

# **GAWLER EAST DEVELOPMENT PLAN AMENDMENT**

## **Gawler East Ecological Survey**

*Prepared for:*

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**Limitations Statement**

The sole purpose of this report and the associated services performed by Kellogg Brown & Root Pty Ltd (KBR) is to provide a baseline ecological survey in accordance with the scope of services set out in the contract between KBR and Delfin Lend Lease Pty Ltd ('the Client'). That scope of services was defined by the requests of the Client, by the time and budgetary constraints imposed by the Client, and by the availability of access to the site.


KBR derived the data in this report primarily from visual inspections, examination of records in the public domain and interviews with individuals with information about the site made on the dates indicated. The passage of time, manifestation of latent conditions or impacts of future events may require further exploration at the site and subsequent data analysis, and re-evaluation of the findings, observations and conclusions expressed in this report.

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**Revision History**

Revision	Date	Comment	Signatures		
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# 1 Introduction

Kellogg Brown & Root Pty Ltd (KBR) was contracted by Delfin Lend Lease (Delfin, the Client) to undertake an ecological assessment for a site at Gawler East, South Australia which is the subject of a Development Plan Amendment (DPA). The initial assessment described in this report is based on an on-site reconnaissance survey and a review of 'desktop information' carried out in July and August 2008. A detailed, formal survey of flora and fauna has not been undertaken at this stage in the project.

# 2 Background

The site is primarily located in The Town of Gawler local council jurisdiction with smaller areas controlled by the Barossa Council.

It is part of the Mount Lofty Block of Laut et al. (1977) and is on the edge of the Barossa sub-division of the Southern Mount Lofty Ranges region of Armstrong et al. (2003). Within this whole region about 13 % remnant native vegetation occurs, with larger areas of remnancy in some of the Hundreds.

The site is part of the Southern Lofty botanical region.

The area of the site north of the South Para River is within the jurisdiction of the Native Vegetation Council of South Australia.

## **Land use**

The Gawler District and the southern section of the Barossa Council area has undergone major residential housing growth in the past, especially over the last 15 years. Areas to the south and west of the site have been developed into residential housing estates and larger area blocks of land for rural living, with agriculture and extractive industry remaining in the north and central areas.

The site has been primarily used for sheep and horse grazing and cereal crops, with some areas showing evidence of overgrazing. A disused sand quarry is located in the north western section of the site, with a smaller operational quarry south east of the site boundary.

The South Para River dissects the property to the west; and a smaller, unnamed drainage line, which is a tributary of the River, dissects the site and flows into the South Para River from the east.

## Geology and soils

The Gawler region forms part of the Mt Lofty Block Province as described by Laut et al. (1977). The region contains some of the most productive agricultural land in South Australia, hence its dominant land use of grazing and cereal crops.

Specifically the site forms part of the Rosedale environmental association further detailed by Laut et al. (1977). Some areas of rock outcrop occur and skeletal soils maybe associated with these. Red brown duplex earth soils and terra rossa soils are common through out the province with their depth and colour determined by topography. Moderately deep to deep duplex soils occur on gentle slopes and as slope increases, depth decreases.

Shallow, well drained sandy textured earths and duplex soils with rocky outcrops are also common throughout the region and were observed on site. Small areas of alluvial soils, including fine textured cracking soils, are likely to be present along riparian areas (Kraehenbuehl 1996).

## Vegetation

Little of the original native vegetation once covering the province remains, owing to extensive clearing for agriculture (Laut et al. 1977). This reference considered that open forests, low open forests and woodlands originally dominated the landscape in the southern sections of the province (which includes the site). South Australian Blue gum (*Eucalyptus leucoxyton*) and Peppermint box (*E. odorata*) woodland remnants apparently occurred in these areas of lower rainfall with fertile soils. Mallee occurred on some areas of deep sands throughout the province.

The site is on the north eastern edge of the area assessed and mapped by Kraehenbuehl (1996). He indicates that the site was originally occupied by *E porosa* (Mallee box) woodland or low woodland usually over native grassland understorey. Small areas of native grassland would also be predicted to occur and areas of *E. camaldulensis* (River red gum) +/- *E. largiflorens* (Black box) would have likely occurred along riparian areas, plus with small areas of SA Blue gum and *Allocasuarina verticillata* (Drooping she-oak) elsewhere on the site.

## 3 Legislation and policy

Commonwealth legislation relevant to the project in relation to matters of national environmental significance, including vegetation communities and flora and fauna species and their habitat is the:

- *Environment Protection and Biodiversity Conservation Act 1999* (Cwlth) (EPBC Act).

State legislation includes:

- *National Parks and Wildlife Act 1972 (SA) (NP&W Act)*, especially Schedules 7, 8 and 9 as revised in the *National Parks and Wildlife (Miscellaneous) Amendment Act 2000* and in 2008
- *Natural Resources Management Act 2004 (NRM Act)* repeals the Animal and Plant Control (Agricultural Protection and Other Purposes) Act 1986 and the Soil Conservation and Land Care Act 1997 and incorporates the functional requirements of these latter Acts under the NRM Act. The NRM Act establishes provisions for the management of the State's natural resources, including pest plants and animals and the land and water resources.
- *Native Vegetation Act 1991 (SA)*, *Native Vegetation (Miscellaneous) Amendment Act 2002* and the Native Vegetation Regulations 2003
- *Mining Act 1971*, including its Regulations as the Mines and Works Inspection Regulations 1996 and the Mining Regulations 1998 (for the extractive industry site).

