endangered V = Vulnerable R= Rare NT= Near Threatened

10.2.1.3 Weeds of Management Concern

Three declared weed species, listed under the *Land Protection (Pest and Stock Route Management) Act 2002* (LPA), were identified during the ecological assessment. These were:

- *Senecio madagascariensis* (Fireweed) - Class 2 Declared Plant;
- *Opuntia tomentosa* (Velvety Tree Pear) - Class 2 Declared Plant; and
- *Opuntia stricta* (Prickly Pear) – Class 2 Declared Plant.

These species occur as scattered individuals or small open clumps throughout the Project site, primarily in the lightly timbered areas. Under the LPA, landowners must take reasonable steps to keep land free of Class 2 plants.

Species occurring on the property that are not declared under the LPA but are generally considered as environmental weeds can be viewed in the flora species list in Appendix C.

10.2.2 Terrestrial Fauna

10.2.2.1 Fauna habitats

The majority of the site is well vegetated and therefore provides habitat for a range of fauna species. In particular Vegetation Community 1 is generally structurally complex with a good cover of canopy, shrubs and ground cover vegetation. These areas provide excellent cover and resources for local fauna including forest dependant species such as Thornbills (*Acanthiza* spp.), Rufous Whistler (*Pachycephala rufiventris*), Scarlet Honeyeater (*Myzomela sanguinolenta*), White-throated Gerygone (*Gerygone olivacea*) and Brown-headed Honeyeater (*Melithreptus brevirostris*) that were recorded in this habitat.



Flowering Eucalypts in this area were heavily utilised by Honeyeaters and Friarbirds during the survey. It is also likely that nocturnal fauna such as gliders, possums and flying-foxes also feed on Eucalypt nectar. A dense cover of leaf litter as well as ground cover provides excellent cover for cryptic species including reptiles.

Within Vegetation Community 1, patches appear to have been disturbed through historical clearing. While these areas lack the diversity and structure of the majority of the community, fallen timber commonly occurs that provides additional habitat for snakes, skinks and small mammals.

More modified habitats such as Vegetation Communities 2, 3, 4 and 5 are preferable habitat for generalist species that can out-compete specialists for the limited resources. Consequently these areas are dominated by Noisy Miner (*Manorina melanocephala*), Crested Pigeon (*Ocyphaps lophotes*), Australian Magpie (*Gymnorhina tibicen*), Butcherbirds (*Cracticus* spp.), Torresian Crow (*Corvus orru*) and Willie Wagtail (*Rhipidura leucophrys*). White-winged Fairy-wren (*Malurus leucopterus*) and Superb Fairy-wren (*Malurus cyaneus*) were common throughout the Date Palm plantation and surrounding regrowth vegetation.

Three farm dams across the site provide water sources and habitat for native fauna. Grey Teal (*Anas gracilis*), White-necked Heron (*Ardea pacifica*) and Pacific Black Duck (*Anas superciliosa*) were observed in these areas.

10.2.2.2 Fauna Diversity

The site provides limited habitat diversity. It is likely that the entire site consisted of a largely homogenous habitat prior to human intervention, with some localised variation of dominant flora species. Human disturbances including clearing for infrastructure (residents, tracks and dams), as well as agricultural and grazing activities has provided additional habitats, however these areas are generally low biodiversity value. Consequently only 48 fauna species were recorded during the survey. This consisted primarily of birds (43) with only one reptile and four mammal species observed.

The modified habitats provided by Vegetation Communities 2, 3, 4 and 5 lack the cover, structure and flora species requirements for many local native species. Therefore these typically forest dependant species are unlikely to frequently utilise these areas for foraging, roosting or breeding. These disturbed habitats have allowed for generalist fauna to dominate the sites fauna population. Many of these species will out-compete other native fauna for resources and often display aggressive behaviour in these habitats as well as the edges of more vegetated habitats.

However the more intact areas of Vegetation Community 1 provide excellent habitat for forest specialists. It is likely that this habitat supports a variety of native fauna. Accordingly, reasonable numbers of forest birds were recorded within this area. It is also likely that small mammals and reptiles frequently occur in these areas due to the dense cover provided by deep leaf litter and understorey vegetation.



