COTERRA ENVIRONMENT

Native Vegetation Clearing Permit Application

Kennedy Bay Jetty Development

Rev 0 June 2025

CALIBRE | COMMITMENT | COLLABORATION

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1 Introduction

1.1 Background

Western Australia Beach and Golf Resort Pty Ltd (WABGR) is proposing to construct a recreational jetty in Port Kennedy, located in south Warnbro Sound within the City of Rockingham, Western Australia (Figure 1).

The Kennedy Bay Local Structure Plan (LSP) which provides residential and local centre development areas extends over approximately 67 ha (Figure 1). The foreshore zone encompasses the landholdings between the LSP boundary and the coastline adjacent to the urban development and provides for conservation and recreational land use opportunities (Figure 2).

In addition to the urban development and as required by Kennedy Bay Sale and Development Agreement (SADA) in place between the project proponent and the State government, a jetty is proposed within Shoalwater Islands Marine Park in Warnbro Sound (Figure 3). The jetty is located approximately 350 m northeast of the existing Kennedy Bay boat ramp and finger jetty (Plate 1-1).

The proposed jetty will provide:

- An elevated main deck
- Low-level short-stay vessel berths
- Central jetty 'node' to include a diving platform, terracing, stairs, swimming platform, ladders
- Demarcated swimming area.

The jetty will be universal access compliant and allow users to berth their vessels as well as undertaking fishing, swimming/diving and promenading.

The jetty will be constructed within a defined 0.25 ha development footprint and overall development envelope supporting construction activities of 1.19 ha (Plate 1-1).

Activities within the development footprint will include a terrestrial vegetation clearing of approximately 0.16 ha which encompasses a construction zone surrounding the terrestrial jetty footprint. The portion of the construction works zone not required for jetty infrastructure will be landscaped post-construction.

The jetty terrestrial infrastructure would be located within Lot 209 (Table 1-1). Temporary construction works would also occur within Lot 3019 and/or Part Lot 3026 (Table 1-1) which were cleared as part of the development works for the residential and local centre components of the site.

The jetty project life is estimated at ≥ 50 years, with major maintenance forecast every 10-15 years. The construction phase is expected to be undertaken over approximately 6 months, with operations and maintenance phases ongoing thereafter.

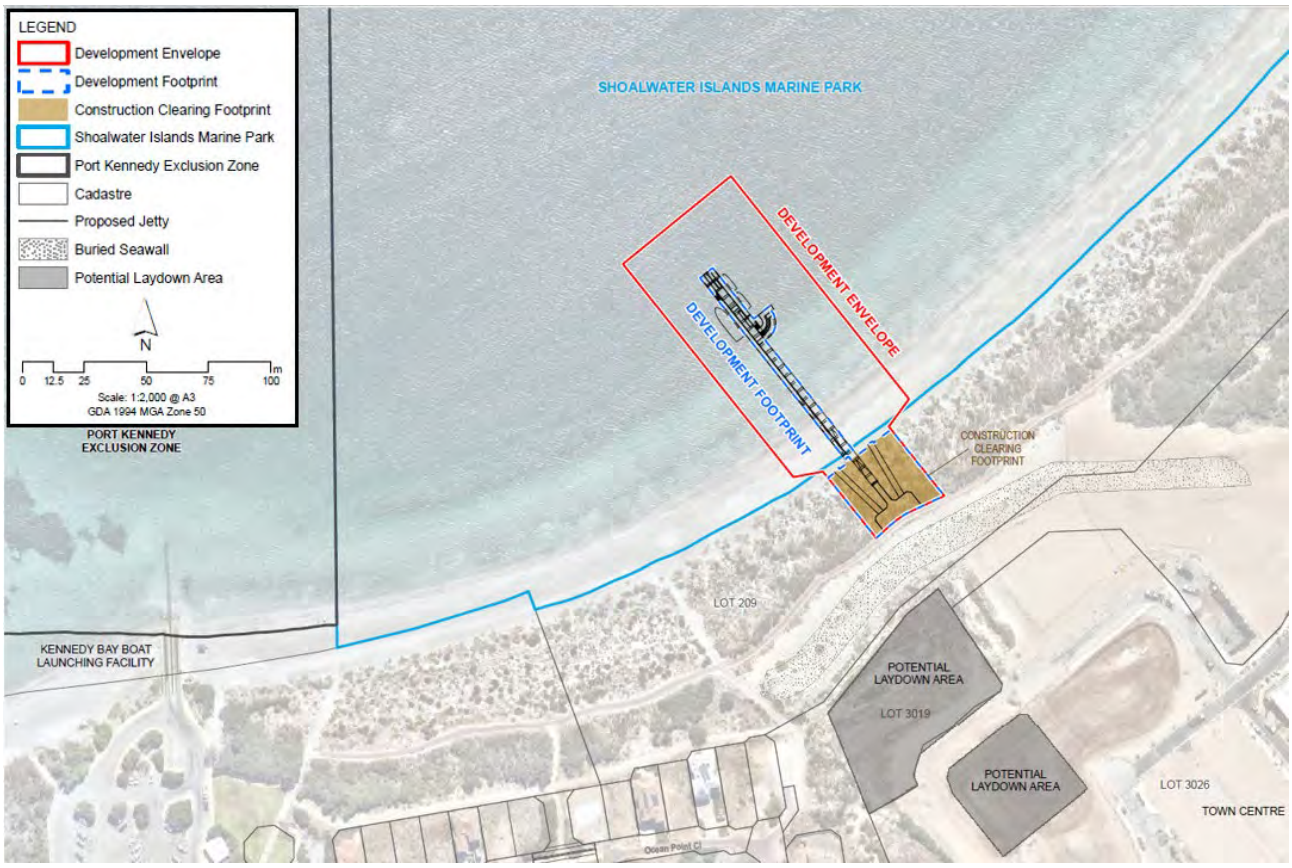

Plate 1-1: Jetty proposal elements

Source: Coterra Environment (2025)

Table 1-1: Land Tenure

Location	Ownership	Area impacted by Proposal
Part of Marine Reserve 5 (Shoalwater Islands Marine Park)	Crown land vested with the Marine Parks and Reserves Authority.	Disturbance area of 1.19 ha containing a 0.25 ha development footprint
Lot 209 (Reserve 44886)	State of Western Australia (C-Class Reserve for public recreation, vested to the City of Rockingham)	
Lot 3019 and/or part Lot 3026	Lot 3019 – Vacant Crown land Part Lot 3026 – WABGR	Temporary construction laydown area comprising up to: • 0.485 ha within Lot 3019 • 0.281 ha within Part Lot 3026

1.2 Purpose of this Report

This report has been prepared to support a Native Vegetation Clearing Permit (NVCP) application to clear native vegetation within Lot 209, under Part V of the *Environmental Protection Act 1986* (EP Act) (Section 2.1), to progress development of the Kennedy Bay jetty.

2 Legislative Context and Approvals History

2.1 Environmental Protection Act 1986

The *Environmental Protection Act 1986* (EP Act) governs environmental impact assessment and environmental protection in Western Australia. Under Part IV of the EP Act projects must be referred to the Environmental Protection Authority (EPA) if there is likely to be significant environmental impact as a result of implementation of a proposal. The EPA assesses projects against 14 environmental factors, with set objectives for each factor in the context of environmental conservation and management. Each factor should be considered only if relevant to a project.

The original Kennedy Bay development project (Port Kennedy Regional Recreation Centre, Stage 1) was referred to the EPA in 1988. The project was assessed at a level of Environmental Review and Management Programme (ERMP) (Binnie & Partners, 1988) under the EP Act. The original project included the following marine components, in addition to the urban development aspects of the project:

- Marina and town centre
  - 130 moorings in fixed pens for casual and day visitors
  - Additional permanent moorings in fixed pens for essential and service craft
  - 250 peninsula moorings within the boat harbour
  - 950 car parking spaces near marina

The original project was approved for implementation in 1990, with the approval conditions and proponent commitments outlined within Ministerial Statement No. 105.

In September 1993, the project proponent sought an amendment to the original conditions (under s 46 of the EP Act) including modification of the terrestrial conservation and development area boundaries. In August 1994, this was approved by the Minister for the Environment (Ministerial Statement No. 359).

As noted above, the original project design associated with the 1990 and 1993 approvals included a marina to be located in the area which was excluded from the Shoalwater Islands Marine Park (exclusion area). The Ministerial approvals contained conditions which were needed to be met in order to progress the marina development.

A number of houses were constructed at the site following receipt of this initial approval prior to the project entering a period of dormancy where no further works were progressed.

In the early 2000s a revised development layout was prepared and approved (s 45c amendment). This revised layout deleted the marina component of the project.

In 2013/2014, a request to amend the proposal (s 45c) and implementation conditions (s4 6) under the EP Act was prepared to respond to a requirement for increased coastal setback. This request was approved by the Minister for the Environment in October 2015 (Ministerial Statement No. 1019). The revised development plan was also referred under the *Environment Protection and Biodiversity Conservation Act 1999* (EPBC Act) and determined to be 'Not a Controlled Action' in February 2014.

In October 2024, WABGR referred the jetty proposal to the Environmental Protection Authority (EPA) to confirm if additional assessment was required, beyond the Development Approval application assessment (Section 2.2.3), DBCA Lawful Authority assessment (Section 2.3.1) and the DBCA Deed of Licence (Section 2.3.2).

The EPA published a Notice of Decision Not to Assess a Proposal under section 38(G)(1)(b) on 13 May 2025:

Referral examined, preliminary investigations and inquiries conducted. Proposal not to be assessed under Part IV of the EP Act – Advice given (Appendix 1).

Based on the above, approval under part V of the EP Act, including the *Environmental Protection (Clearing of Native Vegetation) Regulations 2004* is now sought for clearing of native vegetation associated with the terrestrial footprint of the jetty (this report).

2.2 Planning and Development Act 2005

The *Planning and Development Act 2005* (PD Act) governs development and planning in the context of land-use zoning throughout Western Australia. The PD Act outlines the consultation with relevant authorities (i.e. Local Government, State Government) that is required to progress development proposals and obtain Development Approvals from the Western Australian Planning Commission (WAPC) for assessment.

2.2.1 Port Kennedy Development Agreement Act 1992

The *Port Kennedy Development Agreement Act 1992* (PKDA Act) was legislated to facilitate development of the Port Kennedy area. The PKDA Act set up an arrangement between original proponents (Fleuris Pty Ltd) and the State of Western Australia to deliver elements of public infrastructure as part of the overall development. The PKDA Act references delivery of:

- Marina
- A minimum of 100 moorings which will be available to the general public
- Service facilities and landings within the harbour.

2.2.2 Port Kennedy Development Act 2017

The PKDA Act was repealed in February 2018 by the *Port Kennedy Development Act 2017* (PKD Act). The PKD Act was established based on the revised land-based component of Port Kennedy development plan that was approved under the EP Act and Ministerial Statement No. 1019. The PKD Act is an agreement between the State of Western Australia and the proponent (Western Australia Beach and Golf Resort Pty Ltd (WABGR)) regarding the development of Kennedy Bay. A Sale and Development Agreement (SADA) was prepared consequent to the PKD Act and requires WABGR to develop several public work elements, including:

- Boat moorings
- Public jetty.

The provision of these facilities is therefore a requirement of the State Government.

2.2.3 Jetty Development Approval Application (2025)

A Development Application (DA) for the jetty has been lodged for determination by the WAPC. This application seeks approval for the jetty construction.

Once approved, conditions can be applied to the DA which may relate to:

- Jetty design
- Construction management
- Environmental monitoring and management in accordance with Referral Scoping Document and/or other management plans.

2.3 Conservation and Land Management Act 2016

The *Conservation and Land Management Act 1984* (CALM Act) allows for the provision of jetties (as public utility works) within Class A marine reserves (Section 13AA). The CALM Regulations (Part 2, Division 4, Regulation 34) specify that unauthorised buildings, including jetties, are not able to be erected or placed on CALM land, without a Lawful Authority (Part 1, Regulation 3) being obtained.

2.3.1 DBCA Lawful Authority approval

Approval for the jetty construction will be sought through the Department of Biodiversity, Conservation and Attractions (DBCA) Disturbance Approval System (DAS) which will enable DBCA to issue a Lawful Authority for the construction of the jetty. The Lawful Authority would be issued to manage short-term impacts and conditions associated with the construction of the jetty. These conditions could potentially include:

- Marine fauna management measures, including requirements for Marine Fauna Observers and actions to be undertaken should marine fauna come within proximity to the construction area
- Restriction on when piling could occur
- Requirement for the preparation and approval of a Construction Environmental Management Plan

2.3.2 DBCA Deed of Licence

Subsequent to the Lawful Authority approval, a Deed of Licence for the operation of the jetty will also be required from DBCA.

A Deed of Licence would be issued in relation to the operation of the jetty and will provide DBCA with a mechanism to approve management of jetty infrastructure within the Shoalwater Islands Marine Park. The Deed of Licence can specify management responsibilities and any monitoring/reporting requirements applicable to the project proponent.

2.3.3 Shoalwater Islands Marine Park Management Plan

The marine component of the Kennedy Bay jetty will be located within the SIMP. The DBCA approvals noted above would address the location of the site being within the SIMP.

2.4 Jetties Act 1926

The jetty will be managed and maintained in accordance with a Jetty Licence under the *Jetties Act 1926* and the *Jetty Regulations 1940*.

Under the *Jetties Act 1926* (Jetties Act), the Department of Transport (DoT) is responsible for issuing jetty licences for construction, maintenance and operation of private, commercial and community jetty use.

The Jetties Act requires licensing in respect of public safety standards and waterway navigation (DoT, 2023). The *Jetties Regulations 1940* (Jetties Regulations) specify implementation and management measures relevant to jetties.

A jetty licence application will be submitted to DoT after DA and Lawful Authority (DAS) approvals have been sought.

3 Project Location

The location of the proposed jetty was considered with respect to existing environmental conditions, and the land-based urban component of the Kennedy Bay development, including the following elements:

- Deeper water to facilitate safe vessel access and avoid the need for dredging
- Avoidance of sensitive benthic habitat areas.
- Separation from the Becher Point whitebait nursery which is located ~320 m to the west in the marine park exclusion zone
- Separation from the existing boat ramp of approximately 350 m
- Proximity to the Town Centre being developed as part of the project's residential estate at Kennedy Bay
- Location of construction laydown area within already-cleared lots within the Town Centre
- The land-based component falls within a C-Class Reserve (Reserve 44886) vested to the DPLH and managed by the City of Rockingham. This was preferred over the adjacent A-Class Reserve (Reserve 44004) which is vested and managed by DBCA.

4 Proposed Clearing Works

4.1 Proposed Clearing Works

Works will involve clearing 0.16 ha of vegetation to facilitate jetty construction adjacent to the infrastructure footprint. Design of the jetty, and use of cleared lots within the adjacent Town Centre for the construction laydown area, has minimised the amount of vegetation required to be cleared for the project.

Post-construction, the clearing footprint will be landscaped and revegetated with native species, where possible.

4.2 Clearing Schedule

Works are proposed to be commenced in late 2025.

4.3 Clearing Methodology

4.3.1 Pre-Clearing Works

Prior to clearing, the clearing footprint will be physically demarcated with flagging tape (or similar), to ensure no clearing is undertaken beyond what is required.

An Environmental Induction Note (Appendix 2) will be provided to contractors, outlining:

- Site environmental characteristics
- Access and fencing requirements, including clearing area delineation
- Vehicle speed limits
- Dust minimisation measures
- Fauna management measures, including Injured Fauna Protocol
- Disease and pathogen hygiene requirements
- Waste management measures
- Complaints process.

4.3.2 Clearing

Clearing will be undertaken via mechanical removal. Vegetation will be mulched and disposed of off-site. A watercart will be made available from the adjacent urban development area, to control dust emissions, if necessary, and to limit impacts to surrounding vegetation and nearby residences, noting the closest property is approximately 100 m southwest from the clearing footprint.

Clearing works will be supervised by a Fauna Consultant, who will implement fauna management protocols, if required, in accordance with the Environmental Induction Note (Appendix 2).

4.4 Alternatives Considered

The jetty location was selected and refined to minimise impacts to the local environment (Section 3). The use of nearby cleared areas for laydown purposes has also been identified to future reduce the extent of clearing required for construction (Section4.1).

5 Environmental Context

5.1 Landform and Topography

The topography within the jetty construction clearing footprint comprises a generally flat beach and an undulating foredune, with elevation ranging from 0-3 mAHD (Figure 4).

The onshore Landform Planning Units F1, I and BR1 within this location predominantly comprise low incipient foredunes backing the beach along Warnbro Sound (EC & ES, 1994).

