

QUILL WAY AND COCKBURN ROAD INTERSECTION UPGRADES

FLORA, VEGETATION AND FAUNA SURVEY

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1 INTRODUCTION

1.1 Background

DevelopmentWA is proposing to upgrade the intersections between Quill Way (north and south) and Cockburn Road in Henderson (the site) to facilitate traffic movement associated with the Australian Marine Complex (AMC).

The AMC is a world-class centre of excellence for manufacturing, fabrication, assembly, service and repair for the marine, defence and resource industries. Incorporating fabrication, ship building, technology and support industry precincts, the AMC features a deepwater port, world-class common user facilities, load out and fabrication infrastructure. The road upgrade works are required to improve road access from the AMC to nearby Kwinana and Latitude 32 industrial zones.

The site is approximately 23km south of the Perth Central Business District (Figure 1). The extent of works is shown in Figure 2. The road upgrades will require the clearing of vegetation in the road reserve. This report has been prepared to determine the extent of any native vegetation within the road upgrade footprint and to identify any flora, vegetation and fauna of conservation significance that may occur in the areas to be cleared.

1.2 Scope of Work

PGV Environmental was commissioned by DevelopmentWA to undertake a Flora, Vegetation and Fauna Survey of the north and south intersections of Quill Way and Cockburn Road. The report will identify the extent, if any, of

A Reconnaissance Flora and Vegetation Survey was undertaken in accordance with EPA Technical Guidance *Flora and Vegetation Surveys for Environmental Impact Assessment* (EPA, 2016a) and a Level 1 Fauna Survey was undertaken in accordance with EPA Technical Guidance *Fauna Surveys for Environmental Impact Assessment* (EPA, 2016b).

The surveys included the following scope of work:

- Desktop search and review of the Department of Biodiversity, Conservation and Attractions (DBCA) Naturemap database and Threatened Ecological Communities database on National Map;
- A search of the Commonwealth Government's Protected Matters Search Tool to identify species potentially occurring within the area that are protected under the *Environment Protection and Biodiversity Conservation (EPBC) Act 1999*;
- Examination of historic and recent aerial photography and contour and soil maps to provisionally identify vegetation types and condition;
- Field reconnaissance survey;
- Description and mapping of vegetation types and vegetation condition; and
- Description of fauna habitats.

2 EXISTING ENVIRONMENT

2.1 Land Use

The earliest available historic aerial photograph on-line from 1953 shows that the site is largely undeveloped native vegetation with some tracks on the coastal strip. Cockburn Road extends north-south (Plate 1) (Landgate, 2021).

Plate 1: Aerial Photograph 1953 (Landgate, 2021)



Development starts along the coastal area in the mid-1970s. There is some land reclamation in the southern part during the 1980s (Plate 2). Russell Road forms a T-junction with Cockburn Road at this stage.

Plate 2: Aerial Photograph 1981 (Landgate, 2021)



Breakwaters are constructed in the ocean between 1985 and 1995 and the Henderson Industrial Area is developed behind the coastal strip. Cockburn Road remains in its original location along the coastal strip during this period.

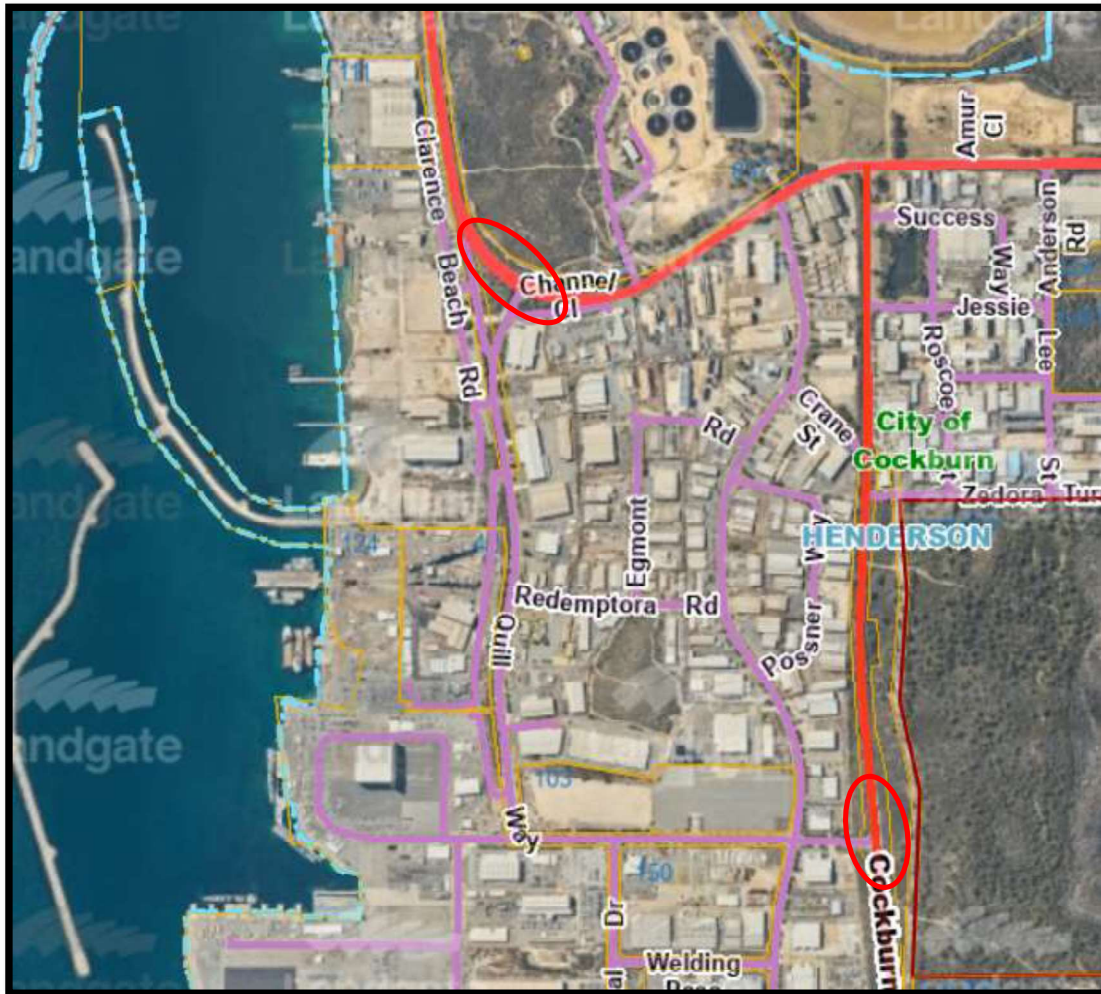
The intersection of Cockburn Road and Russell Road was realigned as a curved road, rather than a T-Junction with earthworks apparent in the February 2000 aerial photograph (Plate 3). Construction of a new southern extension of Cockburn Road down the eastern side of the developing AMC is also apparent in the 2000 photograph. The Quill Way intersections with Cockburn Road were constructed in 2000 (northern intersection) and 2002 (southern intersection).

Plate 3: Aerial Photograph 2000 (Landgate, 2021)



The Henderson development has continued to grow and is now almost completely developed (Plate 4).

Plate 4: Aerial Photograph 2021(Landgate, 2021)



2.2 Topography

The natural contours have been highly modified through the Henderson area to allow for development. According to Landgate, the spot elevations for the north intersection is 20m AHD and the southern intersection is 18m AHD (Landgate, 2021).

The northern intersection has a steeply sloping batter along the northern side of Cockburn Road which was recontoured during the 2000 earthworks to realign the Cockburn Road-Russell Road intersection.

The roads in the southern intersection are cut into the natural landscape with the road verges sloping up to 4m above the road surface on both sides.

2.3 Geology and Soils

2.3.1 Geology

The site is mapped as part of the Spearwood System. These dunes formed during the Pleistocene glacial and interglacial periods, around 40,000 years ago, and are made up of yellow brown sands of varying thickness over Tamala limestone (Bolland, 1998). The Spearwood System is described:

- Sand dunes and plains. Yellow deep sands, pale deep sands and yellow/brown shallow sands. (DPIRD, 2021).

2.3.2 Soils

The soils on the site have been described by the Department of Primary Industry and Regional Development (DPIRD) as (DPIRD, 2011):

- Spearwood LS1 Phase (211Sp__LS1) - Yellow/brown shallow sand LIMESTONE - light, yellowish brown, fine to coarse-grained, sub-angular to well rounded, quartz, trace of feldspar, shell debris, variably lithified, surface kankar, of eolian origin. Minor heavy minerals.
- Spearwood S2a Phase (S211Sp_S2a) - Lower slopes (1-5%) of dune ridge with moderately deep to deep siliceous yellow-brown sands or pale sands with yellow-brown subsoils and minor limestone outcrop.

2.4 Hydrology

Groundwater is at approximately 1m AHD which is 19- 21m below the surface level, and flows to the west towards the coast (DWER, 2021).

There are no surface water features associated with the north or south upgrade works (SLIP, 2021).

2.5 Heritage

2.5.1 Aboriginal Heritage

One heritage site ID 15840 is mapped as occurring in the north upgrade works (SLIP, 2021).

A Regulation 10 request under the Aboriginal Heritage Regulations 1974 was sent to the Registrar at DPLH and was approved for works commencing December 2021 and is valid for 12 months (Appendix 6). The permit will be issued in November 2021.

2.5.2 Cultural Heritage

There are no listed heritage sites associated with either north or south upgrade works (SLIP, 2021).

2.6 Contaminated Sites

There are no registered contaminated sites associated with either the north or south upgrade works (SLIP, 2021).

3 FLORA AND VEGETATION SURVEY

3.1 Methodology

3.1.1 Database Searches

Searches of the following databases were undertaken for a 10km radius around the central point of the site prior to the site survey:

- DBCA Naturemap Database (DBCA, 2020) (Appendix 1) which is a database of recorded occurrences; and
- The Commonwealth Government’s Protected Matters Search Tool which identifies species potentially occurring within the area that are protected under the *Environment Protection and Biodiversity Conservation (EPBC) Act 1999* (DAWE, 2020). A radius of 5km was used for this database (Appendix 2).

3.1.2 Site Survey

A site reconnaissance survey was conducted by Dr Paul van der Moezel from PGV Environmental on 16 March 2021. The survey included walking the site to identify vegetation types, vegetation condition and all plant species (Appendix 3) in the areas to be cleared as well as sampling flora and vegetation from 14 relevés (Appendix 4) in the survey area.

3.2 Results

3.2.1 Flora Database Searches

The search of the DBCA Naturemap (Appendix 1) indicates that a number of species that are listed as Endangered, Threatened or Priority have been recorded within a 10km radius of the site. The EPBC Act Protected Matters Search Tool (Appendix 2) identifies species listed under the EPBC Act as potentially having habitat in the area. The results from these database searches are shown in Table 1. None of the species has been recorded from the survey area.

Table 1: Conservation Significant Flora Identified in Database Searches

Scientific Name	Common Name	Conservation Status (WA)	Status under EPBC Act
<i>Andersonia gracilis</i>	Slender Andersonia	Schedule 3	Endangered
<i>Caladenia huegelii</i>	King Spider-orchid, Grand Spider-orchid, Rusty Spider-orchid	Schedule 1	Endangered
<i>Diuris purdiei</i>	Purdie's Donkey-orchid	Schedule 1	Endangered
<i>Diuris micrantha</i>	Dwarf bee-orchid	Schedule 1	Vulnerable
<i>Drakaea elastica</i>	Glossy-leafed Hammer Orchid	Schedule 1	Endangered
<i>Drakaea micrantha</i>	Dwarf Hammer-orchid	Schedule 2	Vulnerable
<i>Eleocharis keigheryi</i>	Keighery’s Eleocharis	Schedule 1	Vulnerable
<i>Austrostipa mundala</i>		Priority 3	

Scientific Name	Common Name	Conservation Status (WA)	Status under EPBC Act
<i>Hibbertia spicata</i> subsp. <i>leptotheca</i>		Priority 3	
<i>Dodonaea hackettiana</i>	Hackets Hopbush	Priority 4	
<i>Grevillea olivacea</i>	Olive Grevillea	Priority 4	

3.2.2 TEC Database Search

EPBC Act Protected Matters Search Tool (Appendix 2) identified two Threatened Ecological Communities (TEC) as potentially occurring in the vicinity of the site.

Table 2: Threatened Ecological Communities likely to occur within 5km of the Site

Ecological Community	Description	Status under the EPBC Act
Banksia Woodlands of the Swan Coastal Plain	This ecological community typically has a prominent tree layer of Banksia sometimes with scattered eucalypts and other tree species within or above the Banksia canopy. The understorey is species rich with many wildflowers, including sclerophyllous shrubs, sedges and herbs. Banksia Woodlands vary in their structure (height, cover, density) and species composition across the Swan Coastal Plain. These variations can occur over small distances, but the woodlands are united by having a generally dominant Banksia component, which includes at least one of four key species— <i>Banksia attenuata</i> (candlestick banksia), <i>B. menziesii</i> (firewood banksia), <i>B. prionotes</i> (acorn banksia) and/or <i>B. ilicifolia</i> (holly-leaved banksia).	Endangered
Tuart (<i>Eucalyptus gomphocephala</i>) Woodlands and Forests of the Swan Coastal Plain	Tuart trees are primary defining feature of this ecological community. Other trees can also form part of the canopy, and commonly include: <i>Agonis flexuosa</i> (Peppermint), <i>Banksia grandis</i> (Bull Banksia); <i>Banksia attenuata</i> (Candlestick Banksia), or <i>Eucalyptus marginata</i> (Jarrah).	Critically Endangered

3.2.3 Vegetation Complex

Vegetation Complexes are a broad level of vegetation description which is based on the underlying geomorphology and rainfall (Hedde *et al.*, 1980). The vegetation to the north and east of the site is mapped as being part of the Spearwood Dunes Cottesloe Complex – Central and South which is described as:

- Mosaic of woodland of *Eucalyptus gomphocephala* and open forest of *E. gomphocephala*, *E. marginata*- *Corymbia calophylla* – Closed heath on the limestone outcrops (Hedde *et al.*, 1980).

3.3 Vegetation



3.3.1 Vegetation Type



Vegetation types are based on the composition and structure of the dominant species rather than based on geomorphology (vegetation complexes).

Five vegetation types were mapped on the site, including four native types and two landscaped or planted types. The vegetation types are described in Table 3 and mapped in Figure 2.

Table 3: Vegetation Types on the Site

Vegetation Type	Description	Photograph
<p>BsAr <i>Banksia sessilis</i>/<i>Acacia rostellifera</i> Open Heath to Shrubland</p>	<p>This is the main vegetation type in the southern intersection area, occurring both sides of the Cockburn Road reserve. <i>Banksia sessilis</i> is the most common species, 1-2m high and varying in density from 20-50%. <i>Acacia rostellifera</i> is always present and ranges in density from sparse to more common than the <i>B. sessilis</i>. Native understorey species are few and include scattered <i>Hibbertia hypericoides</i>, <i>Calothamnus quadrifidus</i>, <i>Banksia dallanneyi</i> and <i>Phyllanthus calycinus</i>. Grassy weed species are common particularly <i>Ehrharta calycina</i> (Perennial Veldtgrass), <i>Avena fatua</i> (Wild Oats), <i>Lagurus ovatus</i> (Hare's Tail Grass) and <i>Bromus diandrus</i> (Great Brome).</p>	
<p>AsAr <i>Acacia saligna</i>/<i>A. rostellifera</i> Closed Tall Scrub</p>	<p>This vegetation type occurs at several small locations in the southern intersection area. <i>Acacia saligna</i> is up to 3m high and may have been planted as part of the landscaping works. Few native understorey species are present. Common introduced species include <i>Ehrharta calycina</i>, <i>Avena fatua</i>, <i>Lagurus ovatus</i>, <i>Bromus diandrus</i> and <i>Euphorbia terraccina</i>.</p>	

Vegetation Type	Description	Photograph
<p>Ba <i>Banksia attenuata</i> Low Open Woodland over <i>Grevillea crithmifolia</i> Low Open Shrubland</p>	<p>A small area containing <i>Banksia attenuata</i> trees occurs at the north-western tip of the southern intersection area. The <i>Banksia</i> trees are mostly young and may have been planted. The understorey contains very few native species, including <i>Hibbertia hypericoides</i>, <i>Gompholobium tomentosum</i> and <i>Acacia pulchella</i>. <i>Grevillea crithmifolia</i> is present but is highly likely to have been planted. Weed species dominate including <i>Ehrharta calycina</i>, <i>Avena fatua</i>, <i>Cenchrus longisetus</i> (Fountain Grass), <i>Pelargonium capitatum</i> (Rose Pelargonium).</p>	
<p>ArCpMh <i>Acacia rostellifera</i>/<i>Callitris preissii</i>/<i>Melaleuca huegelii</i> Shrubland to Tall Open Scrub over weeds</p>	<p>This is the main vegetation type in the northern intersection area. Historical aerial photography shows that the areas containing this vegetation type were cleared around 2000 for the construction of the Cockburn Road/Quill Way intersection. The dominant trees, <i>Acacia rostellifera</i>, <i>Callitris preissii</i> (Rottneest Island Pine) and <i>Melaleuca huegelii</i> would all have been planted after the roadworks were completed. No native understorey species occurs in most of this vegetation type. The understorey is therefore dominated by weed species, particularly <i>Avena fatua</i>, <i>Bromus diandrus</i> and <i>Asparagus asparagoides</i> (Bridal Creeper).</p>	

Vegetation Type	Description	Photograph
<p>Eg <i>Eucalyptus gomphocephala</i> Open Woodland over <i>Acacia rostellifera</i>/<i>Callitris preissii</i> Tall Shrubland over weeds</p>	<p>One small stand containing Tuart (<i>Eucalyptus gomphocephala</i>) occurs in the south-west tip of the northern intersection area. Historical aerial photographs show that most of this area has been cleared in the past. The Tuart trees are all young (DHB <30cm). Some native understorey species occur in the area as well as many weed species.</p>	
<p>Landscaping</p>	<p>Several landscaped areas occur on the site. A variety of Australian native and some non-native plants have been planted.</p>	

3.3.2 Vegetation Condition

The condition of the vegetation was assessed according to the system of Keighery as described in Bush Forever (Government of Western Australia, 2000) (Table 4).

