15. Fauna

15.1 Overview

This section outlines the existing fauna within the study area. Further fauna surveys will be carried out to determine presence and likely impacts of the project on fauna species and surrounding region and the way it will be managed during the planning, design, construction and operational phases of the South Road Superway Project.

15.2 Legislative and policy requirements

Table 15.1 summarises key legislation relevant to the fauna issues associated with the project.

Table 15.1 Commonwealth and state legislation

Legislation	Description	Relevance to proposed project
Environment Protection and Biodiversity Conservation Act 1999 (Cwlth)	This Act is the primary Commonwealth legislation protecting the environment in relation to Commonwealth land and controlling significant impacts on matters of national environmental significance. The Act requires assessment and approval of actions that are likely to have a significant impact on a Matter of National Environmental Significance, or are undertaken by a Commonwealth agency or involve Commonwealth land and will have a significant impact on the environment.	Ten fauna species were identified through the EPBC Protected Matters Search Tool as potentially occurring within the project area: ▪ *Neophema chrysogaster* (Orange-bellied Parrot) ▪ *Rostratula australis* (Australian Painted Snipe) ▪ *Haliaetus leucogaster* (White-bellied Sea-eagle) ▪ *Hirundapus caudactutus* (White-throated Needletail) ▪ *Merops ornatus* (Rainbow Bee-eater) ▪ *Ardea alba* (Great Egret) ▪ *Ardea Ibis* (Cattle Egret) ▪ *Gallinago hardwickii* (Latham's Snipe) ▪ *Rostratula benghalensis s. lat* (Painted Snipe) ▪ *Apus pacificus* (Fork-tailed Swift). A bird survey of the portion of Barker Inlet affected by the project is being undertaken.
Environment Protection Act 1993 (SA)	This Act is the overarching environmental legislation that deals with the protection of the environment and environmental offences. The Act is administered and enforced by the SA Environment Protection Authority. In relation to fauna Part 4 Section 25 of the Act states: *A person must not undertake an activity which pollutes, or might pollute the environment unless the person takes all reasonable and practicable measures to prevent or minimise any resulting environmental harm.*	Construction and operation of the proposed road network must comply with the Act. This includes the prevention of environmental harm as detailed in Part 4 Section 25 of the Act.
Natural Resources Management Act 2004 (SA)	This Act provides for pest management.	Pest management will be undertaken as required.

Legislation	Description	Relevance to proposed project
National Parks and Wildlife Act 1972 (NPW Act) (SA)	This Act was developed to establish and manage reserves for public enjoyment. In addition this Act provides for the protection of native flora and fauna. In particular this Act identifies flora and fauna species considered to be of conservation significance for the state of South Australia.	Species listed as being of conservation significance by the Act should be protected. Potential impacts to these species should be avoided or minimised to ensure protection of these species into the future. 15 species of native flora listed under the NPW Act are considered likely to occur within 5.0 km of the project footprint.

15.3 Assessment methodology

The fauna assessment included:

- a literature review of previous investigations
- a search of fauna database records from local, South Australian and Australian governments including the Biological Database of South Australia (BDBSA) maintained by the Department for Environment and Heritage (DEH) and a Protected Matters Search of the *Environment Protection and Biodiversity Act 1999* (EPBC Act)
- field surveys
- consultation with South Australian Government groups and key stakeholders
- assessment of impacts based on the criteria outlined in the EPBC Act Significant Impact Guidelines and DTEI guidelines.

15.4 Existing conditions

This section outlines the existing fauna habitat conditions in the study area. In addition the presence of native fauna is discussed along with the likelihood of occurrence of species of conservation significance listed under the EPBC Act and/or *National Parks and Wildlife Act 1972*.

15.4.1 Conditions within the project footprint

Remnant fauna habitat within the Port Adelaide Enfield region has been progressively cleared since 1855, thus the study area contains virtually no remnant native vegetation. However, the Barker Inlet Wetland system and trees within the Regency Park Golf Course and roadside verges do provide habitat for locally common native flora and fauna species (**Figure 15.1**).