5.2 Geomorphology, Geology and Soils

5.2.1.1 Soils and Geology

Regional scale geological mapping indicates that soils along the foreshore comprise of Safety Bay Sand, overlaying Tamala Limestone and Becher Sand (Figure 4). The regional sands are characterised as calcareous sand (S13) which consists of white, fine to medium grained, sub-rounded quartz and shell debris of eolian origin. These eolian dunes form part of the Quindalup Dune System (Gozzard, 1983).

5.2.1.2 Geomorphology

From a geomorphic viewpoint the scientific significance of Port Kennedy relates to the fact that it is one of the largest accumulations of Holocene sand in the region of the inner Rottnest Shelf coast of WA. This has produced a range of geomorphic features which, in conjunction, provide an opportunity to reconstruct sea-level history and geomorphic evolution of the Rockingham-Becher Plain (BBG, 1994).

Three geomorphic units are present in proximity to the construction clearing footprint (Figure 5), including:

- QuQf1: Foredune/blowout complexes (semi-erosional) with very low relief ridge and swale topography with deep uniform calcareous sands
- QuQf2: Relict foredunes and gently undulating beach ridge plain with deep uniform calcareous sands
- QuQf4: Relict foredunes forming a plain which is topographically lower than Qf2 and Qf3 with prominent ridges and swales. Swamps frequently occupy the swales. Deep calcareous sands with variable organic matter.

5.3 Hydrology

Based on the clearing footprint location being at the edge of the coastline, groundwater level will be approximately 0 mAHD.

There are no wetlands or other surface water features mapped within the proposed clearing footprint.

5.4 Flora and Vegetation

5.4.1 Pre-European Vegetation

5.4.1.1 Vegetation Systems

Broad scale mapping of pre-European vegetation was undertaken by Beard (1975) which recorded 75 major categories of plants. Shepherd et al. (2002) reassessed Beard's mapping and divided some of the larger vegetation units into smaller units, which then resulted in a total of 819 vegetation types being mapped across the state.

One Vegetation System Association (Rockingham_3048) is present within the site (Beard (1990), Landgate (2025a). Rockingham_3048 Vegetation System Association is described as 'shrublands; scrub-heath on the Swan Coastal Plain' (Government of Western Australia, 2019a after DAFWA, 2012).

Vegetation System Association 3048 occurs at 25.25% of the pre-European extent at a regional level (Table 4-1). Vegetation System Association 3048 is represented by greater than 10% of its original vegetation extent within Western Australia, the Swan Coastal Plan and Perth sub-regions and the City of Rockingham (Table 4-1).

Table 4-1: Vegetation System Association 3048 Statistics

Area	Pre-European Extent (ha)	Current Extent (ha) [% of pre-European extent]	Current Extent Protected for Conservation (ha) [% of current extent]	Site representation (ha) [% of current extent]
Western Australia (1b)	12,100.76	3,055.38 [25.25%]	7.03 [0.23%]	0.16 [0.005%]
Swan Coastal Plain (2b)	10,418.06	3,043.13 [29.21%]	8.10 [0.27%]	0.16 [0.005%]
City of Rockingham (4b)	9,147.49	2,735.19 [29.90%]	8.52 [0.31%]	0.16 [0.005%]

Source: Government of Western Australia (2019a)

5.4.2 Vegetation Complexes

Remnant vegetation at the site is representative of the Quindalup Complex, which is a 'coastal dune complex consisting of mainly two alliances – the strand and foredune alliance and the mobile and stable dune alliance. Local variations include the low closed forest of *Melaleuca lanceolata – Callitris preissii* and the closed scrub of *Acacia rostellifera* (Heddle et al. (1980), Landgate (2025a)).

Vegetation complexes are used by the EPA to determine regional representation of biodiversity (EPA, 2008). The EPA has an objective to retain 30% of the pre-clearing extent of each ecological community or at least 10% of the pre-clearing extent of each ecological community within defined constrained areas including the Perth Metropolitan Region (EPA ,2008).

The current extent of the Quindalup vegetation complex remains above the 30% threshold at a regional (Swan Coastal Plain and local (City of Rockingham) level (Table 4-2). The occurrence of all vegetation complexes over 10% at both the regional and local scale also meets the EPA's objective for vegetation protection.

Table 4-2: Vegetation Complexes Statistics

Area	Vegetation Complex	Pre-European extent (ha)	Current Extent (ha)	Site representation (ha)
Swan Coastal Plain	Quindalup	54,573.87	33,011.64 (60.49%)	0.16
City of Rockingham	Quindalup	11,061.73	4,129.76 (37.33%)	0.16

Source: Government of Western Australia (2019b)

5.4.3 Vegetation Assessment

5.4.3.1 Vegetation Type

Historical vegetation and flora surveys for the Kennedy Bay foreshore and surrounds have identified two vegetation types are potentially located within the construction clearing footprint (City of Rockingham, 2016; FVC, 2021; Table 5-3).

Table 5-3: Vegetation Types

Vegetation Type	Description
Acacia rostellifera tall closed shrubland	Shrubland of *Acacia rostellifera* over sparse native low shrubs and introduced herbs and grasses (Plate 5-1)
Mixed Coastal shrubland	A mixed shrubland comprising *Olearia axillaris, Rhagodia baccata, Lepidosperma gladiatum, Scaevola crassifolia, Acacia rostellifera* and *Acacia cyclops*, over introduced herbs and grasses (Plate 5-2)

Source: City of Rockingham (2016)

A botanical assessment specific to the Kennedy Bay jetty terrestrial footprint was undertaken by Del Botanics in spring 2024 (Appendix 3). This assessment confirmed that the *Acacia rostellifera* tall closed shrubland vegetation type was present within the proposed clearing extent (Plate 5-1; Figure 6). Vegetation types are consistent with finding of a spring 2021 botanical assessment in the Kennedy Bay foreshore area (FVC, 2021; Appendix 4).

Plate 5-1: Tall closed shrubland, represented by *Acacia rostellifera* with weedy understorey

Source: Coterra Environment (2024)

Plate 5-2:Mixed coastal shrubland, represented by *Spinifex longifolius* and *Olearia axillaris*

Source: Coterra Environment (2024)

5.4.3.2 Vegetation Condition

Vegetation condition in the construction clearing footprint ranges from 'Good' to 'Degraded' (Figure 7, Del Botanics, 2024), as defined by Keighery (1994):

- Good – Vegetation structure significantly altered by very obvious signs of multiple disturbance. Retains basic vegetation structure or ability to regenerate 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 revegetation 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.

Vegetation within the jetty construction clearing footprint is similar to surrounding vegetation within the foreshore (Plate 5-3; FVC, 2021).

Plate 5-3: Aerial Photograph of Vegetation within Jetty Construction Footprint

Source: MNG Access (2025) utilising Nearmaps imagery

5.4.3.3 Flora

21 flora species were identified within the site, none of which have conservation significance (Del Botanics, 2024; Table 5-4). The site contains 12 (57%) weed species, none of which are weeds of national significance (WONS) or declared plants under the *Biosecurity and Agriculture Management Act 2007* (Table 5-4).

Table 5-4: Flora species identified on site

Species	Common Name	Growth Form	Height (m)	% Cover
Acacia cyclops	Coastal Wattle	Shrub/Tree	0.8-4	Opportunistic
Acacia rostellifera	Summer-scented Wattle	Shrub/Tree	1-6	10-50
Acanthocarpus preissii		Herb	0.2-0.7	7
**Asphodelus fistulosus*	Onion Weed	Herb	0.2-0.4	
**Bromus diandrus*	Great Brome	Grass/Herb	0.2-0.7	80
**Cakile maritima*	Sea Rocket	Succulent/Herb	0.2-0.5	
Carpobrotus virescens	Coastal Pigface	Succulent	0.1-0.3	
**Corrigiola litoralis*	Strapwort	Herb	0.03-0.3	
**Euphorbia terracina*	Geraldton Carnation Weed	Herb	0.1-0.5	7
**Fumaria capreolata*	Whiteflower Fumitory	Herb	0.1-1	
**Lagurus ovatus*	Hare's Tail Grass	Grass/Herb	0.1-0.3	
**Lolium rigidum*	Wimmera Ryegrass	Grass/Herb	0.3-1	

Species	Common Name	Growth Form	Height (m)	% Cover
Olearia axillaris	Coastal Daisybush	Shrub	0.2-3	12
**Pelargonium capitatum*	Rose Pelargonium	Herb	0.1-1	
**Raphanus raphanistrum*	Wild Radish	Herb	0.15-1	
Scaevola crassifolia	Thick-leaved Fan-flower	Shrub	0.6-1.5	12
Senecio sp		Herb		
**Sonchus oleraceus*	Common Sowthistle	Herb	0.1-1.5	
Spinifex longifolius	Beach Spinifex	Grass/Herb	0.3-1	12
Spyridium globulosum	Basket Bush	Shrub	0.3-5	
**Tetragonia decumbens*	Sea Spinach	Shrub	0.1-0.3	7

Sources: Del Botanics (2024), Western Australian Herbarium (1998–)

5.4.3.4 Threatened and Priority Ecological Communities

No known threatened or priority ecological communities, threatened or priority flora species are present within the site.

5.5 Fauna and Habitat

The City of Rockingham identified three onshore fauna habitats within the Warnbro Sound area (Table 5-5).

Table 5-5: Fauna Habitat

Fauna Habitat	Supporting vegetation
Incipient dunes (newly developed foredunes)	Grassland and open heath vegetation types
Secondary dunes (established dunes developed from incipient dunes)	Shrubland and sedgeland vegetation types
Parkland/modified natural lagoon	Grassed area and modified natural water body for recreation use

Source: City of Rockingham (2016)

Based on the vegetation present within the construction clearing footprint, the foredune fauna habitat appears to be the only habitat present.

5.5.1.1 Conservation Significant Fauna

Based on previous studies (BBG, 1988; BCE, 2011; City of Rockingham, 2016), five species of conservation significant fauna which have been identified to have the potential to occur in the Kennedy Bay area:

- *Isoodon fusciventer* (Quenda) – Priority 4
- *Notamacropus irma* (Western Brush Wallaby) – Priority 4
- *Lerista lineata* (Perth Lined Lerista) – Priority 3
- *Neelaps calonotos* (Black-striped Snake) – Priority 3
- *Eudyptula minor* (Little Penguin) – regionally significant.

The construction clearing footprint is likely to be depauperate in fauna, based on the limited area and the degraded nature of vegetation.

5.6 Conservation Areas, Environmentally Sensitive Area and Ecological Linkages

The clearing footprint is located within a C-Class Reserve (Reserve 44886) for Public Recreation, vested to the DPLH and managed by the City of Rockingham.

Several conservation areas occur in proximity to the clearing footprint, including:

- Port Kennedy Scientific Park (Reserve 44077; Lot 138): 'A' Class Conservation Reserve for the conservation of flora and fauna managed by DBCA (south of clearing footprint along Port Kennedy Drive)
- Northern Coastal Conservation Reserve (Reserve 44044; Lot 134): A' Class Conservation Reserve for the conservation of flora and fauna managed by DBCA (immediately north of the clearing footprint).
- Coastal Reserve 44005 (Lot 135): 'C' Class Reserve for Public Recreation managed by City of Rockingham (south of clearing footprint adjacent to Reserve 44077).

The clearing area and surrounds falls within a mapped Environmentally Sensitive Area (ESA) associated with the Register of the National Estate. It is noted that the ESA trigger is referenced in the *Environmental Protection (Environmentally Sensitive Areas) Notice 2005* but this is no longer a statutory list with the Department of Climate Change, Energy, the Environment and Water advising that the register was closed in 2007, with all references to the register now having been removed from the *Environment Protection and Biodiversity Conservation Act 1999*.

5.7 Heritage

5.7.1 Indigenous Cultural Heritage

There are no registered Aboriginal heritage sites within or surrounding the clearing footprint.

The following Aboriginal heritage survey of the site was undertaken in 1988 as part of the formal environmental assessment for the site:

- Report on the Survey for Aboriginal Sites at the Port Kennedy Regional Recreation Centre Development, Warnbro Sound. Report prepared by R. O'Connor and G. Quartermaine, May 1988. Survey included Archaeological and Ethnographic components.

Archae- Aus undertook recent survey work associated with the overall Kennedy Bay development. No new Aboriginal cultural heritage sites were identified within the archaeological or ethnographic assessments (Archae- Aus, 2022). Three cultural features were identified by Noongar consultants within the broader Kennedy Bay development site, including:

- Cluster of women's trees (possible camp site) – within future urban development area
- Two clusters of grass trees (Balga; *Xanthorrhoea preissii*) – within golf course site.

Balga (*Xanthorrhoea preissii*) were also noted to be a locally occurring species which had cultural significance. No Balga were identified within the clearing footprint.

5.7.2 European Heritage

The Heritage Council – State Heritage Office identifies the following two sites within the surrounding area:

- Linear Wetlands located in the Quindalup Dunes at Port Kennedy. Place No. 10310
- Port Kennedy Scientific Area (Port Kennedy Scientific Park) located off Port Kennedy Drive, Port Kennedy. Place No. 03361.

These areas of heritage significance are not located within the site.

6 Assessment Against Native Vegetation Clearing Principles

An assessment of the proposed vegetation clearing against the ten native vegetation clearing principles contained in Schedule 5 of the EP Act suggests that the clearing proposed for the jetty development is not at variance with any of the ten clearing principles (Table 6-1).

Table 6-1: Assessment Against Clearing Principles

Clearing principle	Discussion	Assessment
(a) Native vegetation should not be cleared if it comprises a high level of biological diversity	Vegetation in the clearing footprint is dominated by *Acacia rostellifera*., which is common within the broader foreshore environment. The remaining vegetation is representative of coastal shrubland, including *Olearia axillaris, Scaevola crassifolia, Spinifex longifolius, Carpobrotus virescens, Acanthocarpus preissii, Spyridium globulosum, Senecio* sp and weed species (Section 5.4.3.3) (Del Botanics, 2024). Vegetation ranges in condition from Good to Degraded, with no conservation significant species being identified in spring 2024 (Del Botanics, 2024). Historical aerial photography suggests vegetation is remnant, however the area has been subject to disturbance from off road vehicles and constructed post-war shacks from 1965-1989 (Landgate, 2025b). As a result, the proposed clearing is not considered to be at variance with this principle.	The proposed clearing is not considered to be at variance with this principle.
(b) Native vegetation should not be cleared if it comprises the whole or a part of, or is necessary for the maintenance of, a significant habitat for fauna indigenous to Western Australia	The construction clearing footprint is likely to be depauperate in fauna, based on the limited area and the degraded nature of vegetation. The conservation significant species which are noted to be potentially present in the general area are not expected to occur within this location, or be reliant on this location for habitat. Available habitat is plentiful around the clearing footprint within the A-Class Reserves in the vicinity of the area (Reserve 44044 (Lot 134) and Reserve 44077 (Lot 138; Port Kennedy Scientific Park)). The 0.16 ha extent of clearing is not considered to significantly alter the extent of available habitat in the area and is not expected to significantly affect conservation significant fauna occurrence in the area. Fauna management protocols will also be implemented to ensure impact to fauna is minimal. On this basis, the proposed clearing is considered unlikely to be at variance with this principle.	The proposed clearing is considered unlikely to be at variance with this principle.
(c) Native vegetation should not be cleared if it includes, or is necessary for the continued existence of rare flora	No rare (threatened or priority) native flora have been identified within the clearing footprint (Del Botanics, 2024). Vegetation within the clearing footprint is in Good to Degraded condition, with high weed species diversity (Section 5.4.3.3) (Del Botanics, 2024). On this basis, the proposed clearing will not result in the clearing of rare flora.	The proposed clearing is not considered to be at variance with this principle.
(d) Native vegetation should not be cleared if it comprises the whole, or a part of, or is necessary for the maintenance of, a threatened ecological community	There are no threatened or priority listed ecological communities which occur within the vicinity of the site (FVC, 2021) and no TEC or PEC vegetation has been identified as potentially occurring within the clearing area. As a result, the proposed clearing will not impact threatened, or priority listed ecological communities.	The proposed clearing is not considered to be at variance with this principle.
(e) Native vegetation should not be cleared if it is significant as a remnant of native vegetation in an area that has been extensively cleared	Remnant vegetation within the area is mapped as the Quindalup Complex. The current extent of the Quindalup vegetation complex remains at 60.49% on the Swan Coastal Plain and at 37.33% within the City of Rockingham. The Quindalup Complex remains well above the 30% threshold at a regional (Swan Coastal Plain and local (City of Rockingham) level. The occurrence of all vegetation complexes over 10% at both the regional and local scale also meets the EPA's objective for vegetation protection. In addition, the Quindalup Complex is well represented in the vicinity of the clearing footprint, within protected reserves: • Port Kennedy Scientific Park (Reserve 44077; Lot 138): 'A' Class Conservation Reserve for the conservation of flora and fauna managed by DBCA (south of clearing footprint along Port Kennedy Drive) • Northern Coastal Conservation Reserve (Reserve 44044; Lot 134): A' Class Conservation Reserve for the conservation of flora and fauna managed by DBCA (immediately north of the clearing footprint). • Coastal Reserve 44005 (Lot 135): 'C' Class Reserve for Public Recreation. On this basis, vegetation within the clearing footprint is not considered significant as a remnant of native vegetation.	The proposed clearing is not considered to be at variance with this principle.
(f) Native vegetation should not be cleared if it is growing in, or in association with, an environment associated with a watercourse or a wetland	No surface water features (wetlands or watercourses) are present within or in proximity to the clearing footprint.	The proposed clearing is not considered to be at variance with this principle.
(g) Native vegetation should not be cleared if the clearing of the vegetation is likely to cause appreciable land degradation	The clearing works are being undertaken on a small scale, in a location that connects existing urban development to the marine environment. The location avoids areas of geomorphic significance and high dunes (i.e. the site is topographically flat, ranging in elevation from 0-3 m AHD (Section 5.1)). Potential impacts to surrounding vegetation and soils will be managed through standard construction management measures, to be outlined in the Environmental Induction Note (Appendix 1). As such, the proposed clearing is not expected to be at variance with this principle.	The proposed clearing is not considered to be at variance with this principle.

