Appendix I

Biodiversity Assessment Report

(SLR, 2015b)



Euroley Poultry Production Complex

Environmental Impact Statement

Biodiversity Assessment Report

Report Number 610.14072.00400-BAR-REV0

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ProTen Ltd

PO Box 1746

North Sydney, NSW 2060

Australia

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Euroley Poultry Production Complex

Environmental Impact Statement

Biodiversity Assessment Report

PREPARED BY:

SLR Consulting Australia Pty Ltd
ABN 29 001 584 612
10 Kings Road
New Lambton NSW 2305 Australia
(PO Box 447 New Lambton NSW 2305 Australia)
T: +61 2 4037 3200 F: +61 2 4037 3201
newcastleau@slrconsulting.com www.slrconsulting.com

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1 INTRODUCTION

1.1 Background

SLR Consulting Australia (SLR) has been engaged to prepare an Environmental Impact Statement (EIS) to support an application by ProTen Limited (ProTen) seeking development consent under Part 4 of the *Environmental Planning and Assessment Act 1979* (EP&A Act) for an intensive poultry production farm known as the Euroley Poultry Production Complex.

The Secretary's Environmental Assessment Requirements (SEARs) issued by the Secretary of the Department of Planning and Environment (DP&E) for the Project require the following Biodiversity Assessment Report (BAR) be prepared to inform the EIS.

1.2 Proposed Development

The proposed development site is located within a rural property in Euroley, within Narrandera local government area in southwestern New South Wales (NSW) (Figure 1). The site is characteristic of the surrounding landscape, being largely cleared for agricultural pursuits (Figure 2).

ProTen is seeking development consent under Part 4 of the EP&A Act to develop five PPUs where broiler birds will be grown for human consumption. Figure 3 shows the preferred location and conceptual layout of the proposed complex.

The development will comprise five PPU's each with 16 tunnel-ventilated fully-enclosed climate-controlled poultry sheds, with associated support infrastructure and staff amenities. Each shed will have the capacity to house a maximum of 49,000 broilers at any one time, equating to a PPU population of up to 784,000 broilers and a total farm population of 3,920,000 broilers. The complex will employ a total of 30 full time employees, 10 of whom will live in the development site as farm managers and assistant managers.

1.3 Proposed Development Site

1.3.1 General site description

The proposed development site compromises approximately 1,160 hectares of rural land positioned around 4 kilometres off the Sturt Highway, approximately 26 kilometres north-west of Narrandera and 48 kilometres south-east of Griffith in south-western NSW, as illustrated on Figure 1. It is identified as Lots 1, 41, 42, 44, 45 and 54 in DP 750898 and Lot 1 in DP 1054064 and is located within the Parish of Ourendumbee, County of Boyd and the Local Government Area (LGA) of Narrandera. The development site also includes the easement in which the access road will be constructed and the intersection of this access road with the Sturt Highway, as shown on Figure 1.

The topography of the development site (and surrounding lands) is relatively flat, ranging between approximately 133 metres Australian Height Datum (AHD) and 138 metres AHD. The visual amenity is that of a rural property that has been significantly modified by historic land clearing and long-term agricultural production activities. There are no water courses within the development site however there are some ephemeral drainage lines that traverse the site.

No large remnant patches of vegetation remain within the development site. Across the site there are small areas of vegetation, such as in the north east corner and along the low lying areas that traverse the site. The surrounding locality is also primarily characterised by traditional agricultural production.

1.3.2 Development footprint

The proposal comprises the development of five poultry production units (PPU), where broiler birds will be grown for human consumption. The development will be relatively small, with a disturbance footprint of approximately 90 hectares, comprising just 8% of the development site, and the commercial activity associated with the development will be largely confined to this area. At this point in time it is intended to continue using the land outside of the disturbance footprint for continued agricultural production purposes under some form of lease or share farming arrangement.

In addition to poultry shedding, the proposed development will also include:

- The construction of 10 houses to accommodate farm managers and assistant farm managers;
- The construction of ancillary infrastructure and improvements required to support the poultry production operation; including
    - Amenity facilities encompassing office space, toilets, and staff change rooms;
    - Servicing infrastructure to ensure that the development's electricity, gas and water requirements can be met;
    - An engineered surface water drainage and management system;
    - Dead bird chiller/chiller room;
    - Chemical storage;
    - Generator shed, workshop and poultry shed floor bedding material storage shed;
    - Wheel wash facility at the PPU entrance;
    - Feed silos, which will automatically dispense the feed into the poultry sheds; and
    - Water storage tanks, with the capacity to store adequate supply at peak demand
- Construction of an intersection with the Sturt Highway to a new access road to gain access to the development site. This will include the development of an easement through privately owned land between the proposed development site and the intersection with the Sturt Highway.

1.4 Scope and Aims of this Report

As part of an application for State Significant Development under the *Environmental Planning and Assessment Act 1979* (EP&A Act), a proponent must prepare an Environmental Impact Statement (EIS). Before preparing an EIS, proponents must apply to the Secretary of the DP&E for the SEARs. The SEARs set out matters to be addressed in the EIS.

Under the *NSW Biodiversity Offsets Policy for Major Projects* (NSW Government & OEH 2014a), the SEARs require a proponent to apply the Framework for Biodiversity Assessment (FBA) to assess impacts on biodiversity. The FBA is also applied to identify reasonable measures and strategies that can be taken to avoid and minimise impacts on biodiversity. A Biodiversity Assessment Report (BAR) is required to describe the biodiversity values present on the development site and the impact of the Major Project on these values. An additional Biodiversity Offset Strategy (BOS) is required to outline how the proponent intends to offset the impacts of the Major Project. These reports form part of the EIS.

The Department of Planning and Environment provided the SEARs for the Euroley Poultry Production Complex development application (SSD 6882) on the 6th of February 2015. This full list of SEARs is provided in Appendix A of the EIS.

Biodiversity is identified as an issue in the SEARs and is identified as requiring "*to be assessed and documented in accordance with the Framework for Biodiversity Assessment…*". Consequently the scope of this BAR has been defined by the SEARs and FBA.

The Secretary has identified several additional assessment requirements for biodiversity impacts not considered by the FBA in the SEARs. These impacts (such as impacts of groundwater dependent ecosystems) are also documented within the EIS. Table 1 lists the SEARs that are relevant to biodiversity. An excerpt of the biodiversity related SEARs is provided in Appendix A of this report.

Table 1 SEARs relating to Biodiversity

SEARs	Location in BAR
Key Issue – biodiversity to include:	
Accurate predictions of any vegetation clearing in study area or for any road upgrades	Chapter 5, Figure 9
Detailed assessment of the potential impacts on any threatened species, populations, endangered ecological communities or their habitats, groundwater dependent ecosystems and any potential for offset requirements;	Chapter's 4 to 7, Figure 9
Detailed description of the measures to avoid, minimise, mitigate and offset biodiversity impacts	Chapter 5
Assessment of the proposal and all biodiversity values on the site under the Framework for Biodiversity Assessment 2014	Chapter 6
OEH requirements (SEARs letter, Attachment B)	
Impacts on the following species, populations and ecological communities will require further consideration and provision of the information specified in s9.2 of the Framework for Biodiversity Assessment: Threatened species - Sand-Hill Spider Orchid *Caladenia arenaria*, Bindweed *Convolvulus tedmoorei*, Small Scurf-pea *Cullen parvum*, Oaklands Diuris *Diuris* sp. (Oaklands, D.L. Jones 5380), Austral Pillwort *Pilularia novae-hollandiae*), Lanky Buttons *Leptorhynchos orientalis*, Regent Honeyeater *Anthochaera phrygia*, Endangered populations - Glossy Black-Cockatoo *Calyptorhynchus lathami* Riverina population, Endangered ecological communities - *Allocasuarina luehmannii* Woodland, SandhiI Pine Woodland, Inland Grey Box Woodland and Myall Woodland.	Chapter's 4 to 6

Consideration of the *Environment Protection & Biodiversity Conservation Act 1999* (EPBC Act 1999) is also provided (see Section 9). Matters of National Environmental Significance (MNES) are protected under the EPBC Act and the FBA requires proponents to identify and assess the impacts on all nationally listed threatened species and threatened ecological communities that may be on the development site. Other MNES are not considered by the FBA.

1.5 Information Sources

The key information sources utilised in the assessment include:

- the *OEH Atlas of NSW Wildlife* for previous records of threatened species from the locality;
- the Protected Matters Search Tool, located on the Department of the Environment website (DE 2014b) for matters of national environment significance (as listed under the EPBC Act) predicted to occur within the locality;
- the *Threatened Species Profile Database*, for detailed information on threatened species of relevance to the site and the locality;
- GIS data on Interim Biogeographic Regionalisation for Australia (IBRA) regions and Mitchell Landscapes;

- the Biobanking Credit Calculator, for lists of predicted ecosystem credit species and species credit species and for the Project credit requirements;
- mapping of the vegetation of the Murrumbidgee catchment management area (CMA), including GIS data that was utilise to prepare base vegetation maps and design field surveys;
- data collected during field surveys;
- officers of the Office of Environment and Heritage (OEH), NSW Offsets Policy Team who provided assistance on particular matters relating to the FBA and the Credit Calculator.

1.6 Methods Summary

This BAR was prepared according to the steps and processes detailed in the FBA, with the key steps being:

- Desktop review – database searches to identify listed threatened biota (species, populations and communities) of potential relevance to the study area; initial GIS mapping; survey design;
- Field survey of the study area (see Appendix B for details);
- GIS mapping and data compilation;
- Using GIS and field survey results to complete the 'landscape assessment';
- Identification of vegetation zones and use of biobanking plot/transect data and GIS mapping to assess 'site value';
- Applying the proposed development footprint in GIS to calculate vegetation removal;
- application of the Credit Calculator, including identification of candidate threatened species and impact credit calculations; and
- Preparation of the BAR.

Appendix B provides details of the field surveys, including methods, survey effort and weather conditions. The study area was surveyed on two occasions (January and February 2015) by staff of the ecology discipline at SLR. The purpose of the field surveys was to inspect the areas proposed for development and to collect the necessary floristic and habitat details for completion of the FBA assessment (including plot and transect data for site value score and targeted threatened species surveys). Plot and transect data was collected according to the *Biobanking Assessment Methodology* (DECC 2009), and copies of biobanking field sheets are provided in Appendix C.

Application of the Credit Calculator was completed by Jeremy Pepper, an accredited assessor (assessor #0107) and Principal SLR Ecologist.

1.7 Definitions

Definitions used in this report are listed in Table 2.

The majority of the proposed facility will be located within the 'development site', as shown in Figure 1. However, we note that field surveys and vegetation mapping was completed for a wider 'study area', which includes land north of the development site, near the Sturt Highway (see Figure 7). This area, which does not form part of the development site, will be affected by access road construction, which will require the removal of a small narrow band of native vegetation near the Highway. Accordingly, these vegetation impacts have been included in the impact assessment and credit calculations of this BAR.

Table 2 Definitions in the BAR

Term	Definition
Development Site	The area proposed for the PPUs and associated infrastructure and ancillary works, as shown in Figure 1. Excludes the access road.
Locality	All land within 10 kilometres (km) of the study area.
Study Area	Area of land containing the Development Site and land surrounding the proposed access road alignment and site entrance, which was subject to field surveys (including threatened species surveys). The boundary of the study area is shown in Figure 7.
TEC	Threatened ecological community listed under TSC Act and/or EPBC Act
EEC	Endangered ecological community listed under TSC Act and/or EPBC Act

2 LANDSCAPE FEATURES

This chapter describes the landscape features of the study area and surrounds, in accordance with Section 4 of the FBA.

2.1 IBRA Bioregions and Subregions

The study area lies within the eastern margins of the Riverina bioregion, with the NSW Southwestern Slopes Bioregion located only a few kilometres (10-15 km) to the east of the study area (Figure 2). The Riverina Bioregion lies in southwest NSW and covers an area of approximately 9,576,964 hectares, 74 % of which lies in NSW (IBRA). The Riverina Bioregion extends from Ivanhoe in the Murray Darling Depression Bioregion south to Bendigo, and from Narrandera in the east to Balranald in the west. Within its boundaries lie the towns of Hay, Coleambally, Deniliquin, Leeton, Mossgiel, Hillston, Booligal and Wentworth, while Griffith, Ivanhoe, Narrandera and Albury lie just outside its boundary in neighbouring bioregions. The Murray and Murrumbidgee Rivers and their major tributaries, the Lachlan and Goulburn Rivers, flow from the highlands in the east, westward across the Riverina plain (OEH 2011).

The study area lies within the Murrumbidgee IBRA subregion (RIV02), which is characterised by Quaternary alluvial sediments, clay and sand with source bordering dunes and lakes. Soils are red brown earths, grey and brown clays and deep siliceous sands on dunes. Vegetation comprises River Red Gum and River Cooba on channels; Black Box, Lignum and Old Man Saltbush on floodplains; Myall and saltbush and grasses on backplains, with White Cypress Pine on dunes. Stands of these main vegetation types are present within the study area.

2.2 Mitchell Landscapes

The study area lies within two Mitchell landscapes:

- Murrumbidgee Scalded Plains, which cover the majority of the site, including all of the proposed locations for the PPUs; and

- Murrumbidgee Source bordering Dunes, which occur in the northern parts of the site, with a large patch occurring north and south of the Sturt Highway at this location. The proposed access road would traverse south from the Highway through this landscape.

The distribution of Mitchell Landscapes across the study area is shown in Figure 1.

Murrumbidgee Scalded Plains are described by DECCW (2002) as “Quaternary alluvial plains with extensive scalding interpreted as relic floodplains or terraces”. Soils are grey, brown and red cracking clays and red brown texture-contrast soils with scalds. Relief is generally less than 1 m, but up to 5 m on associated pans, swamps and lunettes. The vegetation comprises low shrublands and grasslands of bladder saltbush (*Atriplex vesicaria*), other annual saltbushes (*Atriplex* sp.), numerous burrs (*Sclerolaena* sp.), cottonbush (*Maireana aphylla*), bush minuria (*Minuria cunninghamii*), white-top grass (*Austrodanthonia caespitosa*), windmill grass (*Chloris truncata*), and hill wallaby grass (*Austrodanthonia eriantha*).

Murrumbidgee Source bordering Dunes are described as “sandy rises adjacent to river channels and along prior streambeds, deep red and brown sands and loams, relief 3 to 12m. Often heavily grazed and subject to wind erosion”. Common native plant species are white cypress pine (*Callitris glaucophylla*), needlewood (*Hakea leucoptera*), hooked needlewood (*Hakea tephrosperma*), wilga (*Geijera parviflora*), bull oak (*Allocasuarina luehmannii*), emu bush (*Eremophila longifolia*), miljee (*Acacia oswaldii*), yarran (*Acacia homalophylla*), native quince (*Petalostigma pubescens*), thorny saltbush (Rhagodia spinescens), western pittosporum (*Pittosporum phylliraeoides*), belah (*Casuarina cristata*), some Bimble box (*Eucalyptus populnea*), narrow-leaf hopbush (*Dodonaea attenuata*) with sparse grasses. Black bluebush (*Maireana pyramidata*) occurs in the shrub layer in western areas.

2.3 Native Vegetation extent

The extent of native vegetation within the study area and within the locality has been obtained using broad scale vegetation mapping data for the Murrumbidgee catchment management area (CMA). To cover the proposed development site a 1,500 ha inner circle was drawn in GIS, using available aerial imagery as a base. Using a 1:10 ratio, a 15,000 ha outer assessment circle was also drawn. The extent of native vegetation within the landscape assessment circles (outer assessment circle), as well as cleared areas are listed in Table 3. Around 14% (2,159 ha) of the outer assessment circle comprises native vegetation, with the remaining 86% (12,833 ha) comprising cleared land.

Table 3 Native vegetation extent and cleared areas within outer (15,000 ha) circle

Existing Veg Cover (Formation)	Outer Assessment Circle (15000 ha)
00_Cleared	12833
04_Grassy woodlands	182
10_Freshwater wetlands	14
11_Forested wetlands	48
13_Semi-arid woodlands (Grassy subformation)	1334
14_Semi-arid woodlands (Shrubby subformation)	580
Total Native Vegetation	**2159**

2.4 Waterbodies

2.4.1 Topography

A review of topographical mapping indicates that the floodplain of both the Murrumbidgee River and Yanco Creek is relatively flat within proximity to the site. Google earth elevation data shows the study area to be elevated lower than land immediately to the south of the Murrumbidgee River and immediately to the east of Yanco Creek.

The general low relief and flat topography of the study area is illustrated in the contour data, which reveals that no 10 m contours intersect with the study area and that the study area lies between 133 m and 138 m above sea level.

2.4.2 Rivers and streams

The Murrumbidgee River flows to the north of the development site, flowing from Narrandera in the east through to Darlington Point to the northwest of the site. At its closest point the river flows approximately 9 kilometres to the north of the site.

There are no notable surface water bodies or tributaries within the study area. The nearest waterway, Yanco Creek, is a regulated stream of the Murrumbidgee River System, flowing approximately 8 kilometres to the east of the study area boundary at its closest point. Although inflows to Yanco Creek are controlled by Yanco weir under normal conditions, during large floods, the Murrumbidgee breaks out of its banks before the Yanco Weir and flows directly to Yanco Creek (SKM, 2000).

There is evidence that a minor topographical depression runs east-west through the site, which acts as a minor drainage feature. The feature has no formed banks and is only distinguishable as a drainage feature by its location topographically and the vegetation present within it. This area coincides with a band of Black Box Lignum Woodland, which runs east-west through the study area as shown in Figure 5.

Some agricultural drains also run along the field boundaries in the north of the development site.

2.4.3 Wetlands

There are no wetlands within the study area. The nearest wetlands, as identified within the Narrandera Shire Council LEP mapping, are shown to occur approximately 3 km to the north of the north-west corner of the development site, 3.7km to the east of the north-east corner of the development site and approximately 5 km to the east of the southern tip of the development site. The ephemeral 'Dry Lake' wetland lies approximately 5.8 km east of the proposed north-east poultry production unit.

2.5 Biodiversity corridors (links)

There are no State or regional biodiversity corridors or links mapped within or adjacent to the study area.