Table 4: Vegetation Condition Rating Scale

Condition	Description
Pristine	Pristine or nearly so, no obvious signs of disturbance.
Excellent	Vegetation structure intact, disturbance affecting individual species and weeds are non-aggressive species.
Very Good	Vegetation structure altered, obvious signs of disturbance. For example, disturbance to vegetation structure caused by repeated fires, the presence of some more aggressive weeds, dieback, logging and grazing.
Good	Vegetation structure significantly altered by very obvious signs of multiple disturbance. Retains basic vegetation structure or ability to regenerate to it. For example, disturbance to vegetation structure caused by very frequent fires, the presence of some very aggressive weeds at high density, partial clearing, dieback and grazing.
Degraded	Basic vegetation structure severely impacted by disturbance. Scope for regeneration but not to a state approaching good condition without intensive management. For example, disturbance to vegetation structure caused by very frequent fires, the presence of very aggressive weeds, partial clearing, dieback and grazing.
Completely Degraded	The structure of the vegetation is no longer intact and the area is completely or almost completely without native species. These are often described as 'parkland cleared' with the flora comprising weed or crop species with isolated native trees or shrubs.

The condition of the vegetation was all rated as Degraded to Completely Degraded due to the past clearing and dominance of weed species in the understorey.

3.3.3 Floristic Community Type

The Reconnaissance survey does not allow a detailed assessment of Floristic Community Types (FCTs) as that requires spring quadrat data to analyse. Nevertheless, PGV Environmental considers all the areas in Degraded to Completely Degraded condition would not meet any of the defined FCTs.

3.3.4 Threatened and Priority Ecological Community Assessment.

None of the vegetation in Degraded to Completely Degraded condition is able to be assessed as a FCT. Therefore, no FCTs that are a Threatened Ecological Community (TEC), or Priority Ecological Community (PEC) occur in the area.

Some Banksia trees occur in the western road reserve at the southern intersection. The Banksias may have been planted. The area containing Banksia trees does not meet the definition of the Banksia Woodlands of the Swan Coastal Plain ecological community as the area is Degraded and therefore below the minimum condition threshold of Good to qualify as the Banksia Woodland TEC.

Some scattered Tuart trees occur in the southern intersection road reserve. The trees are considered too far apart, and the understorey too degraded, for that area to meet the criteria for the Tuart Woodlands and Forests of the Swan Coastal Plain TEC.

The small area of Tuart Woodland in the northern intersection area is too small (0.04ha), isolated and degraded to meet the criteria for the Tuart Woodland TEC.

3.4 Flora

A total of 51 plant species were recorded during the 2021 Reconnaissance flora survey (Appendix 3). This total consisted of 24 native and 27 introduced species. Given the Degraded to Completely Degraded condition of the vegetation it is considered that a spring would not record many more native species.

Based on the soil types, vegetation type and vegetation condition recorded during the reconnaissance survey the likelihood of conservation significant species identified in the database searches occurring on the site has been examined (Table 5).

Table 5: Likelihood of Identified Significant Flora Species Occurring on the Site

Scientific Name	Common Name	Habitat*	Likelihood to occur on the site
<i>Andersonia gracilis</i>	Slender Andersonia	Slender Andersonia occurs in white/grey sand, sandy clay, gravelly loam in winter-wet areas, near swamps.	Highly Unlikely – not suitable habitat
<i>Caladenia huegelii</i>	King Spider-orchid, Grand Spider-orchid, Rusty Spider-orchid	The Grand Spider-orchid prefers deep grey-white sand usually associated with the Bassendean sand-dune system, however, rare plants have been known to extend into the Spearwood system (in which calcareous yellow sands dominate) in some areas (DEC, 2009a). This species generally does not survive in disturbed areas.	Highly Unlikely due to previous clearing and poor condition
<i>Diuris micrantha</i>	Dwarf bee-orchid	The Dwarf Bee-orchid is usually found on cleared firebreaks or open sandy patches that have been disturbed with in Jarrah Banksia woodland or thickets of Spearwood (<i>Kunzea ericifolia/ glabrescens</i>) (Williams et al., 2001).	Highly Unlikely – not suitable habitat
<i>Diuris purdiei</i>	Purdie's Donkey-orchid	Purdie's Donkey Orchid occurs in grey-black sand in moist winter-wet swamps.	Highly Unlikely – not suitable habitat

Scientific Name	Common Name	Habitat*	Likelihood to occur on the site
<i>Drakaea elastica</i>	Glossy-leafed Hammer Orchid	The Glossy-leafed Hammer Orchid prefers low-lying situations adjoining winter-wet swamps. This species does not survive in disturbed areas (DEC, 2009b).	Highly Unlikely as no intact vegetation on winter-wet swamps occur
<i>Drakaea micrantha</i>	Dwarf Hammer-orchid	Dwarf Hammer-orchid occurs in grey sands over dark, grey to blackish, sandy clay-loam substrates in winter wet depressions or swamps.	Highly Unlikely as no intact vegetation on winter-wet swamps occur
<i>Eleocharis keigheryi</i>	Keighery's Eleocharis	Keighery's Eleocharis occurs in clay, sandy loam and is emergent in freshwater: creeks, claypans.	Highly Unlikely – not suitable habitat
<i>Austrostipa mundala</i>		<i>Austrostipa mundala</i> occurs on plains in grey sand (Western Australian Herbarium, 2001).	Highly Unlikely – not suitable habitat
<i>Hibbertia spicata</i> subsp. <i>leptotheca</i>		<i>Hibbertia leptotheca</i> grows near-coastal limestone ridges, outcrops and cliffs in coastal heaths and thickets usually dominated by species of Melaleuca and Acacia (Thiele, 2019).	Unlikely due to previous clearing, not recorded during the survey
<i>Dodonaaea hackettiana</i>	Hackets Hopbush	Hackett's Hopbush occurs in sand with outcropping limestone.	Unlikely due to previous clearing, not recorded during the survey
<i>Grevillea olivacea</i>	Olive Grevillea	<i>Grevillea olivacea</i> grows in white or grey sand on coastal dunes, limestone rocks.	Unlikely due to previous clearing, not recorded during the survey

* sourced from Florabase (DBCAs, 2017) and SPRAT Database (DoEE, 2016) as well as the DBCA database searches unless otherwise denoted

4 FAUNA

4.1 Methodology

The Level 1 Fauna Survey was undertaken in accordance with *EPA Technical Guidance Fauna Surveys for Environmental Impact Assessment* (EPA, 2016b). Desktop studies were undertaken to identify habitats and potential threatened species that may occur on the site. A site reconnaissance was conducted by PGV Environmental on 16 March 2021. The inspection included traversing the site on foot.

4.1.1 Desktop Searches

PGV Environmental undertook a search of the EPBC Protected Matters Database (Appendix 2) and the DBCA Nature Map (Appendix 1) to determine if any species protected under the EPBC Act and the BC Act are likely to occur on the site. The results are provided in Table 6. The listed marine species and marine migratory species are not included in Table 6 as the site is land based.

Fourteen Schedule species eleven Priority species were listed as occurring within 5km of the site in the Nature Map Report. The EPBC Protected matters Report listed 42 conservation significant species of which 25 were marine or marine/marine migratory species. The State and Commonwealth conservation codes key can be found at Appendix 4.

Table 6: List of Fauna Species Identified from Database Searches

Scientific Name	Common Name	Status under Wildlife Cons. Act	Status under EPBC Act
<i>Anous tenuirostris melanops</i>	Australian Lesser Noddy		Vulnerable
<i>Botaurus poiciloptilus</i>	Australasian Bittern	Schedule 1	Endangered
<i>Calidris canutus</i>	Red Knot	Schedule 1	Migratory/Marine
<i>Calidris ferruginea</i>	Curlew Sandpiper	Schedule 1	Critically Endangered/ Migratory/Marine
<i>Calidris tenuirostris</i>	Great Knot	Schedule 1	Critically Endangered
<i>Calyptorhynchus banksii naso</i>	Forest Red-tailed Black Cockatoo	Schedule 1	Vulnerable
<i>Calyptorhynchus baudinii</i>	Baudin's Cockatoo	Schedule 1	Vulnerable
<i>Calyptorhynchus latirostris</i>	Carnaby's Black Cockatoo	Schedule 1	Endangered
<i>Charadrius leschenaultii</i>	Greater Sand Plover, Large Sand Plover		Vulnerable
<i>Charadrius mongolus</i>	Lesser Sand Plover, Mongolian Plover		Endangered
<i>Dasyurus geoffroii</i>	Chuditch, Western Quoll	Schedule 1	Vulnerable
<i>Leipoa ocellata</i>	Malleefowl	Schedule 1	Vulnerable
<i>Numenius madagascariensis</i>	Eastern Curlew	Schedule 1	
<i>Pseudocheirus occidentalis</i>	Western Ringtail Possum	Schedule 1	Vulnerable
<i>Rostratula australis</i> (also listed as <i>Rostratula benghalensis</i>)	Australian Painted Snipe	Schedule 1	Endangered/ Marine/Migratory
<i>Apus pacificus</i>	Fork-tailed Swift	Schedule 3	Migratory/Marine
<i>Falco peregrinus</i>	Peregrine Falcon	Schedule 4	

Scientific Name	Common Name	Status under Wildlife Cons. Act	Status under EPBC Act
<i>Idiosoma sigillatum</i>	Swan Coastal Plain Trapdoor Spider	Priority 3	
<i>Neelaps calonotos</i>	Black-striped Snake	Priority 3	
<i>Lerista lineata</i>	Perth Slider	Priority 3	
<i>Tyto novaehollandiae</i>	Masked Owl	Priority 3	
<i>Thinornis rubricollis</i> (also listed as <i>Charadrius rubricollis</i>)	Hooded Plover	Priority 4	
<i>Falsistrellus mackenziei</i>	Western False Pipistrelle	Priority 4	
<i>Hydromys chrysogaster</i>	Rakali, Water Rat	Priority 4	
<i>Synemon gratiosa</i>	Graceful Sunmoth	Priority 4	
<i>Isoodon obesulus fusciventer</i>	Southern Brown Bandicoot, Quenda	Priority 4	
<i>Oxyura australis</i>	Blue Billed Duck	Priority 4	
<i>Tringa brevipes</i>	Grey-tailed Tattler	Priority 4	

4.1.2 Fauna Habitat

Fauna habitat can be assessed using several factors including; the size of the habitat, the level of habitat connectivity, availability of specific resources (eg. tree hollows) and overall vegetation quality. The habitat was assessed according to the following categories (Coffey Environments, 2009):

High Quality Fauna Habitat – *These areas closely approximate the vegetation mix and quality that would have been in the area prior to any disturbance. The habitat has connectivity with other habitats and is likely to contain the most natural vertebrate fauna assemblage.*

Very Good Fauna Habitat - *These areas show minimal signs of disturbance (eg. grazing, clearing, fragmentation, weeds) and generally retain many of the characteristics of the habitat if it had not been disturbed. The habitat has connectivity with other habitats and fauna assemblages in these areas are likely to be minimally affected by disturbance.*

Good Fauna Habitat – *These areas showed signs of disturbance (eg. grazing, clearing, fragmentation, weeds) but generally retain many of the characteristics of the habitat if it had not been disturbed. The habitat has connectivity with other habitats and fauna assemblages in these areas are likely to be affected by disturbance.*

Disturbed Fauna Habitat – *These areas showed signs of significant disturbance. Many of the trees, shrubs and undergrowth are cleared. These areas may be in the early succession and regeneration stages. Areas may show signs of significant grazing, contain weeds or have been damaged by vehicle or machinery. Habitats are fragmented or have limited connectivity with other fauna habitats. Fauna assemblages in these areas are likely to differ significantly from what might be expected in the area had the disturbance not occurred.*

Highly Degraded Fauna Habitat – *These areas often have a significant loss of vegetation, an abundance of weeds, and a large number of vehicle tracks or are completely cleared. Limited or no fauna habitat connectivity. Faunal assemblages in these areas are likely to be significantly different to what might have been in the area pre-disturbance.*

The fauna habitat type of trees with a mixed native and non-native understorey was assessed as being Disturbed Fauna Habitat due to the mostly weedy understorey, and very high likelihood of feral predators such as foxes and cats for ground-dwelling fauna.

4.1.3 Fauna Habitat

The site has two fauna habitats:

- Trees with a mixed native and non-native understorey – Highly Degraded Fauna habitat (Plate 5); and
- Closed Shrubland with native and non-native understorey – Disturbed Fauna Habitat (Plate 6).

Both fauna habitats are degraded due to historic clearing to construct the current roads. The eastern side of Cockburn Road at the northern intersection with Quill Way adjoins disturbed bushland along a limestone ridge. The southern intersection of Quill Way and Cockburn Road is adjacent to Bush Forever Site No. 346 (Brownman Swamp, Mt Brown Lake and Adjacent Bushland, Henderson/Naval Base) to the east of Cockburn Road.

Plate 5: Highly Degraded Habitat



Plate 6: Disturbed Fauna Habitat



4.1.4 Conservation Significant Species

Outlined in Table 7 is a short description of each of the species that were identified in the Naturemap and the Protected Matters database search in Table 6 above and the likelihood of each species to be present on the site.