Clearing principle	Discussion	Assessment
(h) Native vegetation should not be cleared if the clearing of the vegetation is likely to have an impact on the environmental values of any adjacent or nearby conservation area	The clearing footprint is located within a 'C' Class Reserve for Public Recreation. The area is located between the coast and a Dual-Use Path that connects this 'C' Class Reserve with other reserves to the north and south, including two 'A' class Reserves for the conservation of flora and fauna. Vegetation pertaining to the Quindalup Complex occurs throughout all these reserves, and the extent of clearing associated with this proposal is not expected to significantly decrease the amount of vegetation within the surrounding area. Clearing works will use a watercart in response to dust emissions, should they occur, to lessen the impact of dust disturbing remnant vegetation around the site. In addition, landscaping and revegetation works will be undertaken in the clearing footprint post-construction. These works will consider the use of native vegetation representative of the local area (i.e. Quindalup Complex). As such, the proposed clearing is not considered to be at variance with this principle.	The proposed clearing is not considered to be at variance with this principle.
(i) Native vegetation should not be cleared if the clearing of vegetation is likely to cause deterioration in the quality of the surface or underground water	The proposed works are limited to the construction of jetty infrastructure, only. Jetty construction works do not require dewatering, or soil excavation works within the clearing footprint. Based on the scale and extent of clearing, no changes to surface water flows, or emissions to the environment (including groundwater) are anticipated.	The proposed clearing is not considered to be at variance with this principle.
(j) Native vegetation should not be cleared if the clearing of vegetation is likely to cause, or exacerbate, the incidence or intensity of flooding	The proposed works are limited to the construction of jetty infrastructure, only. Based on the scale and extent of clearing, no changes to surface water flows, or emissions to the environment (including groundwater) are anticipated.	The proposed clearing is not considered to be at variance with this principle.

7 Conclusion

Based on an assessment of the proposed clearing against the clearing principles, the project is not anticipated to be at variance to any of the 10 principles and is therefore not considered significant at a local or regional scale.

8 References

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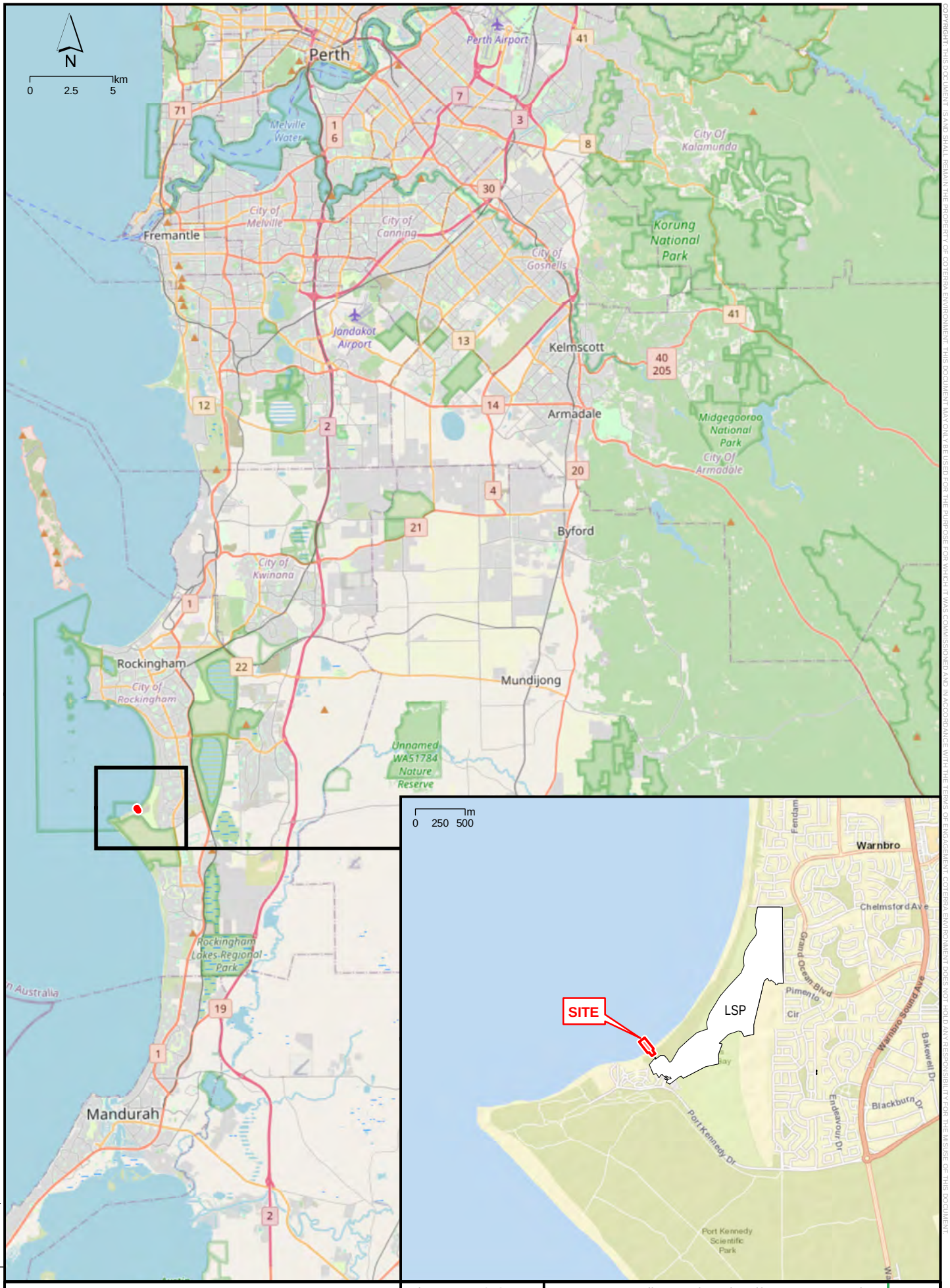

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Western Australia Beach and Golf Resorts Pty Ltd
NVCP APPLICATION REPORT
KENNEDY BAY DEVELOPMENT, KENNEDY BAY

REGIONAL LOCATION

Figure 1

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LEGEND

- Site Boundary
- Development Envelope
- Construction Clearing Footprint
- Cadastre
- Proposed Jetty
- Buried Seawall
- Potential Laydown Area
- 2020 Erosion Hazard Line
- 2030 Erosion Hazard Line
- 2070 Erosion Hazard Line
- 2120 Erosion Hazard Line
- Port Kennedy Exclusion Zone
- Shoalwater Islands Marine Park
- Foreshore Zone Boundary
- Foreshore Open Space
- Conservation Reserve
- Foreshore Reserve

N

0 12.5 25 50 75 100 m

Scale: 1:2,000 @ A3
GDA 1994 MGA Zone 50

SHOALWATER ISLANDS MARINE PARK

PORT KENNEDY EXCLUSION ZONE

CONSTRUCTION CLEARING FOOTPRINT

POTENTIAL LAYDOWN AREA

POTENTIAL LAYDOWN AREA

TOWN CENTRE

KENNEDY BAY BOAT LAUNCHING FACILITY

Bridport Pnt

Ocean Point Cl

Jetty Pl

Sunset Cove

Wave Cove

Long Beach Rise

Ski Ct

Bay Links Bvd

Source: Cadastre - Landgate
Orthophoto - NearMaps, 02.04.24

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NVCP APPLICATION REPORT
KENNEDY BAY DEVELOPMENT, KENNEDY BAY

SITE LOCATION

Figure 2

LEGEND

- Development Envelope
- Development Footprint
- Construction Clearing Footprint
- Shoalwater Islands Marine Park
- Port Kennedy Exclusion Zone
- Cadastre
- Proposed Jetty
- Buried Seawall
- Potential Laydown Area

N

0 12.5 25 50 75 100 m

Scale: 1:2,000 @ A3
GDA 1994 MGA Zone 50

SHOALWATER ISLANDS MARINE PARK

DEVELOPMENT ENVELOPE

DEVELOPMENT FOOTPRINT

CONSTRUCTION CLEARING FOOTPRINT

PORT KENNEDY EXCLUSION ZONE

KENNEDY BAY BOAT LAUNCHING FACILITY

LOT 209

POTENTIAL LAYDOWN AREA

LOT 3019

POTENTIAL LAYDOWN AREA

LOT 3026

TOWN CENTRE

Ocean Point Cl

Bridport Prt

Jels Pl

Sunset Cove

Wave Cove

Long Beach Rise

Ski Ct

Bay Links Blvd

Source: Cadastre - Landgate
Orthophoto - NearMaps, 02.04.24

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Western Australian Beach and Golf Resorts Pty Ltd
NVCP APPLICATION REPORT
KENNEDY BAY DEVELOPMENT, KENNEDY BAY

PROPOSAL ELEMENTS

Figure 3

LEGEND

- Site Boundary
- Development Envelope
- Construction Clearing Footprint
- Shoalwater Islands Marine Park
- Cadastre
- Proposed Jetty
- Buried Seawall
- Potential Laydown Area
- 2120 Erosion Hazard Line
- Contour (mAHD)

Soils

- S13: CALCAREOUS SAND - white, fine to medium-grained, sub-rounded quartz and shell debris, of eolian origin.

N

0 12.5 25 50 75 100 m

Scale: 1:2,000 @ A3
GDA 1994 MGA Zone 50

SHOALWATER ISLANDS MARINE PARK

PORT KENNEDY
EXCLUSION ZONE

KENNEDY BAY BOAT
LAUNCHING FACILITY

CONSTRUCTION
CLEARING
FOOTPRINT

POTENTIAL
LAYDOWN AREA

POTENTIAL
LAYDOWN AREA

TOWN CENTRE

S13

0

5

5

Ocean Point Cl

Bridport Pnt

Jetty Pl

Sunset Cove

Wave Cove

Long Beach Rise

Ski Ct

Bay Links Blvd

Source: Cadastre - Landgate
Orthophoto - NearMaps, 02.04.24
Geology - DoIR: Geological Survey of W.A., 1999

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NVCP APPLICATION REPORT
KENNEDY BAY DEVELOPMENT, KENNEDY BAY

TOPOGRAPHY, GEOLOGY AND SOILS

Figure 4

LEGEND

- Site Boundary
- Development Envelope
- Construction Clearing Footprint
- Cadastre
- Shoalwater Islands Marine Park
- Proposed Jetty
- Buried Seawall
- Potential Laydown Area
- 2120 Erosion Hazard Line

Geomorphic Mapping

- QuQf4: Relict foredunes forming a plain which is topographically lower than Qf2 and Qf3 with prominent ridges and swales. Swamps frequently occupy the swales. Deep calcareous sands with variable organic matter.
- QuQf1: Foredune/blowout complexes (semi-erosional) with very low relief ridge and swale topography with deep uniform calcareous sands.
- QuQf2: Relict foredunes and gently undulating beach ridge plain with deep uniform calcareous sands.

N

0 12.5 25 50 75 100 m

Scale: 1:2,000 @ A3
GDA 1994 MGA Zone 50

SHOALWATER ISLANDS MARINE PARK

PORT KENNEDY EXCLUSION ZONE

KENNEDY BAY BOAT LAUNCHING FACILITY

CONSTRUCTION CLEARING FOOTPRINT

QuQf4

QuQf1

POTENTIAL LAYDOWN AREA

POTENTIAL LAYDOWN AREA

QuQf2

TOWN CENTRE

Ocean Point Cl

Bridport Prt

Jetti Pl

Sunset Cove

Wave Cove

Long Beach Rise

Ski Ct

Bay Links Blvd

Source: Cadastre - Landgate
Orthophoto - NearMaps, 02.04.24
Geomorphic Mapping - DPIRD

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Western Australia Beach and Golf Resorts Pty Ltd
NVCP APPLICATION REPORT
KENNEDY BAY DEVELOPMENT, KENNEDY BAY

GEOMORPHIC MAPPING

Figure 5

LEGEND

- Construction Clearing Footprint
- Site Boundary
- Development Envelope
- Cadastre
- Shoalwater Islands Marine Park
- Proposed Jetty
- Buried Seawall
- Potential Laydown Area
- Quadrat (Del Botanics, 2024)
- Quadrat (FVC, 2021)

Vegetation Type

- *A rostillifera*

N

0 10 20 40 60 80 m

Scale: 1:1,500 @ A3
GDA 1994 MGA Zone 50

SHOALWATER ISLANDS MARINE PARK

PORT KENNEDY EXCLUSION ZONE

CONSTRUCTION CLEARING FOOTPRINT

Q1

Q2

PK07■

PK08■

PK09■

PK10■

PK11■

BURIED SEAWALL

POTENTIAL LAYDOWN AREA

POTENTIAL LAYDOWN AREA

TOWN CENTRE

Ocean Point Cl

Long Beach Rise

Jets Pl

Sunset Cove

Wave Cove

Source: Cadastre - Landgate
Orthophoto - NearMaps, 02.04.24

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Western Australia Beach and Golf Resorts Pty Ltd
NVCP APPLICATION REPORT
KENNEDY BAY DEVELOPMENT, KENNEDY BAY

VEGETATION TYPE

Figure 6

LEGEND

- Site Boundary
- Development Envelope
- Construction Clearing Footprint
- Shoalwater Islands Marine Park
- Cadastre
- Proposed Jetty
- Potential Laydown Area
- Buried Seawall
- Quadrat (Del Botanics, 2024)
- Quadrat (FVC, 2021)

Vegetation Condition

- Good
- Degraded

N

0 10 20 40 60 80 m

Scale: 1:1,500 @ A3
GDA 1994 MGA Zone 50

SHOALWATER ISLANDS MARINE PARK

PORT KENNEDY EXCLUSION ZONE

CONSTRUCTION CLEARING FOOTPRINT

BURIED SEAWALL

POTENTIAL LAYDOWN AREA

POTENTIAL LAYDOWN AREA

TOWN CENTRE

Q1

Q2

PK07■

PK08■

PK09■

PK10■

PK11■

Ocean Point Cl

Long Beach Rise

Jets Pl

Sunset Cove

Wave Cove

Source: Cadastre - Landgate
Orthophoto - NearMaps, 02.04.24
Vegetation - FVC & City of Rockingham

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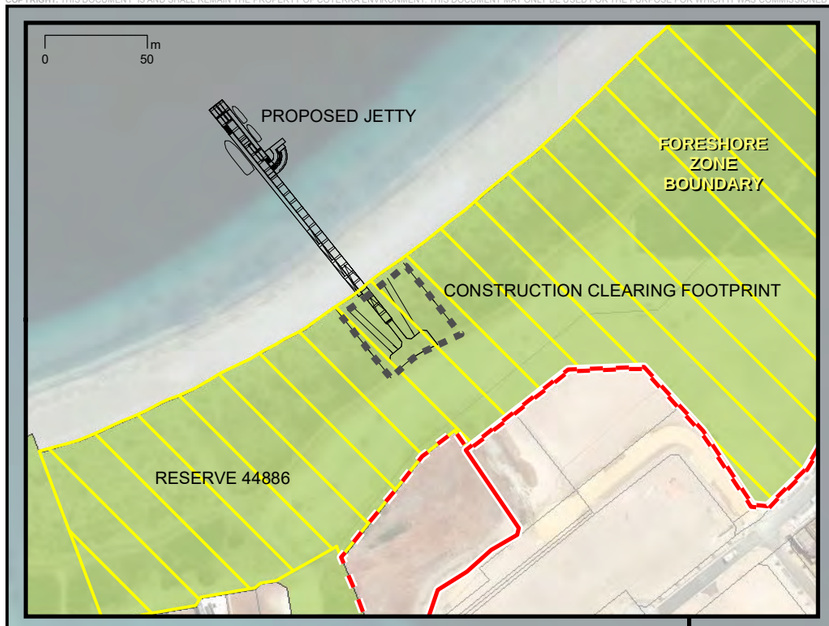
Western Australia Beach and Golf Resorts Pty Ltd
NVCP APPLICATION REPORT
KENNEDY BAY DEVELOPMENT, KENNEDY BAY