Common Name	Environment Protection and Biodiversity Conservation Act	National Parks Wildlife Act
Musk Duck		Rare
Banded Stilt		Vulnerable
Little Egret	Marine	Rare
Blue-billed Duck		Rare
Australasian Darter		Rare
Great Crested Grebe		Rare
Fairy Tern	Marine	Endangered
Spotless Crake	Marine	Rare
Australasian Shoveler		Rare
Glossy Ibis	Migratory and Marine	Rare
Wood Sandpiper	Migratory and Marine	Rare
Common Sandpiper	Migratory and Marine	Rare
Cattle Egret	Migratory and Marine	Rare

Study Area
South Road Superway
Musk Duck
Banded Stilt
Little Egret
Blue-billed Duck
Australasian Darter
Great Crested Grebe
Fairy Tern
Spotless Crake
Australasian Shoveler
Glossy Ibis
Wood Sandpiper
Common Sandpiper
Cattle Egret

Listed Fauna within the Study Area

(DEH 2009)

Figure 15.1

15.4.2 Fauna habitats within the study area

Fauna habitat in the project footprint is limited to the following areas:

- Regency Park Golf Course
- vegetation in roadside verges
- open swale drain
- Barker Inlet South Wetland.

A habitat assessment of vegetated areas in the study area in August 2009 indicated the presence of seven vegetation associations (see Section 14), three of which were identified as providing significant habitat value to native fauna (EBS 2009). They were primarily located in Barker Inlet South Wetland in the northeastern corner of the study area (Vegetation Associations 2, 4 and 5). In particular the freshwater habitat in these vegetation associations is likely to attract bird species (EBS 2009).

In addition the vegetation communities in Regency Park Golf Course and roadside verges were also found to provide habitat for native fauna. These primarily native and exotic amenity plantings have exotic herbaceous and grass species in the understorey (EBS 2009). The large native and exotic trees in these areas provide habitat for native fauna (EBS 2009).

In addition the habitat assessment identified high value native fauna habitat in non-vegetated areas of the Barker Inlet South Wetland (EBS 2009). Areas of mudflats with minor low shrubland species along the perimeter as well as open water are likely to attract bird species (EBS 2009).

A recent opportunistic bird survey of the study area (EBS 2009) identified the presence of 29 bird species (**Table 15.2**).

Table 15.2 Bird species recorded during opportunistic survey (EBS 2009)

Species name	Common name	Habitat recorded in
Acanthagenys rufogularis	Spiny-cheeked Honeyeater	Roadside verges in urban area
Accipiter cirrhocephalus	Collared Sparrowhawk	Roadside verges in urban area
Acrocephalus stentoreus	Clamorous Reed-warbler	Barker Inlet South Wetland
Alauda arvensis	Skylark	Barker Inlet South Wetland
Anas superciliosa	Pacific Black Duck	Barker Inlet South Wetland
Ardea novaehollandiae	White-faced Heron	Roadside verges in urban area
Corvus mellori	Little Raven	Barker Inlet South Wetland
Cygnus atratus	Black Swan	Barker Inlet South Wetland
Egretta garzetta	Little Egret	Barker Inlet South Wetland
Gallinula tenebrosa	Dusky Moorhen	Barker Inlet South Wetland
Glossopsitts concinna	Musk Lorikeet	Roadside verges in urban area
Grallina cyanoleuca	Magpie-lark	All habitats
Gymnorhina tibicen	Australian Magpie	Regency Park Golf Course and roadside verges in urban area
Lalage tricolor	White-winged Triller	Barker Inlet South Wetland
Larus novaehollandiae	Silver Gull	All habitats
Lichenostomus penicillatus	White-plumed Honeyeater	Roadside verges in urban area
Malurus cyaneus	Superb Fairy-wren	Barker Inlet South Wetland
Manorina melanocephala	Noisy Minor	All habitats
Megalurus gramineus	Little Grassbird	Barker Inlet South Wetland
Ocyphaps lophotes	Crested Pigeon	Roadside verges in urban area
Pelecanus conspillatus	Australian Pelican	Barker Inlet South Wetland
Phalacrocorax fuscescens	Black-faced Cormorant	Barker Inlet South Wetland
Phalacrocorax varius	Pied Cormorant	Barker Inlet South Wetland
Phylidonyris novaehollandiae	New Holland Honeyeater	Barker Inlet South Wetland
Rhipidura leucophrys	Willie Wagtail	Roadside vergers in urban area