Table 7: Likelihood of Conservation Significant Species occurring on the Site

Scientific Name	Common Name	Habitat	Likelihood to occur on the site
<i>Anous tenuirostris melanops</i>	Australian Lesser Noddy	The Australian Lesser Noddy usually occupies coral-limestone islands that are densely fringed with White Mangrove (<i>Avicennia marina</i>).	No – suitable habitat not present
<i>Botaurus poiciloptilus</i>	Australasian Bittern	The Australasian Bittern occurs mainly in densely vegetated freshwater wetlands and, rarely, in estuaries or tidal wetlands (DoE, 2014).	No – no wetlands on site
<i>Calidris canutus</i>	Red Knot	In Australasia the Red Knot mainly inhabit intertidal mudflats, sandflats and sandy beaches of sheltered coasts, in estuaries, bays, inlets, lagoons and harbours; sometimes on sandy ocean beaches or shallow pools on exposed wave-cut rock platforms or coral reefs (DoE, 2014).	No – suitable habitat not present
<i>Calidris ferruginea</i>	Curlew Sandpiper	Curlew Sandpipers mainly occur on intertidal mudflats in sheltered coastal areas, such as estuaries, bays, inlets and lagoons, and also around non-tidal swamps, lakes and lagoons near the coast, and ponds in saltworks and sewage farms (DoE, 2014).	No – suitable habitat not present
<i>Calidris tenuirostris</i>	Great Knot	The Great Knot winters in Australia, occurring in sheltered coastal habitats such as inlets, bays, harbours, estuaries and lagoons with large intertidal mud and sandflats, oceanic sandy beaches with nearby mudflats, sandy spits and islets, muddy shorelines with mangroves and occasionally exposed reefs or rock platforms. It roosts in refuges such as shallow water in sheltered sites, on coastal dunes or on saltflats amongst mangroves during high tides (BirdLife International, 2015).	No – suitable habitat not present
<i>Calyptorhynchus banksii naso</i>	Forest Red-tailed Black Cockatoo	Forest Red-tailed Black Cockatoos frequent the humid to sub-humid south-west of Western Australia from Gingin in the north, to Albany in the south and west to Cape Leeuwin and Bunbury (SEWPaC, 2012). It nests in tree hollows with a depth of 1-5m, that are predominately Marri (<i>Corymbia calophylla</i>), Jarrah (<i>Eucalyptus marginata</i>) and Karri (<i>E. diversicolor</i>) and it feeds primarily on the seeds of Marri (SEWPaC, 2012).	No – suitable habitat not present
<i>Calyptorhynchus baudinii</i>	Baudin's Black Cockatoo	Baudin's Black-Cockatoo mainly occurs in eucalypt forests, especially Jarrah (<i>E. marginata</i>), Marri (<i>Corymbia calophylla</i>), also Karri (<i>E. diversicolor</i>) forest, often feeding in the understorey on proteaceous trees and shrubs, especially banksias (SEWPaC, 2012).	Unlikely Limited foraging habitat

Scientific Name	Common Name	Habitat	Likelihood to occur on the site
<i>Calyptorhynchus latirostris</i>	Carnaby's Black Cockatoo	Carnaby's Cockatoo is found in the south-west of Australia from Kalbarri through to Ravensthorpe. It has a preference for feeding on the seeds of <i>Banksia</i> , <i>Dryandra</i> , <i>Hakea</i> , <i>Eucalyptus</i> , <i>Grevillea</i> , <i>Pinus</i> and <i>Allocasuarina</i> spp. It is nomadic often moving toward the coast after breeding. It breeds in tree hollows that are 2.5 – 12m above the ground and have an entrance 23-30cm with a depth of 1-2.5m. Nesting mostly occurs in smooth-barked trees (e.g. Salmon Gum, Wandoo, Red Morrell) (SEWPaC, 2012).	Possible Limited foraging habitat (Parrot Bush – <i>Banksia sessilis</i>)
<i>Charadrius leschenaultii</i>	Greater Sand Plover, Large Sand Plover	In Australasia, the Greater Sand Plover is almost entirely coastal, inhabiting littoral and estuarine habitats. They mainly occur on sheltered sandy, shelly or muddy beaches with large intertidal mudflats or sandbanks, as well as sandy estuarine lagoons.	No – suitable habitat not present
<i>Charadrius mongolus</i>	Lesser Sand Plover, Mongolian Plover	The Lesser Sand Plover species prefers coastal littoral and estuarine environments. It inhabits large intertidal sandflats or mudflats in sheltered bays, harbours and estuaries, and occasionally sandy ocean beaches, coral reefs, wave-cut rock platforms and rocky outcrops. It also sometime occurs in short saltmarsh or among mangroves.	No – suitable habitat not present
<i>Dasyurus geoffroii</i>	Chuditch, Western Quoll	The Chuditch have been known to occupy a wide range of habitats including woodlands, dry sclerophyll forests, riparian vegetation, beaches and deserts. They are opportunistic feeders, and forage on the ground at night, feeding on invertebrates, small mammals, birds and reptiles (DoE, 2014).	Highly unlikely – no recent records, disturbed site conditions and feral and domestic predators
<i>Leipoa ocellata</i>	Malleefowl	Malleefowl have been found in mallee regions of southern Australia from approximately the 26th parallel of latitude southwards in mallee bushland (DoE, 2014).	No - suitable habitat not present and no Malleefowl nests were observed
<i>Pseudocheirus occidentalis</i>	Western Ringtail Possum	The Western Ringtail Possum is a medium sized nocturnal marsupial. This species occurs in and near coastal Peppermint Tree (<i>Agonis flexuosa</i>) forest and Tuart (<i>Eucalyptus gomphocephala</i>) dominated forest with a Peppermint Tree understorey (DoE, 2014).	No – suitable habitat not present
<i>Numenius madagascariensis</i>	Eastern Curlew	The Eastern Curlew is most commonly associated with sheltered coasts, especially estuaries, bays, harbours, inlets and coastal lagoons, with large intertidal mudflats or sandflats, often with beds of seagrass. Occasionally, the species occurs on ocean beaches (often near estuaries), and coral reefs, rock platforms, or rocky islets.	No – suitable habitat not present

Scientific Name	Common Name	Habitat	Likelihood to occur on the site
<i>Rostratula australis</i> (also listed as <i>Rostratula benghalensis</i>)	Australian Painted Snipe	The Australian Painted Snipe has been recorded at wetlands in all states of Australia but is most common in eastern Australia. It generally inhabits shallow terrestrial freshwater (occasionally brackish) wetlands, including temporary and permanent lakes, swamps and claypans. It also uses inundated or waterlogged grassland or saltmarsh, dams, rice crops, sewage farms and bore drains. Typical sites include a cover of vegetation, including grasses (DoE, 2014).	No – suitable habitat not present
<i>Apus pacificus</i>	Fork-tailed Swift	The Fork-tailed Swift is almost exclusively aerial and is not known to breed in Australia. They are seen in inland plains but sometimes above foothills or in coastal areas. They often occur over cliffs and beaches and also over islands and sometimes well out to sea. They also occur over settled areas, including towns, urban areas and cities (DoE, 2014).	Possible aerial visitor
<i>Idiosoma sigillatum</i>	Swan Coastal Plain Trapdoor Spider	The Swan Coastal Plain Shield-backed Trapdoor Spider arranges fallen twigs from the sheoak tree around the rim of its burrow entrance, enabling it to feel the vibrations of unsuspecting prey that wander by (Curtin, 2018).	No – suitable habitat not present
<i>Lerista lineata</i>	Perth Slider	The Lined Skink is a burrowing species that occurs in pale sandy soils with coastal heath and shrubland areas in isolated populations in the south-west and mid-west coast of Western Australia. It feeds on termites and other small insects (AROD, 2014).	Possible
<i>Falco peregrinus</i>	Peregrine Falcon	The Peregrine Falcon is found in a variety of habitats but nests on high cliff ledges or artificial structures. It feeds primarily on small-medium sized birds, but occasionally taking insects, such as moths, cicadas and locusts (Birdlife Australia, 2012).	Possible intermittent visitor to the site
<i>Tyto novaehollandiae</i>	Masked Owl	In northern Australia, the Masked Owl has been recorded from riparian forest, rainforest, open forest, Melaleuca swamps and the edges of mangroves, as well as along the margins of sugar cane fields.	Yes intermittent visitor to the site
<i>Thinornis rubricollis</i> (also listed as <i>Charadrius rubricollis</i>)	Hooded Plover	The Hooded Plover primarily inhabits sandy, ocean beaches, with the highest densities on beaches with large amounts of beach-washed seaweed that are backed by extensive open dunes. In Western Australia the species also inhabits inland and coastal salt lakes (Birdlife International 2014b).	No suitable habitat not present
<i>Falsistrellus mackenziei</i>	Western False Pipistrelle	The Western False Pipistrelle occurs in high rainfall Jarrah, Karri and Tuart forests and coastal woodlands. They roost in hollows of trees, branches and stumps, and are insectivorous, feeding at night between the canopy and understorey of tall forest trees (Environment Australia, 1999).	Possible

Scientific Name	Common Name	Habitat	Likelihood to occur on the site
<i>Hydromys chrysogaster</i>	Rakali, Water Rat	The Water Rat generally prefers wetland habitats characterised by dense, low-lying vegetation (0–30 cm from ground), low-density canopy cover and shallow, narrow water bodies (Speldewinde <i>et al.</i> , 2013).	No suitable habitat not present
<i>Isodon obesulus fusciventer</i>	Southern Brown Bandicoot, Quenda	Southern Brown Bandicoots are small grey marsupials that prefer dense scrub (up to one metre high), often in or near swampy vegetation. Their diet includes invertebrates (including earthworms, adult beetles and their larvae), underground fungi, subterranean plant material, and very occasionally, small vertebrates (DEC, 2012a).	Possible degraded understorey and presence of feral predators

Species identified in the database searches possibly present on the site were:

- Carnaby’s Black Cockatoo (*Calyptorhynchus latirostris*);
- Forked-tailed Swift (*Apus pacificus*): An aerial species that may occasionally fly over the site, however it is not reliant on the site for survival and as it is also located over settled areas residential development will not have a significant impact on this species;
- Perth Slider (*Lerista lineata*);
- Peregrine Falcon (*Falco peregrinus*) It may be an intermittent visitor, however breeding habitat is not present on the site and it does not rely on the site for survival;
- Masked Owl (*Tyto novae-hollandiae*) It may be an intermittent visitor, however breeding habitat is not present on the site and it does not rely on the site for survival;
- Quenda (*Isodon obesulus fusciventer*) known to occur in the adjacent areas;
- Western False Pipistrelle (*Falsistrellus mackenzieii*).

The site does not contain any tall trees that could be used for roosting or breeding by Black Cockatoos. The Parrot Bush (*Banksia sessilis*) heath and some scattered young Banksia trees provide foraging habitat for Carnaby’s and Baudin’s Black Cockatoos. Evidence of foraging by Black Cockatoos on Parrot Bush was observed in the southern road reserve (Plate 7).

Overall, the area of Parrot Bush and Banksia trees is 0.5360ha which is below the 1ha threshold that could lead to a significant impact and therefore require a referral under the Commonwealth *Environment Protection and Biodiversity Conservation Act 1999* (EPBC Act). The adjacent bushland to both intersections provides foraging, roosting and potential breeding habitat for Black Cockatoos of much higher quality.

There may be some Quenda in the surrounding bushland as they are known in the Woodman Point, Lake Coogee and the Bush Forever Site to the east of the southern intersection. The likelihood of Quenda occurring in the bush directly adjacent to Cockburn Road is low due to the presence of traffic.

Plate 7: Evidence of foraging by Black Cockatoos on *Banksia sessilis*



4.1.5 Biodiversity Value

The Environmental Protection Authority's (EPA) (2002) *Terrestrial Biological Surveys as an Element of Biodiversity Protection Position Statement No. 3* indicated an ecological assessment of a site must consider its biodiversity value at the genetic, species and ecosystem levels; and its ecological functional value at the ecosystem level.

From a fauna perspective, the vegetation within the site is Highly Degraded fauna habitat at the northern intersection and Disturbed fauna habitat at the southern intersection. The trees provide habitat for birds, however there is likely to be a paucity of native mammals present.

Feral species such as cats, foxes and rabbits are highly likely to be present in the area and would impact on the fauna assemblage on the site.

It is not possible to assess the biodiversity value at a genetic level based on the information available.

5 SUMMARY AND CONCLUSIONS

The 2021 Reconnaissance Flora and Vegetation Survey and Level 1 Fauna Survey of areas proposed to be cleared for the upgrade of two intersections of Quill Way and Cockburn Road resulted in the following findings:

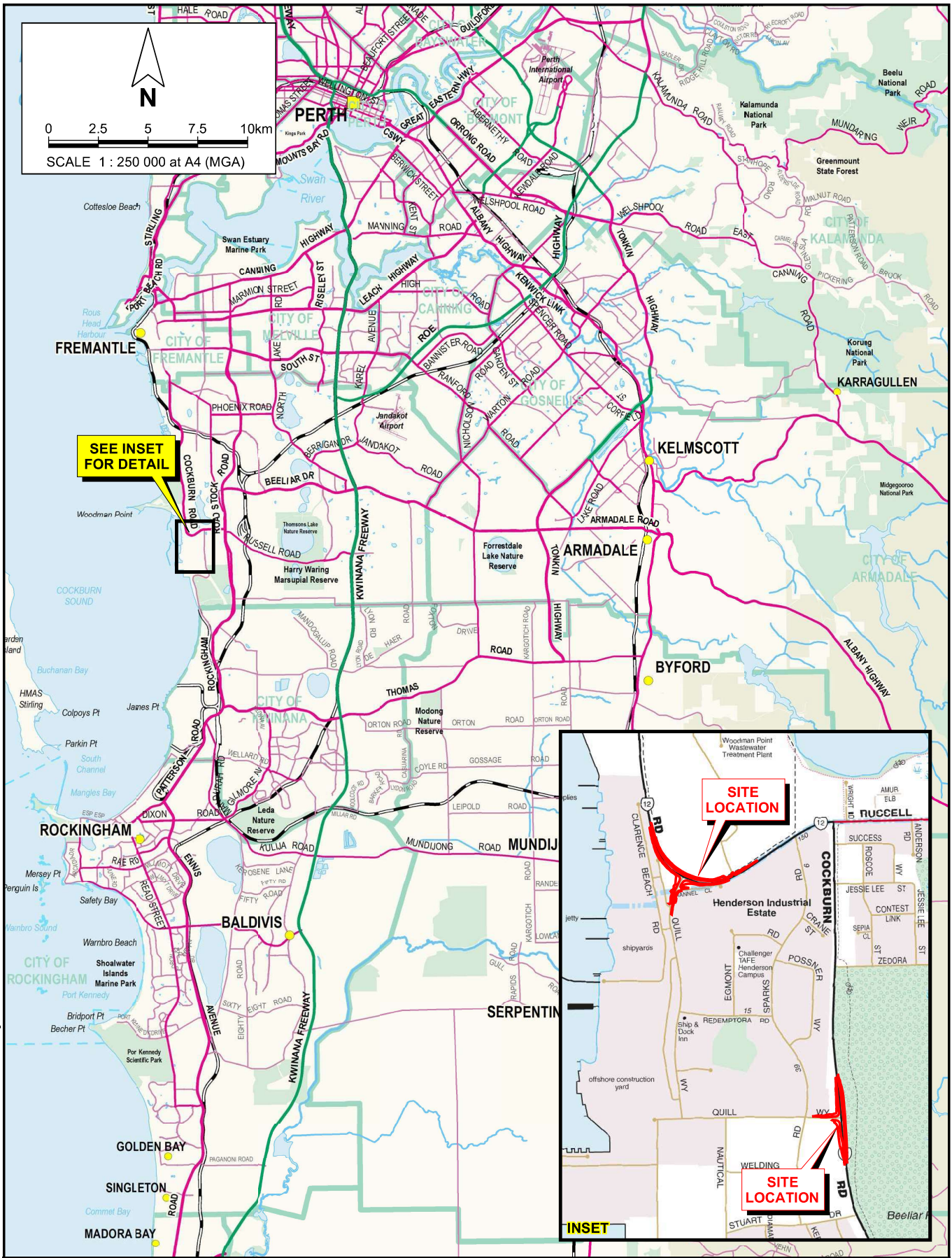
- The sites have been disturbed by previous clearing to construct Cockburn Road;
- Five vegetation types were mapped on the site, including four native types and two landscaped or planted types. Most native vegetation occurred at the southern intersection area with *Banksia sessilis*/*Acacia rostellifera* Heath to Shrubland present in the road reserves. All of the vegetation in the northern intersection site is dominated by planted native species following the construction of the Quill Way intersections with Cockburn Road in 2000. Very little regeneration of native shrubs has occurred in these areas;
- The condition of the vegetation on the site was all rated as Degraded to Completely Degraded;
- Most of the vegetation was too degraded to be assigned a Floristic Community Type. The areas containing *Banksia attenuata* plants were too degraded to meet the criteria of the Banksia Woodlands of the Swan Coastal Plain TEC. The stand of Tuart trees at the northern intersection, and the scattered Tuarts in the southern intersection are too small, fragmented and degraded to meet the criteria of the Tuart Woodlands and Forests of the Swan Coastal Plain TEC;
- The Reconnaissance survey recorded 51 plant species including 24 native and 27 (53%) introduced species. A spring survey would be unlikely to record many more native species due to the Degraded and Completely Degraded condition of the vegetation. No Threatened or Priority flora species were recorded on the site or are expected to be recorded in a spring survey;
- Two fauna habitats are described on the site. The fauna habitats are assessed as Disturbed and Highly Degraded Fauna Habitat;
- Conservation Significant species that may have habitat on the site include Carnaby's and Baudin's Black Cockatoo, three other bird species, one reptile, one bat and Quenda; and
- The site does contain foraging habitat for Carnaby's and Baudin's Black Cockatoo. Evidence of foraging on Parrot Bush (*Banksia sessilis*) was recorded during the survey. The total area of Parrot Bush proposed to be cleared is 0.5632ha which is below the threshold 1ha of quality foraging habitat that would likely require a referral under the Commonwealth EPBC Act. No roosting habitat or potential breeding habitat for Black Cockatoos occurs in the survey area.