VEGETATION CONDITION

Figure 7



RESERVE 44005

RESERVE 44004

RESERVE 44886

CHELMSFORD AV

GRAND OCEAN BVD

WARNBRO SOUND AV

PORT KENNEDY DR

RESERVE 44077

LEGEND

- Site Boundary
- LSP Boundary
- Construction Clearing Footprint
- Cadastre
- Railway
- Proposed Jetty
- Ecological Linkages
- Foreshore Zone Boundary
- Coastal Reserve 44005 (Lot 135): 'C' Class Reserve for Public Recreation
- Northern Coastal Conservation Reserve (Reserve 44004; Lot 134): 'A' Class Conservation Reserve
- Reserve 44886; Lot : 'C' Class Reserve for Public Recreation
- Port Kennedy Scientific Park (Reserve 44077; Lot 138): 'A' Class Conservation Reserve

Bushland Policy

- SPP 2.8 Bush Forever Areas
- SPP 2.8 Bush Forever Reserves (existing or proposed)
- SPP 2.8 Conservation Category Wetlands in Bush Forever Areas
- SPP 2.8 Government Lands or Public Infrastructure in Bush Forever Areas

N

0 100 200 400 600 800 m

Scale: 1:15,000 @ A3
GDA 1994 MGA Zone 50

Source: Cadastre - Landgate
Bushland Policy - DPLH
Orthophoto - Open Source
Ecological Linkages - DBCA

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Western Australia Beach and Golf Resorts Pty Ltd
NVCP APPLICATION REPORT
KENNEDY BAY DEVELOPMENT, KENNEDY BAY

CONSERVATION AREAS AND ECOLOGICAL LINKAGES

Figure 8

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Appendix 1 EPA Decision and Chair Determination

GOVERNMENT OF WESTERN AUSTRALIA

Environmental Protection Authority

Environmental Protection Act 1986

Section 38G(1)(b)

NOTICE OF DECISION NOT TO ASSESS A PROPOSAL

PERSON TO WHOM THIS NOTICE IS GIVEN

(a) Western Australian Beach and Golf Resort Pty Ltd (ACN 89 097 109 067)
C/O RYA Pty Ltd
92 Outram Street
WEST PERTH WA 6005

(b) Relevant Decision-Making Authorities, see Attachment 1

PROPOSAL TO WHICH THIS NOTICE RELATES:

Kennedy Bay Public Jetty

Pursuant to s. 38G(1) of the *Environmental Protection Act 1986* (EP Act), the Environmental Protection Authority (EPA) has decided the following:

Referral examined, preliminary investigations and inquiries conducted. Proposal not to be assessed under Part IV of the EP Act – Advice given.

The EPA has examined the proposal and carried out preliminary investigations and inquiries and considers that the proposal raises a number of environmental issues. However, the environmental effect of the proposal is not so significant as to require assessment by the EPA, and the subsequent setting of formal conditions by the Minister for Environment under Part IV of the *Environmental Protection Act 1986* (EP Act). Nevertheless, the EPA expects that the proposal will be implemented in an environmentally responsible way to ensure consistency with the EPA objectives for environmental factors and has provided advice on the environmental aspects of the proposal.

APPEAL RIGHTS:

There are no rights of appeal under the EP Act in respect of this decision.

Darren Walsh
CHAIR
Delegate of the Environmental Protection Authority

13 May 2025

Prime House, 8 Davidson Terrace Joondalup, Western Australia 6027
Postal Address: Locked Bag 10, Joondalup DC, Western Australia 6919
Telephone: (08) 6364 7000 | Facsimile: (08)6364 7001| Email: info.epa@dwer.wa.gov.au
Website: www.epa.wa.gov.au

Attachment 1

Relevant Decision-Making Authorities

DMA	Legislation and approval
Minister for Lands	*Land Administration Act 1997* - s. 79 lease of Crown land - s. 91 licence over Crown land - s. 144 easement over Crown land
Chief Executive Officer, Department of Biodiversity, Conservation and Attractions	*Conservation and Land Management Act 1984* - Permit/lease/licence within a marine park
Chief Executive Officer, Department of Transport	*Marine Navigational Aids Act 1973* and Navigable Waters Regulations 1958 - Regulation 8 permission to throw into or place things in port, harbour or navigable waters *Jetties Act 1926* - s. 7 licence for erection, construction, maintenance or use of jetty
Chief Executive Officer, Department of Water and Environmental Regulation	*Environmental Protection Act 1986* - Part V clearing permit
Chair, Western Australian Planning Commission	*Planning and Development Act 2005* - Development approval

GOVERNMENT OF WESTERN AUSTRALIA

Environmental Protection Authority

Public record pursuant to s. 39 of the *Environmental Protection Act 1986*

Proposal title: Kennedy Bay Public Jetty

Proposal description: The proposal is for constructing and operating a recreational jetty in Port Kennedy, located in south Warnbro Sound with the City of Rockingham, Western Australia. The proposal will provide:

- an elevated main deck
- low-level short-stay vessel berth
- central jetty 'node' to include a diving platform, terracing, stairs, swimming platform, ladders
- demarcated swimming area.

Proposal location: Port Kennedy, City of Rockingham, Western Australia

CMS number: APP-0025750

Date referral received: 22-10-2024

Date more information received: 21-02-2025

Referrer: Western Australia Beach and Golf Resort Pty Ltd

Proponent: Western Australia Beach and Golf Resort Pty Ltd

Potential significant effects: There are potential impacts on marine fauna from underwater noise, vessel strike, entanglement and artificial light; benthic communities and habitats and marine environmental quality from piling and construction activities; flora and vegetation from clearing; and social surroundings associated with construction and operation.

Preliminary key environmental factors: benthic communities and habitats, marine environmental quality and marine fauna.

Public comment on referral information:

Do not assess:		0
Assess:	a) Referral information	0
	b) Environmental review - no public review	1
	c) Public environmental review	1
	Total submissions:	2

Decision: s. 38G(1) – Not assess.

Summary of reasons pursuant to s. 38G(1)(c)

The EPA has decided not to assess the proposal because:

- The EPA considers the likely environmental effects of the proposal are not so significant or unmitigated as to warrant formal assessment under Part IV of the EP Act.
- The EPA's decision has been made based on the proponent implementing the proposal in accordance with:
  - the proposal content document
  - the marine fauna observer procedures set out in Appendix F to the referral supporting document
  - the marine construction management framework set out in Appendix G to the referral supporting document

- the marine operational environmental management framework set out in Appendix H to the referral supporting document.

Any changes to elements of the referred proposal during its implementation which are likely to result in significant environmental effects may result in a new referral being required for that different proposal.

Construction elements

- The proposal has been located so that direct impacts to benthic communities and habitat (BCH) from piling is within areas of macroalgae and sand/silt substrate. No seagrass will be impacted.
- The EPA considered the sediment assessment which indicated that any release of sediment into the water column during construction is not likely to increase contaminants or toxicants to levels higher than baseline.
- Implementation of marine fauna management and exclusion zones; dedicated marine fauna observers; and pre- and soft-start and shutdown procedures as specified in the proponent's referral will minimise effects from underwater noise.
- In addition, the timing of construction of the proposal has considered important ecological windows of key marine fauna species, including that no piling works will be undertaken during June to mid-October to avoid:
  - peak Australian sealion abundance
  - peak little penguin guarding
  - peak whitebait spawning period
  - humpback whale migration
  - southern right whale calving period.
- Potential impacts to BCH, marine environmental quality and marine fauna are likely to be localised, temporary and minor, noting the small extent of the footprint and limited intensity of the construction activities.

Operational elements

- The EPA acknowledges that little penguins are at risk of collision with recreational vessels within Warnbro Sound and that the proposal may attract recreational vessels to remain within the south Warnbro Sound area. However, noting that the proposal does not include additional boat launching facilities, or vessel moorings, it is not likely that the proposal will result in material increase in recreational vessel traffic within the vicinity of the proposal area.
- The EPA considered cumulative impacts of the proposal with other activities within Warnbro Sound and the City of Rockingham area. Noting the small and limited scale of impacts likely from the proposal, it is unlikely to contribute significantly to cumulative impacts in the area.
- The EPA does not consider that the proposal impacts will combine or interact in a holistic way which requires assessment by the EPA.

Public advice

The EPA publishes the following public advice for the benefit of other decision-making authorities to ensure that their statutory decision-making processes achieve and assure environmental outcomes consistent with the EPA's environmental factor objectives:

- The proponent's marine fauna observer procedures, marine construction environmental management, and specifications about construction activities and timing are material to ensuring the proposal is not likely to have a significant impact on the environment.

The EPA publishes the following public advice about the state of the environment in the proposal area for the benefit of future proponents and the community:

- Recent population estimates of little penguins from Penguin Island during September to November 2023 by Dr Belinda Cannell indicated that there are 114 individuals utilising the area for foraging, which is a significant decline (94%) since the highest estimate in 2008. The study highlighted that population declines may be attributed to various factors, including reduced food availability, increasing terrestrial temperatures, impact to nest site access, recreational vessel strike injury, and predation. This has led to changes in little penguin breeding behaviour and success, and changes to the mortality rate of fledglings and adults.
- In light of the above, the EPA notes the prevalence of the existing pressures from recreational vessels on little penguins within Shoalwater Island Marine Park and surrounds, particularly through summer and spring. Whilst the referred proposal is not likely to materially increase recreational vessel traffic within the vicinity of the proposal area, the EPA recommends practical strategies be applied in the general use zone of the Shoalwater Island Marine to respond to any potential increased pressures from vessels using the proposal. This may include DBCA considering whether to apply vessel speed limits to additional areas, as an example of a strategy currently provided for in the Shoalwater Island Marine Park Management Plan.
- Given the location of the proposal and in light of strategies set out in the Shoalwater Island Marine Park Management Plan in relation to the little penguin, the EPA supports the proponent and DBCA collaborating with a view to amending the Shoalwater Island Marine Park boundary to include the Port Kennedy exclusion area in the marine park.

Material information considered by the EPA in this decision

The EPA has considered the following material information in making its decision:

- Referral (22 October 2024)
- Referral Supporting Document (O2 Marine, 1 November 2024) and appendices
  - Appendix A: Hydrobiology 2022, Baseline Marine Environmental Assessment, Ref: P21027
  - Appendix B: Del Botanics Environmental Consulting 2024, Flora and Vegetation Survey
  - Appendix C: Marine Fauna Desktop Report (O2 marine 2024)
  - Appendix E: ANV Consultants 2024, Underwater Piling Noise Modelling, Ref: 755.23062-R01-v1.0

- Appendix D: Boating Guide South Metropolitan (DoT 2023)
- Appendix F: O2 Marine 2024, Marine Fauna Observer Procedures, Ref: 24ENV322 / R240333
- Appendix G: O2 Marine 2024, Marine Construction Environmental Management, Ref: 24ENV322 / R240333
- Appendix H: O2 Marine 2024, Marine Operation Environmental Management, Ref: 24ENV322 / R240333

- Additional information to referral supporting document (Coterra 2025)
- Population estimate of the little penguin colony on Penguin Island during September to November 2023 (Cannell 2024)
- Information from agencies regarding their statutory decision-making processes
- EP Act s.3, s.4, and Part IV, Admin Procedures, EPA factor and technical guidance

Appeals: There are no rights of appeal under the EP Act in respect of this decision.

Darren Walsh
Chair
Delegate of the Environmental Protection Authority **Date: 13 May 2025**

Appendix 2 Environmental Induction Note

Our Ref: WABKEN21
Date: 4 June 2025

COTERRA ENVIRONMENT
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info@coterra.com.au

MEMORANDUM

TO:	Environmental and Construction Contractors
FROM:	Coterra Environment
PROJECT NAME:	Kennedy Bay – Jetty Construction
SUBJECT:	Environmental Induction Note

The development of the Kennedy Bay jetty was determined as 'Not Assessed' by the Environmental Protection Authority under part IV of the *Environmental Protection Act 1986* (EP Act), and an approval to clear vegetation is therefore required under part V of the EP Act to construct the jetty.

The Proponent, represented by the Place Development, is bound to undertake management actions to manage potential impacts to the surrounding environment.

This Environmental Induction Note should be provided to all construction personnel to:

- Ensure knowledge and appropriate environmental controls are applied to the revegetation process
- Adequately implement measures to protect the environment
- Minimise impacts to native vertebrate fauna within the works areas
- Ensure personnel working onsite are aware of injured fauna protocol
- Comply with the project's environmental requirements.

Table 1: Roles and Responsibilities

Name	Company	Position	Contact Details
Reyne Dial	Place Development (on behalf of Western Australia Beach and Golf Resort)	Development Manager – Residential Development	reyne@placedevelopment.com.au 0447 170 500
Peter Doust	Westpeak Engineering	Coastal Engineer (Jetty)	p.doust@westpeakeng.com.au 0432 965 579
Aaron Pereira	Cossill & Webley	Civil Engineer (Residential Development)	aaronp@cosweb.com.au 0422 529 837
To be appointed	To be appointed	Construction Contractor	To be appointed
Kristen Watts	Coterra Environment	Environmental Consultant	kristen.watts@coterra.com.au 0408 094 747 / 9381 5513
Catherine Rea	Coterra Environment	Environmental Consultant	catherine.rea@coterra.com.au 9381 5513

This Environmental Induction Note outlines:

- Site environmental characteristics
- Access and fencing requirements, including clearing area delineation
- Vehicle speed limits
- Dust minimisation measures
- Fauna management measures, including Injured Fauna Protocol
- Disease and pathogen hygiene requirements
- Waste management measures
- Complaints process.

Management actions are consistent with those detailed in approved Kennedy Bay management plans, including:

- Foreshore Management Plan – Kennedy Bay Stage 2 [Rev 2] (Coterra Environment, 2025)
- Fauna Relocation and Management Plan – Kenndy Bay Local Structure Plan Area [Rev 0] (Coterra Environment, 2023).

Conservation Zones

Reserve 44004 (Lot 134) is an A-Class Reserve (light green shaded area on Plate 1) for the protection and conservation of vegetation and flora.

- No personnel or equipment are permitted to enter or otherwise disturb this area

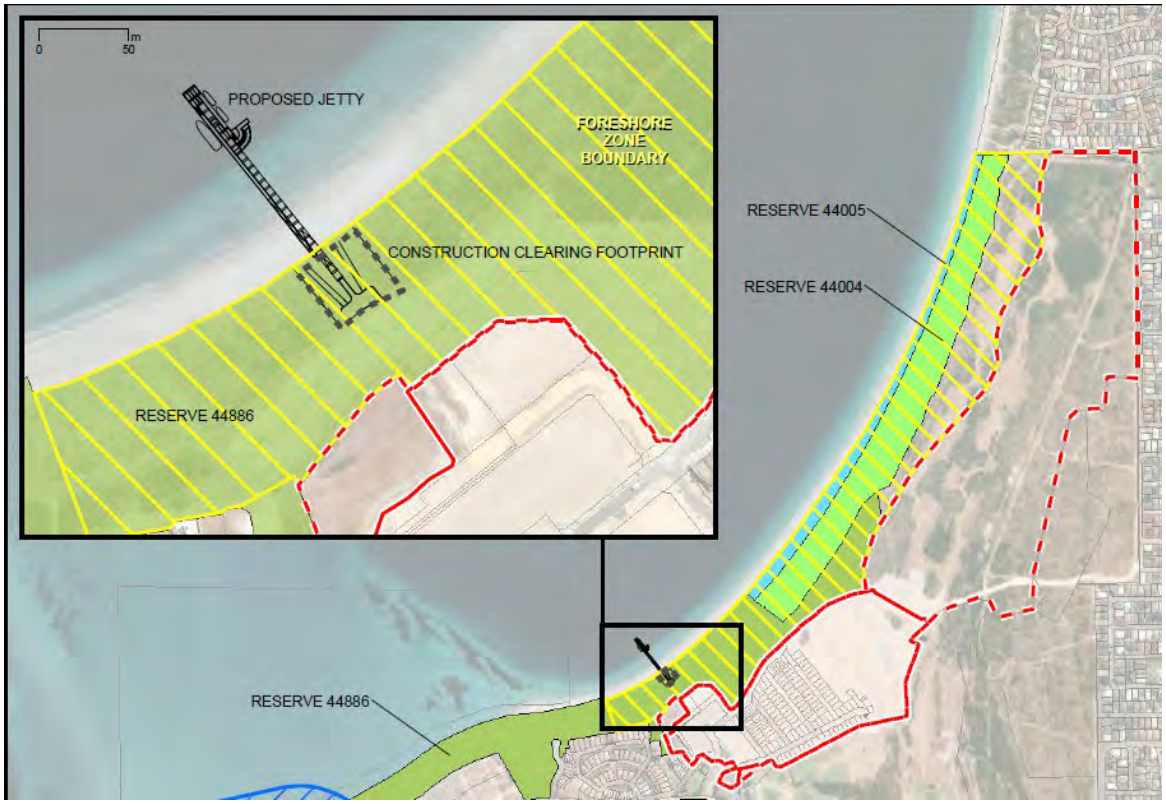

Plate 1: Reserve 44004 in relation to construction clearing footprint

Source: Coterra Environment (2025)

Site Environmental Characteristics

Vegetation and Flora

Vegetation at the site comprises shrublands over sparse native low shrubs and introduced herbs and grasses (Plate 2 and Plate 3).