2.6 Landscape Value Score

Landscape value score was calculated according to Chapter 4 of the FBA. As noted above in section 2.3, to cover the proposed development site a 1,500 ha inner circle was drawn in GIS, using available aerial imagery as a base. Using a 1:10 ratio, a 15,000 ha outer assessment circle was also drawn.

2.6.1 Native woody vegetation cover

Native vegetation extent was mapped and the area calculated within both landscape assessment circles using Murrumbidgee CMA data (Eco Logical 2011). The proportion of native woody vegetation within both assessment circles is listed in Table 4.

Table 4 Percent native vegetation cover in the landscape

Circle Size (ha)	Existing Veg Cover (%)	Future Veg Cover (%)
1500	15	15
15000	14	14

2.6.2 Connectivity

Connectivity score was calculated according to the FBA (with reference to the *Biobanking Operational Manual* DECC 2009). Using aerial imagery the connecting links across the study area were mapped and the link with the narrowest section was chosen as the primary link. Inspection of aerial imagery reveals that two main east-west links traverse the site, but narrow to just one or two trees in small sections just off the study area to the east and west (see Figure 1). The width of these narrow sections was measured as the 'limiting width' – around 10-15 m wide. Construction of the proposed PPUs will not affect the main east-west connecting link through the site, so there will be no change to linkage width class. Linkage condition class (of woody vegetation) is assumed to be at benchmark and will remain at benchmark after the proposed development.

2.6.3 Patch Size

Patch size was estimated for each vegetation zone and entered in to the Credit Calculator. Using aerial imagery and CMA vegetation mapping, two patches were identified:

- One large patch of around 1900 ha which occupies the southern parts of the study area and extends to the west of the site, and which includes the Black Box Grassy Open Woodland (MR 517) and Black Box Lignum Woodland (MR 518) vegetation types; and
- A patch of around 63 ha lies south of the Sturt Highway and includes the patches of White Cypress Pine Woodland (MR 644) that occur near the location of the proposed intersection of the Sturt Highway with the access road.

The landscape value score, taking into account the existing vegetation cover, connectivity and patch size, and future scores for these variables after the proposed development, is 12.

3 NATIVE VEGETATION

This chapter describes the native vegetation on the study area in accordance with Section 5 of the FBA.

3.1 Study area Characteristics

The majority of the study area has been historically cleared and used for agricultural purposes and is consequently composed of modified often bare soils and exotic pastures. There are a few patches of native vegetation remaining associated with sandhills in the north adjacent to the Sturt Highway and with a band of low lying terrain (which might act as a periodic floodplain) in the south (Figure 1).

Widely scattered paddock trees are distributed intermittently across the site, with generally limited shrubs cover and low diversity and cover of native groundcover vegetation. The groundcover across most of the open portions on the study area is subject to sheep grazing and is dominated by exotic agricultural pasture and weed species typical of the locality.

3.2 Regional (Broad-scale) Vegetation Mapping

Two vegetation mapping resources are available for the study area:

- Composite Vegetation Map for the Murrumbidgee Catchment: NSW Keith Vegetation Class Allocation (Eco Logical Australia 2011); and
- Vegetation mapping by 3-D digital aerial photo interpretation: vegetation of central-southern New South Wales (OEH 2011b).

The Eco Logical Australia (2011) mapping uses a combination of aspatial and spatial allocation of vegetation classes and Geographic Information System (GIS) to assign NSW vegetation classes (Keith 2004) to polygons in the aerial photography interpretation (API) based vegetation composite layer developed by DECCW. This project did not involve any field verification or amendment of the original polygons (Ecological Australia 2011).

The OEH (2011) mapping used a combination of reviewing existing vegetation mapping and quadrat data, field reconnaissance and aerial photo interpretation. The field reconnaissance involved collection of basic data (including the three dominant canopy species, best fit plant community types (PCT) and percentage cover estimates). The data was collected by several consultants at an intensity of 100 plots per 1:100,000 map sheet using 50m by 50m plots. The field reconnaissance was generally concentrated on public land with some access granted to private land, and some areas inspected using binoculars. The digital aerial photo interpretation involved determining signature, height and density in tree cover and the delineation of polygons (areas greater than 5% crown cover mapped as woody vegetation). Mostly areas of native vegetation greater than one hectare were picked up as polygons. However some 0.5 hectare patches were also mapped.

3.3 Vegetation Classes

According to broad scale mapping (OEH 2011), eight vegetation classes occur in the development site:

- Floodplain Transition Woodland, a few small patches across the site;
- Inland Floodplain Swamps, five small patches in the lower lying south of the site;
- Inland Floodplain Woodlands, scattered small patches through the south of the site;
- Inland Riverine Forest, three patches along the western boundary of the site;
- Riverine Plain Grassland, mapped as a block in the southwest of the site;
- Riverine Plain Woodlands, including a few very small patches along the eastern boundary;

- Riverine Sandhill Woodland, a few small patches in the south of the site and a large patch around the proposed access road easement off the Sturt Highway; and
- Semi-arid Sand Plain Woodlands, a very small patch in the south of the site.

The distribution of these vegetation classes within the study area is shown in Figure 4. The vegetation formations that these vegetation classes fall within and their mapped area within the study area are listed in Table 5.

Table 5 Vegetation formations and vegetation classes mapped within the study area

Vegetation Formation	Vegetation Class	Area (ha)
Grassy Woodlands	Floodplain Transition Woodlands	3.87
Freshwater Wetlands	Inland Floodplain Swamps	19.82
Semi-arid woodlands (grassy subformation)	Inland Floodplain Woodlands	125.43
Forested Wetlands	Inland Riverine Forests	10.78
Grasslands	Riverine Plain Grasslands	537.99
Semi-arid Woodlands (grassy subformation)	Riverine Plain Woodlands	4.96
Semi-arid Woodlands (shrubby subformation)	Riverine Sandhill Woodlands	80.55
Semi-arid Woodlands (shrubby subformation)	Semi-arid Sand Plain Woodlands	0.78
Not classified	Not classified	2.05

Floodplain Transition Woodland is an open woodland dominated by Inland Grey Box *E. microcarpa* with Yellow Box *E. melliodora* from 15 to 25 metres in height. The groundcover is a largely continuous grassy cover with a sparse layer of sclerophyllous shrubs. This vegetation is typically found in transitional zones receiving less than 550 millimetres mean annual rainfall and occurs at flats and shallow depressions on gilgaied clays and red earths. This vegetation may constitute the EEC known as 'Inland Grey Box Woodland in the Riverina, NSW South Western Slopes, Cobar Peneplain, Nandewar and Brigalow Belt South Bioregions', as listed under the TSC Act.

Inland Floodplain Swamps are sedgeland or grassland with aquatic forbs in standing water. There are no trees, shrubs or vines and species which are present include *Eleocharis* spp., *Juncus* spp., *Typha* spp. and *Phragmites australis*. The community is found in permanently and semi-permanently inundated depressions and billabongs in low-lying sites on semi-arid floodplains. Whilst this vegetation might typically constitute several wetland EECs listed under the TSC Act ('Artesian Springs Ecological Community', 'Carex Sedgeland' and 'Marsh Club-rush sedgeland') none of those EECs are known or predicted to occur in the Euroley area.

Inland Floodplain Woodland is described as 'eucalypt' woodland to 25 metres high, with a variable shrub stratum of saltbushes and semi-continuous herbaceous groundcover. The community is typically dominated by Black Box *Eucalyptus largiflorens*, with occasional Inland Grey Box *E. microcarpa* or Yellow Box *E. melliodora*. This vegetation does not typically represent an endangered ecological community (EEC).

Inland Riverine Forests are open eucalypt forests of River Red Gum *Eucalyptus camaldulensis* up to 40 metres tall. Scattered small trees and shrubs that may be present include Cooba *Acacia salicina,* River Cooba *A. stenophylla*, Nitre Goosefoot *Chenopodium nitrariaceum,* Dwarf Cherry *Exocarpos strictus* and Lignum *Muehlenbeckia florulenta*. The groundcover is a dense to patchy, species-rich, herbaceous layer of forbs and sedges, such as Lesser Joyweed *Alternanthera denticulata*, Common Buttercup *Ranunculus lappaceus*, *Carex* spp. and *Juncus* spp. The community occurs on fertile alluvium subject to frequent flooding on the sandy banks of major inland rivers and the beds of intermittent streams, billabongs and channelled floodplains.

Riverine Plain Grasslands are short, open tussock grasslands with an abundance of herbs and occasional emergent shrubs. The community occurs on extensive, flat, riverine plains with grey-brown clays and clay loams receiving 350-420 mm mean annual rainfall. Species include occasional shrubs (Slender-fruit Saltbush *Atriplex leptocarpa*, *Maireana spp*. and Weeping Myall *Acacia pendula*), a variety of herbs (such as Common Woodruff *Asperula conferta*, *Crassula* spp., Common Everlasting *Chrysocephalum apiculatum,* Woolly Buttons *Leptorhynchos panaetioides* and Woolly-heads *Myriocephalus rhizocephalus*) and grasses (*Austrodanthonia* spp*., Austrostipa nodosa,* Windmill Grass *Chloris truncata* and Curly Windmill Grass *Enteropogon ramosus*). This vegetation may constitute EECs known as 'Myall Woodland' and 'Artesian Springs Ecological Community', though the latter is not known to the Euroley area.

Riverine Plain Woodlands occur on grey clays on gilgaied flats and is typically an open Acacia woodland to eight metres tall, with sparse chenopod shrub stratum and continuous grassy ground stratum. Species include Weeping Myall *Acacia pendula*, rarely with Black Oak *Casuarina pauper*, False Sandalwood *Eremophila mitchellii*, Umbrella Wattle *A*. *oswaldii*, River Cooba *A*. *stenophylla*, and Western Rosewood *Alectryon oleifolius* ssp. *elongates*. This vegetation may constitute EEC's known as 'Artesian Springs Ecological Community', 'Myall Woodland in the Darling Riverine Plains, Brigalow Belt South, Cobar Peneplain, Murray-Darling Depression, Riverina and NSW Slopes bioregions' or 'Native Vegetation on Cracking Clay Soils of the Liverpool Plains'.

Riverine Sandhill Woodland is an open woodland on raised sandy areas dominated by cypress pines with scattered eucalypts and an open shrub stratum. Species composition typically includes White Cypress Pine *Callitris glaucophylla*, Kurrajong *Brachychiton populneus*, with occasional Yellow Box *E. melliodora* and Gum Coolabah *E. intertexta*. This vegetation may constitute EEC's known as '*Allocasuarina luehmannii* Woodland in the Riverina and Murray-Darling Depression Regions' or 'Sandhill Pine Woodland in the Riverina and Murray-Darling Depression Regions and NSW Western Slopes bioregions'.

Semi-arid Sand Plain Woodlands are an open casuarina woodland with chenopod understorey. They occur on red-brown calcareous loams on level to gently undulating sand plains. Trees and shrubs include *Casuarina pauper*, *Alectryon oleifolius* ssp. *canescens*, *Maireana* spp., *Geijera parviflora*, *Exocarpos aphyllus*, *Rhagodia spinescens*, *Myoporum platycarpum* and *Eremophila* spp. Groundcover species include *Sclerolaena* spp., *Cheilanthes sieberi*, *Tetragonia tetragonioides*, *Austrostipa nitida*, *Enneapogon avenaceus*, *Eragrostis dielsii*, *Sporobolus caroli* and *Chloris truncata*. This vegetation may constitute EECs known as 'Acacia melvillei Shrubland in the Riverina and Murray-Darling Depression bioregions' and '*Acacia loderi* Shrublands', though the latter is not known to the Euroley area.

3.4 Site Specific Mapping - Plant Community Types (PCTs)

SLR has mapped plant community types within the study area, based on the results of the field survey, as:

- Black Box Lignum Woodland – present along a low lying area in the south of the development site;
- Black Box Grassy Open Woodland – present on drier slightly more elevated land in the south of the development site; and
- White Cypress Pine Open Woodland – present on sandy hills and rises in the north of the development site.

The distribution of these plant community types within the study area is shown in Figure 5 and their mapped area and percentage cleared values for the Murrumbidgee CMA are listed in

Table 6.

Table 6 Plant Community Types (PCTs) mapped within the study area

Code	Plant Community Name[1]	TEC[2]	% Cleared Value[3]	Area (ha)
MR517	Black Box Lignum Woodland	No	80	59.31
MR518	Black Box Grassy Open Woodland	No	60	109.68
MR644	White Cypress Pine Open Woodland	Yes	80	35.21
			Total	**204.2**

3.4.1 Black Box Lignum Woodland

'Black Box - Lignum woodland of the inner floodplains in the semi-arid (warm) climate zone (Benson 13)' is positioned on inner floodplains and on alluvial plains mostly in depressions that are frequently flooded. It is a woodland, open forest or open woodland averaging about 15 metres high and occurs on clay or clay-loam, often gilgaied, soils.

In addition to the correct soil and landscape conditions, flora species relied upon to determine the presence of this vegetation type include:

- dominant canopy species Black Box *Eucalyptus largiflorens* - this was the only canopy species present and was scored 5% - 75% cover in the plots surveyed;
- characteristic midstorey species – Lignum *Duma florulenta* (syn. *Muehlenbeckia florulenta*) (which was abundant in all biobanking plots of this PCT) and Thorny Saltbush *Rhagodia spinescens* (which was present in low abundance in several of the plots); and
- characteristic groundcover species - Black Rolypoly *Sclerolaena muricata* (which was present in low abundance in several of the plots) and Quena *Solanum esuriale* (which was observed in low abundance in one plot).

The Black Box – Lignum woodland is a widespread community along rivers in southwestern NSW including the Murray, Wakool, lower Darling, Lachlan, Murrumbidgee Rivers and Willandra Creek.

This plant community type does not constitute an EEC.

3.4.2 Black Box Grassy Open Woodland

'Black Box grassy open woodland of rarely flooded depressions, south western NSW (Benson 16)' is located on alluvial plains. The community occurs on heavy clay soils in ephemeral discharge areas including claypans and depressions distant from the major river floodplains. These areas are rarely flooded compared to fringing lake Black Box. This community contains a sparser understorey than Black Box communities on the floodplains near major rivers.

In addition to the correct soil and landscape conditions, flora species relied upon to determine the presence of this vegetation type include:

- dominant canopy species Black Box *Eucalyptus largiflorens* - this was the only canopy species present and was scored less than 20% cover in all plots;

1 Based on *NSW Vegetation Types Database*
2 Threatened ecological community, as listed under the TSC Act
3 Proportion of the original distribution of the community that has been cleared within the CMA

- characteristic midstorey species - Thorny Saltbush *Rhagodia spinescens* (which was observed in low abundance in two of the plots); and
- characteristic groundcover species - Black Rolypoly *Sclerolaena muricata* var. *muricata* (which was observed in low abundance in one plot) and *Oxalis perennans* (which was observed in low abundance in two plots).

This plant community type does not constitute an EEC.

3.4.3 White Cypress Pine Open Woodland

'White Cypress Pine open woodland of sand plains, prior streams and dunes mainly of the semi-arid (warm) climate zone (Benson 28)' occurs on prior streams, source bordering sand dunes and sand plains in south-western NSW. It is an open woodland or a derived grassland with scattered trees up to 15 metres high. The community occurs on sandy loam soils and is often present in a mosaic with Belah - Western Rosewood, Acacia or *Eucalyptus* communities. Few sites are in good condition due to grazing and clearing.

In addition to the correct soil and landscape conditions, flora species relied upon to determine the presence of this vegetation type include:

- dominant canopy species White Cypress Pine *Callitris glaucophylla* - this was the only canopy species present in almost all plots and was scored from 5% to 50% cover;
- characteristic midstorey species - *Maireana enchylaenoides* (which was present in low abundance in one of the plots); and
- characteristic groundcover species - *Dissocarpus paradoxus* (which was present in low abundance in one of the plots), Speargrass *Austrostipa scabra* subsp. *scabra* (which was common in a number of the plots) and *Calotis hispidula* (which was present in low abundance in one of the plots).

This plant community type constitutes an EEC known as 'Sandhill Pine Woodland in the Riverina and Murray-Darling Depression Regions and NSW Western Slopes bioregions'.

3.5 Site Specific Vegetation Mapping – Differences to Regional Mapping

SLR has undertaken a detailed review of the broad-scale vegetation mapping available for the study area and considers there to be some problems with these resources. The OEH (2011) mapping (Figure 4) appears more accurate (or at least more precise) than the Eco Logical Australia (2011) mapping, but we note that:

- The OEH (2011) data set is at a similarly large scale to the Murrumbidgee CMA dataset. Although it employs ADS40 aerial imagery and involved limited ground-truthing, it cannot be used as a surrogate for intensive site specific ground surveys. For this reason alone, as with any broad scale mapping, it cannot be relied upon to accurately map vegetation at the site scale.
- Appears to 'over-split' the vegetation patches on the study area. For example, lower lying areas through the south of the site are mapped as including various vegetation types such as Shallow Swamp, Buloke-Moonah-Black Box Open Woodland and River Red Gum-Black Box Open Woodland). These vegetation patches were surveyed then subjected to detailed floristic analysis by SLR. In most cases the data indicated Black Box-Lignum Woodland as the most appropriate fit.
- Maps patches of woodland and open woodland, which SLR has found to be in low condition and to lack the requisite structure and floristics to constitute the vegetation communities mapped by OEH (2011) or EcoLogical Australia (2011). For example:

  - Various mapped patches of Black Box grassy open woodland which appear to have been reduced to an open scattered tree canopy, with no mid-storey and a groundcover dominated by exotic grasses.
  - Two small patches of Weeping Myall Woodland are mapped in the east of the site. These patches comprise a monoculture of scattered Weeping Myall with a complete absence of native understorey or groundcover. This vegetation would not comply with the description of the Weeping Myall plant community. In particular the threshold for the community according to the EPBC Act guidelines (DEWHA 2009) require "*of the vegetation cover (shrub and ground layers) present, 50 percent is comprised of native species*" and identifies "*areas that have a total absence of native species in the understorey are considered to be so highly degraded that they cannot be returned to a state in which they could be considered part of the listed ecological community. Patches that consist of single paddock trees with no native understorey are generally excluded (where the above condition thresholds have not been met*".
  - The OEH (2011) data depicts a patch of White Cypress Pine Open Woodland in the northwestern corner of the development site (see Figure 4). This area lies immediately northwest of a proposed PPU in that location in that location (see Figure 4). The footprint of the PPU and the immediate surrounds was subject to field reconnaissance during the site survey and native vegetation patches were not detected in this area. However, regardless of the type and condition of vegetation (as visible in aerial imagery and in regional mapping in this part of the site, the vegetation in the northwestern corner has been excluded from the proposed development footprint and will not be affected by construction or operation of the proposed development. Detailed sampling and assessment of this area is therefore not necessary for assessing the impacts of the development on native vegetation.