6 REFERENCES

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FIGURES

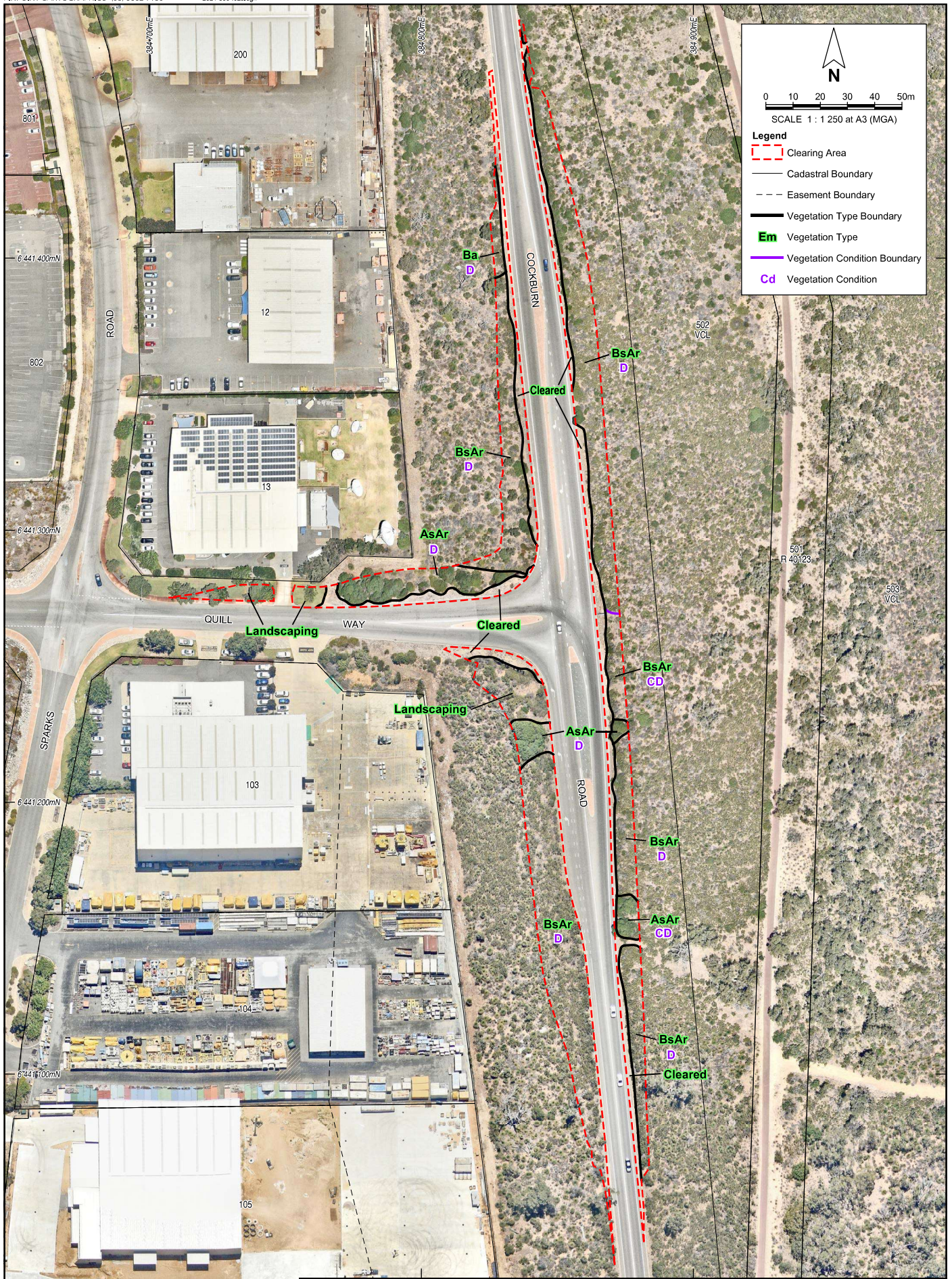


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		DevelopmentWA FLORA, VEGETATION AND FAUNA SURVEY QUILL WAY AND COCKBURN ROAD INTERSECTION UPGRADES	
Drawn: B. Heath Job: 10434 Rpt: 2021-580	Date: 9 Jun 2021 Revision: A	SITE LOCATION	

Figure 1





	DevelopmentWA FLORA, VEGETATION AND FAUNA SURVEY QUILL WAY AND COCKBURN ROAD INTERSECTION UPGRADES	Figure 2b
	Drawn: B. Heath Date: 15 Jul 2021 Job: 10434 Rpt: 2021-580 Revision: A	
CADASTRAL SOURCE: Landgate, April 2021. AERIAL PHOTOGRAPHY SOURCE: NearMap, flown February 2021. CLEARING AREA SOURCE: Porter Engineers, Dwg No. 202148-0107, Rev C, 14-06-21.		

APPENDIX 1
DBCA NATUREMAP REPORT

NatureMap Species Report

Created By Guest user on 25/05/2021

Current Names Only Yes
Core Datasets Only Yes
Method 'By Circle'
Centre 115° 46' 11" E, 32° 09' 07" S
Buffer 5km
Group By Conservation Status

Conservation Status	Species	Records
Non-conservation taxon	553	5762
Other specially protected fauna	1	3
Priority 3	7	51
Priority 4	8	109
Protected under international agreement	28	935
Rare or likely to become extinct	17	129
TOTAL	614	6989

Name ID	Species Name	Naturalised	Conservation Code	¹ Endemic To Query Area
Rare or likely to become extinct				
1.	41326 <i>Ardenna carneipes</i> (Flesh-footed Shearwater, Fleshy-footed Shearwater)		T	
2.	24784 <i>Calidris ferruginea</i> (Curlew Sandpiper)		T	
3.	24790 <i>Calidris tenuirostris</i> (Great Knot)		T	
4.	24731 <i>Calyptorhynchus banksii</i> subsp. <i>naso</i> (Forest Red-tailed Black Cockatoo)		T	
5.	24733 <i>Calyptorhynchus baudinii</i> (Baudin's Cockatoo, White-tailed Long-billed Black Cockatoo)		T	
6.	24734 <i>Calyptorhynchus latirostris</i> (Carnaby's Cockatoo, White-tailed Short-billed Black Cockatoo)		T	
7.	34031 <i>Carcharodon carcharias</i> (Great White Shark)		T	
8.	25335 <i>Caretta caretta</i> (Loggerhead Turtle)		T	
9.	25575 <i>Charadrius leschenaultii</i> (Greater Sand Plover)		T	
10.	25576 <i>Charadrius mongolus</i> (Lesser Sand Plover)		T	
11.	25346 <i>Dermochelys coriacea</i> (Leatherback Turtle)		T	
12.	30836 <i>Diomedea exulans</i> subsp. <i>exulans</i> (Snowy Albatross)		T	
13.	10796 <i>Diuris drummondii</i> (Tall Donkey Orchid)		T	
14.	24210 <i>Neophoca cinerea</i> (Australian Sea-lion)		T	
15.	24798 <i>Numenius madagascariensis</i> (Eastern Curlew)		T	
16.	44607 <i>Thalassarche melanophris</i> (Black-browed Albatross)		T	
17.	34113 <i>Westralunio carteri</i> (Carter's Freshwater Mussel)		T	
Protected under international agreement				
18.	41323 <i>Actitis hypoleucos</i> (Common Sandpiper)		IA	
19.	48573 <i>Ardenna pacifica</i> (Wedge-tailed Shearwater)		IA	
20.	25736 <i>Arenaria interpres</i> (Ruddy Turnstone)		IA	
21.	24779 <i>Calidris acuminata</i> (Sharp-tailed Sandpiper)		IA	
22.	24780 <i>Calidris alba</i> (Sanderling)		IA	
23.	25738 <i>Calidris canutus</i> (Red Knot, knot)		IA	
24.	24788 <i>Calidris ruficollis</i> (Red-necked Stint)		IA	
25.	48587 <i>Hydroprogne caspia</i> (Caspian Tern)		IA	
26.	30932 <i>Limosa lapponica</i> (Bar-tailed Godwit)		IA	
27.	24690 <i>Macronectes giganteus</i> (Southern Giant Petrel)		IA	
28.	24691 <i>Macronectes halli</i> (Northern Giant Petrel)		IA	
29.	25742 <i>Numenius phaeopus</i> (Whimbrel)		IA	
30.	24497 <i>Oceanites oceanicus</i> (Wilson's Storm-petrel)		IA	
31.	41347 <i>Onychoprion anaethetus</i> (Bridled Tern)		IA	
32.	48591 <i>Pandion cristatus</i> (Osprey, Eastern Osprey)		IA	
33.	24843 <i>Plegadis falcinellus</i> (Glossy Ibis)		IA	
34.	24382 <i>Pluvialis fulva</i> (Pacific Golden Plover)		IA	
35.	24383 <i>Pluvialis squatarola</i> (Grey Plover)		IA	
36.	24517 <i>Stercorarius parasiticus</i> (Arctic jaeger, Arctic Skua)		IA	
37.	24518 <i>Stercorarius pomarinus</i> (Pomarine Jaeger, Pomarine Skua)		IA	
38.	25640 <i>Sterna dougallii</i> (Roseate Tern)		IA	

Name ID	Species Name	Naturalised	Conservation Code	¹ Endemic To Query Area
39.	25642 <i>Sterna hirundo</i> (Common Tern)		IA	
40.	24526 <i>Sterna hirundo</i> subsp. <i>hirundo</i> (Common Tern)		IA	Y
41.	48593 <i>Sterna albifrons</i> (Little Tern)		IA	
42.	48597 <i>Thalasseus bergii</i> (Crested Tern)		IA	
43.	24808 <i>Tringa nebularia</i> (Common Greenshank, greenshank)		IA	
44.	24809 <i>Tringa stagnatilis</i> (Marsh Sandpiper, little greenshank)		IA	
45.	41351 <i>Xenus cinereus</i> (Terek Sandpiper)		IA	
Other specially protected fauna				
46.	25624 <i>Falco peregrinus</i> (Peregrine Falcon)		S	
Priority 3				
47.	35317 <i>Austrostipa mundula</i>		P3	
48.	11461 <i>Hibbertia spicata</i> subsp. <i>leptotheca</i>		P3	
49.	48935 <i>Idiosoma sigillatum</i> (Swan Coastal Plain shield-backed trapdoor spider)		P3	
50.	25147 <i>Lerista lineata</i> (Perth Slider, Lined Skink)		P3	
51.	25249 <i>Neelaps calonotos</i> (Black-striped Snake, black-striped burrowing snake)		P3	
52.	5237 <i>Pimelea calcicola</i>		P3	
53.	24855 <i>Tyto novaehollandiae</i> subsp. <i>novaehollandiae</i> (Masked Owl (southwest))		P3	
Priority 4				
54.	4763 <i>Dodonaea hackettiana</i> (Hackett's Hopbush)		P4	
55.	2054 <i>Grevillea olivacea</i> (Olive Grevillea)		P4	
56.	24215 <i>Hydromys chrysogaster</i> (Water-rat, Rakali)		P4	
57.	48588 <i>Isodon fusciventer</i> (Quenda, southwestern brown bandicoot)		P4	
58.	24328 <i>Oxyura australis</i> (Blue-billed Duck)		P4	
59.	48116 <i>Stercorarius antarcticus</i> (Brown Skua)		P4	
60.	48135 <i>Thinornis rubricollis</i> (Hooded Plover, Hooded Dotterel)		P4	
61.	24803 <i>Tringa brevipes</i> (Grey-tailed Tattler)		P4	
Non-conservation taxon				
62.	??			
63.	3262 <i>Acacia cochlearis</i> (Rigid Wattle)			
64.	3282 <i>Acacia cyclops</i> (Coastal Wattle)			
65.	3374 <i>Acacia huegelii</i>			
66.	3409 <i>Acacia lasiocarpa</i> (Panjang)			
67.	11611 <i>Acacia lasiocarpa</i> var. <i>lasiocarpa</i>			
68.	15481 <i>Acacia pulchella</i> var. <i>glaberrima</i>			
69.	3525 <i>Acacia rostellifera</i> (Summer-scented Wattle)			
70.	3527 <i>Acacia saligna</i> (Orange Wattle, Kudjong)			
71.	30032 <i>Acacia saligna</i> subsp. <i>saligna</i>			
72.	3584 <i>Acacia truncata</i>			
73.	<i>Acanthaluteres brownii</i>			
74.	<i>Acanthaluteres spilomelanurus</i>			
75.	<i>Acanthaluteres vittiger</i>			
76.	24260 <i>Acanthiza apicalis</i> (Broad-tailed Thornbill, Inland Thornbill)			
77.	24261 <i>Acanthiza chrysorrhoa</i> (Yellow-rumped Thornbill)			
78.	24262 <i>Acanthiza inornata</i> (Western Thornbill)			
79.	1208 <i>Acanthocarpus preissii</i>			
80.	25535 <i>Accipiter cirrocephalus</i> (Collared Sparrowhawk)			
81.	25536 <i>Accipiter fasciatus</i> (Brown Goshawk)			
82.	48409 <i>Acetabularia caliculus</i>			
83.	25755 <i>Acrocephalus australis</i> (Australian Reed Warbler)			
84.	4582 <i>Adriana quadripartita</i> (Bitter Bush)			
85.	<i>Afurcagobius suppositus</i>			
86.	184 <i>Aira caryophyllea</i> (Silvery Hairgrass)	Y		
87.	1732 <i>Allocasuarina humilis</i> (Dwarf Sheoak)			
88.	126 <i>Amphibolis antarctica</i> (Sea Nymph)			
89.	127 <i>Amphibolis griffithii</i>			
90.	20184 <i>Amphipogon laguroides</i> subsp. <i>laguroides</i>			
91.	<i>Aname mainae</i>			
92.	24312 <i>Anas gracilis</i> (Grey Teal)			
93.	24315 <i>Anas rhynchotis</i> (Australasian Shoveler)			
94.	24316 <i>Anas superciliosa</i> (Pacific Black Duck)			
95.	47414 <i>Anhinga novaehollandiae</i> (Australasian Darter)			
96.	<i>Anoplocapros lenticularis</i>			
97.	<i>Anoplocapros robustus</i>			
98.	<i>Anoplodactylus pycnosoma</i>			Y
99.	24561 <i>Anthochaera carunculata</i> (Red Wattlebird)			
100.	24562 <i>Anthochaera lunulata</i> (Western Little Wattlebird)			
101.	6210 <i>Apium annuum</i>			
102.	6211 <i>Apium prostratum</i> (Sea Celery)			

APPENDIX 2
EPBC PROTECTED MATTERS REPORT



EPBC Act Protected Matters Report

This report provides general guidance on matters of national environmental significance and other matters protected by the EPBC Act in the area you have selected.

Information on the coverage of this report and qualifications on data supporting this report are contained in the caveat at the end of the report.

Information is available about [Environment Assessments](#) and the EPBC Act including significance guidelines, forms and application process details.

Report created: 25/05/21 13:19:41

[Summary](#)

[Details](#)

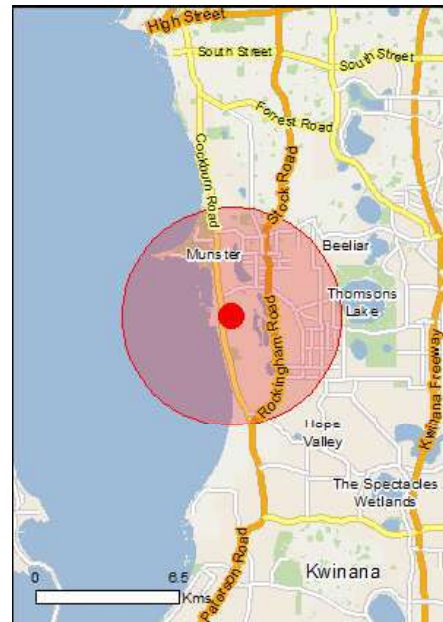
[Matters of NES](#)

[Other Matters Protected by the EPBC Act](#)

[Extra Information](#)

[Caveat](#)

[Acknowledgements](#)



This map may contain data which are
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[Coordinates](#)

Buffer: 5.0Km



Summary

Matters of National Environmental Significance

This part of the report summarises the matters of national environmental significance that may occur in, or may relate to, the area you nominated. Further information is available in the detail part of the report, which can be accessed by scrolling or following the links below. If you are proposing to undertake an activity that may have a significant impact on one or more matters of national environmental significance then you should consider the [Administrative Guidelines on Significance](#).