Plate 2: Tall closed shrubland, represented by *Acacia rostellifera* with weedy understorey

Source: Coterra Environment (2025)

Plate 3: Aerial Photograph of Vegetation within Jetty Construction Footprint

Source: MNG Maps (2024) utilising Nearmaps imagery

Fauna and Habitat

Based on the vegetation present within the construction clearing footprint, limited foredune fauna habitat appears likely to be present.

Fauna, including birds, ground-dwelling mammals and lizards could be present in the construction clearing area.

Delineation of Works Areas

The construction clearing footprint is to be operated and managed in accordance with the Construction Environmental Management Plan (CEMP) (in preparation).

- The clearing footprint is to be physically demarcated with flagging tape prior to clearing.

Access and Fencing

- Suitable fencing (temporary fencing) is to be located around the construction clearing footprint, to ensure no inadvertent damage is caused to vegetation beyond the approved clearing area.
- Prior to and during construction, unauthorised access to foreshore construction areas is to be prevented through installation and maintenance of temporary fencing and signage.

Vehicle Movement

- Vehicles accessing the site to undertake the clearing works must be restricted to the clearing and construction area footprint to prevent disturbance to vegetation beyond these boundaries.
- Vehicle movements are to be restricted to speeds of 25 km/hour within construction/revegetation areas.
- Vehicles are to remain within the construction area and will not be permitted to access other parts of the coastal zone

Dust Minimisation

- The contractors will visually assess the generation of dust during the clearing works. A water cart is to be available to attend the site, should it be required to be used in the event of wind-born nuisance dust being created.
- Wind barriers may be utilised by construction contractors during works to prevent transport of dust offsite. The need for these barriers/fencing is to be assessed prior to construction commencing and be included in construction contracts where necessary
- Site stabilisation is to be undertaken post-construction, as necessary.

Fauna Management

The following actions must be undertaken by all parties to minimise fauna impact during clearing and construction:

- A fauna consultant, who has obtained a Regulation 28 licence from the Department of Biodiversity, Conservation and Attractions (DBCA)), must be present on site and throughout the clearing process, to capture/relocate any vertebrate fauna, as necessary
- Feral fauna attractants and potential native fauna traps, such as open skip bins, are to be minimised during and post-construction. Contractors must be directed to dispose of food waste within sealed bins to avoid attracting fauna to the area.
- Should any native fauna be injured during the clearing of vegetation, the project fauna consultant is to be notified and will provide instructions. For fauna capable of being rehabilitated and subsequently released into the natural environment the fauna consultant will deliver the animal to a wildlife carer or undertake any other actions as advised by the DBCA's Wildcare Helpline (9474 9055)

Disease and pathogen hygiene requirements

Weeds

During construction, measures are to be undertaken to ensure the prevention or spread of weeds within the project area.

Equipment and vehicles are to be subject to weed hygiene inspections prior to entry to and upon exit from site to ensure there is no transport of weeds to or from the site.

Specific weed hygiene and management measures will be included in the CEMP (in preparation).

Phytophthora cinnamomi (Dieback)

To prevent inadvertent spread of plant diseases (i.e. *Phytophthora cinnamomi*), the following protocol are to be undertaken:

- All vehicles, tools, equipment and machinery to be clean on entry and clean on exit from the site
- Contractors' footwear should be free of material to prevent soil spread onto/off the site
- Vehicles, equipment and machinery to remain within designed work areas only
- If weeds are being manually removed, they should be immediately placed in waste bins for offsite disposal
- Soil disturbance during firebreak construction/maintenance will be minimised. Mowing/slashing or applying herbicide treatment is preferable to grading or ploughing.

Polyphagous Shor-Hole Borer

As of the 6 September 2024, a Quarantine Area Notice (QAN) restricting the movement of wood and plant material has been put in place to help stop the spread of Polyphagous Shot-hole Borer (PSHB) (DPIRD, 2024a). The Quarantine Area encompasses two zones, including:

- Zone A covers an area with high numbers of infested trees and where intensive control activities such as tree removal are underway. This zone will have more restrictions on the movement of high-risk materials.
- Zone B covers an area with fewer or no infested trees and where heightened surveillance is underway to identify and control new infestations. This zone will help create a buffer between areas of high infestations and the rest of WA, further protecting WA's growing areas.

The site is located in Zone B (DPIRD, 2024a). Restrictions apply to Zone B, include:

- Cannot move untreated or unseasoned wood from Zone A into Zone B, unless chipped to pieces that are 2.5 cm or less in diameter
- Cannot move plant materials, including living plants, that are greater than 2 cm in diameter from Zone A into Zone B
- Cannot move untreated or unseasoned wood outside the Quarantine Area (i.e. outside of Zone A or Zone B), unless chipped to pieces that are 2.5 cm or less in diameter
- Cannot move plant materials, including living plants, that are greater than 2 cm in diameter outside the Quarantine Area
- Can move wood or plant materials, including living plants, into Zone A
- Must ensure any machinery used to handle green waste is cleaned before it can be moved from Zone A to Zone B or moved from either of these zones to outside of the Quarantine Area (DPIRD, 2024a).

Exemptions to the above include:

- Nursery stock from nurseries within the quarantine area which has been inspected by a staff member who has completed the PSHB Nursery Stock Inspection Course (Polyphagous shot-hole borer training | Agriculture and Food) is exempt from the above requirements
- Green waste can be taken to DPIRD-approved waste sites (pshb_approved_waste_sites.pdf). Green waste transported to these facilities must be securely transported in a fully sealed and covered skip bin, trailer, or truck.
- It is also noted that a permit can be obtained from DPIRD if the conditions of the PSHB Quarantine Area Notice cannot be met.

These measures are to be taken into account to ensure all mulching and disposal of cleared vegetation complies with the DPIRD quarantine controls. In addition, if PSHB is identified on site, it must be reported to DPIRD and/or a permit may be required if QAN conditions cannot be met (DPIRD, 2024a).

To assist with the implementation of the above, contractors will be provided with information as part of the Environmental Induction Note regarding how to identify potential PSHB and will be provided with a copy of the DPIRD '*Biosecurity alert: Polyphagous shot-hole borer*' fact sheet (DPIRD, 2024c).

Contractors will be advised that should any suspected PSHB signs be observed on site (Plate 4), they are to immediately notify the site superintendent, project landscape consultant and project environmental consultant. The City of Rockingham and DPIRD will then be immediately informed of the potential PSHB observations by the project landscape or environmental consultant.

Plate 4: Polyphagous shot-hole borer attack example images

Source: DPIRD (2024d)

Complaints Procedure

Should any complaints be received during or after construction works, details are to be recorded in a dedicated complaints register:

- Name and contact details of the complaint
- Date and time of the complaint, and the date and time of the associated dust nuisance
- Details of the complaint and effect on premises.

For each compliant received, an investigation into the matter is to be undertaken, with subsequent implementation (if necessary) of contingencies, including, but not limited to:

- Wind fencing installation
- Application of hydromulch
- Adjusting timing of works to avoid dry and windy weather conditions.

The investigation and management measures undertaken (if any) will be recorded in the complaints register. A copy of the complaints register will be made available to the City of Rockingham upon request.

References

Department of Primary Industries and Regional Development (DPIRD) (2024a). *Polyphagous Shor-Hole Borer.* Government of Western Australia, Perth, Western Australia. [Online]. Available at: https://www.agric.wa.gov.au/borer

Department of Primary Industries and Regional Development (DPIRD) (2024b). *Polyphagous shot-hole borer: Which plants are affected?* Government of Western Australia, Perth, Western Australia. [Online]. Available at: Polyphagous shot-hole borer: Which plants are affected?

Department of Primary Industries and Regional Development (DPIRD) (2024c). *Biosecurity alert: Polyphagous shot-hole borer.* Government of Western Australia, Perth, Western Australia. [Online]. Available at: pshb_alert_factsheet.pdf.

Department of Primary Industries and Regional Development (DPIRD) (2024d). *Polyphagous shot-hole borer: What to look for.* Government of Western Australia, Perth, Western Australia. [Online]. Available at: Polyphagous shot-hole borer: What to look for.

Appendix 3 Botanical Assessment (Del Botanics, 2024)

Del Botanics Environmental Consulting
0427 700 496|PO BOX 119 MT HELENA WA 6082|EMAIL: DELBOTANICS@BIGPOND.COM|ABN: 90910128697

Flora and Vegetation Survey- Kennedy Bay 2024

The Flora and Vegetation within the Kennedy Bay Construction Clearing Footprint was assessed on the 2nd October 2024. The total survey area is approximately 0.16 hectares.

The vegetation communities and condition within the Construction Clearing Footprint with a buffer of 10m on either side were assessed to determine if the site contains the same vegetation communities and conditions as previously recorded in the area in 2020 by Focused Vision Consulting. Quadrat data was compared to PK07, PK08, PK09 and PK10 from the *Flora and Vegetation Assessment, Port Kennedy August 2021* report (FVC).

The survey results suggested that the vegetation condition of the site has deteriorated since last surveyed in 2020. Vegetation condition mapping is provided in **Figure 1**.

The assessment of the vegetation confirmed the vegetation community recorded within the Construction Clearing Footprint is the same vegetation community recorded previously in 2020.

The vegetation community is described as ***Acacia rostellifera* Shrubland:**

Shrubland of *Acacia rostellifera* over sparse native, low shrubs and introduced herbs and grasses.

Vegetation community mapping is provided on **Figure 2**. Quadrat locations from this survey and the survey undertaken in 2020 are shown on **Figure 3**. Quadrat data is available below.

Figure 1: Vegetation Condition

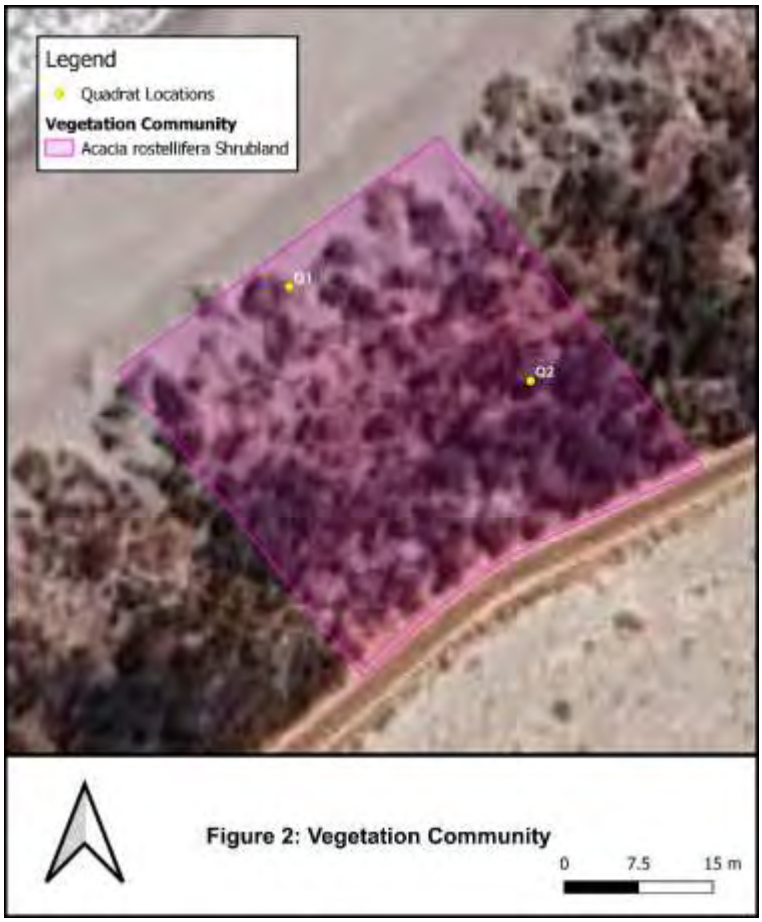

Figure 2: Vegetation Community

Figure 3: Survey Area & Quadrat Locations

Del Botanics

FIELD SHEET – FLORA AND VEGETATION SURVEY

Job Code: Kennedy Bay	**Date:** 02/10/2024	**Site:** Q1
GPS Datum: (50) 380781.60 m E 6418385.01 m S	**Topography:** Coastal Dunes	**Litter cover:** 2% twigs, 20 % leaves 0% logs
Age since fire: >10 yrs	**Disturbance:** Hi **Med** Lo	**Soils:** Sand white/grey
Vegetation Description: *Acacia rostellifera* shrubland		
Vegetation Condition: Good		
Observations:		

Coll No.	Taxon	Ht (cm)	% Alive	% Dead	% Cover
Top	*Acacia rostellifera*	100	90	20	10
Middle	*Olearia axillaris*	100	70	30	12
	Scaevola crassifolia	60	100		12
Bottom	*Spinifex longifolius*	80	100		12

SP1	**Tetragonia decumbens*	30	100		7
	**Bromus diandrus*	40	60	40	6
	**Sonchus oleraceus*				
	**Lolium rigidum*				
	**Pelargonium capitatum*				
	Carpobrotus virescens				
	**Lagurus ovatus*				
	Senecio sp				
	**Asphodelus fistulosus*				
SP2	**Cakile maritima*				
SP3	**Corrigiola littoralis*				

Del Botanics

FIELD SHEET – FLORA AND VEGETATION SURVEY

Job Code: Kennedy Bay	**Date:** 02/10/2024	**Site:** Q2
GPS Datum: (50) 380805.97 m E 6418375.50 m S	**Topography:** Coastal Dunes	**Litter cover:** 5% twigs, 20 % leaves 0% logs
Age since fire: >10 yrs	**Disturbance:** **Hi** Med Lo	**Soils:** Sand white/grey
Vegetation Description: *Acacia rostellifera* shrubland		
Vegetation Condition: Degraded		
Observations: High density of weed species		

Coll No.	Taxon	Ht (cm)	% Alive	% Dead	% Cover
Top	*Acacia rostellifera*	400	80	20	50
Middle					
Bottom	**Euphorbia terracina*	40	100		7
	Acanthocarpus preissii	60	100		7
	**Bromus diandrus*	40	100		80

	**Sonchus oleraceus*				
	**Lolium rigidum*				
	**Fumaria capreolata*				
Sp3	**Corrigiola littoralis*				
	**Lagurus ovatus*				
	Senecio sp				
	**Asphodelus fistulosus*				
SP2	**Cakile maritima*				
	Spyridium globulosum				
SP1	**Tetragonia decumbens*				
	**Pelargonium capitatum*				
	Spinifex longifolius				
	**Raphanus raphanistrum*				
Opp	*Acacia cyclops*				

Appendix 4 Botanical Assessment (FVC, 2021)

FLORA AND VEGETATION ASSESSMENT, PORT KENNEDY

COTERRA ENVIRONMENT

AUGUST 2021

Focused Vision Consulting Pty Ltd
ABN 25 605 804 500

Please direct all enquiries to:
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8/83 Mell Road, SPEARWOOD WA 6163
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Document History

Rev.	Author	Reviewed	Approved	Date
A	Daniel Roberts Botanist/Ecologist	Kellie Bauer-Simpson Principal Ecologist		22/12/2020
B	Daniel Roberts Botanist/Ecologist	Kristen Bleby Senior Ecologist		30/12/2020
C	Daniel Roberts Botanist/Ecologist	Kellie Bauer-Simpson Principal Ecologist	Kellie Bauer-Simpson Principal Ecologist	05/02/2021
0	Daniel Roberts Botanist/Ecologist	Kellie Bauer-Simpson Principal Ecologist	Kellie Bauer-Simpson Principal Ecologist	16/03/2021
1	Daniel Roberts Botanist/Ecologist	Kellie Bauer-Simpson Principal Ecologist	Kellie Bauer-Simpson Principal Ecologist	16/08/2021

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FIGURES

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EXECUTIVE SUMMARY

Coterra Environment (Coterra) are assisting a client with a proposed development at Port Kennedy. Focused Vision Consulting Pty Ltd (FVC) was commissioned by Coterra, on behalf of the client, to undertake the flora and vegetation assessment to support necessary approvals for the development.