10.2.2.3 Fauna of Conservation Significance

No significant fauna species listed under EPBC or NCA were recorded during the field investigations undertaken by Conics. The review of both Wildlife Online and EPBC database searches identified 21 federally significant and 16 state significant fauna species that may occur on the site. An assessment of the potential occurrence of these species within the Project site has been made on an understanding of the species preferred habitat and knowledge of type and condition of habitat present within the Project site (see Table 10.3).

Although no significant fauna species were recorded during the site assessment, suitable habitat occurs for several species. Several migratory species, such as Cattle Egret (*Ardea ibis*), Rainbow Bee-eater (*Merops ornatus*) and White-throated Needletail (*Hirundapus caudacutus*), are considered likely to utilise the site periodically. However these species commonly occur in the area and the site is unlikely to provide important breeding habitat.

Threatened species that the site provides potential habitat for include Square-tailed Kite (*Lophoictinia isura*), Swift Parrot (*Lathamus discolor*), Major Mitchell's Cockatoo (*Lophochroa leadbeteri*) and Turquoise Parrot (*Neophema pulchella*). However only the densely vegetated areas (i.e. Vegetation Community 1) of the site provide suitable habitat for the Square-tailed Kite and Swift Parrot and the site is at the outer range limits for both the Major Mitchell's Cockatoo and Turquoise Parrot. Suitable habitat for these species also occurs throughout the area and broader region.



TABLE 10.3 LIKELIHOOD OF OCCURRENCE OF THREATENED FAUNA SPECIES

SPECIES	COMMON NAME	NCA STATUS	EPBC STATUS	HABITAT	LIKELIHOOD OF OCCURRENCE
Reptiles					
<i>Furina dunmalli</i>	Dunmall's Snake	V	V	Prefers Brigalow (<i>Acacia harpophylla</i>) forest and woodland growing on cracking black clay and clay loam soils on the Darling Downs.	Unlikely due to lack of suitable habitat.
<i>Hemiaspis damelii</i>	Grey Snake	E	-	Favours cracking flood-prone soils in the Brigalow Belt. Shelters in soil cavities.	Unlikely due to lack of suitable habitat.
<i>Anomalopus mackayi</i>	Five-clawed Worm-skink	E	V	Natural grasslands on deep cracking clays.	Unlikely due to lack of suitable habitat.
<i>Tympanocryptis pinguicollis</i>	Grassland Earless Dragon	E	V	All specimens are known from highly modified agricultural land. Large areas of native and introduced grasses existing as headlands, and along drainage lines are a feature of the farmlands where the dragon exists. Soils are essentially black, cracking clays of the Condamine River flood plain.	Unlikely due to lack of suitable habitat.
Aves					
<i>Apis pacificus</i>	Fork-tailed Swift	-	M	Low to very high airspace over varied habitat, rainforest to semi-desert.	Possible fly-over
<i>Ardea alba</i>	Great Egret	-	M	Wetlands, flooded pastures, dams, estuarine mudflats, mangroves and reefs.	Possible intermittent occurrence at dams
<i>Ardea ibis</i>	Cattle Egret	-	M	Wide range of open habitats from grazing paddocks to wetlands and tidal mudflats.	Possible intermittent occurrence at dams and cleared areas
<i>Lophoictinia isura</i>	Square-tailed Kite	R	-	Eucalyptus woodland, open forest and heath-woodland.	Possible occurrence.
<i>Erythrotriorchis radiatus</i>	Red Goshawk	E	V	Open forests, woodlands especially near rivers, wetlands, rainforest fringes	Remote possibility
<i>Gallinago hardwickii</i>	Latham's snipe	-	M	Soft wet ground or shallow tussocks and other green or dead growth.	Possible intermittent occurrence at dams
<i>Geophaps scripta scripta</i>	Squatter Pigeon	V	V	Grassy understorey of eucalypt woodland, usually with ready access to water	Potentially suitable habitat but unlikely to be present
<i>Haliaeetus leucogaster</i>	White-bellied Sea-Eagle	-	M	Usually coastal, over islands, reefs, headlands, beaches, bays, estuaries, mangroves, seasonally flooded inland swamps, lagoons and floodplains.	Unlikely due to lack of suitable habitat.
<i>Hirundapus caudacutus</i>	White-throated Needletail	-	M	High open spaces above almost any habitat.	Probably fly-over
<i>Lathamus discolor</i>	Swift Parrot	E	E	Eucalypt forests and woodlands, plantations and banksias	Possible sporadic occurrence when ironbark in flower