- Maps areas of Native Grassland Complex that are low condition and are typically dominated by exotic grass and forb species and/or very few natives. In addition the mapping does not include descriptions of what would constitute native grassland and describes the following limitations in this respect: "*Delineation between low grasslands… was undertaken with less certainty. Accurate delineation of structurally similar non-woody vegetation types requires a level of reconnaissance beyond the scope of this study, or a reliance on vast amounts of existing vegetation plot data presenting strong correlations with accurate edaphic datasets, which were not available for the parts of the study area where these vegetation types occur. As a result, the majority of natural grasslands were mapped as either a 'Native Grassland Complex' or as a NSW VCA plant community type with lower level of confidence.*" Further, the vegetation mapping explains that "*The ADS40 imagery used for this study was captured after eight to ten years of severe drought, and much of the reconnaissance was undertaken during drought conditions. Therefore, it is likely that this limitation would be alleviated if image capture and field reconnaissance was undertaken during times of vigorous vegetative growth*".
- Maps the following vegetation types which were not detected during detailed site surveys by SLR:
  - Belah/Black Oak – Western Rosewood – Wilga woodland;
  - Buloke – Moonah – Black Box open woodland;
  - Native Grassland Complex;
  - River Red Gum – Black Box woodland wetland;
  - Shallow Swamp;
  - Weeping Myall open woodland; and
  - Western Grey Box – White Cypress Pine tall woodland.
- Does not appear to be based on groundtruthing of the subject site based on the discrepancies mentioned above.
- Is based on 2007 aerial imagery following severe drought periods.

- Detects areas of open woodland at a minimum of 5% canopy cover (according to Specht 1995 <10% FPC is classed as open woodland). However, whilst mapping areas of woody canopy cover with greater than 5 % foliage projective cover (FPC) as a patch of native vegetation (and assigning the patch to a PCT) may be appropriate for regional scale mapping exercises (with limited or no ground-truthing involved), this approach (when used on its own) is not appropriate when detailed site based surveys with 'ground-truthing' are employed, as canopy cover (FPC) is but one of several indicators used in the field to determine the presence of a patch of native vegetation.
- Some parts of the site that are not mapped by SLR as plant communities by SLR contain a scattered and sparse canopy cover and may equate to 'open woodland' according to Specht (1995) classification. However, these areas do not form patches of native vegetation and so have been omitted from the SLR vegetation mapping due to low native floristic diversity and absence of a native midstorey, understorey and groundcover layer.

Our approach to mapping the native vegetation of the site is a standard approach to mapping for development assessments in NSW and involved a two-step process (as always):

- Step 1 – obtain regional vegetation mapping data and review aerial imagery to stratify the site into vegetation patches and create a 'preliminary vegetation map' and identify potential sampling sites;
- Step 2 – ground surveys of subject site involving both rapid reconnaissance over the extent of the site (to ascertain the presence and distribution of native vegetation) and detailed sampling at selected locations, in order to verify and amend (as required) the preliminary vegetation map, assess condition, collect plot/transect data in accordance with the FBA, as well as assess habitat for threatened species and undertake targeted searches for threatened species in suitable habitats.

Vegetation mapping for the Murrumbidgee CMA (Eco Logical 2011) was used initially for the BAR. However, OEH (2011) mapping of Central-Southern NSW has been utilised in the revised BAR, as recommended by OEH (see Figure 4). Regardless of the regional vegetation data used in the assessment, SLR has not relied upon this data, or on canopy cover visible in aerial imagery, in isolation. Instead, we have based our vegetation mapping of the study area on a combination of regional mapping, aerial photo interpretation and ground surveys verification, as noted above.

With due consideration to the above listed factors, SLR has modified the regional vegetation mapping for the study area and has mapped native vegetation patches, where present, to create a site specific vegetation map for the study area. The PCTs recorded and mapped within the study area are described in Section 3.4.

3.6 Vegetation Zones

According to the biobanking methodology (DECC 2009), vegetation zones are areas of vegetation of the same type and same condition class. Vegetation zones are categorised into either 'low' or 'moderate to good' condition. To qualify as low condition the native vegetation (being woody vegetation) within a vegetation zone must have:

- a value of less than 25 % of the lower benchmark value in the canopy; and
- a groundcover which is either less than 50 % indigenous (or native) or over 90 % cleared.

The plant community types mapped within the study area have been further divided (by SLR) into the following condition zones:

- Black Box Lignum Woodland (moderate to good condition) – five biobanking plots were undertaken in this zone, which displays benchmark values for canopy cover, native shrub cover, and native groundcover species; as such it qualifies as moderate to good condition;

- Black Box Grassy Open Woodland (low condition) - four biobanking plots were undertaken in this zone, which displays below benchmark canopy foliage cover and less than 50% cover of native species and as such it qualifies as low condition;
- White Cypress Pine Open Woodland (moderate to good condition) - four biobanking plots were undertaken in this community, which displays within benchmark canopy cover and benchmark scores for other site attributes and as such it qualifies as moderate to good condition; and
- White Cypress Pine Open Woodland (low condition) - two biobanking plots were undertaken in this zone, which displays a low diversity and cover of native groundcover species and as such it qualifies as low condition.

The distribution of these vegetation zones within the study area is shown in Figure 7. The vegetation zones and their mapped extent within the study area are listed in Table 7.

Table 7 Vegetation zones mapped within the study area

Code	Vegetation Zone	Mapped Extent (ha)
MR517	Black Box Lignum Woodland – mod_good	59.31
MR518	Black Box Grassy Open Woodland – low	109.68
MR644	White Cypress Pine Open Woodland – mod_good	29.43
MR644	White Cypress Pine Open Woodland – low	5.78

We note that the majority of the vegetation zones for the White Cypress Pine PCT lie outside of the proposed development site (Figure 7), but have been included in the assessment because a small area of these two zones will be affected by construction of the access road, and because the alignment of the access road was not known at the time of surveys, so on this basis, the entire patch of White Cypress Pine woodland was surveyed and mapped as part of the current assessment. Hence, all figures in the BAR show this patch, which is included in the study area, but falls outside of the development site.

3.7 Threatened Ecological Communities

One of the plant community types mapped in the disturbance footprint associated with the proposed development, the ‘White Cypress Pine Open Woodland’, constitutes an EEC known as ‘Sandhill Pine Woodland in the Riverina and Murray-Darling Depression Regions and NSW Western Slopes bioregions’. The distribution of this EEC within the study area is displayed in Figure 6. As shown on Figure 6, the extent of this EEC is limited to the disturbance footprint associated with the easement and intersection with the Sturt Highway. It is not within the proposed poultry production complex.

4 THREATENED SPECIES

This chapter describes the threatened species predicted to occur within the study area, based on outputs of desktop assessment and outputs of the Biobanking Credit Calculator, in accordance with Section 6 of the FBA.

4.1 Overview

Several sources of information have been employed to create a full list of candidate threatened species and populations relevant to the study area. These include the Credit Calculator outputs of ecosystem credit species and species credit species (as the basis of this BAR), the SEARs and the NSW Wildlife Atlas (10 km search results).

Overall, an assemblage of 39 threatened species or populations are deemed as potential relevance to the study area. This assemblage consists of nine plants, 24 birds, four mammals, one amphibian and one endangered population. Additionally four EECs have been identified as potentially occurring (see Section 4.2.2). The habitat requirements and ecology of the candidate species and relevant habitat attributes within the study area are described in the likelihood of occurrence table presented in Appendix D of this report. The likelihood of occurrence rating is based on the results of field surveys, and particularly on the extent, nature and condition of habitat types and habitat features within the study area.

Of the 39 threatened biota listed as candidate species, five were recorded within the study area during the current field surveys (see Figure 6).

The following sections describe ecosystem credit species and species credit species separately, in accordance with Chapter 6 of the FBA.

4.2 Ecosystem Credit Species

4.2.1 Generated by credit calculator

A total of 21 ecosystem credit species have been predicted to occur within the study area according to the Credit Calculator (Table 8). Candidate species prediction is based on the vegetation zones that have been mapped within the study area , including their size, patch size and condition class (as described in Chapter 3), and on landscape values (Chapter 2).

A total of 17 bird and two mammal (microchiropteran bats) ecosystem credit species have been predicted to occur (Table 8). Of these, three were recorded during field surveys (see Figure 6);

- Grey crowned Babbler;
- Inland Forest Bat; and
- Little Pied Bat.

Two additional ecosystem credit species were also recorded during the field surveys – the Superb Parrot and the Yellow-bellied Sheathtail bat (see Figure 6) – neither of which was generated by the Credit Calculator. These additional species were entered into the ‘Threatened species survey results’ tab of the Credit Calculator and are therefore included in the offset calculation for the proposal. The five recorded species are briefly described below and the locations of records within the study area are shown in Figure 6.

Grey crowned Babbler *Pomatostomus temporalis temporalis*

Vulnerable (NSW TSC Act)

The Grey-crowned Babbler inhabits open box-gum woodlands on the slopes and box-cypress pine and open box woodlands on alluvial plains. The species prefers short flights between trees and is not often found in open areas where trees are sparse. The habitat within the study area is only of limited value to this species due to its fragmentation and low structural complexity.

This species breeds between July and February and constructs conspicuous dome shaped nests in saplings or eucalypts. Although nesting activities were not observed during field surveys, nests indicative of the Grey-crowned Babbler were recorded in the northern parts of the site, outside of the development site and outside of the development footprint (Figure 6).

Superb Parrot *Polytelis swainsonii*

Vulnerable (NSW TSC Act)

The Superb Parrot is found along timbered waterways and nearby well-watered woodlands, especially in River Red Gums along the Murray and Murrumbidgee Rivers. Also inhabits box-gum, box-cypress-pine and Boree woodlands. This species nests in large hollow-bearing trees and according to the Threatened Species Profile Database, prefers live or dead trees with hollows >= 6cm diameter that are >4m above the ground. Nest trees are restricted to: *Eucalyptus blakelyi*, *Eucalyptus melliodora*, *Eucalyptus albens*, *Eucalyptus camaldulensis*, *Eucalyptus microcarpa* and *Eucalyptus polyanthemus*.

Foraging habitat varies, usually within understorey vegetation and canopy of woodlands and is often within a 10km range of nesting sites. This species breeds between September and January and is best surveyed during this time.

Yellow-bellied Sheathtail-bat *Saccolaimus flaviventris*

Vulnerable (NSW TSC Act)

This species occurs in many habitat types and occupies very large ranges. Like all microchiropteran bats, this species is most active in warmer months between October and March. It forages throughout most habitats over its large range, even in treeless areas. Individuals roosts in tree hollows and in treeless areas, is known to roost in mammal burrows. The hollow-bearing trees within the study area could provide roosting habitat for this species. Breeding has been recorded from December to mid-March.

Inland Forest Bat *Vespadelus baverstocki*

Vulnerable (NSW TSC Act)

This species occurs in a variety of woodland formations, including Mallee, Mulga and River Red Gum. Most records are from drier woodland habitats with riparian areas. Distribution and densities are largely unknown and identification is difficult. The record of this species within the study area is 'probable' meaning that call frequencies can overlap with those of other bats – making analysis of Anabat files difficult. The Inland Forest Bat roosts in small tree hollows and fissures and therefore individuals of the species could utilise the hollow-bearing trees within the study area (where suitable hollows exist). Foraging habitat, in the form of open woodland and paddock trees, is present within the study area and in the surrounding locality.

Little Pied Bat Chalinolobus *picatus*

Vulnerable (NSW TSC Act)

This species occurs in dry open forest, open woodland, mulga woodlands, chenopod shrublands, cypress pine forest and mallee and Bimble box woodlands. Roosting habitat is often in caves, rock outcrops, mine shafts, tunnels, tree hollows and buildings. It is possible that this species may utilise the hollow-bearing trees within the study area for roosting habitat. The Little Pied Bat can utilise a range of drier habitats but requires presence of water bodies nearby.

Table 8 lists the total ecosystem credit species for the study area (including records from field surveys) and provides reasoning for the predicted presence or absence of the species within the study area, according to Section 6.3 of the FBA.

Table 8 does not incorporate other 'ecosystem credit' threatened species relevant to the study area (as listed in Section 4.2.2). Such species have not been generated by the Credit Calculator, but instead have been previously recorded in the locality in the Wildlife Atlas and/or listed by OEH as additional species requiring consideration in the SEARs.

Table 8 Ecosystem credit species generated by credit calculator

Species	TSC	LoO**	On site	Explanation (for presence/absence)
Little Eagle *Hieraaetus morphnoides*	Vulnerable	L	No	Low habitat availability; large home range; unlikely to occur apart from possible foraging activity.
Spotted Harrier *Circus assimilis*	Vulnerable	L	No	Low habitat availability, large home ranges - unlikely to occur apart from possible foraging activity.
Freckled Duck *Stictonetta naevosa*	Vulnerable	N	No	No suitable habitat
Bush Stone-curlew *Burhinus grallarius*	Endangered	N	No	No suitable habitat; condition of habitats in the ground layer and current sheep grazing and cropping incompatible with occurrence of ground dwelling birds; unlikely to occur.
Australian Painted Snipe *Rostratula australis*	Endangered	N	No	No suitable habitat
Major Mitchells *Lophochroa leadbeateri*	Vulnerable	L	No	Low habitat availability, large home ranges - unlikely to occur apart from possible foraging activity.
Diamond Firetail *Stagonopleura guttata*	Vulnerable	L	No	Low habitat availability, large home ranges - unlikely to occur apart from possible foraging activity.
Brolga *Grus rubicunda*	Vulnerable	N	No	No suitable habitat
Gilbert's Whistler *Pachycephala inornata*	Endangered	L	No	Low habitat availability, prefers dense shrub layer associations - unlikely to occur apart from possible foraging activity.
Superb Parrot *Polytelis swainsonii*	Vulnerable	P	Yes	Recorded in study area (not predicted in Credit Calculator)
Regent Parrot *Polytelis anthopeplus*	Critically Endangered	L	No	Low habitat availability, prefers mallee and riverine woodlands - unlikely to occur apart from occasional foraging activity.

Species	TSC	LoO**	On site	Explanation (for presence/absence)
monarchoides				
Pied Honeyeater *Certhionyx variegatus*	Vulnerable	L	No	Low habitat availability, highly nomadic - unlikely to occur apart from possible foraging activity.
Painted Honeyeater *Grantiella picta*	Vulnerable	L	No	Low habitat availability, nomadic - unlikely to occur apart from possible foraging activity.
Grey-crowned Babbler *Pomatostomus temporalis temporalis*	Vulnerable	P	Yes	Recorded within study area
Hooded Robin *Melanodryas cucullata cucullata*	Vulnerable	L	No	Low habitat availability, prefers structurally diverse woodlands - unlikely to occur apart from possible foraging activity.
Varied Sittella *Daphoenositta chrysoptera*	Vulnerable	L	No	Low habitat availability; unlikely to occur apart from possible foraging activity.
Masked Owl *Tyto novaehollandiae*	Vulnerable	L	No	Low habitat availability, large home range - unlikely to occur apart from possible foraging activity.
Barking Owl *Ninox connivens*	Vulnerable	L	No	Low habitat availability, large home ranges - unlikely to occur apart from possible foraging activity.
Little Pied Bat *Chalinolobus picatus*	Vulnerable	Y	Yes*	Recorded in study area (via Anabat)
Inland Forest Bat *Vespadelus baverstocki*	Vulnerable	Y	Yes*	Recorded in study area (via Anabat)
Yellow-bellied Sheathtail-bat *Saccolaimus flaviventris*	Vulnerable	Y	Yes	Recorded in study area (not predicted in Credit Calculator)

* Based on 'probable' confidence level in identification of Anabat recordings. Some possibility of confusion of data with those of other bat species.
** Likelihood of occurrence

4.2.2 Species requiring further consideration

A range of other 'ecosystem credit' threatened species has been identified by OEH in the SEARs and in the 10km search results from the Wildlife Atlas. These species were also targeted during surveys conducted in January and February 2015. Table 9 provides the listings and survey findings for each species.

The relevance of each species to the proposal is based on their individual habitat requirements, which are provided in the Likelihood of Occurrence table in Appendix D of this report.

Table 9 Ecosystem credit species generated by SEARs and Wildlife Atlas

Species	TSC	LoO	On site	Relevance
Turquoise Parrot *Neophema pulchella*	Vulnerable	L	No	Low habitat availability, large home ranges - unlikely to occur apart from possible foraging activity.
Brown Treecreeper *Climacteris picumnus victoriae*	Vulnerable	L	No	Low habitat availability, unlikely to occur apart from possible foraging activity.
Flame Robin *Petroica phoenicea*	Vulnerable	L	No	Low habitat availability, largely vagrant - unlikely to occur apart from possible foraging activity.
Plains-wanderer *Pedionomus torquatus*	Endangered	L	No	Low habitat availability; condition of habitats in ground layer and current sheep grazing and cropping incompatible with occurrence of ground dwelling birds; unlikely to occur.
Endangered Ecological Communities				
Allocasuarina luehmannii Woodland	EEC	N	No	Does not occur within study area
Sandhill Pine Woodland	EEC	N	No	Does not occur within study area
Inland Grey Box Woodland	EEC	N	No	Does not occur within study area
Myall Woodland	EEC	N	No	Does not occur within study area

4.3 Species Credit Species

4.3.1 Generated by credit calculator

A total of five species credit species have been determined relevant to the study area according to the Credit Calculator (Table 10). This prediction is based, *inter alia*, on previous records and the 'Geographic/Habitat Features' identified in the Credit Calculator. The recent surveys within the study area did not record any of these species despite the timing being considered appropriate for all of the target species, with the exception of the Mossgiel Daisy.

Superb Parrot

As detailed in Section 4.2, the Superb Parrot was not predicted to occur as an ecosystem credit species by the Credit Calculator, but was recorded during field surveys (see Figure 6). This species is also a candidate species for consideration as a Species Credit Species according to the Threatened Species Profile Database (TSPD), and is again assessed in accordance with the FBA. A description of this species and its habits is provided in the Section 4.2.