World Heritage Properties:	None
National Heritage Places:	None
Wetlands of International Importance:	1
Great Barrier Reef Marine Park:	None
Commonwealth Marine Area:	None
Listed Threatened Ecological Communities:	2
Listed Threatened Species:	49
Listed Migratory Species:	61

Other Matters Protected by the EPBC Act

This part of the report summarises other matters protected under the Act that may relate to the area you nominated. Approval may be required for a proposed activity that significantly affects the environment on Commonwealth land, when the action is outside the Commonwealth land, or the environment anywhere when the action is taken on Commonwealth land. Approval may also be required for the Commonwealth or Commonwealth agencies proposing to take an action that is likely to have a significant impact on the environment anywhere.

The EPBC Act protects the environment on Commonwealth land, the environment from the actions taken on Commonwealth land, and the environment from actions taken by Commonwealth agencies. As heritage values of a place are part of the 'environment', these aspects of the EPBC Act protect the Commonwealth Heritage values of a Commonwealth Heritage place. Information on the new heritage laws can be found at <http://www.environment.gov.au/heritage>

A [permit](#) may be required for activities in or on a Commonwealth area that may affect a member of a listed threatened species or ecological community, a member of a listed migratory species, whales and other cetaceans, or a member of a listed marine species.

Commonwealth Land:	1
Commonwealth Heritage Places:	None
Listed Marine Species:	90
Whales and Other Cetaceans:	12
Critical Habitats:	None
Commonwealth Reserves Terrestrial:	None
Australian Marine Parks:	None

Extra Information

This part of the report provides information that may also be relevant to the area you have nominated.

State and Territory Reserves:	6
Regional Forest Agreements:	None
Invasive Species:	40
Nationally Important Wetlands:	None
Key Ecological Features (Marine)	None

Details

Matters of National Environmental Significance

Wetlands of International Importance (Ramsar)	[Resource Information]
Name	Proximity
Forrestdale and thomsons lakes	Within Ramsar site

Listed Threatened Ecological Communities [Resource Information]

For threatened ecological communities where the distribution is well known, maps are derived from recovery plans, State vegetation maps, remote sensing imagery and other sources. Where threatened ecological community distributions are less well known, existing vegetation maps and point location data are used to produce indicative distribution maps.

Name	Status	Type of Presence
Banksia Woodlands of the Swan Coastal Plain ecological community	Endangered	Community likely to occur within area
Tuart (Eucalyptus gomphocephala) Woodlands and Forests of the Swan Coastal Plain ecological community	Critically Endangered	Community likely to occur within area

Listed Threatened Species [Resource Information]

Name	Status	Type of Presence
Birds		
Anous tenuirostris melanops		
Australian Lesser Noddy [26000]	Vulnerable	Species or species habitat may occur within area
Botaurus poiciloptilus		
Australasian Bittern [1001]	Endangered	Species or species habitat known to occur within area
Calidris canutus		
Red Knot, Knot [855]	Endangered	Species or species habitat known to occur within area
Calidris ferruginea		
Curlew Sandpiper [856]	Critically Endangered	Species or species habitat known to occur within area
Calidris tenuirostris		
Great Knot [862]	Critically Endangered	Species or species habitat known to occur within area
Calyptorhynchus banksii naso		
Forest Red-tailed Black-Cockatoo, Karrak [67034]	Vulnerable	Species or species habitat known to occur within area
Calyptorhynchus latirostris		
Carnaby's Cockatoo, Short-billed Black-Cockatoo [59523]	Endangered	Species or species habitat known to occur within area
Charadrius leschenaultii		
Greater Sand Plover, Large Sand Plover [877]	Vulnerable	Species or species habitat known to occur within area
Charadrius mongolus		
Lesser Sand Plover, Mongolian Plover [879]	Endangered	Species or species habitat known to occur within area

Name	Status	Type of Presence
Diomedea amsterdamensis Amsterdam Albatross [64405]	Endangered	Species or species habitat may occur within area
Diomedea dabbenena Tristan Albatross [66471]	Endangered	Species or species habitat may occur within area
Diomedea epomophora Southern Royal Albatross [89221]	Vulnerable	Foraging, feeding or related behaviour likely to occur within area
Diomedea exulans Wandering Albatross [89223]	Vulnerable	Foraging, feeding or related behaviour likely to occur within area
Diomedea sanfordi Northern Royal Albatross [64456]	Endangered	Foraging, feeding or related behaviour likely to occur within area
Halobaena caerulea Blue Petrel [1059]	Vulnerable	Species or species habitat may occur within area
Leipoa ocellata Malleefowl [934]	Vulnerable	Species or species habitat likely to occur within area
Limosa lapponica menzbieri Northern Siberian Bar-tailed Godwit, Russkoye Bar-tailed Godwit [86432]	Critically Endangered	Species or species habitat known to occur within area
Macronectes giganteus Southern Giant-Petrel, Southern Giant Petrel [1060]	Endangered	Species or species habitat may occur within area
Macronectes halli Northern Giant Petrel [1061]	Vulnerable	Species or species habitat may occur within area
Numenius madagascariensis Eastern Curlew, Far Eastern Curlew [847]	Critically Endangered	Species or species habitat likely to occur within area
Pachyptila turtur subantarctica Fairy Prion (southern) [64445]	Vulnerable	Species or species habitat known to occur within area
Pterodroma mollis Soft-plumaged Petrel [1036]	Vulnerable	Species or species habitat may occur within area
Rostratula australis Australian Painted Snipe [77037]	Endangered	Species or species habitat known to occur within area
Sternula nereis nereis Australian Fairy Tern [82950]	Vulnerable	Foraging, feeding or related behaviour known to occur within area
Thalassarche carteri Indian Yellow-nosed Albatross [64464]	Vulnerable	Foraging, feeding or related behaviour may occur within area
Thalassarche cauta Shy Albatross [89224]	Endangered	Foraging, feeding or related behaviour likely to occur within area
Thalassarche impavida Campbell Albatross, Campbell Black-browed Albatross [64459]	Vulnerable	Species or species habitat may occur within area

Name	Status	Type of Presence
Thalassarche melanophris Black-browed Albatross [66472]	Vulnerable	Species or species habitat may occur within area
Thalassarche steadi White-capped Albatross [64462]	Vulnerable	Foraging, feeding or related behaviour likely to occur within area
Mammals		
Balaenoptera musculus Blue Whale [36]	Endangered	Species or species habitat likely to occur within area
Dasyurus geoffroi Chuditch, Western Quoll [330]	Vulnerable	Species or species habitat likely to occur within area
Eubalaena australis Southern Right Whale [40]	Endangered	Breeding known to occur within area
Megaptera novaeangliae Humpback Whale [38]	Vulnerable	Species or species habitat known to occur within area
Neophoca cinerea Australian Sea-lion, Australian Sea Lion [22]	Endangered	Species or species habitat known to occur within area
Pseudocheirus occidentalis Western Ringtail Possum, Ngwayir, Womp, Woder, Ngoor, Ngoolangit [25911]	Critically Endangered	Species or species habitat likely to occur within area
Plants		
Andersonia gracilis Slender Andersonia [14470]	Endangered	Species or species habitat may occur within area
Caladenia huegelii King Spider-orchid, Grand Spider-orchid, Rusty Spider-orchid [7309]	Endangered	Species or species habitat likely to occur within area
Diuris micrantha Dwarf Bee-orchid [55082]	Vulnerable	Species or species habitat known to occur within area
Diuris purdiei Purdie's Donkey-orchid [12950]	Endangered	Species or species habitat may occur within area
Drakaea elastica Glossy-leaved Hammer Orchid, Glossy-leaved Hammer Orchid, Warty Hammer Orchid [16753]	Endangered	Species or species habitat likely to occur within area
Drakaea micrantha Dwarf Hammer-orchid [56755]	Vulnerable	Species or species habitat may occur within area
Eleocharis keigheryi Keighery's Eleocharis [64893]	Vulnerable	Species or species habitat may occur within area
Reptiles		
Caretta caretta Loggerhead Turtle [1763]	Endangered	Foraging, feeding or related behaviour known to occur within area
Chelonia mydas Green Turtle [1765]	Vulnerable	Foraging, feeding or related behaviour known to occur within area
Dermochelys coriacea Leatherback Turtle, Leathery Turtle, Luth [1768]	Endangered	Foraging, feeding or related behaviour known

Name	Status	Type of Presence
Natator depressus Flatback Turtle [59257]	Vulnerable	to occur within area Foraging, feeding or related behaviour known to occur within area
Sharks		
Carcharias taurus (west coast population) Grey Nurse Shark (west coast population) [68752]	Vulnerable	Species or species habitat known to occur within area
Carcharodon carcharias White Shark, Great White Shark [64470]	Vulnerable	Species or species habitat known to occur within area
Rhincodon typus Whale Shark [66680]	Vulnerable	Species or species habitat may occur within area
Listed Migratory Species		[Resource Information]
* Species is listed under a different scientific name on the EPBC Act - Threatened Species list.		
Name	Threatened	Type of Presence
Migratory Marine Birds		
Anous stolidus Common Noddy [825]		Species or species habitat likely to occur within area
Apus pacificus Fork-tailed Swift [678]		Species or species habitat likely to occur within area
Ardenna carneipes Flesh-footed Shearwater, Fleshy-footed Shearwater [82404]		Species or species habitat likely to occur within area
Diomedea amsterdamensis Amsterdam Albatross [64405]	Endangered	Species or species habitat may occur within area
Diomedea dabbenena Tristan Albatross [66471]	Endangered	Species or species habitat may occur within area
Diomedea epomophora Southern Royal Albatross [89221]	Vulnerable	Foraging, feeding or related behaviour likely to occur within area
Diomedea exulans Wandering Albatross [89223]	Vulnerable	Foraging, feeding or related behaviour likely to occur within area
Diomedea sanfordi Northern Royal Albatross [64456]	Endangered	Foraging, feeding or related behaviour likely to occur within area
Hydroprogne caspia Caspian Tern [808]		Foraging, feeding or related behaviour known to occur within area
Macronectes giganteus Southern Giant-Petrel, Southern Giant Petrel [1060]	Endangered	Species or species habitat may occur within area
Macronectes halli Northern Giant Petrel [1061]	Vulnerable	Species or species habitat may occur within area
Onychoprion anaethetus Bridled Tern [82845]		Foraging, feeding or related behaviour likely to occur within area

Name	Threatened	Type of Presence
Sterna dougallii Roseate Tern [817]		Foraging, feeding or related behaviour likely to occur within area
Thalassarche carteri Indian Yellow-nosed Albatross [64464]	Vulnerable	Foraging, feeding or related behaviour may occur within area
Thalassarche cauta Shy Albatross [89224]	Endangered	Foraging, feeding or related behaviour likely to occur within area
Thalassarche impavida Campbell Albatross, Campbell Black-browed Albatross [64459]	Vulnerable	Species or species habitat may occur within area
Thalassarche melanophris Black-browed Albatross [66472]	Vulnerable	Species or species habitat may occur within area
Thalassarche steadi White-capped Albatross [64462]	Vulnerable	Foraging, feeding or related behaviour likely to occur within area
Migratory Marine Species		
Balaena glacialis australis Southern Right Whale [75529]	Endangered*	Breeding known to occur within area
Balaenoptera edeni Bryde's Whale [35]		Species or species habitat may occur within area
Balaenoptera musculus Blue Whale [36]	Endangered	Species or species habitat likely to occur within area
Caperea marginata Pygmy Right Whale [39]		Species or species habitat may occur within area
Carcharhinus longimanus Oceanic Whitetip Shark [84108]		Species or species habitat may occur within area
Carcharodon carcharias White Shark, Great White Shark [64470]	Vulnerable	Species or species habitat known to occur within area
Caretta caretta Loggerhead Turtle [1763]	Endangered	Foraging, feeding or related behaviour known to occur within area
Chelonia mydas Green Turtle [1765]	Vulnerable	Foraging, feeding or related behaviour known to occur within area
Dermochelys coriacea Leatherback Turtle, Leathery Turtle, Luth [1768]	Endangered	Foraging, feeding or related behaviour known to occur within area
Lamna nasus Porbeagle, Mackerel Shark [83288]		Species or species habitat may occur within area
Manta alfredi Reef Manta Ray, Coastal Manta Ray, Inshore Manta Ray, Prince Alfred's Ray, Resident Manta Ray [84994]		Species or species habitat may occur within area
Manta birostris Giant Manta Ray, Chevron Manta Ray, Pacific Manta Ray, Pelagic Manta Ray, Oceanic Manta Ray [84995]		Species or species habitat may occur within area

Name	Threatened	Type of Presence
Megaptera novaeangliae Humpback Whale [38]	Vulnerable	Species or species habitat known to occur within area
Natator depressus Flatback Turtle [59257]	Vulnerable	Foraging, feeding or related behaviour known to occur within area
Orcinus orca Killer Whale, Orca [46]		Species or species habitat may occur within area
Rhincodon typus Whale Shark [66680]	Vulnerable	Species or species habitat may occur within area
Migratory Terrestrial Species		
Motacilla cinerea Grey Wagtail [642]		Species or species habitat may occur within area
Migratory Wetlands Species		
Actitis hypoleucos Common Sandpiper [59309]		Species or species habitat known to occur within area
Arenaria interpres Ruddy Turnstone [872]		Species or species habitat known to occur within area
Calidris acuminata Sharp-tailed Sandpiper [874]		Species or species habitat known to occur within area
Calidris alba Sanderling [875]		Species or species habitat known to occur within area
Calidris canutus Red Knot, Knot [855]	Endangered	Species or species habitat known to occur within area
Calidris ferruginea Curlew Sandpiper [856]	Critically Endangered	Species or species habitat known to occur within area
Calidris melanotos Pectoral Sandpiper [858]		Species or species habitat known to occur within area
Calidris ruficollis Red-necked Stint [860]		Species or species habitat known to occur within area
Calidris subminuta Long-toed Stint [861]		Species or species habitat known to occur within area
Calidris tenuirostris Great Knot [862]	Critically Endangered	Species or species habitat known to occur within area
Charadrius dubius Little Ringed Plover [896]		Species or species habitat known to occur within area
Charadrius leschenaultii Greater Sand Plover, Large Sand Plover [877]	Vulnerable	Species or species habitat known to occur within area
Charadrius mongolus Lesser Sand Plover, Mongolian Plover [879]	Endangered	Species or species habitat known to occur

Name	Threatened	Type of Presence
Limicola falcinellus Broad-billed Sandpiper [842]		within area Species or species habitat known to occur within area
Limosa lapponica Bar-tailed Godwit [844]		Species or species habitat known to occur within area
Limosa limosa Black-tailed Godwit [845]		Species or species habitat known to occur within area
Numenius madagascariensis Eastern Curlew, Far Eastern Curlew [847]	Critically Endangered	Species or species habitat likely to occur within area
Numenius phaeopus Whimbrel [849]		Species or species habitat known to occur within area
Pandion haliaetus Osprey [952]		Species or species habitat known to occur within area
Philomachus pugnax Ruff (Reeve) [850]		Species or species habitat known to occur within area
Pluvialis squatarola Grey Plover [865]		Species or species habitat known to occur within area
Tringa brevipes Grey-tailed Tattler [851]		Species or species habitat known to occur within area
Tringa glareola Wood Sandpiper [829]		Species or species habitat known to occur within area
Tringa nebularia Common Greenshank, Greenshank [832]		Species or species habitat known to occur within area
Tringa stagnatilis Marsh Sandpiper, Little Greenshank [833]		Species or species habitat known to occur within area
Xenus cinereus Terek Sandpiper [59300]		Species or species habitat known to occur within area

Other Matters Protected by the EPBC Act

Commonwealth Land [\[Resource Information \]](#)

The Commonwealth area listed below may indicate the presence of Commonwealth land in this vicinity. Due to the unreliability of the data source, all proposals should be checked as to whether it impacts on a Commonwealth area, before making a definitive decision. Contact the State or Territory government land department for further information.

Name

Commonwealth Land -

Listed Marine Species [\[Resource Information \]](#)

* Species is listed under a different scientific name on the EPBC Act - Threatened Species list.