SPECIES	COMMON NAME	NCA STATUS	EPBC STATUS	HABITAT	LIKELIHOOD OF OCCURRENCE
<i>Calyptorhynchus lathamii</i>	Glossy Black-Cockatoo	V	-	Forests and woodlands with abundant Casuarina trees.	Unlikely due to lack of suitable habitat.
<i>Lophochroa leadbeteri</i>	Major Mitchell's Cockatoo	V	-	Open, sparsely timbered grasslands, drier farmlands with well-treed paddocks, Callitris and Casuarina country.	Possible. At north-eastern end of range.
<i>Neophema pulchella</i>	Turquoise Parrot	R	-	Woodland and open grassland, natural or partially cleared.	Possible. At northern end of range.
<i>Merops ornatus</i>	Rainbow Bee-eater	-	M	Open country of woodlands, open forest, semi-arid scrub, grasslands, clearings in heavier forests and farmlands.	Probably move through on annual migration
<i>Nettapus coromandelianus</i>	Cotton Pygmy-Goose	R	M	Deeper freshwater swamps, lagoons, dams.	Possible intermittent occurrence at dams
<i>Neochima ruficauda ruficauda</i>	Star Finch	E	E	Swamp vegetation, open grassland with sparse vegetation, cultivated land.	Unlikely due to lack of suitable habitat.
<i>Rostratula australis</i>	Australian Painted Snipe	-	V	Well vegetated shallows and margins of wetlands and other water courses.	Unlikely due to lack of suitable habitat.
<i>Rostratula benghalensis</i>	Painted Snipe	V	V/M	Surrounds and shallows of wetlands that are well vegetated with dense low cover.	Unlikely due to lack of suitable habitat.
Mammals					
<i>Chalinolobus dwyeri</i>	Large-eared Pied Bat	R	V	Caves and mines in dry sclerophyll forests and woodlands as well as higher altitude moist eucalypt forest and edges of rainforest.	Unlikely due to lack of suitable habitat.
<i>Dasyurus hallucatus</i>	Northern Quoll	-	E	Variety of vegetation types, but particularly in rocky eucalypt woodlands and near creeks.	Unlikely due to lack of suitable habitat.
<i>Nyctophilus timoriensis</i> (South-eastern form)	Eastern Long-eared Bat	V	V	A range of dry woodland and shrubland communities, roosts mainly in tree hollows, forages low amongst the canopy and shrub layers.	Unlikely due to lack of suitable habitat.
Ray-finned fishes					
<i>Maccullochella peelii peelii</i>	Murray Cod	-	V	Prefers deep holes with abundant snags in slow-moving rivers	Unlikely due to lack of suitable habitat.

(Source: Wildlife Online (EPA) & EPBC Database (DEWHA))

E = Endangered V = Vulnerable R= Rare NT= Near Threatened M = Migratory



10.2.2.4 Introduced Fauna

Three introduced fauna species, Fox (*Vulpes vulpes*), Feral Pigeon (*Columba livia*) and Brown Hare (*Lepus europaeus*), were identified on the site during the site assessment. Domestic Goats (*Capra hircus*) from the adjoining property were also grazing on the grassland in Vegetation Community 4. It is highly likely that several other species inhabit the site including Pig (*Sus scrofa*), Cane Toad (*Rhinella marina*), Indian Mynah (*Sturnus tristis*) and Cat (*Felix catus*). These species may impact upon local native fauna through predation and competition for resources.

10.3 POTENTIAL IMPACTS

10.3.1 Construction Impacts

The construction of the substation may result in impacts to the ecosystems occurring on the site. These are largely associated with the clearing of native vegetation. Although the proposed location of the substation incorporates disturbed areas such as Vegetation Communities 2 and 4, approximately 40 ha of Vegetation Community 1 will also be cleared. While this represents a considerable loss of this vegetation type for the Project site, the more intact areas of Vegetation Community 1 are outside of the substation footprint and are therefore not required to be cleared.