According to the TSPD this species can sustain foraging habitat loss but cannot sustain loss to nesting habitat. The Superb Parrot has specific hollow-bearing tree species requirements for nesting (as listed in Section 4.2.1). The overwhelming majority of hollow-bearing trees within the study area do not match these requirements - apart from approximately one to two individuals of *Eucalyptus microcarpa* and *Eucalyptus melliodora* trees, which are located near the northern study area boundary (and at a distance from the proposed access road). These individual trees occur as infrequent subdominant canopy trees within the White Cypress Pine Open Woodland. These individuals were not identified as hollow bearing and are not considered to be suitable nesting trees for the Superb Parrot.

The record of the Superb Parrot (during the January survey) was of two individuals flying overhead and briefly landing in the canopy of a stand of Black Box Lignum Woodland within the central parts of the site. The observation is likely to be of foraging activity as no evidence of nesting on the subject was found and the survey was undertaken during the breeding season. This species is also known to forage in areas of up to 10 km from nesting sites. The study area does not appear to support a population of the Superb Parrot, although individuals may forage across the site seasonally or periodically. Accordingly, preparation of a species polygon for this species was not considered appropriate.

Threatened Flora

As mentioned, survey timing was optimum for the most of the flora species credit species, with the exception of the Mossgiel Daisy, which flowers in spring. This species is still identifiable during other parts of the year and the woodland areas were thoroughly searched during the SLR surveys. Due to extensive grazing practices over many decades, the ground layer of the study area is highly disturbed and it is likely that seed banks of native species have also been depleted. The Mossgiel Daisy and the other species credit plant species (Austral Pillwort and Winged Peppercress) are not likely to be present within the study area and the assessor has determined the habitat for such species as substantially degraded according to part (a) of Section 6.5.1.3 of the FBA. As a result this species requires no further assessment.

The study area contains habitats or geographic features listed in the Credit Calculator, which have been identified by the assessor as present in the study area. Identifying these features in the Credit Calculator generates additional species credit species for consideration. These features and their associated candidate species include:

- Periodically waterlogged sites (including drains and farm dams) – Austral Pillwort *Pilularia novae-hollandiae*;
- Land within 100m of riparian woodland on inland rivers containing mature live eucalypts or isolated paddock tree overhanging water or dry watercourses. – Grey Falcon *Falco hypoleucos*; and
- Land containing seasonally damp or waterlogged sites – Winged Peppercress *Lepidium monoplocoides*.

Neither the Winged Peppercress nor Austral Pillwort was discovered after thorough searches in the low-lying Black Box Lignum woodland. As described above, the assessor has determined the habitat for such species as substantially degraded according to part (a) of Section 6.5.1.3 of the FBA.

Grey Falcon

The Grey Falcon was not observed within the study area during the SLR surveys and no evidence of this species was discovered (large stick nests high up in eucalypts). Although suitable prey species for the Grey Falcon (eg other birds, small mammals, reptiles) would be present, the woodland habitats across the study area are substantially disturbed and would form only marginal foraging habitat (or hunting grounds) for such species. Nesting within the study area is unlikely due to the large distance from watercourses and riparian areas.

Table 10 Species credit species – Credit Calculator output and field survey records

Species	TSC	Recommended Survey time*	Survey timing Y/N	Recorded on site
Austral Pillwort *Pilularia novae-hollandiae*	Endangered	All months – dependent on periodically waterlogged sites	Yes	No
Mossgiel Daisy *Brachyscome papillosa*	Vulnerable	September, October, November during flowering	No	No
Winged Peppercress *Lepidium monoplocoides*	Vulnerable	November, December, January, February during flowering	Yes	No
Grey Falcon *Falco hypoleucos*	Endangered	All months	Yes	No
Squirrel Glider *Petaurus norfolcensis*	Endangered	All months	Yes	No
Superb Parrot *Polytelis swainsonii*	Vulnerable	All months	Yes	Yes

This section does not incorporate other 'species credit' threatened species relevant to the study area which have been listed in Section 0. Such species have not been generated by the Credit Calculator, but have been recorded previously in the locality in the Wildlife Atlas and/or listed in the SEARs.

4.3.2 Species requiring further consideration

A range of other candidate 'species credit' threatened species has been identified in the SEARs for this proposal and through query of the Wildlife Atlas (10 km search). These species were surveyed during January and February 2015. The timing of these surveys was suitable for the detection of most, but not all species. Species that fall outside the SLR survey timing are still assessed for their relevance to the proposal, based on their individual habitat requirements and the nature and condition of habitats present at the study area, which are which are summarised below and provided in the Likelihood of Occurrence table in Appendix D of this report.

Overall none of the additional candidate species are considered likely to be impacted. Accordingly, no candidate species are ticked as "Impacted by development" in the Credit Calculator. A brief discussion of the candidate species and their relevance to the site, and justification for their exclusion from the site, is provided below:

- **Flora species** – The additional plants identified as candidate species (Bindweed, Lanky Buttons, Oaklands Diuris, Sand-hill Spider, Orchid Silky, Swainson-pea and Small Scurf-pea) were not recorded during the January or February 2015 surveys. SLR acknowledges that some of these species were not in flowering periods during the surveys, although any potential habitat for such species is highly degraded by decades of grazing and disturbance to the ground layer of the study area. It is also highly unlikely that the soil seed bank would have retained any of these species within the study area. As a result, the assessor has determined the habitat for such species as substantially degraded according to part (a) of Section 6.5.1.3 of the FBA. As a result these species require no further assessment.
- **Southern Bell Frog** – there is no suitable habitat within the study area for this species.
- **Glossy Black-Cockatoo, Riverina population** – This species was not recorded within the study area and suitable vegetation for foraging, notably trees of the Casuarinaceae family, is absent. Hollow-bearing trees with hollows >15cm are scarce within the study area; however could theoretically provide potential nest sites for this species. Nesting is however unlikely due to the isolation of woodland within the study area from any significant nearby bushland and also the absence of food sources. This species is wide ranging in the Riverina region and appropriate nesting habitat would be more abundant in better condition areas along nearby river systems.
- **Regent Honeyeater** – No individuals of this species were observed during the SLR surveys and the woodland areas represent only marginal foraging habitat. Breeding of this species does not occur in this part of NSW. This species is highly unlikely to utilise the study area for foraging – mainly due to the lack of understorey vegetation (in which it hunts for insects) and minimal availability of favoured sap feed trees (none of which occur within the development footprint).

Table 11 provides the listings and recommended survey periods for each species and whether or not surveys were conducted at these times.

Species that fall outside the SLR survey timing are still assessed for their relevance to the proposal, based on their individual habitat requirements and the nature and condition of habitats present at the study area, which are which are summarised below and provided in the Likelihood of Occurrence table in Appendix D of this report.

Overall none of the additional candidate species are considered likely to be impacted. Accordingly, no candidate species are ticked as “Impacted by development” in the Credit Calculator. A brief discussion of the candidate species and their relevance to the site, and justification for their exclusion from the site, is provided below:

- **Flora species** – The additional plants identified as candidate species (Bindweed, Lanky Buttons, Oaklands Diuris, Sand-hill Spider, Orchid Silky, Swainson-pea and Small Scurf-pea) were not recorded during the January or February 2015 surveys. SLR acknowledges that some of these species were not in flowering periods during the surveys, although any potential habitat for such species is highly degraded by decades of grazing and disturbance to the ground layer of the study area. It is also highly unlikely that the soil seed bank would have retained any of these species within the study area. As a result, the assessor has determined the habitat for such species as substantially degraded according to part (a) of Section 6.5.1.3 of the FBA. As a result these species require no further assessment.
- **Southern Bell Frog** – there is no suitable habitat within the study area for this species.
- **Glossy Black-Cockatoo, Riverina population** – This species was not recorded within the study area and suitable vegetation for foraging, notably trees of the Casuarinaceae family, is absent. Hollow-bearing trees with hollows >15cm are scarce within the study area; however could theoretically provide potential nest sites for this species. Nesting is however unlikely due to the isolation of woodland within the study area from any significant nearby bushland and also the absence of food sources. This species is wide ranging in the Riverina region and appropriate nesting habitat would be more abundant in better condition areas along nearby river systems.

- **Regent Honeyeater** – No individuals of this species were observed during the SLR surveys and the woodland areas represent only marginal foraging habitat. Breeding of this species does not occur in this part of NSW. This species is highly unlikely to utilise the study area for foraging – mainly due to the lack of understorey vegetation (in which it hunts for insects) and minimal availability of favoured sap feed trees (none of which occur within the development footprint).

Table 11 species credit species SEARs and NSW BioNet

Species	TSC	Recommended Survey time*	Survey timing Y/N	Recorded on site
Silky Swainson-pea Swainsona sericea	Vulnerable	Spring to autumn (foliage); spring to summer (flowers).	Yes	No
Small Scurf-pea *Cullen parvum*	Endangered	In summer months when flowering	Yes	No
Sand-hill Spider Orchid *Caladenia arenaria*	Endangered	August and October when flowering	No	No
Oaklands Diuris *Diuris* sp. (Oaklands, D.L. Jones 5380)	Endangered	November when flowering	No	No
Bindweed *Convolvulus tedmoorei*	Endangered	August and September (recorded flowering times); could be broader given prostrate form.	No	No
Lanky Buttons *Leptorhynchos orientalis*	Endangered	Spring months when flowering	No	No
Southern Bell Frog *Litoria raniformis*	Endangered	All months, November to March breeding	Yes	No
Glossy Black-Cockatoo Riverina population *Calyptorhynchus lathami*	Endangered Population	All months, Autumn and Winter preferred	Yes	No
Regent Honeyeater *Anthochaera phrygia*	Critically Endangered	All months, Spring and Summer more active	Yes	No

5 IMPACT AVOIDANCE AND MINIMISATION

This chapter describes the impacts of the proposed development, in accordance with Section 8 of the FBA.

5.1 Impact Avoidance Measures

5.1.1 Site selection

The principal siting requirements for a poultry broiler development, such as that proposed, include:

- Proximity to a chicken hatchery facility, such as Baiada's hatchery located on the outskirts of Griffith;
- Proximity to a reliable poultry feed source, notably Baiada's feedmill located near Hanwood just south of Griffith;
- Proximity to a processing facility (including protein recovery plant), such as Baiada's processing complex located near Hanwood just south of Griffith;
- Proximity to major regional and State transport routes, such as the Sturt Highway;
- Adequate separation distances to other poultry farms for biosecurity purposes;
- Appropriate land use zoning and surrounding land use activities; and
- Adequate access to a reliable supply of water and electricity.

Any investigation will reveal that finding a site that is both available and meets all of the above criteria is very difficult. Selection of alternative sites must be mindful of transport access to each of the abovementioned support/servicing facilities. The matter of a reliable water supply is crucial and the cost of satisfying the necessary power requirements is sometimes prohibitive. Finding a site that already has a compatible agricultural land use is also preferable, and limits the amount of clearing required to establish the PPUs which is advantageous from a biodiversity perspective.

Prior to proceeding with the development site subject to this development application, ProTen considered a number of alternative sites for the poultry production complex. A site near Goolgowi was initially considered and the environmental impact assessment process commenced. However, consultation with the relevant electricity provider revealed that the necessary power requirements to the site could not be met, rendering the site unviable. A second alternative site was then investigated, this property approximately 20 kilometres west of Narrandera on the Sturt Highway and five kilometres east of the current subject development site. An EIS was prepared for this alternative site and submitted to Narrandera Shire Council, who was the determining authority for the designated development (this proposed development was of a smaller scale and associated CIV compared to the current application due to a smaller property size, hence was not state significant development). During the assessment and consultation process with Council, EPA, OEH and the DPI, it became evident that, whilst not considered to be an operational risk by ProTen, the presence of a wetland known as 'Dry Lake' approximately 1 kilometre from the site meant that the property was not deemed an optimal location for an intensive poultry operation due to biosecurity considerations.

ProTen subsequently investigated a third site, being the development site subject of this application. The development site is still within the same wider Griffith region as the previous two sites; however, it will also have adequate access to power and is further than 3 kilometres from the nearest wetland, as mapped on the wetlands map in the Narrandera LEP. It also meets all of the principle siting requirements listed above, and therefore represents an ideal site for the proposed development.

5.1.2 Optimising the proposed layout

In designing the layout of the proposed development, particularly the locations of the PPUs, the avoidance of trees and native vegetation, and/or the minimising impacts on native vegetation, has been an important factor in the decision making process.

Consideration of alternative PPU locations is dependent upon a number of factors including both environmental impact considerations and engineering design requirements. While other locations were considered within the development site, the proposed layout is considered optimal in terms of minimising the potential for adverse impact and required earthworks. In particular the proposed layout ensures that tree clearing is minimised, whilst ensuring the required buffer distances between PPUs is maintained. The proposed layout will also ensure that that the proposal does not deny access to large areas of viable agricultural lands nor significantly reduce the land area available for agricultural production.

Impact avoidance measures included as part of the proposal include:

- Proposed infrastructure is to be positioned away from higher quality vegetation and habitats, whilst minimising clearing of EEC vegetation (ie Sandhill Pine Woodland near the Sturt Highway);
- Siting proposed PPUs, as much as possible, in cleared areas. All of the PPUs will be located in cleared land, with only a small number of paddock trees requiring removal within each PPU. Initially, the southernmost PPU was to be located within a patch of low condition Black Box Grassy Open Woodland, which would have required the removal of around 14 ha of this vegetation zone. However, since receiving initial adequacy comments from OEH, the southern PPU has been relocated south of the patch, reducing the impact (by around 13 ha) to 0.46 ha.
- Proposed internal access roads follow existing tracks where possible, and generally avoid native trees. Notably, the change to the PPU layout has necessitated realignment of the internal access road to the southernmost PPU, and in its current location, avoids most of the patch of Black Box Grassy Open Woodland (see Figure 5). The area of disturbance has been reduced to less than a hectare (0.46 ha) and noting that the trees are widely spaced in this area, construction of the access road through this patch (as elsewhere within the study area) will be possible with minimal (if any) tree removal;
- Positioning of the entrance and internal access road leading south from the Sturt Highway within an existing patch of cleared land. This importantly achieves RMS requirements for safety and access but also minimises clearing of White Cypress Pine Open Woodland, which is an EEC listed under the TSC Act.

5.2 Final Development Footprint

The development footprint is defined as "*the area of land that is directly impacted on by a proposed Major Project that is under the EP&A Act, including access roads, and areas used to store construction materials*".
The development footprint includes clearing for internal roads, houses, driveways, bores, PPUs, water management infrastructure and sheds (a rice hull and dead bird shed). The final development footprint is shown in Figure 3. Total impact areas for the various features of the proposed development are included in Table 12.

Table 12 Development Footprint Areas

Feature	Clearing Area (ha)
PPUs (x 5 – including ring roads and water management infrastructure)	70.00
Sheds (rice hull and dead bird)	0.53
Housing (x 10 dwellings)	2.00
Driveways to housing	0.60
Internal access roads (12 metre wide)	23.56
Total Development Footprint Area	**96.69**

With regard to the PPUs, each PPU footprint comprises 14 ha of sheds, perimeter road around the array of sheds, and water management infrastructure.

The footprint for the internal access roads comprises 19.04 ha of roads within the development site and 4.52 ha for the road leading from the entrance at the Sturt Highway south to the development site boundary (Figure 3).

5.3 Direct Impacts

5.3.1 Overview

According to the FBA, direct impacts on biodiversity values are described as "*an impact on biodiversity values that is a direct result of vegetation clearance from a development*. *It is predictable, usually occurs at or near to the development site and can be readily identified during the planning, design, construction, and operational phases of a development*."

The development will be relatively small, with a disturbance footprint of approximately 90 hectares, comprising just 8% of the development site, and the commercial activity associated with the development will be largely confined to this area.

The final development footprint will involve the following direct impacts:

- clearing of native vegetation, involving clearing of a small amount of EEC vegetation;
- loss of hollow-bearing trees, some of which may provide potential roost sites for birds and microchiropteran bats;
- removal of low condition open woodland habitat that represents potential nesting habitat for the Grey-crowned Babbler; and
- removal of a small portion of potential fauna foraging habitat, in particular for threatened microchiropteran bats species, the Grey-crowned Babbler and the Superb Parrot.

Whilst the areas of native vegetation to be cleared have been carefully considered and reduced where possible the proposal will impact at the following locations:

- A small area of White Cypress Pine Open Woodland (EEC) will be impacted to facilitate the proposed access road off Sturt Highway. This includes mainly EEC vegetation in low condition.
- An area of Black Box Grassy Open Woodland (non-EEC) will require clearing to facilitate construction of a small section of internal access road to the southernmost PPU.

5.3.2 Impacts on vegetation zones

Areas of native vegetation impacts (or clearing) are shown in Figure 9 and described in Table 13. The total area of vegetation removal required for construction and operation of the proposal is 0.74 ha, which represents 0.4 % of the total area of mapped native vegetation within the study area and 0.06 % of the study area. These areas of native vegetation would be replaced with permanent infrastructure for the proposed facility and therefore impacts on native vegetation (and associated habitats) would be permanent (and unavoidable).

Table 13 Native vegetation impacts (clearing areas for vegetation zones)

Code	Vegetation Zone Name	Clearing Area (ha)
MR518	Black Box Lignum Woodland_mod good	0.00
MR518	Black Box Grassy Open Woodland_low	0.46
MR644	White Cypress Pine Open Woodland_mod good	0.08
MR644	White Cypress Pine Open Woodland_low	0.20
Total native vegetation clearing area		**0.74**

5.4 Impacts Indirect

According to the FBA indirect impacts on biodiversity values are described as "*an impact on biodiversity values that occurs when development related activities affect threatened species, threatened species habitat, populations or ecological communities in a manner other than direct impact*. *Compared to direct impacts, indirect impacts often*:

- *occur over a wider area than just the site of the development*;
- *have a lower intensity of impact in the extent to which they occur compared to direct impacts*;
- *occur off site*;
- *have a lower predictability of when the impact occurs*;
- *have unclear boundaries of responsibility.*"

Indirect impacts in relation to the proposed development include:

- Potential for sedimentation and run-off to occur during construction of chicken farms and associated infrastructure, as well as their operation where proper structures are not installed and maintained (such as roof and road guttering). These are to be managed using appropriate sediment and erosion control measures and in accordance with an engineered stormwater management system (see EIS).
- There is some potential for animal strike (particularly macropods and birds) by increased traffic across the site. The speed limit will be reduced to 60km/hr along the access road and at these speeds animal strikes are unlikely.
- An increased presence of weeds is a possibility across the site. Weed management is to be integrated into the construction and operational management measures. Vehicle wash down which is proposed at each PPU and implementation of property maintenance will reduce the likelihood of weeds entering the native vegetation.