Name	Threatened	Type of Presence
Birds		

Name	Threatened	Type of Presence
Actitis hypoleucos Common Sandpiper [59309]		Species or species habitat known to occur within area
Anous stolidus Common Noddy [825]		Species or species habitat likely to occur within area
Anous tenuirostris melanops Australian Lesser Noddy [26000]	Vulnerable	Species or species habitat may occur within area
Apus pacificus Fork-tailed Swift [678]		Species or species habitat likely to occur within area
Ardea ibis Cattle Egret [59542]		Species or species habitat may occur within area
Arenaria interpres Ruddy Turnstone [872]		Species or species habitat known to occur within area
Calidris acuminata Sharp-tailed Sandpiper [874]		Species or species habitat known to occur within area
Calidris alba Sanderling [875]		Species or species habitat known to occur within area
Calidris canutus Red Knot, Knot [855]	Endangered	Species or species habitat known to occur within area
Calidris ferruginea Curlew Sandpiper [856]	Critically Endangered	Species or species habitat known to occur within area
Calidris melanotos Pectoral Sandpiper [858]		Species or species habitat known to occur within area
Calidris ruficollis Red-necked Stint [860]		Species or species habitat known to occur within area
Calidris subminuta Long-toed Stint [861]		Species or species habitat known to occur within area
Calidris tenuirostris Great Knot [862]	Critically Endangered	Species or species habitat known to occur within area
Catharacta skua Great Skua [59472]		Species or species habitat may occur within area
Charadrius dubius Little Ringed Plover [896]		Species or species habitat known to occur within area
Charadrius leschenaultii Greater Sand Plover, Large Sand Plover [877]	Vulnerable	Species or species habitat known to occur within area
Charadrius mongolus Lesser Sand Plover, Mongolian Plover [879]	Endangered	Species or species habitat known to occur within area

Name	Threatened	Type of Presence
Charadrius ruficapillus Red-capped Plover [881]		Species or species habitat known to occur within area
Diomedea amsterdamensis Amsterdam Albatross [64405]	Endangered	Species or species habitat may occur within area
Diomedea dabbenena Tristan Albatross [66471]	Endangered	Species or species habitat may occur within area
Diomedea epomophora Southern Royal Albatross [89221]	Vulnerable	Foraging, feeding or related behaviour likely to occur within area
Diomedea exulans Wandering Albatross [89223]	Vulnerable	Foraging, feeding or related behaviour likely to occur within area
Diomedea sanfordi Northern Royal Albatross [64456]	Endangered	Foraging, feeding or related behaviour likely to occur within area
Haliaeetus leucogaster White-bellied Sea-Eagle [943]		Species or species habitat known to occur within area
Halobaena caerulea Blue Petrel [1059]	Vulnerable	Species or species habitat may occur within area
Heteroscelus brevipes Grey-tailed Tattler [59311]		Species or species habitat known to occur within area
Himantopus himantopus Pied Stilt, Black-winged Stilt [870]		Species or species habitat known to occur within area
Larus pacificus Pacific Gull [811]		Foraging, feeding or related behaviour may occur within area
Limicola falcinellus Broad-billed Sandpiper [842]		Species or species habitat known to occur within area
Limosa lapponica Bar-tailed Godwit [844]		Species or species habitat known to occur within area
Limosa limosa Black-tailed Godwit [845]		Species or species habitat known to occur within area
Macronectes giganteus Southern Giant-Petrel, Southern Giant Petrel [1060]	Endangered	Species or species habitat may occur within area
Macronectes halli Northern Giant Petrel [1061]	Vulnerable	Species or species habitat may occur within area
Merops ornatus Rainbow Bee-eater [670]		Species or species habitat may occur within area
Motacilla cinerea Grey Wagtail [642]		Species or species habitat may occur within area

Name	Threatened	Type of Presence
Numenius madagascariensis Eastern Curlew, Far Eastern Curlew [847]	Critically Endangered	Species or species habitat likely to occur within area
Numenius phaeopus Whimbrel [849]		Species or species habitat known to occur within area
Pachyptila turtur Fairy Prion [1066]		Species or species habitat known to occur within area
Pandion haliaetus Osprey [952]		Species or species habitat known to occur within area
Philomachus pugnax Ruff (Reeve) [850]		Species or species habitat known to occur within area
Pluvialis squatarola Grey Plover [865]		Species or species habitat known to occur within area
Pterodroma mollis Soft-plumaged Petrel [1036]	Vulnerable	Species or species habitat may occur within area
Puffinus assimilis Little Shearwater [59363]		Foraging, feeding or related behaviour known to occur within area
Puffinus carneipes Flesh-footed Shearwater, Fleshy-footed Shearwater [1043]		Species or species habitat likely to occur within area
Recurvirostra novaehollandiae Red-necked Avocet [871]		Species or species habitat known to occur within area
Rostratula benghalensis (sensu lato) Painted Snipe [889]	Endangered*	Species or species habitat known to occur within area
Sterna anaethetus Bridled Tern [814]		Foraging, feeding or related behaviour likely to occur within area
Sterna caspia Caspian Tern [59467]		Foraging, feeding or related behaviour known to occur within area
Sterna dougallii Roseate Tern [817]		Foraging, feeding or related behaviour likely to occur within area
Thalassarche carteri Indian Yellow-nosed Albatross [64464]	Vulnerable	Foraging, feeding or related behaviour may occur within area
Thalassarche cauta Shy Albatross [89224]	Endangered	Foraging, feeding or related behaviour likely to occur within area
Thalassarche impavida Campbell Albatross, Campbell Black-browed Albatross [64459]	Vulnerable	Species or species habitat may occur within area
Thalassarche melanophris Black-browed Albatross [66472]	Vulnerable	Species or species habitat may occur within area

Name	Threatened	Type of Presence
Thalassarche steadi White-capped Albatross [64462]	Vulnerable	Foraging, feeding or related behaviour likely to occur within area
Thinornis rubricollis Hooded Plover [59510]		Species or species habitat known to occur within area
Tringa glareola Wood Sandpiper [829]		Species or species habitat known to occur within area
Tringa nebularia Common Greenshank, Greenshank [832]		Species or species habitat known to occur within area
Tringa stagnatilis Marsh Sandpiper, Little Greenshank [833]		Species or species habitat known to occur within area
Xenus cinereus Terek Sandpiper [59300]		Species or species habitat known to occur within area
Fish		
Acentronura australe Southern Pygmy Pipehorse [66185]		Species or species habitat may occur within area
Campichthys galei Gale's Pipefish [66191]		Species or species habitat may occur within area
Heraldia nocturna Upside-down Pipefish, Eastern Upside-down Pipefish, Eastern Upside-down Pipefish [66227]		Species or species habitat may occur within area
Hippocampus angustus Western Spiny Seahorse, Narrow-bellied Seahorse [66234]		Species or species habitat may occur within area
Hippocampus breviceps Short-head Seahorse, Short-snouted Seahorse [66235]		Species or species habitat may occur within area
Hippocampus subelongatus West Australian Seahorse [66722]		Species or species habitat may occur within area
Histiogamphelus cristatus Rhino Pipefish, Macleay's Crested Pipefish, Ring-back Pipefish [66243]		Species or species habitat may occur within area
Lissocampus caudalis Australian Smooth Pipefish, Smooth Pipefish [66249]		Species or species habitat may occur within area
Lissocampus fatiloquus Prophet's Pipefish [66250]		Species or species habitat may occur within area
Lissocampus runa Javelin Pipefish [66251]		Species or species habitat may occur within area
Maroubra perserrata Sawtooth Pipefish [66252]		Species or species habitat may occur within area
Mitotichthys meraculus Western Crested Pipefish [66259]		Species or species habitat may occur within area

Name	Threatened	Type of Presence
Nannocampus subosseus Bonyhead Pipefish, Bony-headed Pipefish [66264]		Species or species habitat may occur within area
Phycodurus eques Leafy Seadragon [66267]		Species or species habitat may occur within area
Phyllopteryx taeniolatus Common Seadragon, Weedy Seadragon [66268]		Species or species habitat may occur within area
Pugnaso curtirostris Pugnose Pipefish, Pug-nosed Pipefish [66269]		Species or species habitat may occur within area
Solegnathus lettiensis Gunther's Pipehorse, Indonesian Pipefish [66273]		Species or species habitat may occur within area
Stigmatopora argus Spotted Pipefish, Gulf Pipefish, Peacock Pipefish [66276]		Species or species habitat may occur within area
Stigmatopora nigra Widebody Pipefish, Wide-bodied Pipefish, Black Pipefish [66277]		Species or species habitat may occur within area
Urocampus carinirostris Hairy Pipefish [66282]		Species or species habitat may occur within area
Vanacampus margaritifer Mother-of-pearl Pipefish [66283]		Species or species habitat may occur within area
Vanacampus phillipi Port Phillip Pipefish [66284]		Species or species habitat may occur within area
Vanacampus poecilolaemus Longsnout Pipefish, Australian Long-snout Pipefish, Long-snouted Pipefish [66285]		Species or species habitat may occur within area
Mammals		
Arctocephalus forsteri Long-nosed Fur-seal, New Zealand Fur-seal [20]		Species or species habitat may occur within area
Neophoca cinerea Australian Sea-lion, Australian Sea Lion [22]	Endangered	Species or species habitat known to occur within area
Reptiles		
Caretta caretta Loggerhead Turtle [1763]	Endangered	Foraging, feeding or related behaviour known to occur within area
Chelonia mydas Green Turtle [1765]	Vulnerable	Foraging, feeding or related behaviour known to occur within area
Dermochelys coriacea Leatherback Turtle, Leathery Turtle, Luth [1768]	Endangered	Foraging, feeding or related behaviour known to occur within area
Disteira kingii Spectacled Seasnake [1123]		Species or species habitat may occur within area
Natator depressus Flatback Turtle [59257]	Vulnerable	Foraging, feeding or related behaviour known

Name	Threatened	Type of Presence to occur within area
Whales and other Cetaceans		[Resource Information]
Name	Status	Type of Presence
Mammals		
Balaenoptera acutorostrata Minke Whale [33]		Species or species habitat may occur within area
Balaenoptera edeni Bryde's Whale [35]		Species or species habitat may occur within area
Balaenoptera musculus Blue Whale [36]	Endangered	Species or species habitat likely to occur within area
Caperea marginata Pygmy Right Whale [39]		Species or species habitat may occur within area
Delphinus delphis Common Dolphin, Short-beaked Common Dolphin [60]		Species or species habitat may occur within area
Eubalaena australis Southern Right Whale [40]	Endangered	Breeding known to occur within area
Grampus griseus Risso's Dolphin, Grampus [64]		Species or species habitat may occur within area
Megaptera novaeangliae Humpback Whale [38]	Vulnerable	Species or species habitat known to occur within area
Orcinus orca Killer Whale, Orca [46]		Species or species habitat may occur within area
Stenella attenuata Spotted Dolphin, Pantropical Spotted Dolphin [51]		Species or species habitat may occur within area
Tursiops aduncus Indian Ocean Bottlenose Dolphin, Spotted Bottlenose Dolphin [68418]		Species or species habitat likely to occur within area
Tursiops truncatus s. str. Bottlenose Dolphin [68417]		Species or species habitat may occur within area

Extra Information

State and Territory Reserves		[Resource Information]
Name	State	
Thomsons Lake	WA	
Unnamed WA39584	WA	
Unnamed WA39752	WA	
Unnamed WA42469	WA	
Unnamed WA49220	WA	
Unnamed WA53632	WA	

Invasive Species[\[Resource Information \]](#)

Weeds reported here are the 20 species of national significance (WoNS), along with other introduced plants that are considered by the States and Territories to pose a particularly significant threat to biodiversity. The following feral animals are reported: Goat, Red Fox, Cat, Rabbit, Pig, Water Buffalo and Cane Toad. Maps from Landscape Health Project, National Land and Water Resources Audit, 2001.

Name	Status	Type of Presence
Birds		
Acridotheres tristis Common Myna, Indian Myna [387]		Species or species habitat likely to occur within area
Anas platyrhynchos Mallard [974]		Species or species habitat likely to occur within area
Carduelis carduelis European Goldfinch [403]		Species or species habitat likely to occur within area
Columba livia Rock Pigeon, Rock Dove, Domestic Pigeon [803]		Species or species habitat likely to occur within area
Passer domesticus House Sparrow [405]		Species or species habitat likely to occur within area
Passer montanus Eurasian Tree Sparrow [406]		Species or species habitat likely to occur within area
Streptopelia chinensis Spotted Turtle-Dove [780]		Species or species habitat likely to occur within area
Streptopelia senegalensis Laughing Turtle-dove, Laughing Dove [781]		Species or species habitat likely to occur within area
Sturnus vulgaris Common Starling [389]		Species or species habitat likely to occur within area
Turdus merula Common Blackbird, Eurasian Blackbird [596]		Species or species habitat likely to occur within area
Mammals		
Bos taurus Domestic Cattle [16]		Species or species habitat likely to occur within area
Canis lupus familiaris Domestic Dog [82654]		Species or species habitat likely to occur within area
Felis catus Cat, House Cat, Domestic Cat [19]		Species or species habitat likely to occur within area
Funambulus pennantii Northern Palm Squirrel, Five-striped Palm Squirrel [129]		Species or species habitat likely to occur within area
Mus musculus House Mouse [120]		Species or species habitat likely to occur within area
Oryctolagus cuniculus Rabbit, European Rabbit [128]		Species or species habitat likely to occur within area

Name	Status	Type of Presence
Rattus norvegicus Brown Rat, Norway Rat [83]		Species or species habitat likely to occur within area
Rattus rattus Black Rat, Ship Rat [84]		Species or species habitat likely to occur within area
Vulpes vulpes Red Fox, Fox [18]		Species or species habitat likely to occur within area

Plants

Anredera cordifolia Madeira Vine, Jalap, Lamb's-tail, Mignonette Vine, Anredera, Gulf Madeiravine, Heartleaf Madeiravine, Potato Vine [2643]		Species or species habitat likely to occur within area
Asparagus aethiopicus Asparagus Fern, Ground Asparagus, Basket Fern, Sprengi's Fern, Bushy Asparagus, Emerald Asparagus [62425]		Species or species habitat likely to occur within area
Asparagus asparagoides Bridal Creeper, Bridal Veil Creeper, Smilax, Florist's Smilax, Smilax Asparagus [22473]		Species or species habitat likely to occur within area
Asparagus plumosus Climbing Asparagus-fern [48993]		Species or species habitat likely to occur within area
Brachiaria mutica Para Grass [5879]		Species or species habitat may occur within area
Cenchrus ciliaris Buffel-grass, Black Buffel-grass [20213]		Species or species habitat may occur within area
Chrysanthemoides monilifera Bitou Bush, Boneseed [18983]		Species or species habitat may occur within area
Chrysanthemoides monilifera subsp. monilifera Boneseed [16905]		Species or species habitat likely to occur within area
Genista linifolia Flax-leaved Broom, Mediterranean Broom, Flax Broom [2800]		Species or species habitat likely to occur within area
Genista sp. X Genista monspessulana Broom [67538]		Species or species habitat may occur within area
Lantana camara Lantana, Common Lantana, Kamara Lantana, Large-leaf Lantana, Pink Flowered Lantana, Red Flowered Lantana, Red-Flowered Sage, White Sage, Wild Sage [10892]		Species or species habitat likely to occur within area
Lycium ferocissimum African Boxthorn, Boxthorn [19235]		Species or species habitat likely to occur within area
Olea europaea Olive, Common Olive [9160]		Species or species habitat may occur within area
Opuntia spp. Prickly Pears [82753]		Species or species habitat likely to occur within area
Pinus radiata Radiata Pine Monterey Pine, Insignis Pine, Wilding Pine [20780]		Species or species habitat may occur within

Name	Status	Type of Presence
<p>Rubus fruticosus aggregate Blackberry, European Blackberry [68406]</p>		<p>area Species or species habitat likely to occur within area</p>
<p>Sagittaria platyphylla Delta Arrowhead, Arrowhead, Slender Arrowhead [68483]</p>		<p>Species or species habitat likely to occur within area</p>
<p>Salix spp. except S.babylonica, S.x calodendron & S.x reichardtii Willows except Weeping Willow, Pussy Willow and Sterile Pussy Willow [68497]</p>		<p>Species or species habitat likely to occur within area</p>
<p>Salvinia molesta Salvinia, Giant Salvinia, Aquarium Watermoss, Kariba Weed [13665]</p>		<p>Species or species habitat likely to occur within area</p>
<p>Tamarix aphylla Athel Pine, Athel Tree, Tamarisk, Athel Tamarisk, Athel Tamarix, Desert Tamarisk, Flowering Cypress, Salt Cedar [16018]</p>		<p>Species or species habitat likely to occur within area</p>
Reptiles		
<p>Hemidactylus frenatus Asian House Gecko [1708]</p>		<p>Species or species habitat likely to occur within area</p>

Caveat

The information presented in this report has been provided by a range of data sources as acknowledged at the end of the report.

This report is designed to assist in identifying the locations of places which may be relevant in determining obligations under the Environment Protection and Biodiversity Conservation Act 1999. It holds mapped locations of World and National Heritage properties, Wetlands of International and National Importance, Commonwealth and State/Territory reserves, listed threatened, migratory and marine species and listed threatened ecological communities. Mapping of Commonwealth land is not complete at this stage. Maps have been collated from a range of sources at various resolutions.