The loss of this vegetation will also reduce the available habitat for native fauna on the site. This includes mature Eucalypts that provide habitat and food resources for many of the native birds identified on the site. The substation footprint will also require the filling of one of the farm dams on the site that provides habitat and a watering point for local native fauna.

The loss of native vegetation cover and disturbances to soil also increases the opportunities for weed species to invade the site and encroach into surrounding bushland. Machinery and vehicles may also import weed species on to the site during site construction activities. Environmental weeds may compromise the condition and integrity of surrounding bushland if not managed appropriately.

Vegetation clearing and construction traffic may injure fauna during site construction activities. In particular, less mobile and nocturnal species are highly susceptible during construction as they may lack the opportunity to migrate to safe habitats.

10.3.2 Operational Impacts

Impacts during the operation of the substation are largely associated with vehicle traffic to the substation site as well as potential hazards that the substation may provide to surrounding vegetation such as fire and contamination from pollutants.

Vehicles provide a potential source of road kill and fauna injuries, particularly when traffic is likely to be higher.

The substation may provide a potential fire source to surrounding vegetation. The onset of a bushfire could result in fauna mortalities as well as loss and degradation of habitat. Limited chemical will be used in the operation of the substation however in the event of a chemical spill, chemical may degrade surrounding habitats and intoxicate native fauna.



10.3.3 Impacts on Threatened Communities

No threatened communities occur on the site. There is potential for threatened communities to occur within the surrounding area however impacts on these communities as a result of the Substation development are unlikely.

10.3.4 Impacts on Regional Ecosystems

The proposed substation will require the clearing of remnant vegetation occurring on the site. This will result in the loss of approximately 30.5 ha of mapped 'not of concern' Regional Ecosystems 11.5.1 (*Eucalyptus crebra*, *Callitris glaucophylla*, *Angophora leiocarpa*, *Allocasuarina luehmannii* woodland on Cainozoic sand plains/remnant surfaces) and 11.5.1a (*Eucalyptus populnea* woodland with *Allocasuarina luehmannii* low tree layer) that are associated with Vegetation Communities 1, 2 and 3.

10.3.5 Impacts on Threatened Flora and Fauna

No threatened flora or fauna species were identified on the site during the site assessment. However, it is possible that threatened fauna may occur on the site periodically and may therefore be impacted, especially if they are present on the site during construction. The removal of potential suitable habitat (*Eucalyptus* woodlands, open forests and plantations) for threatened species such as the Square-tailed Kite and Swift Parrot will occur as part of this substation development and this has the potential to impact on such species using the site.

Although not recorded on the site despite targeted searches, the proposed substation will result in the loss of potential habitat for the vulnerable (NCA and EPBC) *Philotheca sporadica*. *Philotheca sporadica* is known to occur where soils are shallow, uniform sandy loam to clay loams of extremely low fertility and poor condition. It primarily occurs in low open forests of Queensland peppermint (*Eucalyptus exserta*), Narrow-leaved Ironbark (*E. crebra*), Red Ironbark (*E. fibrosa*), and Cypress Pine (*Callitris glaucophylla*) (Halford 1995). Native flora which has also been identified in association with *P. sporadica*, includes: Rusty Gum (*Angophora leiocarpa*), Yellow Jacket (*Corymbia watsoniana*), (*Eucalyptus exserta*), Blue-leaved Ironbark (*E. fibrosa* subsp. *nubila*), Burrows Wattle (*Acacia burrowii*), Crowded-leaf Wattle (*A. conderta*), Sticky Hop Bush (*Dodonaea viscosa*), Barbwire Grass (*Cymbopogon refractus*) and Lomandra (*Lomandra longifolia*) (Kanowski 2005; Halford 1995). There is habitat at the proposed substation location which is consistent with this description and therefore the species may occur on the site. Targeted searches have revealed that no significant populations of the species occur within the Project site, however there is potential for individuals to occur on the site.

10.3.6 Impacts on Migratory Species

The substation will result in the loss of potential habitat for several migratory species, namely Cattle Egret and Rainbow Bee-eater. However the site is not considered to provide important habitat for either species. It is also possible that White-throated Needletail and Fork-tailed Swift (*Apis pacificus*) may occasionally fly-over the site but they are unlikely to be impacted through the presence of the substation.