The assessment was undertaken and reported in accordance with the Environmental Protection Authority (EPA) *Technical guidance for flora and vegetation surveys for environmental impact assessment* (EPA 2016). The field assessment was undertaken by Daniel Roberts (Botanist/Ecologist) and Jeni Alford (Senior Botanist) on 27 and 28 October 2020 and included the sampling of 15 vegetation quadrats and targeted searching for Threatened and Priority flora across the study area.

The key findings and conclusions arising from the flora and vegetation assessment within the study area are as follows:

- No Threatened or Priority flora were recorded in the field and none of the Threatened or Priority flora resulting from the desktop assessment are considered likely to occur in the study area.
- One of the recorded species, *Acacia browniana* var. *intermedia*, is exhibiting an extension beyond its currently documented range, however, this species is not of conservation significance.
- One weed species, *Asparagus aethiopicus* (Asparagus fern), listed as a WoNS and as a Declared Pest plant, was recorded within vegetation unit SgAp. Under the Act, landholders are obliged to carry out specific control measures to prevent the spread of pest weeds (Declared Pests). Any disturbance from the proposed development should ensure that further spread of this weed species resulting in degradation of the surrounding environment does not occur. Management measures applicable to the control of this species within the City of Rockingham may be required.
- Three vegetation units were recorded and mapped within the study area, which are all shrublands, dominated by *Spyridium globulosum* and *Alyxia buxifolia* with one also dominated by *Acacia rostellifera*, and each with varying understorey, ranging from weed-dominated layers to sedgelands and rushlands.
- The condition of the vegetation within the study area ranges from 'Good - Very Good' to 'Completely Degraded', with the majority found to be in 'Good - Very Good' condition.
- The desktop assessment revealed that seven ecological communities have the potential to occur within the study area, as they are known to, or have the potential to occur within the desktop assessment area follows:
    - Banksia Dominated Woodlands of the Swan Coastal Plain IBRA Region
    - Tuart (*Eucalyptus gomphocephala*) woodlands and forests of the Swan Coastal Plain
    - Microbial community of a coastal saline lake (Lake Walyungup)
    - SCP 24 - Northern Spearwood shrublands and woodlands
    - SCP 19a - Sedgelands in Holocene dune swales of the southern Swan Coastal Plain
    - SCP 19b - Woodlands over sedgelands in Holocene dune swales of the southern Swan Coastal Plain
    - SCP 29b - Acacia shrublands on taller dunes, southern Swan Coastal Plain

  Review of species present, including via PATN analysis for the recorded vegetation units, did not confirm the presence of any of these ecological communities within the study area.
- The study area does not support any defined wetlands, however, 17 Geomorphic Wetlands of the Swan Coastal Plain occur within the desktop assessment area and of these, one, the Becher Point Wetlands is also listed as a Ramsar site. The Becher Point Wetlands occurs 282 m from the boundary of the study area at its closest point.

1 INTRODUCTION

1.1 BACKGROUND

Coterra Environment (Coterra) are assisting a client with a proposed development at Port Kennedy. The development has been assessed by the Environmental Protection Authority (EPA) and approved as outlined within Ministerial Statement 1019. A Local Structure Plan for the residential and local centre portion of the development was approved in October 2020.

This spring detailed terrestrial flora and vegetation assessment has been undertaken to support the development and refinement of subdivision stage approvals and management plans related to this area. The survey area will form part of the future coastal open space and/or foreshore reserve.

Focused Vision Consulting Pty Ltd (FVC) was commissioned by Coterra, on behalf of the client, to undertake the flora and vegetation assessment. This report presents the findings of the assessment.

1.2 LOCATION

The vegetation survey site at Port Kennedy (study area) extends over approximately 19.65 hectares (ha), and is located to the north and west of the proposed residential, local centre and golf course areas. The site is located approximately 40 km south of Perth, Western Australia (**Figure 1**).

1.3 SCOPE OF WORK

The scope of work required to be fulfilled was as follows:

- Undertake a desktop assessment for the study area plus a 5 km buffer (desktop assessment area) and a 20 km radius addressing Threatened and Priority Flora, including:
    - Department of Biodiversity Conservation and Attractions (DBCA) database searches
    - Assessment of the potentially occurring Threatened and Priority flora (and an analysis of their likelihood of occurrence)
    - Literature review of City of Rockingham's 2016 Foreshore Management Plan (City of Rockingham 2016)
    - Review of other available information.
- Carry out a detailed field assessment within the study area, incorporating quadrat sampling in areas of 'Good' or better condition vegetation and targeted searches for Threatened and Priority flora, in accordance with the Environmental Protection Authority (EPA) *Technical guidance for flora and vegetation surveys for environmental impact assessment* (EPA 2016)
- Report on the above in accordance with EPA (2016).

0 0.5 1 1.5 2 km

GDA 2020 / MGA Zone 50

N

Legend

Study Area

Desktop Assessment Area

FOCUSED VISION consulting

Figure 1 - Study Area

COT20004 29 December 2020

2 EXISTING ENVIRONMENT

2.1 CLIMATE

The study area occurs on the Swan Coastal Plain, which has a warm Mediterranean climate, characterised by hot dry summers and cool to mild wet winters (Mitchell *et al.* 2002). The Bureau of Meteorology (BoM) Jandakot Aero weather station (Site 009172) is the closest to the study area, operating since 1972. Average annual long-term rainfall recorded at the station is 818.8 mm. Annual mean maximum temperatures range from 18.0°C in winter to 31.6°C in summer (BoM 2020). In 2020, monthly rainfall in June to October was low compared to the long-term average (**Figure 2**).

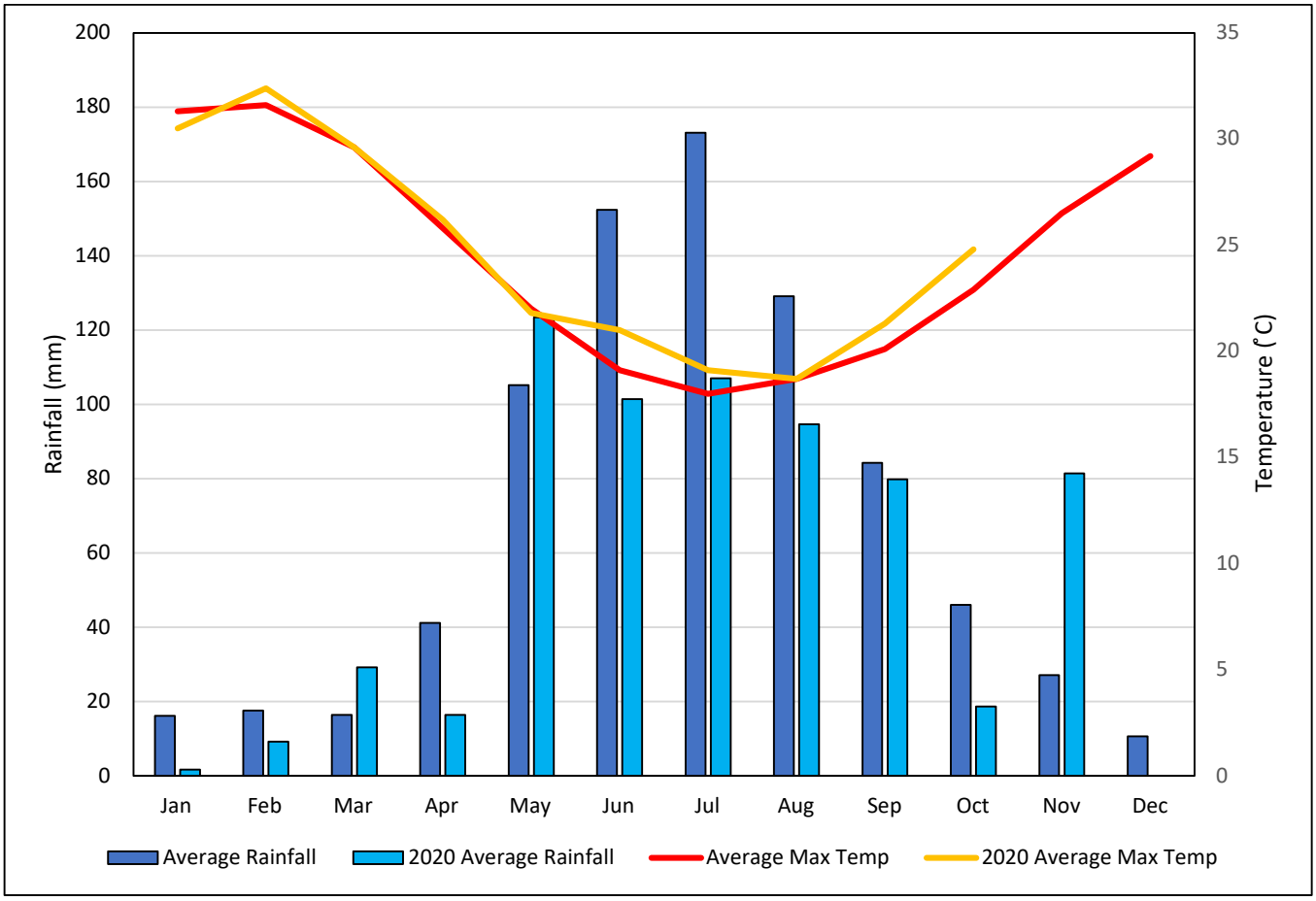

Figure 2 - Climate Data for Jandakot Aero (Site 009172) (BoM 2020)

2.2 IBRA REGION

There are 89 recognised Interim Biogeographic Regionalisation for Australia (IBRA) regions across Australia that have been defined based on climate, geology, landforms and characteristic vegetation and fauna (Commonwealth of Australia 2013). The study area lies within the Swan Coastal Plain (SWA) IBRA region and, at a finer scale, within the Perth subregion (SWA2) (Mitchell *et al.* 2002).

The Swan Coastal Plain bioregion is a low lying coastal plain, mainly covered with Banksia and Tuart woodlands on sandy soils. The Perth subregion is composed of colluvial and aeolian sands, alluvial river flats, coastal limestone, as well as heath and/or Tuart woodlands on limestone, Banksia and Jarrah-Banksia woodlands on Quaternary marine dunes of various ages, Marri on colluvial and alluvials (Mitchell *et al.* 2002).

2.3 GEOLOGY AND SOILS

The surface geology of the study area (based on 1:250,000 scale geological maps, Geological Survey of WA, and Geoscience Australia) is described as basal conglomerate overlain by dune quartz sand with heavy mineral concentrations.

The Swan Coastal Plain supports five major geomorphological systems (landforms) that lie parallel to the coast. From west to east these are; Quindalup Dunes, Spearwood Dunes, Bassendean Dunes, Pinjarra Plain and Ridge Hill Shelf (Churchward and McArthur 1980; Gibson *et al.* 1994). The study area is situated on one landform, the Quindalup South System (Government of Western Australia 2000) (**Figure 3**).

The Quindalup South System is located on the western margin of the Swan Coastal Plain and is described as coastal dunes with calcareous deep sands and deep yellow sands associated with mixed coastal shrubs (Government of Western Australia 2000).

2.4 VEGETATION

Vegetation of the Swan Coastal Plain has been broadly mapped by (Beard 1990), into vegetation associations. Mapping depicted the native vegetation as it was presumed to be at the time of European settlement and is referred to as pre-European vegetation mapping.

One vegetation association, 3048, occurs within the study area. This vegetation association only occurs on the Swan Coastal Plain. It is described as shrublands; scrub-heath on the Swan Coastal Plains (Beard 1990). The remaining extent of vegetation association 3048 on the Swan Coastal Plain and in the City of Rockingham are presented in (**Table 1)** and spatially in (

Figure 4).

Table 1- Pre-European Vegetation of the Study Area

Veg. Association No.	Veg. System Association	Broad Vegetation Description	Extent Context	Pre–European Extent (ha)	Current Extent (ha)	% Pre-European Extent Remaining	% Current Extent in All DBCA-Managed Land (proportion of Pre-European Extent)
3048	3048	Mixed heath with scattered tall shrubs Acacia spp., Proteaceae and Myrtaceae.	IBRA (Swan Coastal Plain) SWA	10,418.06	3,043.13	29.21	8.22
			IBRA sub region (SWA2)	10,418.06	3,043.13	29.21	8.10
			City of Rockingham	9,147.49	2,735.19	29.90	8.58

Vegetation of the Swan Coastal Plain has also been defined by (Heddle *et al.* 1980) into complexes based on vegetation in association with landforms and underlying geology. The study area is situated on one vegetation complex, the 'Quindalup Complex'. This vegetation complex is described as a Coastal dune complex consisting mainly of two alliances - the strand and fore-dune alliance and the mobile and stable dune alliance. Local variations include the low closed forest of *Melaleuca lanceolata* (Rottnest Teatree) - *Callitris preissii* (Rottnest Island Pine), the closed scrub of *Acacia rostellifera* (Summer-scented Wattle) and

the low closed *Agonis flexuosa* (Peppermint) forest of Geographe Bay. The remaining extents on the Swan Coastal Plain and in the City of Rockingham are presented in **Table 2** and spatially in **Figure 5**.

Figure 3 - Soils

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Figure 4 - Pre-European Vegetation

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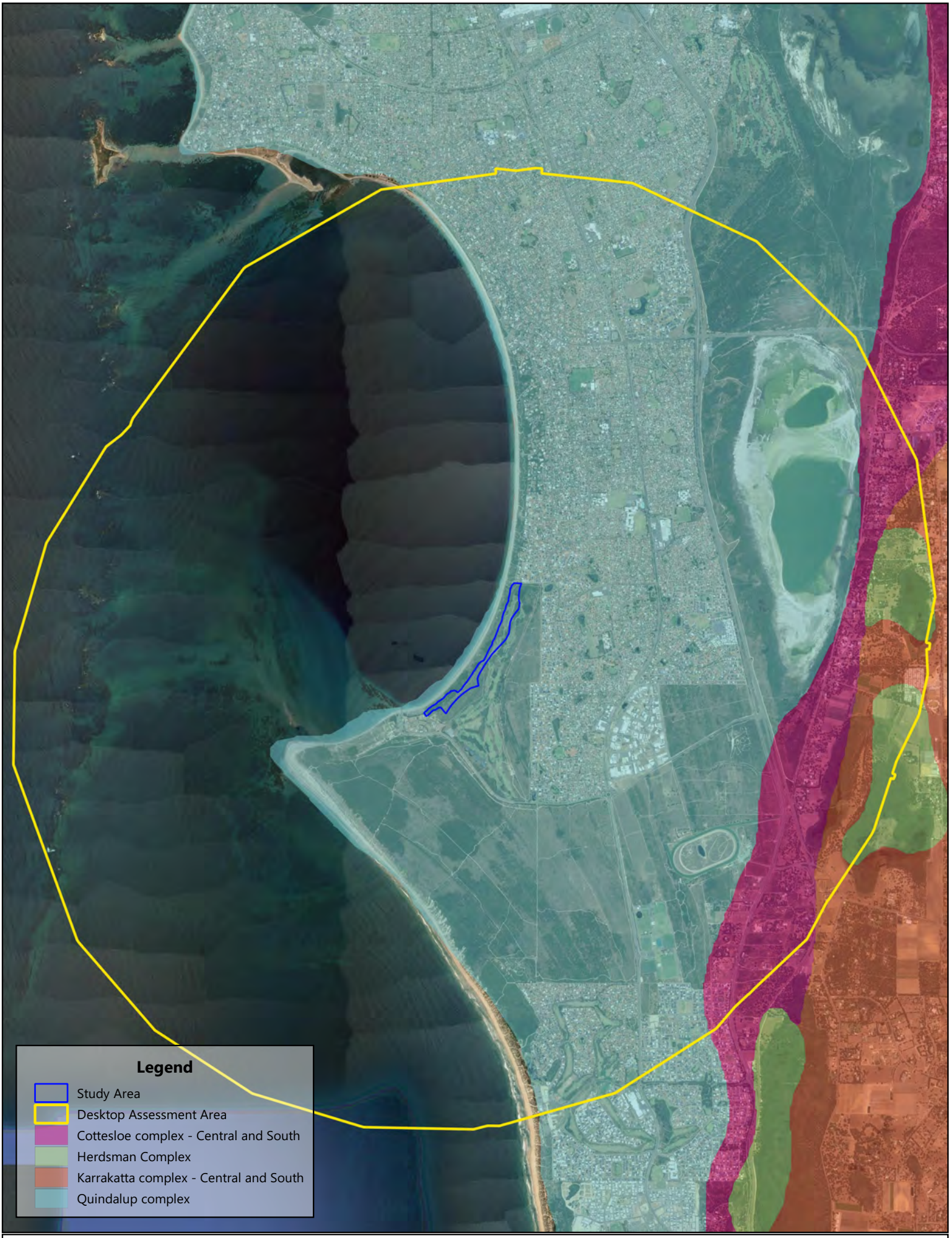

0 0.5 1 1.5 2 km

GDA 2020 / MGA Zone 50

N

Figure 5 - Vegetation Complexes

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Table 2 - Extent of Quindalup Vegetation Complex within the Study Area

Extent Context	Pre–European Extent (ha)	Current Extent (ha)	% Pre-European Extent Remaining	Current % Remaining within all DBCA Managed Land
Swan Coastal Plain	58,573.87	33,011.64	60.49	10.98
City of Rockingham	11,061.73	4,129.76	37.33	20.27

The objective of the Environmental Protection Authority (EPA) in relation to flora and vegetation is: *To protect flora and vegetation so that biological diversity and ecological integrity are maintained* (EPA 2016). The EPA considers it is important that vegetation associations are maintained above a threshold level of 30% of unconstrained areas and 10% for constrained areas, of the original pre-clearing extent of each association (EPA 2008). A level of 30% pre-clearing extent is considered to be the level below which species loss appears to accelerate exponentially at the ecosystem level (EPA 2008).