- Rubbish and pollution may enter the site from staff or during the general day-to-day operation of the poultry facility. To reduce the likelihood of waste entering the environment all waste materials from the facility (chicken manure for example) are proposed to be collected and transported off site for disposal or distribution. Skip bins will be provided and regularly maintained for other general waste.

5.5 On-site Mitigation Measures

Numerous best management practices and mitigation measures will be implemented as part of the proposed poultry development to prevent, minimise and/or manage the potential for adverse impacts upon the local environment and surrounding populace.

ProTen will prepare and implement a site-specific Operational Environmental Management Plan (EMP) for the proposed poultry development to ensure that the commitments made within this EIS, along with relevant statutory obligations and the conditions of development consent (including Environment Protection Licence (EPL) requirements), are fully implemented and complied with.

A Landscaping Strategy will be prepared and implemented to screen the development from neighbouring landholders and generally improve the visual and environmental amenity of the development site.

On-site mitigation measures to reduce direct and indirect impacts include before, during and after construction measures as outlined in Table 14 below.

Table 14 Mitigation measures to be implemented before, during and after construction

Action	Outcome	Timing	Responsibility
Before Construction			
Protection of native vegetation	Delineate construction zone (to ensure no native vegetation outside construction zone is cleared)	Prior to and for the duration of any works	Construction contractor
Erosion and sediment control measures	Install and maintain erosion and sediment control measures in accordance with the requirements of the 'Blue Book'	Prior to and for the duration of any works	Construction contractor
During Construction			
Fauna management	Supervision of tree felling to rescue and recover any fauna (as necessary)	During clearing	Construction team/ProTen
Weed Management	Vehicle wash-down Site maintenance program	Ongoing	Construction team
Rubbish management	Rubbish (such as food scraps and building waste) are to be properly managed during construction and must not be stockpiled on areas of native vegetation	Ongoing	Construction team
Exposed soil surface management	Revegetation – using re-use of topsoil layers and seeding of pasture grasses and legumes (see EIS)	Immediately following soil disturbances	Construction team
Traffic management	Speed limits of 60km/hr are proposed, reducing the likelihood of animal strikes Educate workers on possibility of animal strike through construction management program	Ongoing	Construction team
After Construction			

Traffic management	Speed limits of 60km/hr are proposed, reducing the likelihood of animal strikes	Ongoing	Site operator
Weed management	Limit spread of weeds along with landscape maintenance program	Ongoing, half-yearly minimum	Site operator
Increased artificial light	Each luminaire will be aimed downwards and only switched on during loading-unloading and servicing activities outside of daylight hours and during heavy fog.	Ongoing	Site operator
Waste management	Appropriate systems will be implemented to ensure that each waste stream generated by the development is effectively managed and/or disposed of off-site (see detail in EIS). There will not be any on-site stockpiling or disposal of waste materials.	Ongoing	Site operator
Surface water and run-off	An engineered surface water drainage and management strategy is to be prepared and implemented. Techniques currently proposed to manage stormwater include bunding walls, swales, underground water capture systems and dams (see EIS)	Ongoing	Site operator

6 IMPACT SUMMARY

This chapter describes the impact of the proposed development in terms of biodiversity credits, in accordance with Section 9 of the FBA.

6.1 Areas not requiring Further Assessment

Areas that do not require further assessment are those that do not contain native vegetation, as per Section 9.5 of the FBA (unless otherwise required by the SEARs). Of the development site, around 993 ha (83%) does not contain mappable native plant communities. These areas, which do not require further assessment (and hence do not require offsets), are shown in Figure 8.

We note however, that these areas do contain widely scattered paddock trees, some of which are hollow bearing and therefore could provide habitat for threatened arboreal fauna (particularly birds and bats). Accordingly, these areas have still been assessed for the potential occurrence of threatened species (ie those that generate species credits), as outlined in Chapter 4 (see FBA, Section 9.5).

6.2 Entities not requiring Offsets

Impacts for which the assessor is not required to determine an offset (FBA, Section 9.4) comprise:

- Vegetation clearing within a vegetation zone that has a site value score of less than 17 and the PCT is not a TEC;
- Impacts on PCTs that are not threatened species habitat and are not TECs;
- Threatened species habitat within a vegetation zone that has a site value score of <17; and
- Species or populations that are not threatened and do not form part of a TEC.

As listed in Table 16, all of the vegetation zones mapped and assessed have current site value scores of over 17 and all zones represent potential threatened species habitat (subject to the findings outlined in Chapter 4). Hence, the only entities not requiring offsets are areas of native vegetation not subject to clearing as part of the proposed development.

6.3 Impacts Requiring Offsetting

According to Section 9.3 of the FBA, impacts on native vegetation that require an offset include:

- Impacts on EECs and CEECs, unless specifically nominated in the SEARs as an impact requiring further consideration; and
- impacts on PCTs associated with threatened species habitat and in a vegetation zone that has a site value score of >= 17.

6.3.1 PCTs requiring offset

All vegetation zones mapped with the site have current site value scores of over 17 (see Section 6.5.1) and represent habitat for at least some threatened species; hence any clearing in these vegetation zones would require an offset. Of the three PCTs mapped, no clearing will be required within the Black Box Lignum Woodland PCT. Accordingly, the PCTs within which clearing will occur and which require an offset are:

- MR518 Black Box Grassy Open Woodland; and
- MR644 White Cypress Pine Open Woodland.

The PCTs requiring offset and the corresponding number of ecosystem credits required are listed in Table 15.

Table 15 PCTs requiring offset and credits required

Plant community type	Ecosystem Credits
Black Box grassy open woodland wetland of rarely flooded depressions in south western NSW (mainly Riverina Bioregion and Murray Darling Depression Bioregion)	6
White Cypress Pine open woodland of sand plains, prior streams and dunes mainly of the semi-arid (warm) climate zone	10
Total credits	**16**

6.3.2 Species polygons requiring offset

As discussed in Chapter 4 of this report, no local populations of threatened species that generate species credits are likely to occupy the vegetation within the study area, on other than a transient basis. Hence, the creation of species polygons for such species is not considered appropriate for this assessment.

Hence there are no species credit polygons that require offset as part of the proposed development.

6.4 Impacts Requiring Further Consideration

There are no impacts that require further consideration by the consent authority for the proposed development at Euroley. With reference to the thresholds for such impacts in Table 4 and Section 9.2 of the FBA:

- There are no significant rivers and streams, important wetlands or estuarine areas within the study area; hence there will be no impacts that substantially reduce the width of the riparian buffer zone of such features;
- There are no State significant biodiversity links within (or adjoining) the study area. Hence, the proposal will have no effect on the movement (of native fauna) along such links (corridors);
- The estimated impacts on native vegetation, as described in Section 5.3 of this report, are in no way likely to cause the extinction (or significantly reduce the viability) of a TEC in the Murrumbidgee IBRA subregion. The removal of less than 0.3 ha of Sandhill Pine Woodland EEC for construction of the access road will not reduce the viability of the patch of vegetation in the locality or IBRA subregion or cause its local extinction;
- There is no critical habitat within the study area;
- There are no threatened species or populations nominated in the SEARs as likely to become extinct (or have their viability reduced significantly) in the IBRA subregion if affected by the development;
- The predicted impacts of the proposal on native vegetation are not likely to impact on a critically endangered species, or on any species that have not previously been recorded in the IBRA subregion on the *Atlas of NSW Wildlife* database.

Hence, there are no impacts requiring further consideration in this report.

6.5 Biodiversity Credit Requirement

The Biobanking Credit Calculator has been used to calculate the impacts of the proposed development and potential offset requirements, in accordance with Section 8 of the FBA. This section of the report provides a summary of the results of the credit calculations. A full copy of the credit profile for the impacts of the proposal is provided in Appendix E.

6.5.1 Ecosystem credits

The ecosystem credits required to offset the proposed development are listed by vegetation zone in Table 16. A total of 16 ecosystem credits would be required to offset the clearing of native vegetation as part of the construction and operation of the proposed development. The Credit Calculator identifies matching ecosystem credits (and IBRA subregions) that can be used to offset these impacts (see Section 6.6).

Table 16 Vegetation zones requiring offset and credits required

Code	Vegetation Zone Name	Mgt Area (ha)	Current Site Value Score	Future Site Value Score	Ecosystem Credits
MR517	Black Box Lignum Woodland_mod_good	0.00	54.67	54.67	0
MR518	Black Box Grassy Open Woodland_low	0.46	40.00	0	6
MR644	White Cypress Pine Open Woodland_mod_good	0.08	45.31	0	3
MR644	White Cypress Pine Open Woodland_ low	0.20	38.02	0	7
Total		**0.74**			**16**

6.5.2 Landscape value score

The loss in landscape value score is 12, as per the attached credit report (Appendix E).

6.5.3 Species credits

As shown in the attached credit reports (see Appendix E), no species credits are required to offset the impacts of the proposed development.

6.6 Biodiversity Credit Report

Copies of the Biobanking credit reports are provided in Appendix E. Table 17 lists the credit types required to offset the proposed development and the matching credits and IBRA subregions that can be used as 'offset options'. Any such credits, can only be used as substitutes (or offset options) for credit types required if they belong to an IBRA subregion that adjoins the IBRA subregion in which the development occurs (ie Murrumbidgee IBRA subregion).

Table 17 Ecosystem credits required for offset and matching credit types

Ecosystem Credit Required	No. Credits	Offset Options
MR518 Black Box Grassy Open Woodland	6	• MR517 Black Box - Lignum woodland • MR518 Black Box Grassy Open Woodland • MR 519 Black Box open woodland wetland with chenopod understorey mainly on the outer floodplains in south-western NSW
MR 644 White Cypress Pine Open Woodland	10	• MR 644 White Cypress Pine Open Woodland • MR 645 White Cypress Pine - Drooping Sheoak grassy open woodland of the Riverine Plain • MR649 Yellow Box - White Cypress Pine grassy woodland on deep sandy-loam alluvial soils of the eastern Riverina Bioregion and western NSW South Western Slopes Bioregion • MR664 Cypress Pine woodland of source-

		bordering dunes mainly on the Murray and Murrumbidgee River floodplains • MR681 Slender Cypress Pine - Sugarwood - Western Rosewood open woodland on sandy rises mainly in the Riverina Bioregion and Murray Darling Depression Bioregion
Total Credits	**16**	

7 BIODIVERSITY OFFSET STRATEGY

This chapter provides the Biodiversity Offset Strategy, based on outputs of the Biobanking Credit Calculator, in accordance with Section 10 of the FBA.

7.1 Overview

The assessment completed as part of this BAR has determined that a biodiversity offset is required in accordance with the FBA and the *NSW Biodiversity Offsets Policy for Major Projects* (the 'Offsets Policy'; NSW Government and OEH 2014). The offset requirement for the project is described in Chapter 6. A total of 16 ecosystem credits are required to offset the project impacts, with the type and number of required ecosystem credits, and matching credit options, listed in Table 17. No species credits are required as part of the offset.

According to the Offsets Policy, a *Biodiversity Offset Strategy* (BOS) is required to set out how the proponent intends to fulfil the project's offset requirement and is to be submitted to the Department of Planning & Environment with the project application. Offsets are generally required to be secured prior to commencement of construction, although this can be deferred if a Voluntary Planning Agreement (under the EP&A Act) is entered into prior to project approval.

7.2 Overview of Offset Options

According to the Offsets Policy, proponents can meet their offset obligations through one or a combination of the following offset options:

- Like-for-like credit purchase – the proponent purchases the required number and type of biobanking credits from the biobanking credit 'market' (publically available through the Biobanking Credit Register) (Option 1a);
- Like-for-like credit creation - the proponent creates a biobank site on their own land, which generates the required credits to fulfil their offset requirement; the proponent retires the required number and type of credits from their own portfolio of credits (Option 1b);
- Variations – where like-for-like offsets are not available, and the proponent can demonstrate that "reasonable steps" have been taken to find a suitable offset, proponents may apply the FBA 'variation rules' (as outlined in Appendix A of the Offsets Policy) (Option 2);
- Rehabilitation of mine sites, which is not relevant to the current project;
- Contributing money to supplementary measures. For this option to be available, proponents must demonstrate that reasonable steps have been taken to secure like-for-like offsets under Option 1 and/or 'varied' offsets under Option 2 (Option 3); and/or
- Donating to a State Government fund. Under this scenario, the proponent would calculate the equivalent monetary value of their offset requirement and pay this amount into the fund. At the time of writing, the fund had not been developed. During the current 'transitional implementation period' this option is not available to proponents.

A summary of the available offsetting options, listed in order of priority, for the proposed development at Euroley are listed in Table 18.

Table 18 Ecosystem credits required for offset and matching credit types

Option	Offset Option	No. Credits	Offset Options/Comments

1a	Purchase and retire matching (like-for-like) ecosystem credits	16	• Like-for-like ecosystem credits comprise:
			  • Those of same PCT (see Table 17); or
			  • A PCT from the same vegetation class that has equal or higher percentage cleared value for the CMA (see Table 17)
			• See list of matching credit types in Table 17;
			• number and type of credits must be available on credit register, or will become available prior to construction (or during timeframe specified in in the Conditions of Approval for the SSD project application)

1b	Purchase land and create required credits through a Biobanking Agreement	16	• Requires proponent to find suitable properties for sale in the IBRA subregion, purchase property (or properties) and then generate a Biobanking Agreement on the land; • Biobank site should contain matching credit types and number as in Table 17; • Proponent retires their own credits to offset project, using only Part A costs (ie management costs of biobank per credit).
2	Variation rules - Purchase and retire other credits within same vegetation formation	TBC	• Apply variation rules when matching credit types in Table 17 not available; • For MR 644 credits, find ecosystem credits for PCTs that fall within 'Semi-arid woodlands' formation, with >80% cleared value for CMA; • For MR518 credits, find ecosystem credits for PCTs within 'Grassy Woodlands' formation, with > 60% cleared value for CMA.
3	Supplementary measures	N/A	• Apply FBA variation rules • Apply when suitable credits and/or biobank site unavailable or cannot be secured within BOS and construction timeframe • Use interim method to calculate monetary contribution for supplementary measures • Could be combination of credit purchase and land purchase

Where the proponent has demonstrated reasonable steps have been taken to find a suitable like-for-like offset, but none are available, 'supplementary measures' can be used to fulfil offset obligations. The rules for applying and calculating supplementary measures are provided in Appendix B of the Policy. An interim method for calculating the monetary contribution for supplementary measures will be applied by OEH until a "fund calculator" is developed. An administrative cost of 10% is added to the equivalent cost of a like-for-like offset. The amount calculated is deposited into a NSW Government fund, or invested in another approved conservation fund.

A proponent may use a combination of offset sites and supplementary measures to fulfil an offset requirement. All options listed in Table 18, as applicable to the proposed development at Euroley, have been considered, and are discussed in Section 7.3 below.

Further consultation and discussion with DP&E and OEH will be conducted during the EIS assessment process to determine the most suitable offset for the project.

7.3 Like-for-like Offsets (Option 1)

7.3.1 Purchase like-for-like credits (Option 1a)

The proponent may choose to purchase and retire the ecosystem credits listed in Table 17. However, at the time of writing, these credits are not available on the Biobanking Credit Register, and no applicable expressions of interest are currently published showing an availability of these credit types within the Riverina IBRA region. Given that no credit trades have, to date, occurred in the Murrumbidgee IBRA region, and that there are currently no published expressions of interest (EOIs) for these credit types on the Biobanking site register, it is unlikely that suitable like-for-like ecosystem credits will become available on the credit market in the near future. Accordingly, purchase of like-for-like credits (Option 1a) is not available to the proponent at the time of writing this BOS.

7.3.2 Generate credits by creating a Biobanking Agreement (Option 1b)

The proponent may choose to create a Biobanking Agreement over a portion of land in order to generate the required like-for-like credits and retire these to fulfil the offset obligation. However, this option is not favoured for the following reasons:

- ProTen has entered into a lease agreement with the current landowner that would allow continued use of the land within the development site surrounding the PPUs for an agricultural use such as grazing. This proposed future use of the surplus land within the development site is not compatible with management of a portion of the study area for biodiversity conservation under a Biobanking Agreement;
- As the offset requirement is relatively small (ie only 16 credits are required, equating to around 2 ha of land area), the cost of securing a biobank within the study area (and its ongoing management) would be disproportionate to its size. In this regard, we have employed the OEH *Credit Converter* tool for the 16 ecosystem credits required. The Credit Converter indicates that 2 hectares of land would be required to generate this number of credits. The creation of a biobank on a parcel of land this small would not be economical.
- Purchase of other properties is not feasible for the small offset required. Searches of real estate sources within the Griffith-Narrandera district reveal that potential suitable rural properties are much larger than the required offset area. Suitable offset sites of the size required and containing the ecosystem credits required are not currently available. Similarly, the subdivision and purchase of a portion of one of the large rural properties would be disproportionate to the offset required. Given the rural land use of the majority of the IBRA subregion, the purchase of a 2 ha property (or larger) and converting it into a biobank would not be feasible or economical.

Hence, Option 1b is not available to the proponent. The proponent has pursued reasonable steps to obtain a suitable like-for-like offset. However, like-for-like offsets (ie Options 1a and 1b) are not currently available. Accordingly, the proponent can apply the 'variation rules' in accordance with Appendix A (Section 1) of the Offset Policy.

7.4 Apply Variation Rules (Option 2)

In the case where the required credits are not available, and hence a 'like-for-like' offset is not achievable, proponents can apply the variation rules for matching ecosystem credits. However, a hierarchy of options must be followed, with the proponent demonstrating that "all reasonable steps have been taken…to secure a matching ecosystem credit".