10.3.7 Impacts on Habitat Corridors

Much of the surrounding areas have been impacted through mining, the Kogan Creek Power Station, agricultural and grazing land management that has cleared large tracts of bushland. Therefore the site does not form part of any significant ecological corridor. However it does contribute to some local corridor running north-south and east-west. As there is relatively intact vegetation cover across areas of the Project site which will not be cleared for the substation, the proposed Project will not have a significant impact on regionally significant habitat corridors.

10.4 MITIGATION MEASURES

10.4.1 Construction Impacts

A number of mitigation measures are recommended in order to reduce the potential impacts upon native flora and fauna on and around the site. Construction activities should be restricted to between 6.30am and 6.30pm. No barbed-wire or electric fencing should be used during the construction as these may harm fauna. A Vegetation Management Plan (VMP) should be prepared for the site to address the clearing and protection of vegetation on the site.

Vegetation clearing should be undertaken in a manner that reduces potential injuries and mortalities to fauna. It is recommended that Areas to be cleared should be surveyed by a spotter catcher or ecologist within 24 hours prior to clearing to identify habitat trees that could be occupied by fauna. These trees should be clearly marked and retained during the clearing phase until fauna has had the opportunity to move into nearby habitat on their own accord. Clearing should also be undertaken in the presence of a fauna spotter/catcher.

Areas of vegetation to be retained should be protected by erecting temporary fencing to prevent access by machinery and construction crews. No stockpiling of material or dumping of construction waste should be permitted in these areas.

All vehicles should be free of weeds prior to entering and exiting the site to prevent the spread of weed species. Washdown facilities should be provided and frequent inspections should be undertaken by suitably qualified staff.

Appropriate traffic management should be implemented during site construction. All vehicles, except in the event of an emergency, should be restricted to designated access tracks with a maximum speed limit of 40km/hr. Signs should be erected to notify of speed limits and the potential presence of wildlife.

A bushfire setback area should surround the substation site. This area should be free of flammable material including native trees and shrubs. A Bushfire Management Plan should be prepared for the site to identify management actions to reduce the bushfire hazard as well as emergency procedures.

All chemicals should be stored in appropriately bunded areas and used in accordance with the relevant MSDS and management plans.

All works are to be undertaken in accordance with the EMP (see Appendix E).



10.4.2 Operational Impacts

All vehicles should be free of weeds prior to entering and exiting the site to prevent the spread of weed species. Existing weed infestation should be treated in accordance with a VMP prepared for the site.

Appropriate traffic management should be implemented during the operation of the substation. All vehicles should be restricted to designated access tracks with a maximum speed limit of 40km/hr (except in the event of an emergency). Signs should be erected to notify of speed limits and the potential presence of wildlife.

A bushfire setback needs to be provided around the substation site in accordance with *State Planning Policy 1/03 Guideline*. It should be noted that in the wake of the recent bad bushfire seasons, the requirements of Australian Standard 3959 - 2009 Building in Bushfire Prone Areas have been upgraded and are increasingly enforced in areas where bushfire risk is evident. As of the 1st October 2009, Queensland has adopted these revised Australian Standards (AS 3959:2009) for Building in Bushfire Prone Areas. The adoption of the standard will necessitate amendment of the Building Code of Australia (as of the 1st May 2010), the Queensland Development Code (amendment date of legislation unknown) and the State Planning Policy (1/03) – Mitigating the impacts of floods, bushfire & landside (SPP). The exact implications for the codes, policies and planning scheme however have not been determined at this time. The bushfire setback provided on site should be free of flammable material including native trees and shrubs. A Bushfire Management Plan should be prepared for the site to identify management actions to reduce the bushfire hazard as well as emergency procedures.

All chemicals should be stored in appropriately bunded areas and used in accordance with the relevant MSDS and management plans.

Lighting from the substation should be designed to reduce light spillage in to surrounding vegetation.

All works are to be undertaken in accordance with the EMP (see Appendix E).

10.4.3 Habitat Rehabilitation

Rehabilitation of disturbed areas (Vegetation Communities 2, 4 and 5) that are outside of the substation footprint can offset the loss of native vegetation. Rehabilitation should aim to allow natural revegetation which will return the disturbed areas to a similar condition to that seen prior to disturbance. A Rehabilitation Management Plan should be prepared prior to construction and include details of treatments (revegetation, weed control and monitoring) for these areas.