Not all species listed under the EPBC Act have been mapped (see below) and therefore a report is a general guide only. Where available data supports mapping, the type of presence that can be determined from the data is indicated in general terms. People using this information in making a referral may need to consider the qualifications below and may need to seek and consider other information sources.

For threatened ecological communities where the distribution is well known, maps are derived from recovery plans, State vegetation maps, remote sensing imagery and other sources. Where threatened ecological community distributions are less well known, existing vegetation maps and point location data are used to produce indicative distribution maps.

Threatened, migratory and marine species distributions have been derived through a variety of methods. Where distributions are well known and if time permits, maps are derived using either thematic spatial data (i.e. vegetation, soils, geology, elevation, aspect, terrain, etc) together with point locations and described habitat; or environmental modelling (MAXENT or BIOCLIM habitat modelling) using point locations and environmental data layers.

Where very little information is available for species or large number of maps are required in a short time-frame, maps are derived either from 0.04 or 0.02 decimal degree cells; by an automated process using polygon capture techniques (static two kilometre grid cells, alpha-hull and convex hull); or captured manually or by using topographic features (national park boundaries, islands, etc). In the early stages of the distribution mapping process (1999-early 2000s) distributions were defined by degree blocks, 100K or 250K map sheets to rapidly create distribution maps. More reliable distribution mapping methods are used to update these distributions as time permits.

Only selected species covered by the following provisions of the EPBC Act have been mapped:

- migratory and
- marine

The following species and ecological communities have not been mapped and do not appear in reports produced from this database:

- threatened species listed as extinct or considered as vagrants
- some species and ecological communities that have only recently been listed
- some terrestrial species that overfly the Commonwealth marine area
- migratory species that are very widespread, vagrant, or only occur in small numbers

The following groups have been mapped, but may not cover the complete distribution of the species:

- non-threatened seabirds which have only been mapped for recorded breeding sites
- seals which have only been mapped for breeding sites near the Australian continent

Such breeding sites may be important for the protection of the Commonwealth Marine environment.

Coordinates

-32.15566 115.77431

Acknowledgements

This database has been compiled from a range of data sources. The department acknowledges the following custodians who have contributed valuable data and advice:

- [Office of Environment and Heritage, New South Wales](#)
- [Department of Environment and Primary Industries, Victoria](#)
- [Department of Primary Industries, Parks, Water and Environment, Tasmania](#)
- [Department of Environment, Water and Natural Resources, South Australia](#)
- [Department of Land and Resource Management, Northern Territory](#)
- [Department of Environmental and Heritage Protection, Queensland](#)
- [Department of Parks and Wildlife, Western Australia](#)
- [Environment and Planning Directorate, ACT](#)
- [Birdlife Australia](#)
- [Australian Bird and Bat Banding Scheme](#)
- [Australian National Wildlife Collection](#)
- Natural history museums of Australia
- [Museum Victoria](#)
- [Australian Museum](#)
- [South Australian Museum](#)
- [Queensland Museum](#)
- [Online Zoological Collections of Australian Museums](#)
- [Queensland Herbarium](#)
- [National Herbarium of NSW](#)
- [Royal Botanic Gardens and National Herbarium of Victoria](#)
- [Tasmanian Herbarium](#)
- [State Herbarium of South Australia](#)
- [Northern Territory Herbarium](#)
- [Western Australian Herbarium](#)
- [Australian National Herbarium, Canberra](#)
- [University of New England](#)
- [Ocean Biogeographic Information System](#)
- [Australian Government, Department of Defence Forestry Corporation, NSW](#)
- [Geoscience Australia](#)
- [CSIRO](#)
- [Australian Tropical Herbarium, Cairns](#)
- [eBird Australia](#)
- [Australian Government – Australian Antarctic Data Centre](#)
- [Museum and Art Gallery of the Northern Territory](#)
- [Australian Government National Environmental Science Program](#)
- [Australian Institute of Marine Science](#)
- [Reef Life Survey Australia](#)
- [American Museum of Natural History](#)
- [Queen Victoria Museum and Art Gallery, Inveresk, Tasmania](#)
- [Tasmanian Museum and Art Gallery, Hobart, Tasmania](#)
- Other groups and individuals

The Department is extremely grateful to the many organisations and individuals who provided expert advice and information on numerous draft distributions.

Please feel free to provide feedback via the [Contact Us](#) page.

APPENDIX 3
SITE FLORA LIST

Quill Way/Cockburn Road - Flora List March 2021

*– Introduced species

GYMNOSPERMS

CUPRESSACEAE

**Callitris preissii*

PINACEAE

**Pinus* sp

MONOCOTYLEDONS

ARECACEAE

**Washingtonia filifera*

ASPARAGACEAE

Acanthocarpus preissii

**Asparagus asparagoides*

ASPHODELACEAE

**Asphodelus fistulosus*

**Trachyandra divaricata*

CYPERACEAE

Lepidosperma calcicola

HEMEROCALLIDACEAE

Dianella revoluta var. *divaricata*

IRIDACEAE

**Gladiolus caryophyllaceus*

**Romulea rosea*

POACEAE

**Avena fatua*

**Briza maxima*

**Bromus diandrus*

**Cenchrus longisetus*

**Ehrharta calycina*

**Eragrostis curvula*

**Hyparrhenia hirta*

**Lagurus ovatus*

XANTHORRHOEACEAE

Xanthorrhoea brunonis

Xanthorrhoea preissii

DICOTYLEDONS

APIACEAE

**Foeniculum vulgare*

ASTERACEAE

**Gazania linearis*

Olearia axillaris

DILLENIACEAE

Hibbertia hypericoides

ERICACEAE

Styphelia propinqua

EUPHORBIACEAE

**Euphorbia terracina*

FABACEAE

Acacia cochlearis

Acacia rostellifera

Acacia saligna

Hardenbergia comptoniana

Templetonia retusa

GERANIACEAE

**Pelargonium capitatum*

LAMIACEAE

**Salvia rosmarinus*

MYRTACEAE

Calothamnus quadrifidus

**Chamelaucium uncinatum*

Eucalyptus gomphocephala

**Leptospermum laevigatum*

Melaleuca huegelii

Melaleuca systema

OLEACEAE

**Olea europaea*

PHYLLANTHACEAE

Phyllanthus calycinus

PROTEACEAE

Banksia attenuata

Banksia dallanneyi

Banksia sessilis

**Grevillea crithmifolia*

Hakea prostrata

Hakea trifurcata

RHAMNACEAE

Spyridium globulosum

ROSACEAE

**Cotoneaster pannosus*

SCROPHULARIACEAE

**Eremophila glabra*

APPENDIX 4
RELEVE DATA

RELEVÉ 1

50 384849 E 6441189 N

Vegetation: *Banksia sessilis*/*Acacia rostellifera* Open Heath
Condition: Degraded
Soil Type: Orange-brown sand, some surface limestone
Landform: Sloping up from road
Date: 16.3.21
Recorder: Paul van der Moezel



Relevé

SPECIES	Comments
<i>Banksia sessilis</i>	1-2m 50%
<i>Acacia rostellifera</i>	
<i>Hibbertia hypericoides</i>	
<i>Dianella revoluta</i> var. <i>divaricata</i>	
<i>Calothamnus quadrifidus</i>	
* <i>Eremophila glabra</i>	Planted
* <i>Ehrharta calycina</i>	Perennial Veldtgrass
* <i>Cenchrus longisetus</i>	Fountain Grass
* <i>Lagurus ovatus</i>	Hare's Tail Grass

* Introduced species

RELEVÉ 2

50 384875 E 6441195 N

Vegetation: *Banksia sessilis*/*Acacia rostellifera* Open Heath
Condition: Degraded
Soil Type: Orange-brown sand, some surface limestone
Landform: Sloping up from road
Date: 16.3.21
Recorder: Paul van der Moezel



Relevé

SPECIES	Comments
<i>Banksia sessilis</i>	1-2m, 60%
<i>Acacia rostellifera</i>	
<i>Phyllanthus calycinus</i>	
<i>Acacia saligna</i>	
* <i>Ehrharta calycina</i>	
* <i>Avena fatua</i>	Wild Oats
* <i>Lagurus ovatus</i>	
* <i>Euphorbia terracina</i>	Geraldton Carnation Weed

* Introduced species

RELEVÉ 3

50 384873 E 6441265 N

Vegetation: *Banksia sessilis*/*Acacia rostellifera* Shrubland
Condition: Degraded
Soil Type: Orange-brown sand
Landform: Top of slope down to road
Date: 16.3.21
Recorder: Paul van der Moezel



Relevé

SPECIES	Comments
<i>Banksia sessilis</i>	1-2m, 20%
<i>Acacia saligna</i>	
<i>Xanthorrhoea preissii</i>	
<i>Banksia dallaneyi</i>	
<i>Styphelia propinqua</i>	
* <i>Ehrharta calycina</i>	
* <i>Lagurus ovatus</i>	
* <i>Avena fatua</i>	
* <i>Bromus diandrus</i>	

* Introduced species

RELEVÉ 4

50 384856 E 6441395 N

Vegetation: *Banksia sessilis*/*Acacia rostellifera* Tall Open Scrub
Condition: Degraded
Soil Type: Orange-brown sand
Landform: Sloping up from road
Date: 16.3.21
Recorder: Paul van der Moezel



Relevé

SPECIES	Comments
<i>Banksia sessilis</i>	1-2m, 30%
<i>Acacia rostellifera</i>	3m, 10%
<i>Hibbertia hypericoides</i>	
* <i>Ehrharta calycina</i>	
* <i>Lagurus ovatus</i>	
* <i>Avena fatua</i>	
* <i>Briza maxima</i>	Blowfly Grass

* Introduced species

RELEVÉ 5

50 384828 E 6441425 N

Vegetation: *Banksia attenuata* Low Open Woodland over *Grevillea crithmifolia*
Low Open Shrubland
Condition: Degraded
Soil Type: Orange-brown sand
Landform: Flat
Date: 16.3.21
Recorder: Paul van der Moezel



Relevé

SPECIES	Comments
<i>Banksia attenuata</i>	Mostly young plants
<i>Acacia pulchella</i>	
<i>Gompholobium tomentosum</i>	
* <i>Grevillea crithmifolia</i>	Planted
* <i>Ehrharta calycina</i>	Very common
* <i>Avena fatua</i>	
* <i>Cenchrus longisetus</i>	
* <i>Romulea rosea</i>	Guildford Grass
* <i>Gladiolus caryophyllaceus</i>	Gladiolus
* <i>Pelargonium capitatum</i>	Rose Pelargonium

* Introduced species

RELEVÉ 6

50 384833 E 6441332 N

Vegetation: *Banksia sessilis*/*Acacia rostellifera* Shrubland
Condition: Degraded
Soil Type: Orange-brown sand
Landform: Sloping up from road
Date: 16.3.21
Recorder: Paul van der Moezel



Relevé

SPECIES	Comments
<i>Banksia sessilis</i>	1-2m, 20%
<i>Acacia rostellifera</i>	
<i>Hibbertia hypericoides</i>	
<i>Acacia saligna</i>	
<i>Acacia cochlearis</i>	
<i>Xanthorrhoea preissii</i>	
* <i>Grevillea crithmifolia</i>	Planted
* <i>Ehrharta calycina</i>	
* <i>Lagurus ovatus</i>	
* <i>Romulea rosea</i>	

* Introduced species

RELEVÉ 7

50 384822 E 6441279 N

Vegetation: *Acacia saligna*/*A. rostellifera* Closed Tall Scrub
Condition: Degraded
Soil Type: Orange-brown sand
Landform: Sloping up from the road
Date: 16.3.21
Recorder: Paul van der Moezel



Relevé

SPECIES	Comments
<i>Acacia saligna</i>	3m, 70% maybe planted
<i>Acacia rostellifera</i>	
<i>Hakea prostrata</i>	
<i>Olearia axillaris</i>	
* <i>Eremophila glabra</i>	planted
* <i>Ehrharta calycina</i>	
* <i>Bromus diandrus</i>	
* <i>Avena fatua</i>	
* <i>Euphorbia terracina</i>	
* <i>Lagurus ovatus</i>	
* <i>Asparagus asparagoides</i>	Bridal Creeper

* Introduced species

RELEVÉ 8

50 383967 E 6442584 N

Vegetation: *Acacia rostellifera*/*Callitris preissii* Tall Open Scrub over weeds
Condition: Completely Degraded
Soil Type: Yellow-brown sand
Landform: Steep slope
Date: 16.3.21
Recorder: Paul van der Moezel



Relevé

SPECIES	Comments
<i>Acacia rostellifera</i>	5m, 60%
* <i>Callitris preissii</i>	Planted
* <i>Melaleuca huegelii</i>	Planted
* <i>Avena fatua</i>	Very common
* <i>Ehrharta calycina</i>	
* <i>Euphorbia terracina</i>	
* <i>Asparagus asparagoides</i>	Common
* <i>Leptospermum laevigatum</i>	Victorian Teatree

* Introduced species

RELEVÉ 9

50 384085 E 6442491 N

Vegetation: *Acacia rostellifera* Tall Open Scrub over weeds
Condition: Completely Degraded
Soil Type: Yellow-brown sand
Landform: Flat
Date: 16.3.21
Recorder: Paul van der Moezel



Relevé

SPECIES	Comments
<i>Acacia rostellifera</i>	4m, 30%
* <i>Melaleuca huegelii</i>	
* <i>Avena fatua</i>	90%
* <i>Ehrharta calycina</i>	
* <i>Euphorbia terracina</i>	
* <i>Bromus diandrus</i>	
* <i>Lagurus ovatus</i>	
* <i>Asparagus asparagoides</i>	

* Introduced species

RELEVÉ 10

50 384255 E 6442477 N

Vegetation: *Acacia rostellifera* Tall Open Scrub and Lovegrass
Condition: Completely Degraded
Soil Type: Yellow-brown sand
Landform: Flat, drainage basin
Date: 16.3.21
Recorder: Paul van der Moezel



Relevé

SPECIES	Comments
<i>Acacia rostellifera</i>	4m, 40%
* <i>Washingtonia filifera</i>	Cotton Palm
* <i>Pinus sp</i>	Pine
* <i>Eragrostis curvula</i>	African Lovegrass

* Introduced species

RELEVÉ 11

50 384101 E 6442447 N

Vegetation: *Acacia rostellifera* Tall Open Scrub over weeds
Condition: Degraded
Soil Type: Orange-brown sand
Landform: Sloping up from the road
Date: 16.3.21
Recorder: Paul van der Moezel



Relevé

SPECIES	Comments
<i>Acacia rostellifera</i>	2-3m 40%
* <i>Melaleuca huegelii</i>	Planted
* <i>Callitris preissii</i>	Planted
<i>Hibbertia hypericoides</i>	
<i>Acacia saligna</i>	
<i>Xanthorrhoea preissii</i>	
<i>Xanthorrhoea brunonis</i>	
<i>Lepidosperma calcicola</i>	
<i>Melaleuca systema</i>	
* <i>Avena fatua</i>	Very common
* <i>Ehrharta calycina</i>	Very common
* <i>Bromus diandrus</i>	
* <i>Salvia rosmarinus</i>	Rosemary
* <i>Euphorbia terracina</i>	
* <i>Lagurus ovatus</i>	
* <i>Asparagus asparagoides</i>	

* Introduced species

RELEVÉ 12

50 384019 E 6442362 N

Vegetation: Landscaping
Condition: Completely Degraded
Soil Type: Yellow-brown sand
Landform: Slight slope up from road
Date: 16.3.21
Recorder: Paul van der Moezel



Relevé

SPECIES	Comments
<i>Acacia rostellifera</i>	1-2m, 10%
<i>Acacia pulchella</i>	
<i>Templetonia retusa</i>	
<i>Olearia axillaris</i>	
* <i>Chamelaucium uncinatum</i>	Geraldton Wax
* <i>Hyparrhenia hirta</i>	Tambookie Grass
* <i>Cenchrus longisetus</i>	
* <i>Lagurus ovatus</i>	
* <i>Gazania linearis</i>	Gazania

* Introduced species

RELEVÉ 13

50 384022 E 6442482 N

Vegetation: *Acacia rostelifera*/*Melaleuca huegelii* Shrubland
Condition: Completely Degraded
Soil Type: Yellow-brown sand
Landform: Sloping up from road
Date: 16.3.21
Recorder: Paul van der Moezel



Relevé

SPECIES	Comments
<i>Acacia rostelifera</i>	2m, 20%
* <i>Melaleuca huegelii</i>	
* <i>Callitris preissii</i>	
<i>Spyridium globulosum</i>	
<i>Olearia axillaris</i>	
* <i>Bromus diandrus</i>	
* <i>Avena fatua</i>	
* <i>Ehrharta calycina</i>	
* <i>Hyparrhenia hirta</i>	
* <i>Cenchrus longisetus</i>	

* Introduced species

RELEVÉ 14

50 383998 E 6442382 N

Vegetation: *Eucalyptus gomphocephala* Open Woodland over *Acacia rostellifera*/*Callitris preissii* Tall Shrubland over weeds
Condition: Completely Degraded
Soil Type: Yellow-brown sand
Landform: Flat
Date: 16.3.21
Recorder: Paul van der Moezel



Relevé

SPECIES	Comments
<i>Eucalyptus gomphocephala</i>	Tuart
<i>Acacia rostellifera</i>	
* <i>Callitris preissii</i>	Planted
<i>Acacia saligna</i>	
<i>Acanthocarpus preissii</i>	
<i>Xanthorrhoea brunonis</i>	
<i>Spyridium globulosum</i>	
<i>Hakea trifurcata</i>	
<i>Hardenbergia comptoniana</i>	
* <i>Foeniculum vulgare</i>	Fennel
* <i>Avena fatua</i>	
* <i>Briza maxima</i>	
* <i>Asparagus asparagoides</i>	
* <i>Pelargonium capitatum</i>	
* <i>Euphorbia terracina</i>	

* Introduced species

APPENDIX 5
CONSERVATION CODES

Conservation Codes for Western Australian Flora and Fauna

Specially protected fauna or flora are species* which have been adequately searched for and are deemed to be, in the wild, either rare, at risk of extinction, or otherwise in need of special protection, and have been gazetted as such. Conservation codes have been transitioned under regulations 170, 171 and 172 of the *Biodiversity Conservation Regulations 2018*.