International, Commonwealth and State agreements, policies and strategies relevant to habitats, communities and species include the:

- Convention on Biological Diversity and The National Strategy for the Conservation of Australia's Biological Diversity (ANZECC, Department of the Environment, Sport and Territories 1996)
- National Strategy for the Conservation of Australian Species and Communities Threatened with Extinction (Endangered Species Advisory Committee 1992)
- Threatened Species Strategy for South Australia (Department of Environment and Natural Resources 2007)
- The State Government policy, No Species Loss A Biodiversity Strategy for South Australia 2006 - 2016 is the key policy for protection of biodiversity in the State and is applicable to the project.

## 4 Taxonomy and nomenclature

Plant taxonomy and conservation status accords with Barker et al. (2005).

The taxonomy of vertebrates follows the State listings of Robinson and Casperson (2000) as updated by the following sources:

- Birds Christidis and Boles (2008)
- Mammals Menkhorst (2002)
- Reptiles and amphibians Wilson and Swan (2008) as updated by M. Hutchinson, SA Museum pers. comm.

Definitions of threat status applied in this report are as follow:

- National EPBC Act definitions
- State Species NPW Act Schedules
- Communities Neagle (1995) and DEH (2005) (no legal status)
- Regional Lang and Kraehenbuehl (2002, 2008 update) for flora and Robinson et al. (2000) and Birds Australia (2003) (no legal status) for fauna.

## 5 Methodology

Following review of an aerial photograph of the site, a reconnaissance survey of some of the site was undertaken on 1 August 2008 by Dr Bob Anderson and Sarah Reachill. This survey involved a general assessment of all of the site and identification of areas of potential conservation significance. With the exception of the quarry precinct and the southern most land area, the entire site was inspected. Specific areas of potential interest, such as riparian, rocky and remnant woodland sites, were reviewed on foot. These included sections of the South Para River and an unnamed tributary of the River, plus areas of remnant *Eucalyptus porosa* woodland to the east of the site. Site-specific and incidental observations of all species observed were recorded for the site and surrounding area.

Weather conditions were cloudy and overcast, with strong winds plus showers and rain for much of the day. These were far from ideal for observation of fauna species, hence some species present were unlikely to have been observed.

A search of SA Museum and DEH Biological databases was undertaken for the site and its adjacent region. These provided some historical information about the region. A wider region search up to 10 km from the site was also available from previous projects undertaken by the consultant and these provided useful information about species which are extinct in the region or which may be present in small numbers, including migratory species (especially bird species)

A search of NatureMaps (DEH 2008) was undertaken also. These did not provide any information additional to that obtained from the Biological Survey Database.

A Protected Matters search under the EPBC Act was completed for the site. Data obtained from these sources are in Appendix A.

A literature survey was undertaken for the region and specific sources of information are cited and discussed in the text.

## 6 Results

As noted in Kraehenbuhl (1996) and DTEI (2007), the site was originally part of a dry woodland community with overstorey species occurrence and distribution primarily controlled by the occurrence of water. Mallee box would have dominated the site with smaller areas of SA blue gum and River red gum. Mallee box woodland is part of a similar community which originally occurred in the Peachey Belt (plains area around Smithfield) and as a 'band' along the heavy soils of the foothills both north and south of the site. A recent assessment at Blakeview by KBR (2007) south of the current site recorded a similar community along the foothills. The City of Playford and the Gawler Environment and Heritage Association (GEHA) have extensive records of the occurrence of flora in their respective areas for this community. These were considered in DTEI (2007).

Riparian zones would have included River red gum woodland to forest, plus SA Blue gum woodland on some slopes, and remnants of these are present on the site.

In the past, some of the drier, rocky areas on the site would have been expected to include areas of *Allocasuarina verticillata* woodland (Kraehenbuehl 1996, KBR 2006).

All of these communities originally contained a species-rich understorey and detailed discussion of their distribution in the region is in Kraehenbuehl (1996) and DTEI (2007).

### Vegetation communities

As recorded in the field, there is a relatively large area of *Eucalyptus porosa* open woodland +/- *Acacia pycnantha* over *Dianella revoluta* and native grasses and herbs to the east of the property (Figure 1 and Appendix B). The area of this community is associated with low hills, rock outcrops and relatively shallow soils. Some areas have a similar density of mature trees as would be expected to have occurred in the past and areas with a partially intact understorey are also present. Many of the trees being large and mature i.e. estimated to be over 150 years old. Despite continued grazing pressure and weeds infestations, these areas are in reasonably good condition with a relatively high diversity in the understorey (Refer Appendix B).