The consent authority may approve a variation of the offset rules for matching ecosystem credits, by allowing ecosystem credits created for a PCT from the same vegetation formation as the required ecosystem credit to be proposed as part of the BOS, where in the consent authority's opinion the BOS demonstrates that:

- all "reasonable steps" to secure a matching ecosystem credit have been taken by the proponent, and
- the required ecosystem credit is not for a PCT associated with a CEEC listed on the TSC Act or an ecological community listed on the EPBC Act, and
- the PCT from the same vegetation formation has a percent cleared value of the PCT in the major catchment area equal to or greater than the percent cleared of the PCT to which the required ecosystem credit relates, or
- where the required ecosystem credit is for a PCT that is associated with a CEEC/EEC, the PCT from the same formation is also associated with a CEEC/EEC.

"Reasonable steps" to locate like-for-like offsets are listed in Appendix A (Section 2) of the Offset Policy and summarised as follows:

- investigating land already owned by the proponent within the IBRA subregion or CMA, whether the development site or other properties;
- liaising with an OEH office and local council to obtain a list of potential sites that meet the requirements for offsetting;
- placing an Expression of Interest for the credits wanted on the Biobanking public register (ie the 'Credits Wanted Register') for at least six months, whilst regularly checking the register to see if the required credits have become available;
- considering properties for sale in the "required area" (presumably within the IBRA subregion or CMA); and
- providing evidence of why offset sites are not feasible (e.g. unwillingness of a landowner to sell).

In addition, OEH has advised that reasonable steps should include advertising the credit requirement via an Expression of Interest (EOI) on the Biobanking Credit Register for a period of no less than six months.

SLR, in consultation with the proponent and with OEH, has already commenced investigation of realistic offsetting alternatives and proceeding with the 'reasonable steps' listed above to identify an acceptable offset. In this regard, we note:

- At the time of writing no suitable ecosystem credits are available or have been advertised via an EOI;
- Land already owned by the proponent, or to be purchased by the proponent, within the study area is not currently available for a biobank site, as noted above;
- SLR has consulted with OEH Albury office and Narrandera Shire Council on the availability of offset lands in the region. At the time of writing, OEH are not aware of any suitable properties that meet the requirements for this project;
- There are no suitable properties for sale in the IBRA subregion.

By applying the variation rules, the proponent may purchase and retire ecosystem credits from the same vegetation formation, as follows:

- For MR 644 credits, ecosystem credits for PCTs that fall within the 'Semi-arid woodlands' formation, and that have >80% cleared value for the CMA; and

- For MR 518 credits, ecosystem credits for PCTs within the 'Grassy Woodlands' formation, with >60% cleared value for the CMA.

At the time of writing, no ecosystem credits within the vegetation formations listed above are available on the credit register or through the EOI web page. To demonstrate reasonable steps, the proponent should advertise the credit requirement via an EOI.

7.5 Supplementary measures (Option 3)

Where a proponent can demonstrate that all reasonable steps have been taken to obtain like-for-like credits or a suitable offset site (as per the steps listed above), they can choose to use 'supplementary measures'. A formula for calculating the monetary contribution of supplementary measures is provided in Appendix B of the Offset Policy. However, the formula is based on the premise that a certain percentage of the offset has been achieved by purchasing credits. The Policy therefore notes that where the proponent is proposing to fulfil the entire offset requirement using supplementary measures, they "must negotiate the amount to be spent" with the consent authority, with the advice of OEH. In the case of the current project at Euroley, if the required ecosystem credits (whether like-for-like or other approved credits under the variation rules) or a suitable offset site do not become available during the six month period of the EOI, then the proponent will negotiate a suitable monetary amount to substitute for the offset credit requirement.

Suitable supplementary measures are listed in Appendix B of the Offsets Policy. There are four tiers of supplementary measures, in order of priority from Tier 1 to Tier 4.

7.6 Offset Strategy Actions

Actions proposed to fulfil the offset requirement for the project will involve:

- Uploading an EOI for the required ecosystem credits on the 'Credit Wanted' register of the Biobanking Credit Register;
- Monitor the availability of matching ecosystem credits during the six month advertisement period (as required by OEH), including regularly checking the credit register for ecosystem credits that match the required type and number of credits (Table 17), including 'variation credits' from the same vegetation formations (as listed in Table 18);
- Consult regularly with the OEH Biobanking Team and the Albury office of OEH (during the EOI period) on the availability of suitable credits or offset sites;
- During, or at the end of, the advertisement period, either:
    - Purchase like-for-like credits or if not available purchase 'variation credits'; or if both credit types not available, then:
    - Apply supplementary measures, and calculate suitable monetary fund deposit.

Should supplementary measures be required, the following actions would be completed:

- Consult with OEH on suitable measures that would benefit the plant community types (ie ecosystem credits) impacted by the proposed development;
- Conduct research into current regional and local conservation programs that benefit the plant communities affected, including reference to:
    - NSW Priority Action Statements under the TSC Act;
    - Relevant Recovery Plans, threat abatement plans, or Final Determinations (for Sandhill Pine Woodland EEC);
    - Plans of managements for local and regional conservation reserves that are relevant to the offset entities; and

    - Scientific literature.

- Use the results of the research and consultation with OEH and DP&E to agree and determine a suitable supplementary offset and then calculate agreed monetary deposit to fulfil the project's offset requirements.

These actions and the final outcome will be documented in an addendum to the BOS. This will be completed within 12 months of obtaining Project Approval.

8 GROUNDWATER DEPENDENT ECOSYSTEMS

This chapter describes potential impacts on groundwater dependent ecosystems, as required by the SEARs.

8.1 Background

The SEARs for the EIS request the inclusion of "a *detailed assessment of the potential impacts on any*"…"*groundwater dependent ecosystems*" and suggest reference to the "*NSW State Groundwater Dependent Ecosystems Policy (DLWC, 2002)*".

Groundwater dependent ecosystems (GDEs) are those ecosystems that rely on groundwater as a source for its water requirements (Kumar 2010). In the Lower Murrumbidgee Groundwater Management Area (GMA) there are three types of ecosystems within the Shepparton (or Shallow Source) that may depend on groundwater to some degree:;

1. terrestrial vegetation (Red Gum, Black Box, Lignum, and other vegetation communities along prior streams);
2. wetlands; and
3. river base flows (Kumar 2010).

The GDE Atlas (BoM 2015) identifies a portion of the terrestrial vegetation within the study area (ie White Cypress Pine Open Woodland) and vegetation to the west of the site as GDEs. The White Cypress Pine vegetation in the north of the site is identified as:

- Inflow Dependant Ecosystem (IDE) likelihood of 7;
- Ecosystem that relies on subsurface presence of groundwater; and
- Moderate potential for groundwater interaction.

The nearest wetland and river GDEs are Dry Lake and Yanco Creek (and its associated floodplains and wetlands) approximately 4-8 kilometres to the east of the development site.

The 'Lower Murrumbidgee Groundwater Sources: Groundwater Management Area 002 Groundwater Status Report' (Kumar 2010), however, states "*Although there is limited knowledge on the ecology of these communities at the present time, it is believed that the vegetation communities in the Lower Murrumbidgee have a low dependency on groundwater*. *This conclusion is derived mainly from observations on health of the vegetation communities during prolonged periods of dry weather. It is believed that the communities rely mainly on rainfall and periodic flooding from the Murrumbidgee River*."

This resource further stated that "*the wetlands within the Lower Murrumbidgee GMA are known to depend mainly on surface water*" and "*there is lack of information on any terrestrial fauna that may exist and have any dependency on groundwater*".

8.2 Impacts on GDEs

The potential for adverse impact to surface water and groundwater resources from the development of intensive poultry farms is very low, with the risk of impact considered far less than those associated with traditional agricultural activities.

The development site's water requirement will be soured via four new groundwater bores to be constructed on the development site, consisting of two bores in two locations. The drawdown associated with this groundwater extraction is anticipated to be minimal and will not impact upon GDEs.

Waste water generated by the on-site staff amenities and dwellings will be appropriately treated and disposed of via on-site waste water management systems installed and operated in accordance with the requirements of Council and the relevant standards/guidelines. No detectable impact to surface or groundwater quality is anticipated as a result the low volume that will be generated, the on-site system requirements, the available land area and available separation distances.

Stockpiling and/or disposal of waste materials, especially poultry litter, dead birds and chemical containers, can result in leaching of nutrients and pollution to surface waters and groundwater. However, appropriate systems will be implemented to ensure that each waste stream generated by the development is effectively managed and disposed of off-site.

While the proposed PPU sites are removed from any notable drainage features, construction activities could potentially impact upon water resources through changes to groundwater recharge as a result of soil compaction, loss of groundcover and generation of sediment-laden runoff. Given that the proposed PPU sites will be relatively small and the commercial activity associated with the development will be largely confined to these areas, changes to the existing runoff/recharge pattern will be relatively minor. No detectable impacts to groundwater levels or yields are expected. The nature of the strata and the depth to the water bearing zones will provide a substantial buffer against infiltration of any potential pollutants, such as turbidity and/or hydrocarbons.

The proposal will have limited impact on those GDE terrestrial vegetation types within and adjoining the study area, with a small band of the White Cypress Pine vegetation requiring clearing for the access track. It is not likely that any significant impact on GDEs would ensue as a result of the development.

9 EPBC ACT MATTERS

This chapter identifies matters of national environmental significance listed under the EPBC Act that are of potential relevance to the proposed development.

9.1 Predicted Matters of NES

A search of the on-line Protected Matters Search Tool (PMST) was conducted on 3 March 2015. The PMST database provides an indicative list of matters of national environmental significance (matters of NES) listed under the Commonwealth *Environment Protection and Biodiversity Conservation Act 1999* (EPBC Act). A copy of the PMST results is provided in Appendix F. The PMST results indicate the following matters are either present or relate to the study area:

- 13 threatened species;
- eight listed migratory species;
- four listed threatened ecological communities; and
- four wetlands of international importance (Ramsar Wetlands).

Of the above matters of NES that are predicted to occur within the locality of the site, those of potential relevance to the site and the proposed development are discussed in the following sections.

9.2 Relevant Matters of NES

9.2.1 Listed threatened species

The 13 threatened species (and/or their habitats) listed under the EPBC Act that are predicted to occur within the locality comprise five bird species, three fish species, two mammal species, one amphibian and two plant species. These species and their legal status within NSW and at a national level are listed in Table 19.

Table 19 PMST results – listed threatened species

Species		**EPBC Act Listing**	**TSC Act Listing**
Australasian Bittern	*Botaurus poiciloptilus*	Endangered	Endangered
Malleefowl	*Leipoa ocellata*	Vulnerable	Endangered
Plains-wanderer	*Pedionomus torquatus*	Vulnerable	Endangered
Superb Parrot	*Polytelis swainsonii*	Vulnerable	Vulnerable
Australian Painted Snipe	*Rostratula australis*	Endangered	Endangered
Silver Perch	*Bidyanus bidyanus*	Critically Endangered	Vulnerable
Murray Cod	*Maccullochella peelii*	Vulnerable	
Macquarie Perch	*Macquaria australasica*	Endangered	Endangered
Koala	*Phascolarctos cinereus*	Vulnerable	Vulnerable
South-eastern Long-eared Bat	*Nyctophilus corbeni*	Vulnerable	Vulnerable
Southern Bell Frog	*Litoria raniformis*	Vulnerable	Endangered
Mossgiel Daisy	*Brachyscome papillosa*	Vulnerable	Vulnerable
Silky Swainson-pea	*Swainsona murrayana*	Vulnerable	Vulnerable

Most of the species listed in Table 19 are also listed under the TSC Act and therefore are considered in Chapter 4 of this report, as well as in the likelihood of occurrence table in Appendix D. With regard to the EPBC Act listed species that are not listed on the TSC Act, SEARs or Credit Calculator, such as the Koala, Malleefowl and Australian Bittern – habitat for these species is not present within the study area. Similarly, there are no watercourses available within the study area for threatened fish species, namely the Silver Perch, Murray Cod and Macquarie Perch.

The study area contains suitable foraging and nesting habitat for the Superb Parrot, which was recorded within the study area. However, it is not clear from our survey results whether the Superb Parrot utilises the site for nesting and breeding, although this is theoretically possible. Most likely is that the open woodland habitat through the central portion of the site (ie Black Box Lignum Woodland) provides marginal foraging habitat and perching trees for individuals of a local population that ranges throughout the locality.

The study area may contain marginal habitat for the South-eastern Long-eared Bat which utilises a variety of vegetation types and often roosts in hollow-bearing trees.

9.2.2 Listed threatened communities

The listed threatened communities that have been recorded or are predicted to occur within the locality include:

- Weeping Myall Woodlands;
- Buloke Woodlands of the Riverina and Murray Darling Depression Bioregions;
- Grey Box (*Eucalyptus microcarpa*) Grassy Woodlands and Derived Native Grasslands of South-eastern Australia; and
- White Box-Yellow Box-Blakely's Red Gum Grassy Woodland and Derived Native Grassland.

None of these listed threatened communities are present within the study area.

9.2.3 Wetlands of National Significance

Four Wetlands of National Significance were identified within the 10km radius of the study area, as follows:

- Banrock Station Wetland Complex;
- Coorong and Lakes Alexandria and Albert;
- NSW Central Murray State Forests; and
- Riverland.

These wetlands are not located on or connected to the study area and will not be affected (directly or indirectly) by the proposed development.

9.2.4 Migratory species

Eight migratory species (and/or their habitats) are predicted to occur within the locality, four of which are wetland species (Great Egret, Cattle Egret, Latham's Snipe and Painted Snipe). The remaining four are terrestrial species and include the White-bellied Sea-Eagle, Satin Flycatcher, Rainbow Bee-eater and Fork-tailed Swift.

The study area does not contain suitable habitat for the listed wetland species, with the exception that large or sustained rainfall events could create periodic and temporary soaks or ponds within the low lying parts of the development site. Regardless of this, due to their large ranges, such species would not be dependent on the study area (if they use it at all) for foraging, breeding or other life cycle processes.

The terrestrial species all occupy a large variety of habitats and similarly have very large ranges. The vegetation within the study area does not constitute 'important habitat' for such species, as defined by DoE (2013), most of which utilise more intact and structurally complex woodlands. The White-bellied Sea-Eagle prefers coastal areas or waterways.

9.3 Impacts on relevant Matter of NES

9.3.1 Listed threatened species

The threatened species identified in Section 9.2 have been considered in accordance with the 'significant impact criteria' for 'vulnerable' and 'endangered' species in the *Significant Impact Guidelines 1.1* (DoE 2013).

Taking into consideration all stages and components of the proposal, and all related activities and infrastructure, there is the potential for impacts, including indirect impacts, on matters of national environmental significance, being mainly loss of a small area of degraded habitat for mobile threatened fauna species. However, it is highly unlikely that any of such species will be adversely impacted by the proposal, because:

- suitable habitat for most of the species is absent within the study area. For those species that have either been recorded or could utilise the habitats within the study area, there are not likely to be local populations present wholly within the study area or reliant on the study area for their survival in isolation. Any such populations present within the locality will not be rendered locally extinct by the proposed development. This is based on the large ranges of these species, the poor quality and condition of the habitats present within the study area.
- the study area is not assessed as likely to contain habitat critical to the survival of a species;
- the study area is not likely to support an 'important population' (as defined by DoE 2015) of any threatened species; and
- the proposed mitigation measures, which are described in Section 5.5, will avoid or reduce impacts on threatened species.

With reference to the criteria for vulnerable and endangered species, the proposal is not likely to:

- lead to a long-term decrease in the size of an important population of a species;
- reduce the area of occupancy of an important population;
- fragment an existing important population into two or more populations;
- adversely affect habitat critical to the survival of a species;
- disrupt the breeding cycle of an important population;
- modify, destroy, remove or isolate or decrease the availability or quality of habitat to the extent that a species is likely to decline;
- result in invasive species that are harmful to a vulnerable species becoming established in the vulnerable species' habitat;
- introduce disease that may cause a species to decline; or
- interfere substantially with the recovery of any of these species.

9.3.2 Migratory species

The study area contains no habitat for the four listed migratory wetland species (Great Egret, Cattle Egret, Latham's Snipe and Painted Snipe) and only marginal habitat for the terrestrial migratory species, which include the White-bellied Sea-Eagle, Satin Flycatcher, Rainbow Bee-eater and Fork-tailed Swift.

In regards to the terrestrial species (excluding the White-bellied Sea-Eagle), the study area contains marginal foraging habitat amongst the woodland and scattered paddock trees. It is theoretically possible that these species could utilise the subject temporarily during foraging or dispersal. Vegetation within the study area lacks favourable complexity for these species and would constitute only a relatively small proportion of the large ranges of such species.

With reference to the criteria for migratory species in the *Significant Impact Guidelines 1.1*, the study area does not contain an area of 'important habitat' for any migratory species. Furthermore, the proposal is highly unlikely to disrupt the lifecycle (breeding, feeding, migration or resting behaviour) of an ecologically significant proportion of the population of a migratory species.