The following key criteria are applied to vegetation clearing from a biodiversity perspective, which justifies the retention targets (EPA 2000):

- The 'threshold level' below which species loss appears to accelerate exponentially within an ecosystem level, is regarded as being at a level of 30% of the pre-European, i.e. pre-1750 extent of the vegetation type
- A level of 10% of the original extent of a vegetation community is regarded as being a level representing Endangered
- Clearing which would increase the threat level to a vegetation community should be avoided.

The remaining extents of the Beard vegetation association (**Table 2**) and Heddle vegetation complex (**Table 3**) of the study area, within the City of Rockingham do not fall below the 10% threshold, and therefore, the remaining extents meet the EPA objective of retention for the purpose of biodiversity conservation.

2.5 THREATENED ECOLOGICAL COMMUNITIES

Threatened Ecological Communities (TECs) are naturally occurring biological assemblages that occur in a particular type of habitat, which are subject to processes that threaten to destroy or significantly modify the assemblage across its range. Vegetation communities in Western Australia may be considered threatened once they have been identified as such by the Western Australian Threatened Ecological Communities Scientific Advisory Committee (DEC 2001).

With regards to Commonwealth significance, some TECs or PECs of State (WA) significance are listed under the *Environment Protection and Biodiversity Conservation Act 1999* (EPBC Act). Under the Act, a person must not take an action that has or will have significant impact on a listed TEC without approval from the Commonwealth Minister for the Environment, unless those actions are not prohibited under the Act (DBCA 2016).

2.6 GEOMORPHIC WETLANDS OF THE SWAN COASTAL PLAIN

The Geomorphic Wetlands of the Swan Coastal Plain dataset displays the location, boundary, geomorphic classification (wetland type) and management category of wetlands on the Swan Coastal Plain. Wetland management categories are based on their ecological, hydrological and geomorphological significance, and take into account the degree of disturbance that has occurred. The three Wetland Management Categories on the Swan Coastal Plain can be summarised as follows:

- Conservation Category (CC) – wetlands that support a high level of ecological attributes and functions (generally having intact vegetation and natural hydrological processes), or that have a reasonable level of functionality and are representative of wetland types that are rare or poorly protected
- Resource Enhancement (RE) – wetlands that have been modified (degraded) but still support substantial ecological attributes (wetland dependant vegetation covering more than 10%) and functions (hydrological properties that support wetland dependent vegetation and associated fauna), and have some potential to be restored to CC quality. Typically, such wetlands still support some elements of the original native vegetation, and hydrological function
- Multiple Use (MU) – wetlands that are assessed as possessing few remaining ecological attributes and functions. While such wetlands can still play an important role in regional or landscape ecosystem management, including water management, they are considered to have low intrinsic ecological value. Typically, they have very little or no native vegetation remaining (less than 10%).

According to the Geomorphic Wetlands of the Swan Coastal Plain dataset, no wetlands occur within the study area, however, 17 wetlands comprising 234 separate UFIs (Unique Feature Identifiers) and 134 Conservation Category Wetland (CCW) UFIs occur within the desktop assessment area. Of these wetlands, within a 500 m buffer of the study area, there are eight UFIs, most of which are CCWs, which are all part of the Becher Point Wetlands, as summarised in **Table 3**. The distribution of the varying categories of wetlands within the desktop assessment area are presented in **Figure 6**, which also shows the proximity of the Becher Point Wetlands to the study area.

Table 3 – Geomorphic Wetlands Occurring within the Study Area

Wetland Name	UFI	Evaluation	Classification
Becher Point Wetlands	6069	Conservation	Dampland
	6067	Conservation	Sumpland
	6073	Conservation	Dampland
	13020	Conservation	Dampland
	13019	Conservation	Dampland
	6090	Conservation	Dampland
	6088	Conservation	Dampland
	13018	Conservation	Dampland
	6087	Multiple Use	Dampland
	6086	Multiple Use	Dampland

0 0.5 1 1.5 2 km

GDA 2020 / MGA Zone 50

N

Legend

- Study Area
- Desktop Assessment Area
- Ramsar Wetland
- Conservation
- Multiple Use
- Not Applicable
- Resource Enhancement

Figure 6 - Geomorphic and Ramsar Wetlands

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2.7 RAMSAR WETLANDS

Ramsar wetlands listed under the Ramsar Convention are wetlands considered to be of International importance. These internationally important (Ramsar) wetlands are those that are representative, rare, or unique wetlands, or are important for conserving biological diversity (DEE 2019a).

The desktop assessment area intersects with one Ramsar wetland, the Becher Point Wetlands (Ramsar Ref. 54), which is approximately 282 m to the south of the study area boundary at its closest point (**Figure 6**). The Becher Point Wetlands Ramsar site is a system of about sixty small wetlands located near Rockingham. The wetlands are made up of chains of small linear, ovoid or irregular shaped basins arranged in five groups, each roughly parallel to the coast and separated by sand ridges (DEE 2019b).

3 METHODOLOGY

3.1 DESKTOP ASSESSMENT

A desktop assessment for Threatened and Priority flora potentially occurring within the study area was undertaken prior to the field studies. The desktop assessment consisted of database searches using NatureMap (DBCA 2020a) (**Appendix A**), DBCA Threatened and Priority flora (DBCA 2020b) and ecological communities (DBCA 2020c) databases and the Commonwealth Protected Matters Search Tool (PMST) for Matters of National Environmental Significance (MNES) (DAWE 2020a) (**Appendix B**). All search tools were based on the approximate centre of the study area, being -32.3592 latitude, 115.74072 longitude with a 5 km buffer (radius) and a 20 km buffer (radius) specifically for Threatened and Priority flora referred to as the desktop assessment area.

Threatened and Priority flora identified from the desktop assessment were evaluated for their potential likelihood of occurring within the study area. The likelihood of occurrence of a species was based on four factors; suitable habitat within the study area, age of previous records identified within the study area, proximity of previous records within the study area and current condition of the study area vegetation. These four factors are discussed in more detail below.

Suitable habitat:

- The likelihood of suitable habitat being present within the study area was based on known habitat information gathered from FloraBase (Western Australian Herbarium (DBCA 2020d) and literature sourced from the Species Profile and Threats Database (SPRAT) (DAWE 2020b) (e.g. recovery plans, conservation advice).

Age of previous records:

- The age of previous records for significant species recorded within the study area was evaluated to determine how likely the species was to still occur in the area (i.e. habitat of species recorded decades ago may no longer occur or a species may be locally extinct).

Proximity of previous records:

- Species recorded closer to the study area are considered to have a higher likelihood of occurrence. It is noted that species identified using the PMST have not necessarily been recorded within 5 km of the study area and due to the way in which information is included in the Commonwealth database, may have resulted in the search due to habitat possibly occurring within the area.

Current condition of study area:

- The degree of modification within the study area is considered for this factor. Modifications include clearing of vegetation, vegetation being subject to routine vegetation maintenance and human disturbance and adjacent land-uses that may impact on the vegetation. The higher the modification and degradation, the less likely it is that any significant flora would occur.

3.2 FIELD ASSESSMENT

A detailed spring flora and vegetation assessment was undertaken by Daniel Roberts (Botanist/Ecologist) and Jeni Alford (Senior Botanist) on 27 and 28 October 2020. The field assessment was undertaken and reported in accordance with the Environmental Protection Authority (EPA) *Technical guidance for flora and vegetation surveys for environmental impact assessment* (EPA 2016).

Quadrats were used to define and maps the vegetation types and condition within the study area. In total, 15 quadrats of 10 x 10 m in area were assessed within the study area (**Figure 7**). Sites were selected using aerial imagery, during initial field planning conducted at a desktop level, plus added in the field where appropriate, such as where different vegetation units and condition were identified. Sites were selected to provide representative and replicate samples of each vegetation unit. Field data were collected using an electronic tablet with customised data forms and mobile spatial mapping capability, within the software program, Mappt™.

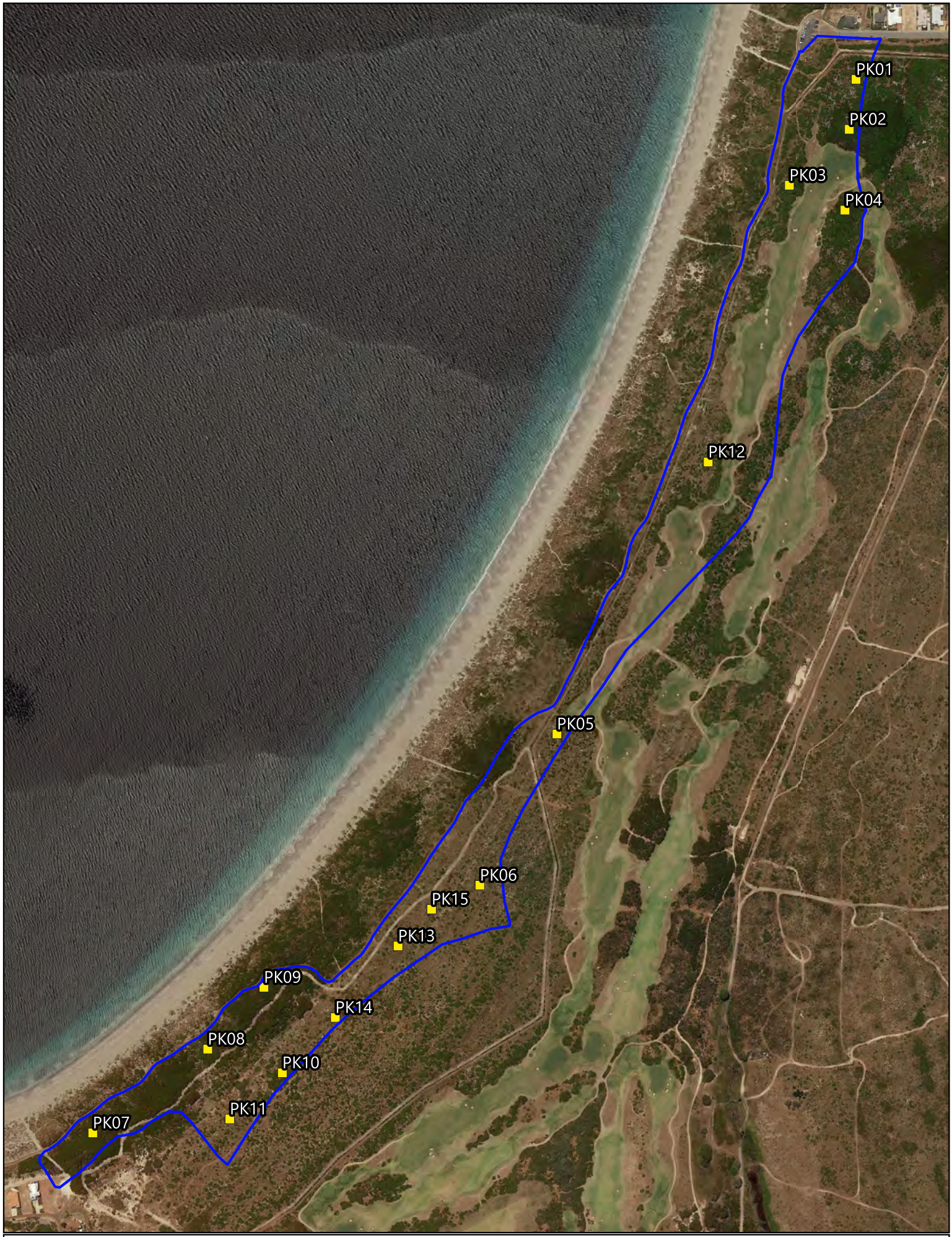
The following data were collected from each site:

- observer
- date
- site
- GPS location (GDA94; zone 50)
- representative photograph
- soil type and colour
- topography
- flora species observed, including average height and projected foliage cover of dominant species within each stratum
- vegetation condition assessed against the currently accepted condition scale of Keighery (1994).

The field assessment also included a targeted search for Threatened and Priority flora that were identified from the desktop search. The study area was traversed on foot as demonstrated by the walked traverses presented in **Figure 8** (EPA 2016).

Where suspected Threatened or Priority flora were observed, the following data were recorded:

- GPS location of each individual plant allowing an inventory of the plants/population size
- vegetation type and condition at the recorded location
- condition of plants
- reproductive status
- photograph.



0 50 100 150 200 m

GDA 2020 / MGA Zone 50

N

Legend

Study Area

Quadrat

Figure 7 - Quadrat Locations

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0 50 100 150 200 m

GDA 2020 / MGA Zone 50

N

Legend

Study Area

Walked Track

Figure 8 - Walked Traverses

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3.3 STUDY LIMITATIONS

The limitations of the flora and vegetation desktop and field assessment have been considered in accordance with the EPA Technical Guidance (EPA 2016) and are summarised in **Table 4**.

Table 4 – Study Limitations

Aspect	Constraint?	Commentary
Availability of local and regional contextual information	No	The study area is within the Perth Metropolitan Region, a well-understood location in terms of ecological values. Several studies have been completed within the vicinity of the study area and wider region. Regional data relating to soils, vegetation and biological values of conservation significance are also available in public databases and in the literature, which are all included in the desktop assessment.
Competency of field personnel	No	The personnel undertaking the field studies have significant experience in biological assessments in the Perth region. Daniel Roberts, who managed the study and was present during all stages of the field surveys, has 8 years of experience and was assisted Jeni Alford who has 35 years' experience in botanical surveys. Personnel with relevant qualifications and experience contributed to the various study tasks, such as flora identifications and technical review of the report.
Selected scope, survey methods and level of survey detail/ intensity	No	The selected scope for the biological field assessments was a detailed flora and vegetation assessment. While it is unlikely that the study area would support the majority of Threatened and Priority flora identified in the desktop assessment given the degraded state, the entire study area where remanent vegetation still remains was searched for Threatened and Priority flora.
Seasonal timing and climatic conditions	No	The field assessment for flora and vegetation was conducted during spring, which is considered optimal timing for recording flora biological values in the region, including the majority of potentially occurring Threatened and Priority flora.
Accessibility	No	The study area was readily accessible by vehicle and on foot.
Mapping reliability/ proportion of values identified and recorded based on extent of survey	No	Mapping within the study area is at a scale based on ground-truth areas, with limited extrapolation, given the good accessibility. Mapping reliability and the proportion of values identified and recorded based on scale and the extent of survey is considered high.
Disturbances that may have affected survey results	No	The study area has been affected by human disturbance from nearby land-uses, including historic clearing and ongoing use of the golf course and adjacent beach used for recreation. These disturbances are not considered a constraint that could have affected the study results, as the current ongoing activities are not considered to have significantly altered the vegetation. No recent fires or natural events were evident.
Survey completeness	No	The study area was thoroughly surveyed in the optimal period for undertaking flora biological surveys within the region. Recorded vegetation units have each been sampled with at least three quadrats, which is the expectation of the EPA Technical Guidance (EPA 2016). The density of quadrats sampled demonstrates the significant survey effort invested.