The distribution of all trees in the site, especially significant trees as defined under the *Development Act 1993* is recorded in Steinwedel (2007)

Some of the areas in between larger trees appear to have been revegetated, using Mallee box and some native, but not indigenous species, such as *E. albopurpurea* (Port Lincoln mallee). A total of 70 vascular plant species was recorded on the site of which 28 were native and 42 were introduced (Refer Appendix C). Additional species in both groups would be expected to be distinguished during a late spring survey.

Of particular interest is the presence of *Myosotis australis* (Austral forget-me-not); this species is considered rare in the Southern Lofty botanical region (SLBR).

Regionally uncommon species in the SLBR were also recorded as *Lomandra sororia/densiflora* (Sword mat rush), *Euphorbia drummondii* (Euphorbia), *Pleurosorus rutifolius* (Blanket fern) and *Solenogyne dominii* (Smooth solenogyne).

The South Para River which traverses the south western section of the property includes areas of *Eucalyptus camaldulensis* (River red gum) tall woodland over *Typha domingensis* +/- *Phragmites australis*. Individual trees of River red gum are present along the eastern watercourse and along the South Para River, with occasional trees of *E. leucoxylon* elsewhere on the property (see Steinwedel 2007 for their distribution).

The remainder of the property is primarily anthropogenic, either as cultivated areas for grain crops or improved pasture, as a weedy herbland and grassland (+/- pasture species) and with occasional to larger areas of planted trees, especially around the quarry site (as amenity plantings).

### **Fauna species and habitat areas**

No DEH Biological Survey assessment sites occur at or near this location (Armstrong et al. 2003, NatureMaps 2008). DEH and SA Museum databases have records of 21 bird species and five frog species for the general region of the site. There are nil records of mammals and reptiles.

However, within the wider region i.e. an area of 10 km x 10 km from the centre of site, about 290 species from all faunal groups have been recorded from all sources in the literature. This also includes records from Birds Australia (Paton et al. 1994), Turner (2001) and assessments reported in DTEI (2007). The dominant native faunal group is birds (avifauna) with 210 species, followed by reptiles (40 species), mammals (20 species) and amphibians (6 species). The remainder of the species listed in other reports and the literature are introduced.

The main faunal habitat areas present in the site are:

- *Eucalyptus porosa* open woodland, especially where it occurs over rocky outcrops
- *Eucalyptus camaldulensis* open woodland over sedgeland and grassland along riparian areas
- South Para River and the unnamed eastern drainage line, especially rock outcrops associated with these watercourses
- quarry precinct
- anthropogenic cropping and pasture areas.

From a fauna habitat perspective, there is limited habitat complexity remaining on the site, with the better quality areas, which are most prospective for fauna, associated with:

- the large, mature trees, particularly those with hollows for birds, micro-chiropteran bats and some reptiles
- riparian areas for aquatic fauna, some birds, plus as a water source
- rocky outcrops for reptiles.

These habitat areas are of moderate to high value.

The remaining areas would be expected to be used by common and cosmopolitan native and introduced species only, especially avifauna.

The rocky areas represent habitat for a suite of reptile species including the nationally vulnerable Flinders Ranges worm-lizard (*Aprasia pseudopulchella*). Of particular interest is the unnamed rocky drainage line which traverses the property in an east west direction. Section 7 of this report provides more details about threatened species.

The South Australian Biological Survey database provided records for five frog species present within the riparian environment of the Gawler River and South Parra River. None of the species recorded is threatened; however, their presence as a bio-indicator suggests that the habitat is of good quality. Refer Appendix C for species lists.

Fish and aquatic macro-invertebrate data are available for the South Para and Gawler rivers, with two native fish species and one introduced fish species recorded in the reach of the South Parra River potentially affected by this proposal. A relatively low abundance but high diversity of macro-invertebrates was recorded here (DTEI 2007). No data are available for the unnamed tributary of the South Parra River (and water was not present in this watercourse during the field reconnaissance).

A fauna survey in late spring to early summer will be required to determine community composition and species diversity.

#### **Pest plants and animals**

A total of forty two (42) weed species were recorded during the survey composing approximately 55% of the total floristic diversity. Of particular note is the abundance of Artichoke thistle (*Cynara cardunculus*) on the fringe of the *Eucalyptus porosa* woodland area and other sections of the site, where it is the dominant species (Refer Appendix B). Weed control of this species will be required to prevent further spread into the woodland area. African boxthorn (*Lycium ferocissimum*) and Olive (*Olea europaea*), both declared weeds in South Australia, were recorded in the woodland areas.

It is likely that weed diversity and dominance will be higher during spring to summer with a wider range of annual species.

Evidence of European red fox (*Vulpes vulpes*) and European rabbit (*Oryctolagus cuniculus*) were recorded during the survey. One adult fox, and fox scats, prints and runs were evident through the woodland areas. Rabbit scats (as buck heaps) were also present through much of the site and several large active warrens were noted. It is expected that feral cat (*Felis catus*) would also be present on site, although no evidence was seen during the survey.

Pest bird species recorded on site included Rock dove (*Columbia livia*), Indian dove (*Streptopelia chinensis*), House sparrow (*Passer domesticus*) and Common starling (*Sturnus vulgaris*). Several other species would be expected to occur.