Species name	Common name	Habitat recorded in
Streptopelia senegalensis	Spotted Turtle-dove	Barker Inlet South Wetland
Threskiomis molucca	Australian White Ibis	Roadside verges in urban area
Trichoglossus haematodus	Rainbow Lorikeet	Roadside verges in the urban area
Vanellus miles	Masked Lapwing	Roadside verges in the urban area

15.4.3 Introduced fauna species

Recent survey effort has not identified the presence of introduced mammal species in the project footprint but it is likely that introduced species do occur in the area including pests species such as Feral Cat (*Felis catus*) and European Rabbit (*Oryctolagus cuniculus*) (Brown and Root 2001a). Historic and current surveys in the study area and surrounding region indicate the presence of the following pest fauna species (DEH 2009; EBS 2009):

- *Alauda arvensis* (Eurasian Skylark)
- *Anas platyrhynchos* (Northern Mallard)
- *Columba livia* (Rock Dove)
- *Passer domesticus* (House Sparrow)
- *Streptopelia chinensis* (Spotted Dove)
- *Sturnus vulgaris* (Common Starling)
- *Turdus merula* (Common Blackbird).

Activities that encourage the spread, or population growth, of these species should be minimised. Measures to reduce the potential for the spread of pest species are outlined in Section 15.6.

2.4.4 Species of conservation significance

Records maintained by DEH in the BDBSA identify a total of 84 unique native fauna species occurring in a 0.5 km radius of the site. The majority of these species were birds recorded in the wetland system in the northeastern portion of the site (**Figure 15.1**). A recent opportunistic bird survey of the study area did not identify the presence of any species of national or state conservation significance but did identify the presence of 29 bird species (EBS 2009).

Records from the BDBSA identified the presence of 13 fauna species of state and national conservation significance within 0.5 km of the study area:

- *Ardea ibis* (Cattle Egret)
- *Sternula nereis* (Fairy Tern)
- *Anhinga novaehollandiae* (Australasian Darter)
- *Oxyura australis* (Blue-billed Duck)
- *Actitis hypoleucos* (Common Sandpiper)
- *Plegadis falcinellus* (Glossy Ibis)
- *Podiceps cristatus* (Great Crested Grebe)
- *Egretta garzetta* (Little Egret)
- *Biziura lobata* (Musk Duck)
- *Porzana tabuensis* (Spotless Crake)
- *Tringa glareola* (Wood Sandpiper)
- *Anas rhynchotis* (Australasian Shoveler)

- *Cladorhynchus leucocephalus* (Banded Stilt).

The majority of these were identified in the Barker Inlet Wetland (**Figure 15.1**).

15.4.4 Likelihood of occurrence

Native mammals

Species identified as occurring within 0.5 km of the study area were entirely birds (DEH 2009). No native mammals have been recorded within 0.5 km of the project footprint. Additionally, no opportunistic sightings of mammals were made during the recent survey of the study area (EBS 2009). However, this does not denote that mammals are not present, just that they have not been recorded during surveys.

The highly altered area has very little native fauna habitat remaining and virtually no remnant habitat remaining. However, the areas of native and exotic planted vegetation including the golf course and roadside verges do provide native mammal habitat. The recent survey of the study area indicates that vegetation in the Regency Park Golf Course and roadside verges does provide habitat for mammals including the presence of mature trees with hallows (EBS 2009).

There is potential for native bat species and non-native feral mammals to forage in these areas of native and exotic vegetation but these areas are not likely to provide significant value for these species (i.e. breeding and nesting habitat). Due to the highly altered nature of the site and the small area of habitat present, the likelihood of native mammals in the project footprint is considered to be low.

Native mammals in the area are likely to occur in the more vegetated areas including vegetated roadside verges, the golf course and the wetland.

Birds

A variety of native and non-native bird species have been identified in and immediately near the study area, including 13 species listed as being of State conservation significance.

Species of conservation significance

The EPBC Protected Matters Search Tool identified the potential presence of two threatened species and ten migratory or marine protected species. **Table 15.3** details these species and the likelihood of occurrence in the study area.