T Threatened species – Schedules 1-4

Listed by order of the Minister as Threatened in the category of critically endangered, endangered or vulnerable under section 19(1), or is a rediscovered species to be regarded as threatened species under section 26(2) of the *Biodiversity Conservation Act 2016* (BC Act).

- **Threatened fauna** is that subset of ‘Specially Protected Fauna’ listed under schedules 1 to 3 of the *Wildlife Conservation (Specially Protected Fauna) Notice 2018* for Threatened Fauna.
- **Threatened flora** is that subset of ‘Rare Flora’ listed under schedules 1 to 3 of the *Wildlife Conservation (Rare Flora) Notice 2018* for Threatened Flora.

The assessment of the conservation status of these species is based on their national extent and ranked according to their level of threat using IUCN Red List categories and criteria as detailed below.

CR Critically endangered species

Threatened species considered to be “*facing an extremely high risk of extinction in the wild in the immediate future, as determined in accordance with criteria set out in the ministerial guidelines*”.

Listed as critically endangered under section 19(1)(a) of the BC Act in accordance with the criteria set out in section 20 and the ministerial guidelines. Published under schedule 1 of the *Wildlife Conservation (Specially Protected Fauna) Notice 2018* for critically endangered fauna or the *Wildlife Conservation (Rare Flora) Notice 2018* for critically endangered flora.

EN Endangered species

Threatened species considered to be “*facing a very high risk of extinction in the wild in the near future, as determined in accordance with criteria set out in the ministerial guidelines*”.

Listed as endangered under section 19(1)(b) of the BC Act in accordance with the criteria set out in section 21 and the ministerial guidelines. Published under schedule 2 of the *Wildlife Conservation (Specially Protected Fauna) Notice 2018* for endangered fauna or the *Wildlife Conservation (Rare Flora) Notice 2018* for endangered flora.

VU Vulnerable species

Threatened species considered to be “*facing a high risk of extinction in the wild in the medium-term future, as determined in accordance with criteria set out in the ministerial guidelines*”.

Listed as vulnerable under section 19(1)(c) of the BC Act in accordance with the criteria set out in section 22 and the ministerial guidelines. Published under schedule 3 of the *Wildlife*

Conservation (Specially Protected Fauna) Notice 2018 for vulnerable fauna or the *Wildlife Conservation (Rare Flora) Notice 2018* for vulnerable flora.

EX Presumed extinct species

Species where “*there is no reasonable doubt that the last member of the species has died*”, and listing is otherwise in accordance with the ministerial guidelines (section 24 of the BC Act).

Published as presumed extinct under schedule 4 of the *Wildlife Conservation (Specially Protected Fauna) Notice 2018* for extinct fauna or the *Wildlife Conservation (Rare Flora) Notice 2018* for extinct flora.

EW Extinct in the wild species

Species that “*is known only to survive in cultivation, in captivity or as a naturalised population well outside its past range; and it has not been recorded in its known habitat or expected habitat, at appropriate seasons, anywhere in its past range, despite surveys over a time frame appropriate to its life cycle and form*”, and listing is otherwise in accordance with the ministerial guidelines (section 25 of the BC Act).

Currently there are no threatened fauna or threatened flora species listed as extinct in the wild. If listing of a species as extinct in the wild occurs, then a schedule will be added to the applicable notice.

Specially protected species

Listed by order of the Minister as specially protected under section 13(1) of the BC Act. Meeting one or more of the following categories: species of special conservation interest; migratory species; cetaceans; species subject to international agreement; or species otherwise in need of special protection.

Species that are listed as threatened species (critically endangered, endangered or vulnerable) or extinct species under the BC Act cannot also be listed as Specially Protected species.

MI Migratory species

Fauna that periodically or occasionally visit Australia or an external Territory or the exclusive economic zone; or the species is subject of an international agreement that relates to the protection of migratory species and that binds the Commonwealth; and listing is otherwise in accordance with the ministerial guidelines (section 15 of the BC Act).

Includes birds that are subject to an agreement between the government of Australia and the governments of Japan (JAMBA), China (CAMBA) and The Republic of Korea (ROKAMBA), and fauna subject to the Convention on the Conservation of Migratory Species of Wild Animals (Bonn Convention), an environmental treaty under the United Nations Environment Program. Migratory species listed under the BC Act are a subset of the migratory animals, that are known to visit Western Australia, protected under the international agreements or treaties, excluding species that are listed as Threatened species.

Published as migratory birds protected under an international agreement under schedule 5 of the *Wildlife Conservation (Specially Protected Fauna) Notice 2018*.

CD Species of special conservation interest (conservation dependent fauna)

Fauna of special conservation need being species dependent on ongoing conservation intervention to prevent it becoming eligible for listing as threatened, and listing is otherwise in accordance with the ministerial guidelines (section 14 of the BC Act).

Published as conservation dependent fauna under schedule 6 of the *Wildlife Conservation (Specially Protected Fauna) Notice 2018*.

OS Other specially protected species

Fauna otherwise in need of special protection to ensure their conservation, and listing is otherwise in accordance with the ministerial guidelines (section 18 of the BC Act).

Published as other specially protected fauna under schedule 7 of the *Wildlife Conservation (Specially Protected Fauna) Notice 2018*.

P Priority species

Possibly threatened species that do not meet survey criteria, or are otherwise data deficient, are added to the Priority Fauna or Priority Flora Lists under Priorities 1, 2 or 3. These three categories are ranked in order of priority for survey and evaluation of conservation status so that consideration can be given to their declaration as threatened fauna or flora.

Species that are adequately known, are rare but not threatened, or meet criteria for near threatened, or that have been recently removed from the threatened species or other specially protected fauna lists for other than taxonomic reasons, are placed in Priority 4. These species require regular monitoring.

Assessment of Priority codes is based on the Western Australian distribution of the species, unless the distribution in WA is part of a contiguous population extending into adjacent States, as defined by the known spread of locations.

Priority 1: Poorly-known species

Species that are known from one or a few locations (generally five or less) which are potentially at risk. All occurrences are either: very small; or on lands not managed for conservation, e.g. agricultural or pastoral lands, urban areas, road and rail reserves, gravel reserves and active mineral leases; or otherwise under threat of habitat destruction or degradation. Species may be included if they are comparatively well known from one or more locations but do not meet adequacy of survey requirements and appear to be under immediate threat from known threatening processes. Such species are in urgent need of further survey.

Priority 2: Poorly-known species

Species that are known from one or a few locations (generally five or less), some of which are on lands managed primarily for nature conservation, e.g. national parks, conservation parks, nature reserves and other lands with secure tenure being managed for conservation. Species may be included if they are comparatively well known from one or more locations but do not meet adequacy of survey requirements and appear to be under threat from known threatening processes. Such species are in urgent need of further survey.

Priority 3: Poorly-known species

Species that are known from several locations, and the species does not appear to be under imminent threat, or from few but widespread locations with either large population size or significant remaining areas of apparently suitable habitat, much of it not under imminent threat. Species may be included if they are comparatively well known from several locations but do not meet adequacy of survey requirements and known threatening processes exist that could affect them. Such species are in need of further survey.

Priority 4: Rare, Near Threatened and other species in need of monitoring

- (a) Rare. Species that are considered to have been adequately surveyed, or for which sufficient knowledge is available, and that are considered not currently threatened or in need of special protection but could be if present circumstances change. These species are usually represented on conservation lands.
- (b) Near Threatened. Species that are considered to have been adequately surveyed and that are close to qualifying for vulnerable but are not listed as Conservation Dependent.
- (c) Species that have been removed from the list of threatened species during the past five years for reasons other than taxonomy.

*Species includes all taxa (plural of taxon - a classificatory group of any taxonomic rank, e.g. a family, genus, species or any infraspecific category i.e. subspecies or variety, or a distinct population).

Western Australian Ecological Communities

Threatened Ecological Communities

The BC Act provides for the statutory listing of threatened ecological communities (TECs) by the Minister.

Presumed Totally Destroyed (PD)

An ecological community that has been adequately searched for but for which no representative occurrences have been located. The community has been found to be totally destroyed or so extensively modified throughout its range that no occurrence of it is likely to recover its species composition and/or structure in the foreseeable future.

Critically Endangered (CR)

An ecological community that has been adequately surveyed and found to have been subject to a major contraction in area and/or that was originally of limited distribution and is facing severe modification or destruction throughout its range in the immediate future, or is already severely degraded throughout its range but capable of being substantially restored or rehabilitated.

Endangered (EN)

An ecological community that has been adequately surveyed and found to have been subject to a major contraction in area and/or was originally of limited distribution and is in danger of significant modification throughout its range or severe modification or destruction over most of its range in the near future.

Vulnerable (VU)

An ecological community that has been adequately surveyed and is found to be declining and/or has declined in distribution and/or condition and whose ultimate security has not yet been assured and/or a community that is still widespread but is believed likely to move into a category of higher threat in the near future if threatening processes continue or begin operating throughout its range.

Priority Ecological Communities

Possible threatened ecological communities that do not meet survey criteria or that are not adequately defined are added to the Priority Ecological Community List under priorities 1, 2 and 3. These three categories are ranked in order of priority for survey and/or definition of the community. Ecological communities that are adequately known, and are rare but not threatened or meet criteria for Near Threatened, or that have been recently removed from the threatened list, are placed in Priority 4. These ecological communities require regular monitoring. Conservation Dependent ecological communities are placed in Priority 5.

Priority One: Poorly-known ecological communities

Ecological communities that are known from very few occurrences with a very restricted distribution (generally ≤ 5 occurrences or a total area of ≤ 100 ha).

Occurrences are believed to be under threat either due to limited extent, or being on lands under immediate threat (e.g. within agricultural or pastoral lands, urban areas, active mineral leases) or for which current threats exist. May include communities with occurrences on protected lands. Communities may be included if they are comparatively well-known from one or more localities but do not meet adequacy of survey requirements, and/or are not well defined, and appear to be under immediate threat from known threatening processes across their range.

Priority Two: Poorly-known ecological communities

Communities that are known from few occurrences with a restricted distribution (generally ≤ 10 occurrences or a total area of ≤ 200 ha). At least some occurrences are not believed to be under immediate threat (within approximately 10 years) of destruction or degradation. Communities may be included if they are comparatively well known from one or more localities but do not meet adequacy of survey requirements, and/or are not well defined, and appear to be under threat from known threatening processes.

Priority Three: Poorly known ecological communities

- (i) Communities that are known from several to many occurrences, a significant number or area of which are not under threat of habitat destruction or degradation or:
- (ii) communities known from a few widespread occurrences, which are either large or with significant remaining areas of habitat in which other occurrences may occur, much of it not under imminent threat (within approximately 10 years), or;
- (iii) communities made up of large, and/or widespread occurrences, that may or may not be represented in the reserve system, but are under threat of modification across much of their range from processes such as grazing by domestic and/or feral stock, inappropriate fire regimes, clearing, hydrological change etc.

Communities may be included if they are comparatively well known from several localities but do not meet adequacy of survey requirements and/or are not well defined, and known threatening processes exist that could affect them.

Priority Four: Ecological communities that are adequately known, rare but not threatened or meet criteria for Near Threatened, or that have been recently removed from the threatened list. These communities require regular monitoring.

- (i) Rare. Ecological communities known from few occurrences that are considered to have been adequately surveyed, or for which sufficient knowledge is available, and that are considered not currently threatened or in need of special protection, but could be if present circumstances change. These communities are usually represented on conservation lands.
- (ii) Near Threatened. Ecological communities that are considered to have been adequately surveyed and that do not qualify for Conservation Dependent, but that are close to qualifying for a higher threat category.
- (iii) Ecological communities that have been removed from the list of threatened communities during the past five years.

Priority Five: Conservation Dependent ecological communities

Ecological communities that are not threatened but are subject to a specific conservation program, the cessation of which would result in the community becoming threatened within five years.

Commonwealth of Australia Conservation Codes

Threatened Flora and Fauna

Threatened fauna and flora may be listed under Section 178 of the *Environment Protection and Biodiversity Conservation Act 1999* (EPBC Act) in any one of the following six categories:

Extinct

A native species is eligible to be included in the extinct category at a particular time if, at that time, there is no reasonable doubt that the last member of the species has died.

Extinct in the wild

A native species is eligible to be included in the extinct in the wild category at a particular time if, at that time:

- a) it is known only to survive in cultivation, in captivity or as a naturalised population well outside its past range; or
- b) it has not been recorded in its known and/or expected habitat, at appropriate seasons, anywhere in its past range, despite exhaustive surveys over a time frame appropriate to its life cycle and form.

Critically endangered

A taxon is Critically Endangered when the best available evidence indicates that it meets any of the five criteria for the category identified in Part 7.01 of the EPBC Regulations, and it is therefore considered to be facing an extremely high risk of extinction in the wild.

Endangered

A taxon is Endangered when the best available evidence indicates that it meets any of the five criteria for the category identified in Part 7.01 of the EPBC Regulations, and it is therefore considered to be facing a very high risk of extinction in the wild.

Vulnerable

A taxon is Vulnerable when the best available evidence indicates that it meets any of the five criteria for the category identified in Part 7.01 of the EPBC Regulations, and it is therefore considered to be facing a high risk of extinction in the wild.

Conservation dependent

A native species is eligible to be included in the conservation dependent category at a particular time if, at that time:

- a) the species is the focus of a specific conservation program the cessation of which would result in the species becoming vulnerable, endangered or critically endangered; or
- b) the following subparagraphs are satisfied:
 - i. the species is a species of fish;

- ii. the species is the focus of a plan of management that provides for management actions necessary to stop the decline of, and support the recovery of, the species so that its chances of long term survival in nature are maximised;
- iii. the plan of management is in force under a law of the Commonwealth or of a State or Territory;
- iv. cessation of the plan of management would adversely affect the conservation status of the species.

The EPBC Act does not provide for listing in a data deficient category. Where sufficient data (evidence) is unavailable to allow assessment by the Threatened Species Scientific Committee against the criteria for listing, the species are found to be ineligible. A recommendation is made to the Minister to not include the species in any category under the EPBC Act. For reasons of transparency and to inform future research, the Threatened Species Scientific Committee publishes the names of those species found to be data deficient. As data deficient is not a listing category under the EPBC Act, this has no statutory implications and the species is not considered to be listed under the EPBC Act.

Threatened Ecological Communities

Threatened Ecological communities under the EPBC Act are listed in three categories.

Critically endangered

If, at that time, an ecological community is facing an extremely high risk of extinction in the wild in the immediate future (indicative timeframe being the next 10 years).

Endangered

If, at that time, an ecological community is not critically endangered but is facing a very high risk of extinction in the wild in the near future (indicative timeframe being the next 20 years).

Vulnerable

If, at that time, an ecological community is not critically endangered or endangered, but is facing a high risk of extinction in the wild in the medium-term future (indicative timeframe being the next 50 years).