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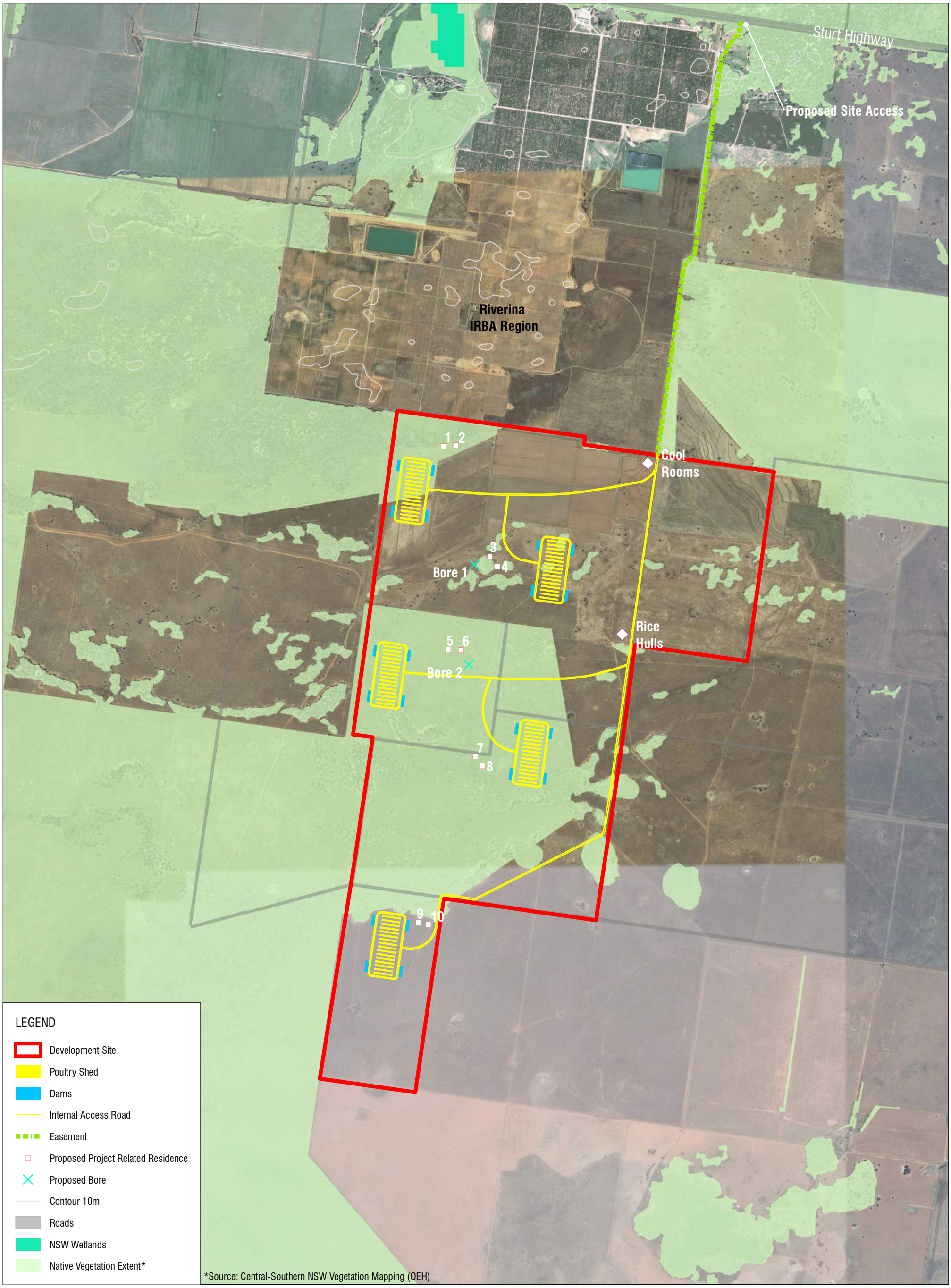
FIGURES

Figure 1 Site Map



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SLR
10 KINGS ROAD
NEW LAMBTON
NEW SOUTH WALES 2305
AUSTRALIA
T: 61 2 4037 3200
F: 61 2 4037 3201
www.slrconsulting.com

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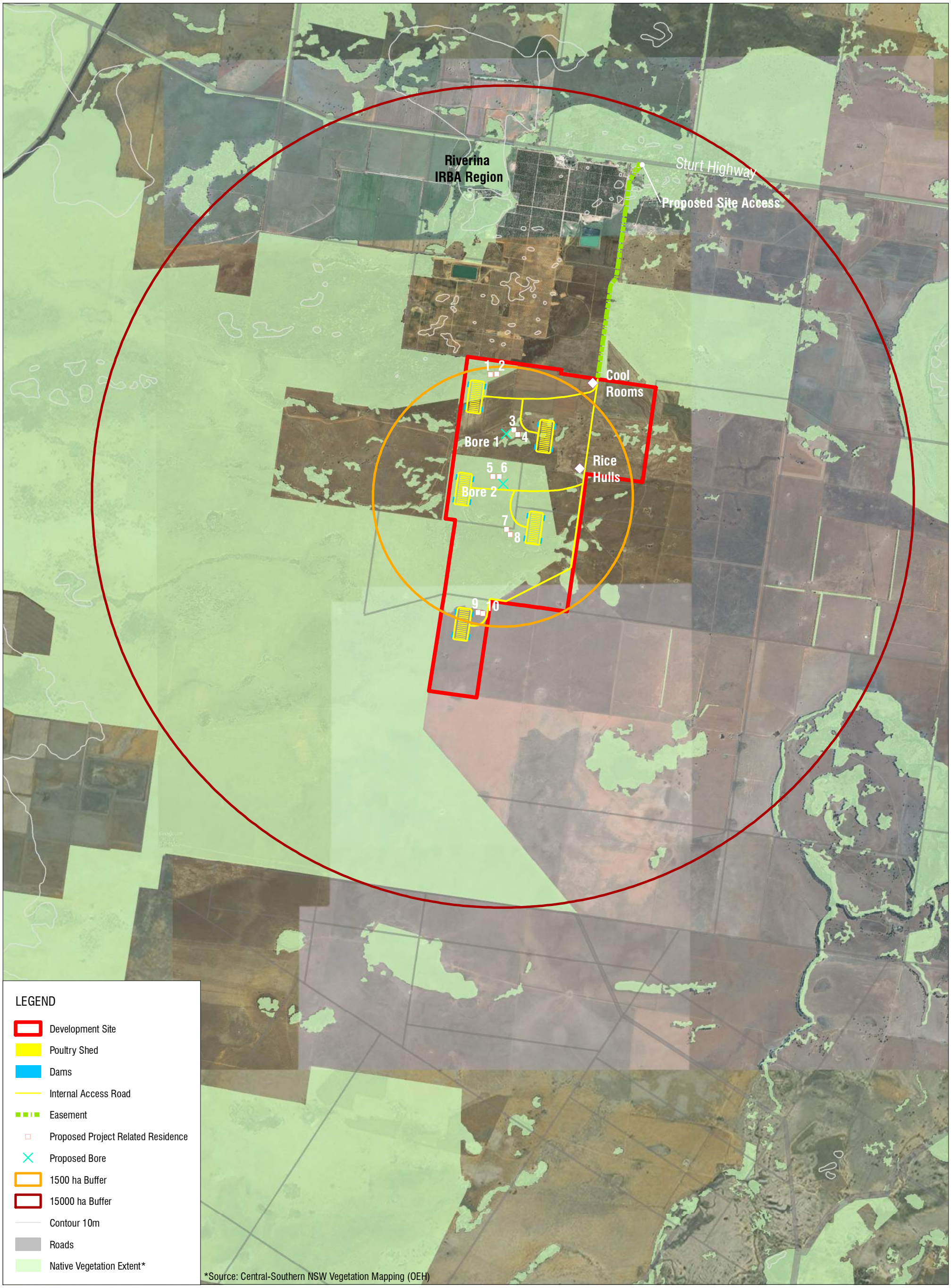
Euroley Poultry Facility EIS

Site Map

FIGURE 1

Figure 2 Location Map



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SLR
10 KINGS ROAD
NEW LAMBTON
NEW SOUTH WALES 2305
AUSTRALIA
T: 61 2 4037 3200
F: 61 2 4037 3201
www.slrconsulting.com

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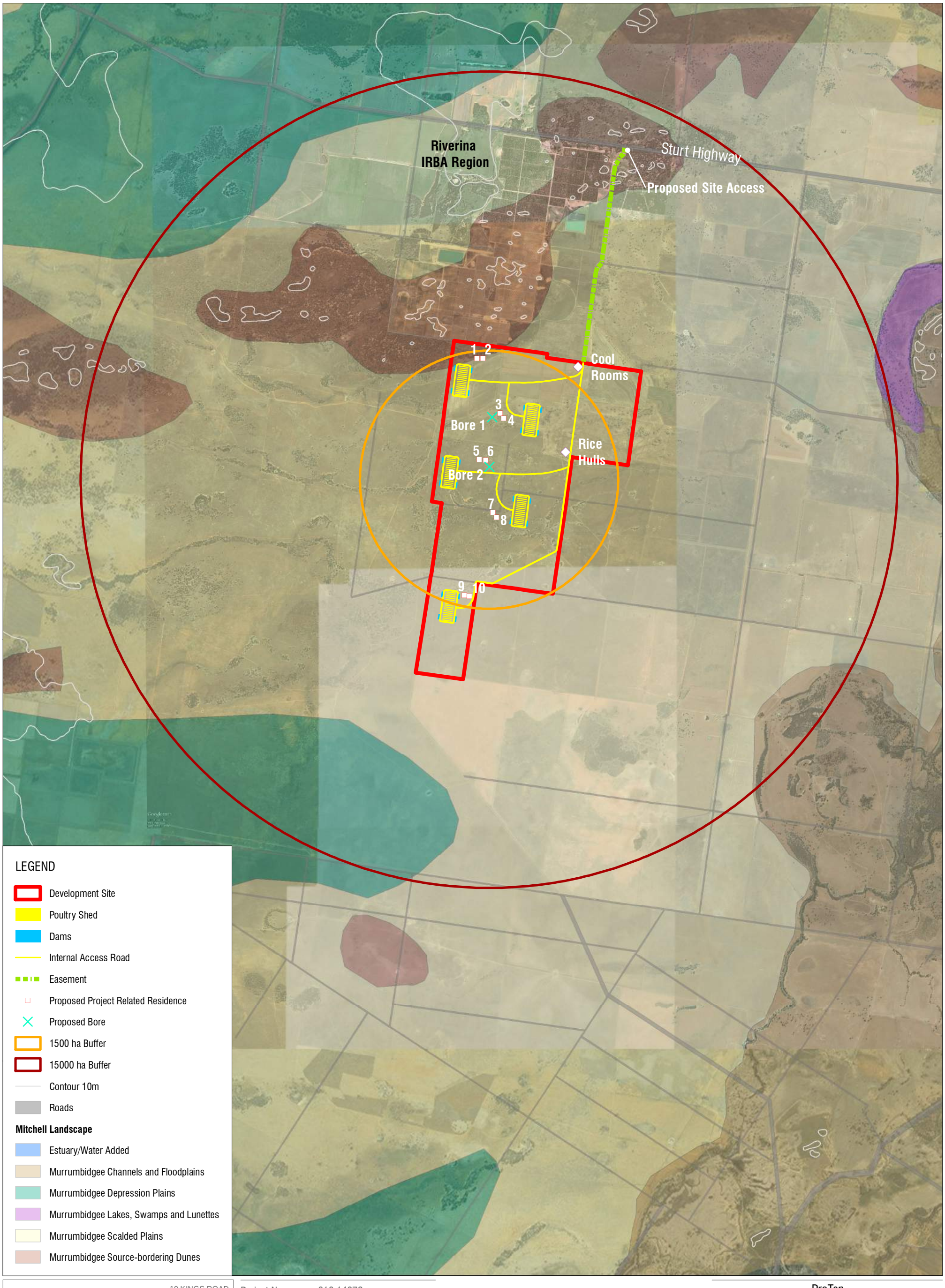
Euroley Poultry Facility EIS

Location Map

FIGURE 2a



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N
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0 400 800 1,200 1,600 m

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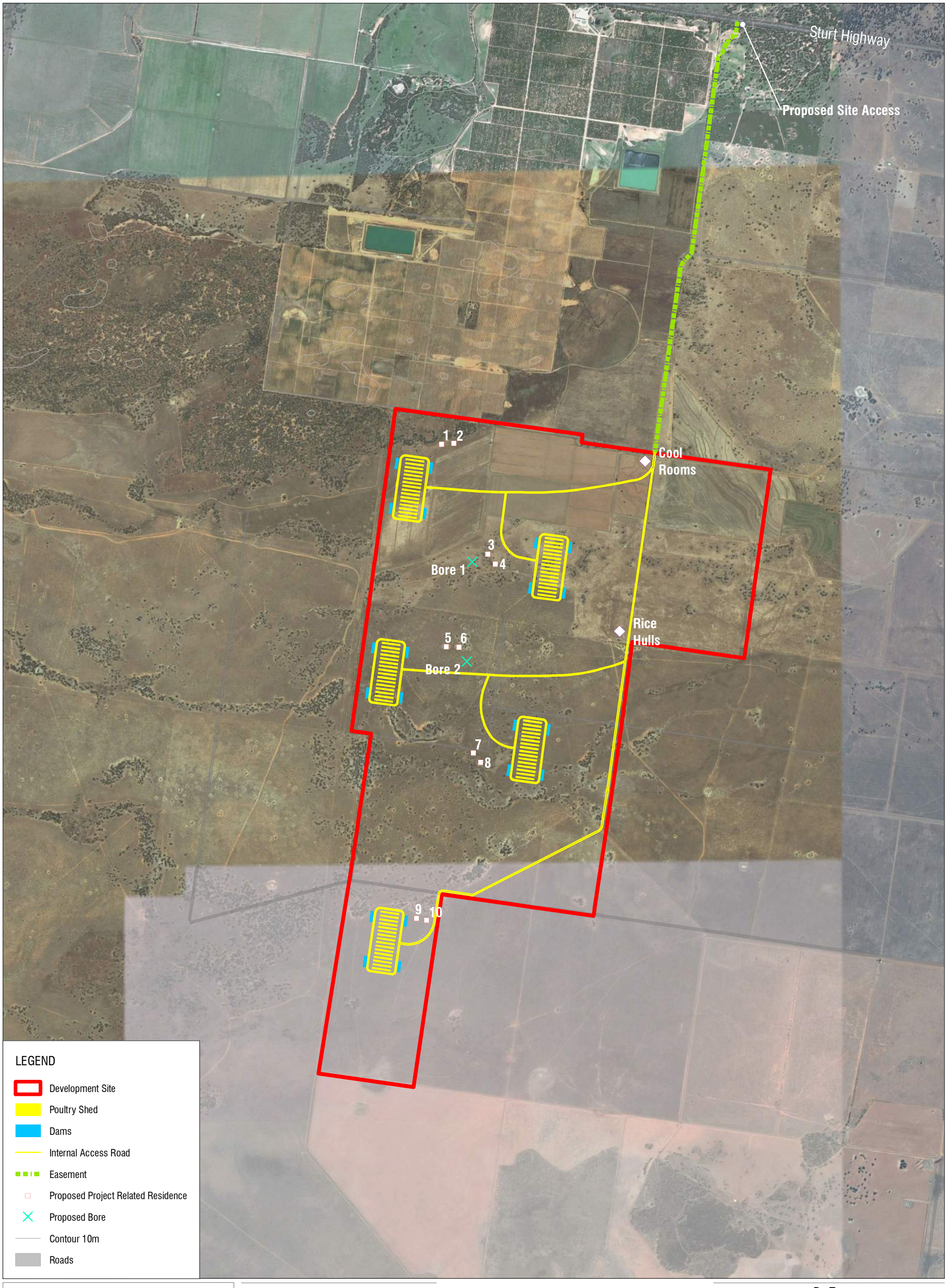
Location Map

FIGURE 2b

Figure 3 Conceptual Layout



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0 200 400 600 800 m

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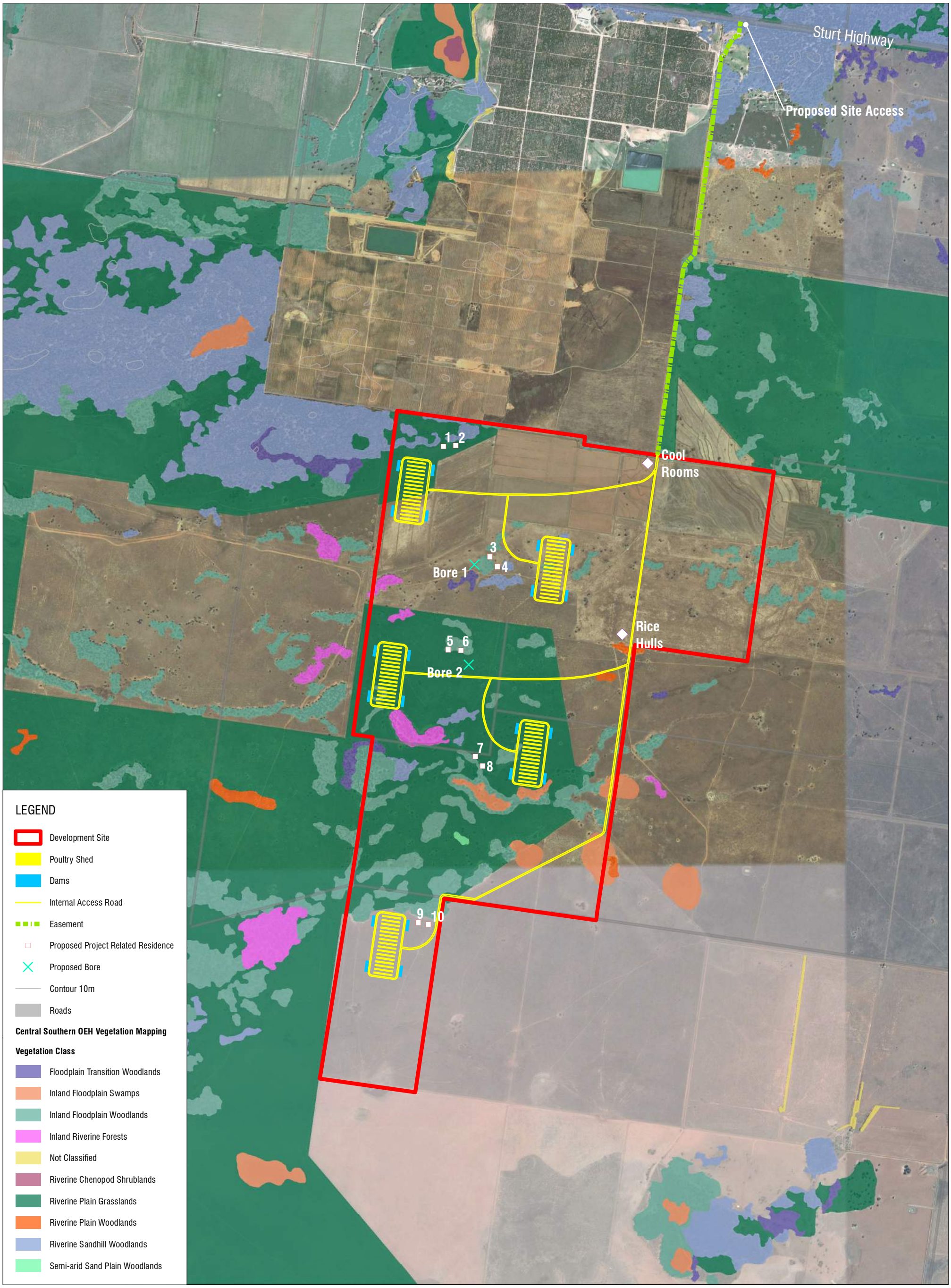
Conceptual Layout