Table 15.3 EPBC listed species potentially occurring in the project footprint

Species	Common name	EPBC rating	Likelihood of occurrence
Neophema chrysogaster	Orange-bellied Parrot	Critically Endangered, Migratory and Marine	Low; no historic or recent recordings of this species (DEH 2009); may fly over the site but key foraging, nesting and breeding habitat does not occur in the area.
Rostratula australis	Australian Painted Snipe	Vulnerable	High; identified as occurring in the area and likely to occur in the study area (DEH 2009).
Haliaeetus leucogaster	White-bellied Sea-eagle	Migratory, Marine	Low; has been recorded as occurring in the area (DEH 2009) but key foraging, nesting and breeding habitat not present.
Hirundupus cadacutus	White-throated Needletail	Migratory, Marine	Low; no historic or recent recordings of this species (DEH 2009); may fly over the site but key foraging, nesting and breeding habitat not present.
Merops Ornatus	Rainbow Bee-eater	Migratory, Marine	Medium; no historic or recent recordings of this species (DEH 2009); known to occur in cleared areas including wooded roadside verges, particularly where

			permanent waterbodies are present (DEWHA 2009).
Ardea alba	Great Egret	Migratory, Marine	Low; has been recorded as occurring in the area (DEH 2009) but key foraging, nesting and breeding habitat not present.
Ardea ibis	Cattle Egret	Migratory, Marine	Low; no historic or recent recordings of this species (DEH 2009); may fly over the site but key foraging, nesting and breeding habitat not present.
Gallinago hardwickii	Latham's Snipe	Migratory, Marine	Low, no historic or recent recordings of this species have been made (DEH 2009). Species may flyover the site but key foraging, nesting and breeding habitat does not occur in the site.
Rostratula behngalensis s. lat	Painted Snipe	Migratory, Marine	Low; no historic or recent recordings of this species (DEH 2009); may fly over the site but key foraging, nesting and breeding habitat does not occur in the site.
Apus pacificus	Fort-tailed Swift	Migratory, Marine	Low; no historic or recent recordings of this species (DEH 2009); may fly over the site but key foraging, nesting and breeding habitat does not occur in the site.

A bird survey is currently being undertaken to determine presence of these species in Barker Inlet South.

Twelve species listed as having conservation significance under the NPW Act (including one species listed as protected by the EPBC Act) were identified as occurring within 0.5 km of the project footprint (see Section 15.4.4). These, primarily waterbird species, are likely to occur in the Barker Inlet Wetland area in the northeastern section of the site.

Amphibians and reptiles

No amphibians or reptiles have been recorded within 0.5 km of the study area during historic or current surveys (DEH 2009; EBS 2009). However, this does not necessarily denote that amphibians and reptiles do not occur in the site.

Amphibians and reptiles such as frogs and lizards are likely occur in the wetland area as well as in open vegetated swales in the study area, which have potential habitat for amphibians including semi-permanent and permanent water sources.

15.5 Effects of the project on the existing fauna species

The EPBC Act Significant Impact Guidelines (DEWHA 2006) outline and define significant impact criteria for categories of threatened species. Broadly, the criteria define an action as 'significant' if it:

- leads to a long term decrease in the population
- reduces the area of occupancy of the species
- fragments an existing population
- adversely affects critical habitat
- disrupts breeding cycles
- detrimentally affects habitat quality
- leads to the introduction of invasive species
- introduces disease that may affect a species
- interferes with the recovery of the species.

For the purposes of this assessment flora or fauna species are considered to be significantly impacted if the construction/operation of the South Road Superway Project is likely to meet one or more of the criteria listed above.

15.5.1 Birds

The majority of species identified as occurring in or using, primarily in the Baker Inlet Wetland system. Additionally, 13 bird species listed as being of conservation significance under the National Parks and Wildlife Act were identified as occurring within 0.5 km of the study area.

Potential impacts to bird species include alteration to the Barker Inlet Wetland area as well as the removal of native and exotic planted vegetation in Regency Park Golf Course and roadside verges which provide habitat for fauna. These potential impacts are considered to be minor given the extent of alteration of the region from its pre-European habitat values.

Due to the altered nature of the site and the minimal clearance of planted native vegetation required for this project, it is unlikely that any fauna species will be significantly impacted. The study area does not comprise key, foraging, breeding or nesting habitat for any EPBC listed species identified as potentially occurring in the project footprint and surrounding region.

15.5.2 Mammals, amphibians and reptiles

The South Road Superway Project is not likely to significantly impact any species of mammals, amphibians or reptiles. The removal of appropriate habitat for these fauna species will be minimal and the habitat present in the site is of poor quality (e.g. exotic flora species).

15.5.3 Limitations

- An opportunistic fauna survey of the study area in conjunction with the flora survey in August 2009 was not comprehensive and only included opportunistic sightings. Further fauna species are likely to be present in the study area which were not identified during this survey.
- Records of historic surveys maintained by DEH in the BDBSA may be inaccurate or incomplete. In addition these historic surveys were not necessarily undertaken throughout all seasons or in the study area. This data indicates which species have been identified as occurring in the study area and surrounding region but cannot be used to determine which species do not occur in the study are and surrounding area
- This assessment has not considered the cumulative impacts of construction or operation of other road networks, industry or residential developments. It only considers potential impacts associated with the construction and operation of the South Road Superway Project.

15.6 Mitigation measures to minimise effects

15.6.1 Principles and measures adopted to minimise effects

Table 15.4 Potential flora and fauna impacts and their management and mitigation

Project stage	Potential impact	Mitigation/management measures
Design	Flora and fauna	▪ Identification of species, or species habitat, of conservation significance in the project footprint ▪ Designing the road corridor to limit the removal of native vegetation and fauna habitat ▪ Designing the road corridor to ensure surface water quality is not decreased through construction and/or operation of the upgraded road network

Project stage	Potential impact	Mitigation/management measures
		▪ Development of a construction environmental management plan ▪ Development of an operational environmental management plan
Construction	Death, injury or disturbance to native fauna Removal of native fauna habitat Spread of pest species	▪ Implementation of a construction environmental management plan including measures such as: – During excavation activities ensure – holes/trenches are backfilled immediately so as not to leave any holes/trenches open or – holes/trenches that cannot be backfilled immediately are plugged, fenced or appropriately managed to reduce the likelihood of animals falling into the holes/trenches and being unable to escape – exposed steel associated with foundations should be capped or bent as soon as practicable after installation to reduce the likelihood of injury. – contact appropriate authorities to remove any trapped fauna or fauna located in vegetation marked for removal. – During construction there shall be no dumping of materials/waste or diversion of drainage lines that will impact native fauna habitat – Any pollution events that occur (i.e. spilling of hydrocarbons) will be cleaned up immediately with minimal impact to native fauna habitat – Provide a sealed bin for site waste to discourage pest fauna from foraging on the site
Operation	Physical impacts to fauna Degradation of fauna habitat adjacent to project footprint.	▪ Implement an operational environmental management plan ▪ Maintain any rehabilitated areas including weeding, watering and replacement of dead plant stocks as necessary ▪ Reduce the likely presence of fauna in the road network, thus the potential for fauna injury or death, by regularly removing litter and animal carcasses from the roadway ▪ Monitoring of surface water and groundwater quality to identify if water quality is decreasing due to the operation of the upgraded road network ▪ Adopt an adaptive management approach to identify impacts associated with the operation of the road network and develop or alter processes/procedures to eliminate or minimise these impacts.

15.7 Conclusion

The native fauna habitat in the study area has been highly altered and extensively cleared since expansion of the Adelaide metropolitan area. The study area now comprises only a few areas of native fauna habitat including:

- Regency Park Golf Course
- Barker Inlet South Wetland
- vegetation in the roadside verges
- open swales.

Of these areas containing native fauna habitat, it is likely that small portions will require removal for the construction of the South Road Superway Project and local road upgrades. While 13 species of fauna considered as having state and/or national conservation significance were identified as occurring within 0.5 km of the site, none were identified as occurring in the project footprint during the recent opportunistic fauna survey (EBS 2009). In addition the area of habitat to be removed is limited and consists primarily of planted native and exotic vegetation (EBS 2009). It is unlikely that any native fauna species including those of conservation significance will be significantly impacted due to the construction and operation of the South Road Superway Project. The proposed management measures

will mitigate or minimise any effects of the construction and operation of the road on native fauna. Additionally further fauna assessments will be conducted to aid in determining the presence of species of conservation significance or species habitat in the study area.