FIGURE 3

Figure 4 Regional Vegetation Mapping



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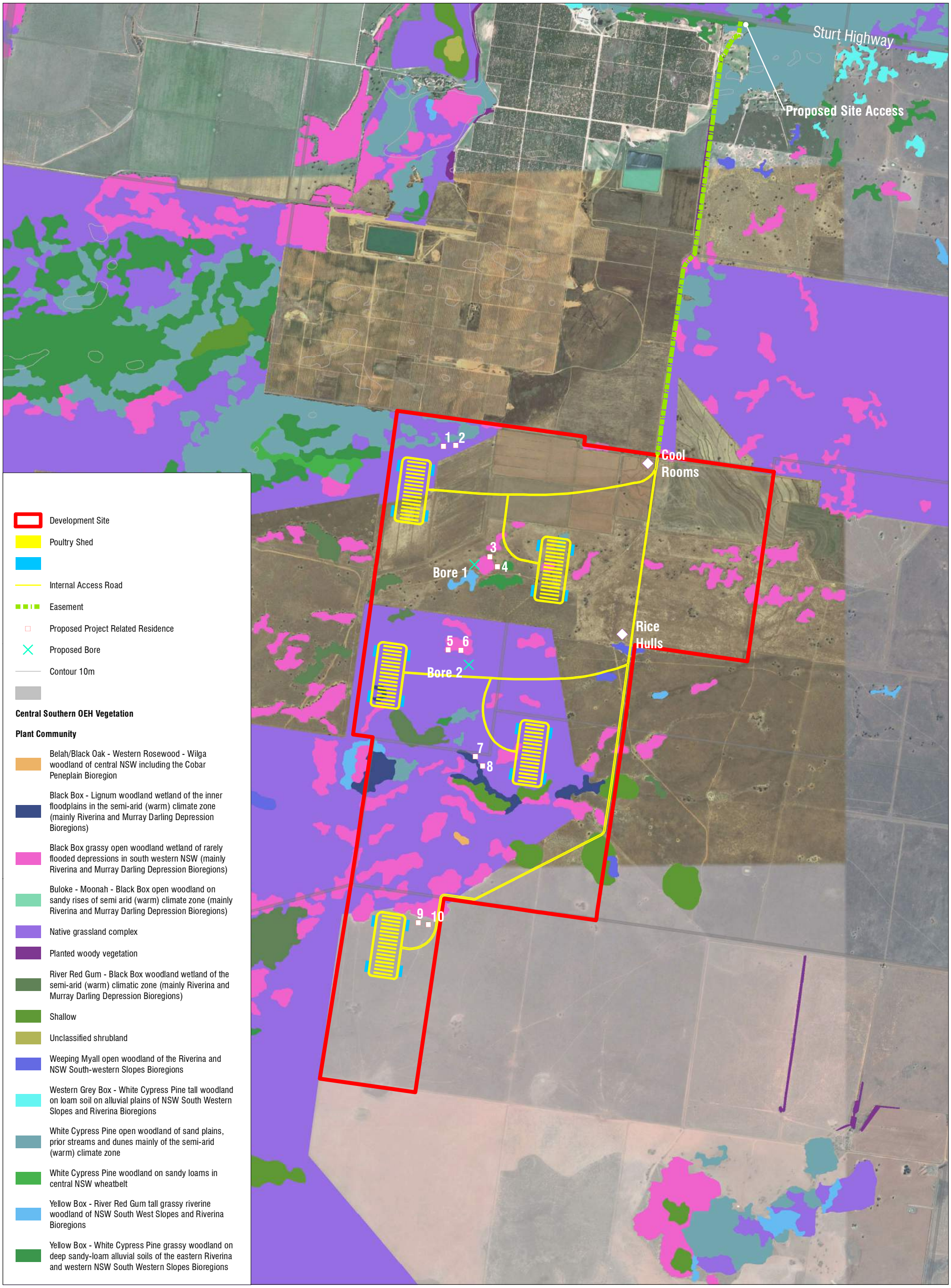
Regional Vegetation Mapping Vegetation Class

FIGURE 4a



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Regional Vegetation Mapping Plant Community Type

FIGURE 4b

Figure 5 Plant Community Types (PCTs) recorded within the site

Sturt Highway

Proposed Site Access

Cool Rooms

Rice Hulls

1 2

3 4

Bore 1

5 6

Bore 2

7 8

9 10

LEGEND

- Development Site
- Poultry Shed
- Dams
- Internal Access Road
- Easement
- Proposed Project Related Residence
- Proposed Bore
- Contour 10m
- Roads

NSW Vegetation Types (PCTs)

- MR517 Black Box Lignum Woodland
- MR518 Black Box Grassy Open Woodland
- MR644 White Cypress Pine Open Woodland

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0 200 400 600 800
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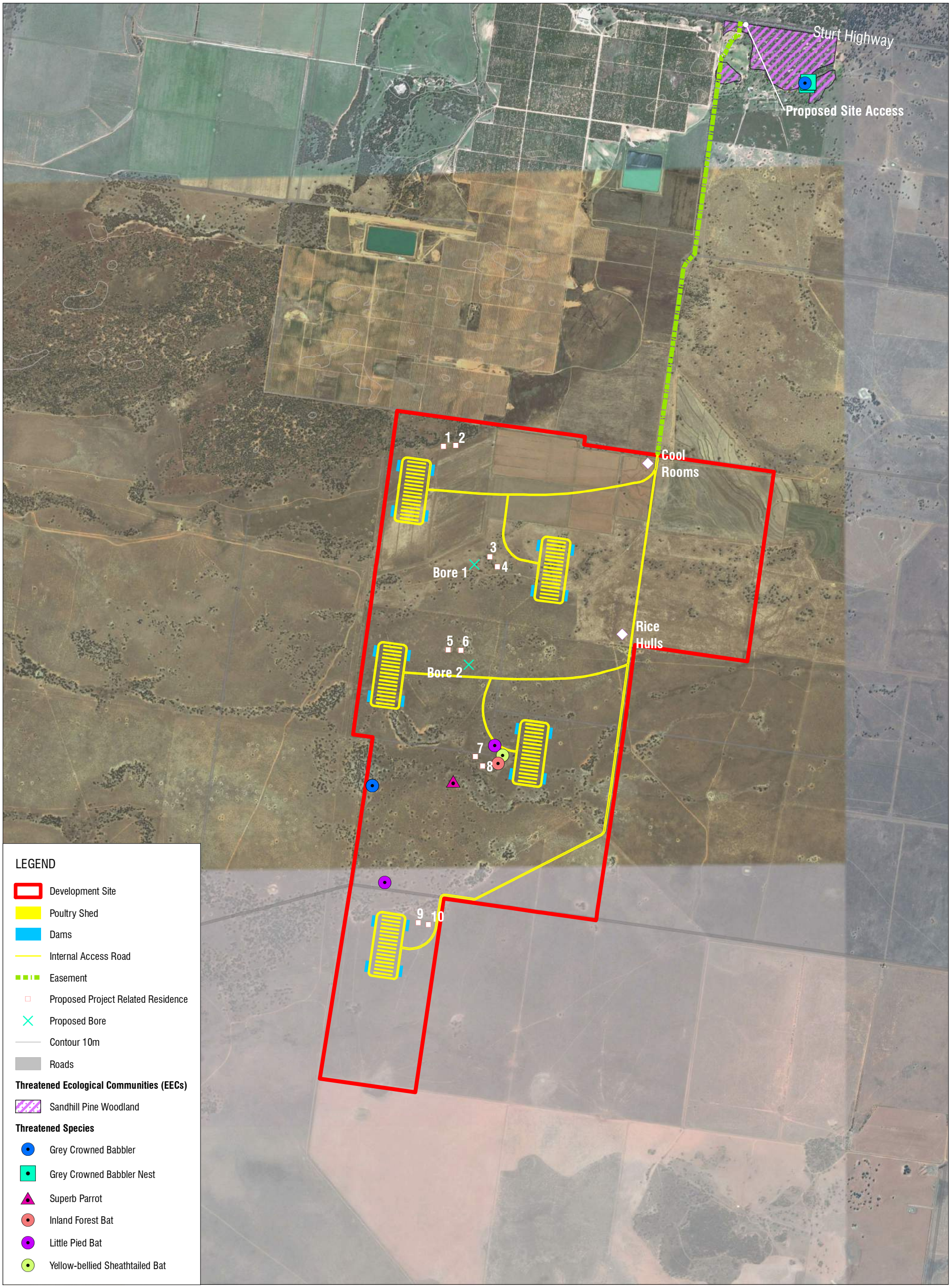
Plant Community Types (PCTs) Recorded within the Site

FIGURE 5

Figure 6 Threatened ecological communities and threatened species recorded on the site



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0 200 400 600 800 m

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Threatened Ecological Communities and Threatened Species Recorded on the Site

FIGURE 6

Figure 7 Vegetation Zones (and plot locations)

Sturt Highway

1
2B
2
2A
3
4

Proposed Site Access

Cool Rooms

Rice Hulls

2D
2C
6
2G
2E
7
2F
8
5

LEGEND

- Study Area
- Development Site
- Poultry Shed
- Dams
- Internal Access Road
- Easement
- Proposed Project Related Residence
- Proposed Bore
- Contour 10m
- Roads
- Biobanking Plots

Vegetation Zones

- MR517 Black Box Lignum Woodland_mod good
- MR518 Black Box Grassy Open Woodland_low
- MR644 White Cypress Pine Open Woodland_mod good
- MR644 White Cypress Pine Open Woodland_low

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N
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E
S

0 200 400 600 800 m

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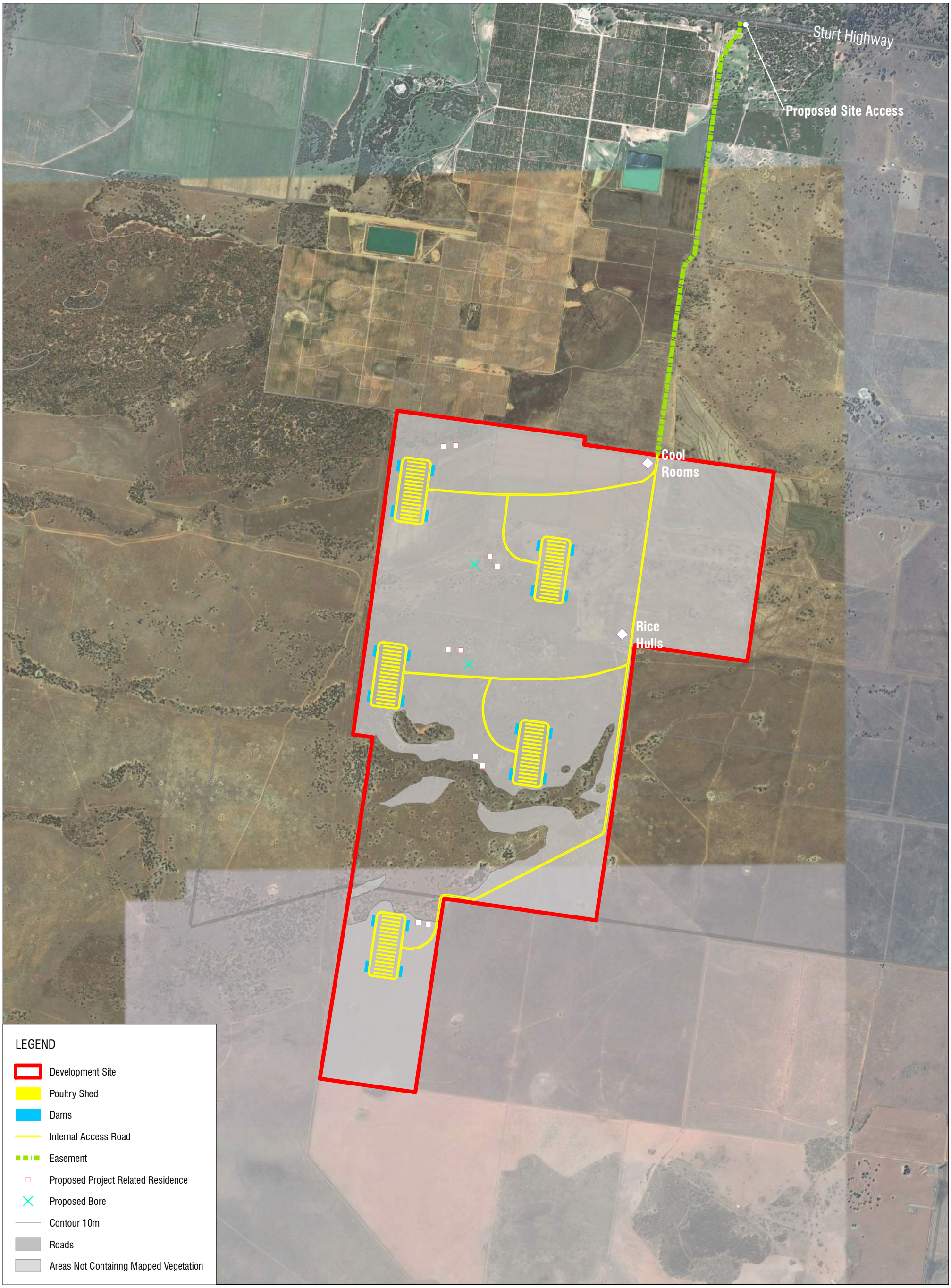
Vegetation Zones (and Plot Locations)

FIGURE 7

Figure 8 Areas not requiring assessment



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N
W E
S

0 200 400 600 800
m

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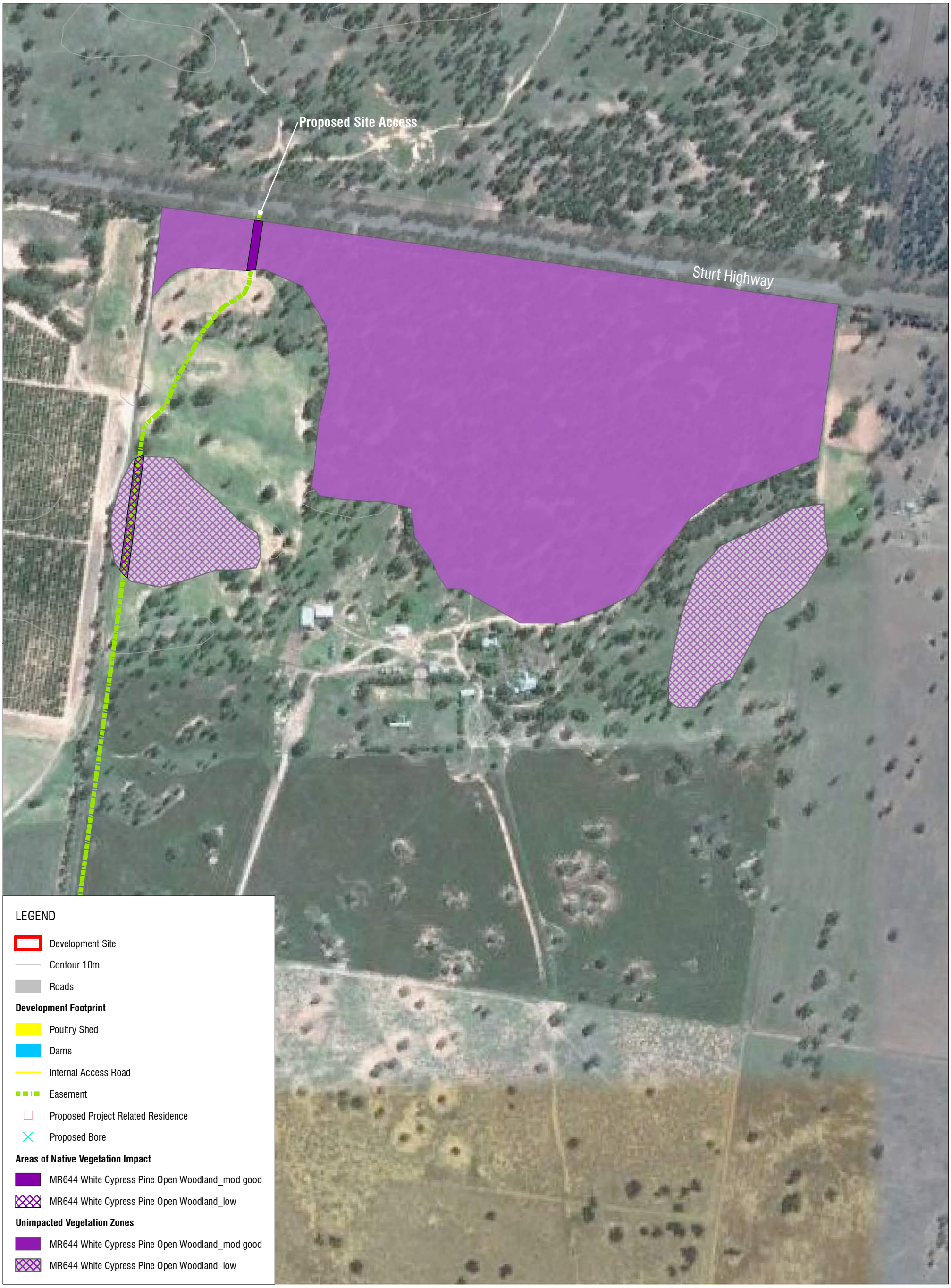
Areas Not Requiring Assessment

FIGURE 8

Figure 9 Impacts on native vegetation zones (PCTs) requiring offset



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Projection:	GDA 1994 MGA Zone 55

N
W E
S

0 50 100 150 200 m

ProTen

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Impacts on Native Vegetation Zones (PCTs) Requiring Offset

FIGURE 9A

LEGEND

- Development Site
- Contour 10m
- Roads

Development Footprint

- Poultry Shed
- Dams
- Internal Access Road
- Easement
- Proposed Project Related Residence
- Proposed Bore

Areas of Native Vegetation Impact

- MR517 Black Box Lignum Woodland_mod good
- MR518 Black Box Grassy Open Woodland_low

Unimpacted Vegetation Zones

- MR517 Black Box Lignum Woodland_mod good
- MR518 Black Box Grassy Open Woodland_low

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N
W E
S

0 50 100 150 200
m

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Impacts on Native Vegetation Zones (PCTs) Requiring Offset

FIGURE 9B