4 RESULTS

4.1 DESKTOP ASSESSMENT

4.1.1 Literature Review – City of Rockingham (2016)

A review of the City of Rockingham Foreshore Management Plan (2016) was carried out as part of the study reported herein. A summary of this review is provided in the following sections.

4.1.1.1 Overview

The City of Rockingham has approximately 37 km of coastline, encompassing a range of local and regional foreshore reserves which deliver a variety of recreation, conservation and commercial activities. The foreshore management plan divided this coastline into the following five management sectors:

- Sector One – Rockingham
- Sector Two – Shoalwater, Safety Bay, Waikiki
- Sector Three – Warnbro, Port Kennedy
- Sector Four – Secret Harbour
- Sector Five – Golden Bay, Singleton.

The City of Rockingham (2016) reported that Sector Three (Warnbro and Port Kennedy area), which encompasses the study area, supports six vegetation types. Vegetation types were determined based on dominant over, middle and understorey species (City of Rockingham 2016). These vegetation types are summarised in **Table 5**.

Table 5 - Foreshore Vegetation Types Associated with Warnbro and Port Kennedy (City of Rockingham 2016)

Name	Description
Acacia rostellifera Shrubland	*Acacia rostellifera* over sparse mixed low shrubs and sparse *Lepidosperma gladiatum* and weedy understorey
Lepidosperma gladiatum Sedgeland	*Lepidosperma gladiatum* over sparse shrubs and herbs
Scaevola crassifolia Mixed Shrubland	Mixed coastal Shrubland of *Scaevola crassifolia*, *Olearia axillaris*, *Spyridium globulosum* and *Acanthocarpus preissii* over *Lomandra maritima* and mixed sedges and grasses
Acanthocarpus preissii Open Heath	Mixed open heath of *Acanthocarpus preissii*, *Scaevola crassifolia* and *Olearia axillaris* over sparse sedges and weedy grasses
Spinifex Grassland	*Spinifex longifolius* with scattered shrubs of *Olearia axillaris* and small areas of *Spinifex hirsutus*
Tall Shrubland	Mixed tall shrubland of *Spyridium globulosum*, *Acacia cyclops* and *Acacia rostellifera* over mixed low shrubs, herbs and grasses

4.1.1.2 Vegetation Condition

Vegetation condition for all 5 sectors was assessed and mapped in accordance with the Keighery scale (EPA 2016), and it was reported that 89.3% of the foreshore vegetation was in 'Good', 'Very Good' or 'Excellent' condition. 'Degraded' areas were generally found along the boundary of vegetated areas and along the foredunes, with medium to high densities of weeds located throughout all areas of the Rockingham foreshore (City of Rockingham 2016).

4.1.1.3 Conservation Significant Flora and "Other Significant Flora"

No Threatened or Priority flora species were reported in the Foreshore Management Plan, although there are records of "other significant flora" in Sector Three, as listed below (City of Rockingham 2016):

- *Callitris preissii* (Rottnest Island Pine) which has a distribution restricted to small, isolated populations in the Quindalup Dune System
- *Lomandra maritima* which is suitable habitat for the Priority 4 listed Graceful Sun Moth (*Synemon gratiosa).*

4.1.1.4 Threatened Ecological Community

The Threatened Ecological Community (TEC), SCP 19 '*Sedgelands in Holocene Dune Swales*' is known to occur nearby in Golden Bay (City of Rockingham 2016).

4.1.1.5 Weeds

No Declared Pest plants or Weeds of National Significance (WoNS) were recorded during the 2015 assessments carried out for the Foreshore Management Plan. *Lantana camara* (WoNS) was noted during the previous 2011 Rockingham Foreshore Management Plan. Weed densities ranged from 'low' to 'high' within the City of Rockingham foreshore. Introduced grasses were recorded throughout all sectors, with the most abundant species being Great Brome (*Bromus diandrus*). Other abundant weed species included Rose Pelargonium (*Pelargonium capitatum*), Sea Spinach (*Tetragonia decumbens*), Trachyandra (*Trachyandra divaricata*) and Geraldton Carnation Weed (*Euphorbia terracina*) (City of Rockingham 2016).

4.1.2 Threatened and Priority Flora

The searches of the DBCA database , NatureMap Species Report (**Appendix A**) and the MNES Report (**Appendix B**) conducted for the desktop assessment area returned results for 45 species of Threatened and Priority flora previously recorded within or in the vicinity of the study area (**Table 6**). The DBCA database search returned results for Priority and Threatened flora species previously recorded within the study area, or within a 20 km buffer (**Figure 9**).

The 45 significant flora species resulting from the desktop assessment comprises eight Commonwealth- and State-listed Threatened flora, five Priority 1, four Priority 2, fifteen Priority 3 and thirteen Priority 4 species. Using the four factors discussed in Section 3.1, of these 45 species, it was determined that 12 species may occur within the study area, 33 are considered unlikely to occur and none are considered likely to occur. Interrogation of the databases indicated that no species of conservation significance have been previously recorded within the study area.

Table 6 - Threatened and Priority Flora with the Potential to occur within the Study Area

Species	EPBC Cons. Status	WA Cons. Status	Description	Preferred Habitat	Likelihood of Occurrence	Source
Synaphea sp. *Serpentine* (G.R. Brand 103)	Critically Endangered	Critically Endangered	Dense, clumped shrub growing to 0.3-0.6 m high and 0.4-0.8 m wide. Produces yellow flowers on erect spikes 0.07-0.24 m long from September to October.	Grey clayey sand soil with lateritic pebbles. Near winter wet flats, low woodlands with weedy grasses.	Unlikely to occur - suitable habitat unlikely present in study area.	DBCA
Caladenia huegelii	Endangered	Critically Endangered	Tuberous, perennial herb growing to 0.25-0.6 m high with a single pale green, hairy leaf. Produces 1-2 (rarely 3) distinctive flowers with red and green-cream parts from September to October.	Grey, white or brown sand, clay loam soils. Margins of swamps, low depressions and flats. Mixed jarrah and Banksia woodlands.	Unlikely to occur - suitable habitat unlikely present in study area.	DBCA, PMST
Diuris purdiei	Endangered	Endangered	Tuberous, perennial herb, 0.15-0.35 m high. Flowers yellow, September to October.	Grey-black sand, moist. Winter wet swamps.	Unlikely to occur - suitable habitat unlikely present in study area.	PMST, Naturemap
Drakaea elastica	Endangered	Critically Endangered	Tuberous, perennial herb growing to 0.1-0.3 m high with a single bright green, glossy, prostrate heart-shaped leaf. Produces distinctive flower with red and green-yellow parts from October to November.	White or grey sand. Low-lying situations adjoining winter-wet swamps.	Unlikely to occur - suitable habitat unlikely present in study area.	DBCA, Naturemap
Diuris drummondii	Vulnerable	Vulnerable	Tuberous, perennial tall orchid growing to 0.5-1 m high. Produces 3-8 pale yellow flowers from November to January.	Brown sandy clay, moist peat soils. Low lying depressions, swamps.	Unlikely to occur - suitable habitat unlikely present in study t area.	DBCA, Naturemap
Diuris micrantha	Vulnerable	Vulnerable	Tuberous, perennial orchid growing to 0.3-0.6 m high with a basal tuft of narrow, linear leaves. Produces up to 7 yellow flowers with red-brown markings from August to October.	Brown loamy clay. Winter-wet swamps, in shallow water.	Unlikely to occur - suitable habitat unlikely present in study area.	DBCA, Naturemap
Drakaea micrantha	Vulnerable	Endangered	Tuberous, perennial, herb, 0.15-0.3 m high. Flowers red & yellow, September to October.	White-grey sand.	May occur - species habitat likely to occur within study area.	PMST, Naturemap
Tetraria australiensis	Vulnerable	Vulnerable	Tufted perennial grass-like sedge growing to 1 m high with cylindrical	Grey sand over clay soil. Winter wet depressions,	Unlikely to occur - suitable habitat unlikely present in study area.	DBCA

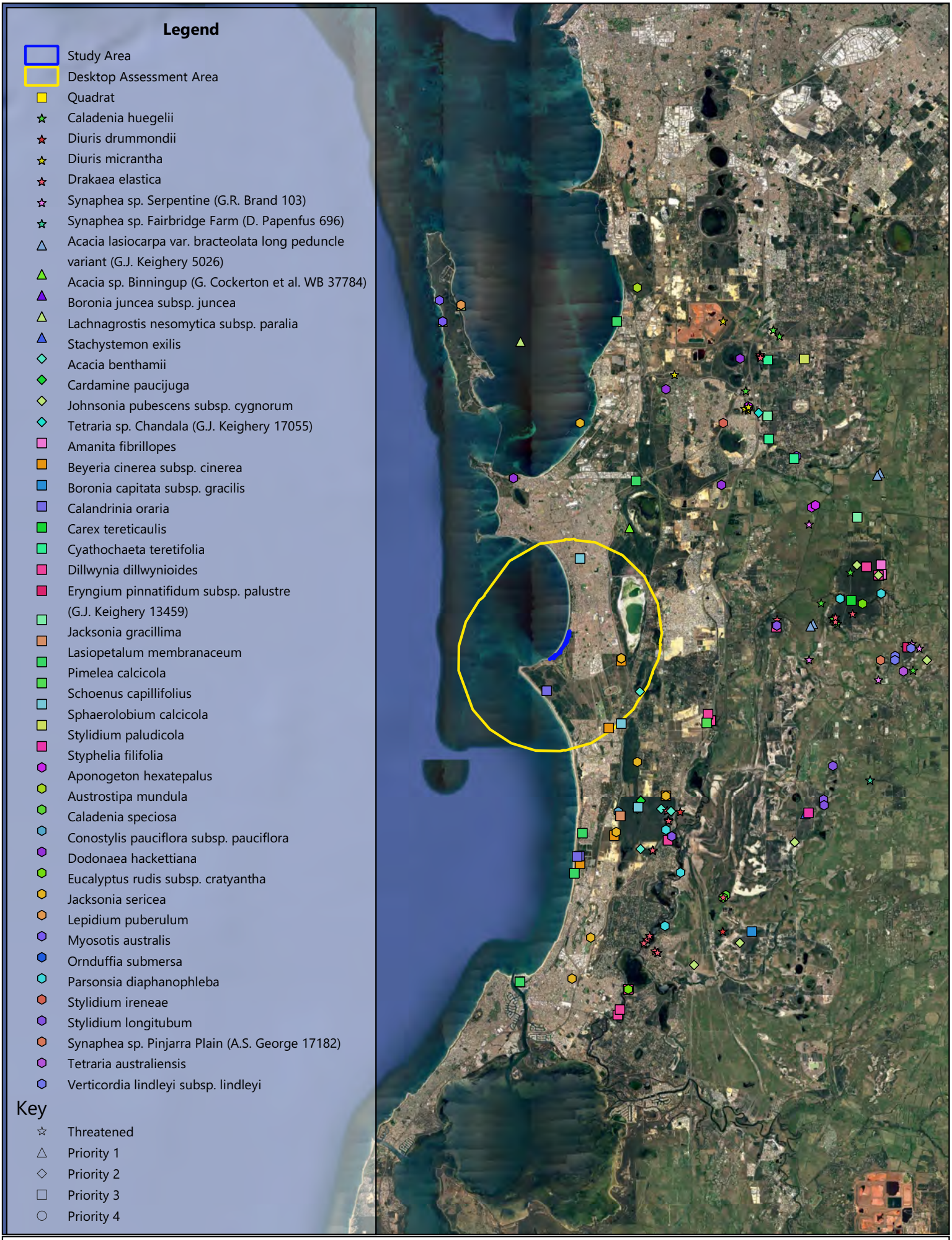
Species	EPBC Cons. Status	WA Cons. Status	Description	Preferred Habitat	Likelihood of Occurrence	Source
			stems. Produces brown flowers following fire.	swamps, drainage lines and swamp margins.		
Acacia lasiocarpa var. bracteolata long peduncle variant (G.J. Keighery 5026)		Priority 1	Spinescent shrub growing between 0.4-1.5 m high. Produces yellow flowers in globular heads from May or August.	Grey or black sand over clay soils. Swampy areas, winter wet lowlands.	Unlikely to occur - suitable habitat unlikely present in study area.	DBCA
Acacia sp. Binningup (G. Cockerton *et al.* WB 37784)		Priority 1	Undescribed species	Undescribed species.	Unable to determine likelihood.	DBCA
Boronia juncea subsp. *juncea*		Priority 1	Slender, erect or straggly shrub growing to 0.6-1 m high. Produces pink or purple flowers in April and December.	Dark grey peaty sandy soil. Winter wet depressions, swamps.	Unlikely to occur - suitable habitat unlikely present in study area.	DBCA
Lachnagrostis nesomytica subsp. *paralia*		Priority 1	Loosely tufted, annual or short-lived perennial grass growing to 0.3-0.5 m high. Produces purple-green flowers, flowering period unknown.	Grey-brown sandy soil. Coastal areas, dunes and swales on Garden Island.	May occur - species habitat likely to occur within study area.	DBCA
Stachystemon exilis		Priority 1	Monoecious, erect shrubs, apparently to 100 cm high, but probably more usually 20–30 cm. leaves consistently opposite, mucronate; young branchlets with short hairs in longitudinal rows; inflorescences lacking bracts and bracteoles.	Three localities in the Swan Coastal Plain bioregion: northern Perth suburb, another about 60 km south of Perth, and the third from the Busselton area.	Unlikely to occur - suitable habitat unlikely present in study area.	DBCA
Acacia benthamii		Priority 2	Erect, spinose shrub growing to 1 m high. Produces golden-yellow flowers in globular heads on short stalks in leaf axils from August to September.	Brown, yellow, grey sandy soils. Flats and slopes, sometimes with limestone and wetlands.	May occur - species habitat likely to occur within study area.	DBCA, Naturemap
Cardamine paucijuga		Priority 2	Erect, sprawling open annual herb growing to 0.4 m high. Produces white flowers from September to October.	Black peaty sand, grey sandy clay soils. Winter wet swamps, creeklines and depressions.	Unlikely to occur - suitable habitat unlikely present in study area.	DBCA
Johnsonia pubescens subsp. *cygnorum*		Priority 2	Tufted, perennial, grass like herb (lily) growing to 0.25 m high. Produces greenish cream flowers from September to October.	Grey or yellow sand, sandy clayey soils. Gentle slopes and flats.	Unlikely to occur - suitable habitat unlikely present in study area.	DBCA

Species	EPBC Cons. Status	WA Cons. Status	Description	Preferred Habitat	Likelihood of Occurrence	Source
Tetraria sp. Chandala (G.J. Keighery 17055)		Priority 2	Erect sedge growing to 0.7-1.5 m high. Produces brown flowers most of year.	Peaty sandy soil. Swamps, edges of wetlands and damplands.	Unlikely to occur - suitable habitat unlikely present in study area.	DBCA
Austrostipa mundula		Priority 3	Erect, fine perennial grass growing to 0.6 m high with mostly basal leaves. Produces brown flowers in a linear or elliptic panicle 5-12 cm long from September to November.	Grey sandy soil with limestone. Dune slopes, coastal cliffs, plains.	May occur - species habitat likely to occur within study area.	DBCA
Beyeria cinerea subsp. *cinerea*		Priority 3	Low spreading shrubs to 30cm, narrow lime green leaves with pale underside and tuberculate fruits.	Limestone ridges, slopes and hilltops, sand over limestone.	May occur - species habitat likely to occur within study area. Previous record approximately 3 km.	DBCA, Naturemap
Boronia capitata subsp. *gracilis*		Priority 3	Slender shrub growing to 0.3-0.6 m high with densely hairy branches. Produces pink flowers from June to November.	White, grey or black sandy soils. Winter wet swamps, hillsides and slopes.	Unlikely to occur - suitable habitat unlikely present in study area.	DBCA
Calandrinia oraria		Priority 3	Succulent, annual herb growing to 0.1-0.2 m high. Produces pink flowers from August to October.	Sandy soil. Coastal dunes, ridges and undulating plains.	May occur - species habitat likely to occur within study area. Previous record approximately 3 km south.	DBCA, Naturemap
Carex tereticaulis		Priority 3	Rhizomatous, tufted perennial sedge growing to 0.7 m high. Produces brown flowers from September to October.	Black peaty sandy soil. Riparian areas.	Unlikely to occur - suitable habitat unlikely present in study area.	DBCA
Cyathochaeta teretifolia		Priority 3	Rhizomatous, clumped, perennial sedge growing to 2 m high and 1.0 m wide. Produces brown-straw flowers from September to January.	Grey sand, sandy clay soil. Lowlands, swamps, creek edges and drainage lines.	Unlikely to occur - suitable habitat unlikely present in study area.	DBCA
Dillwynia dillwynioides		Priority 3	Decumbent or erect shrub growing between 0.3-1.2 m high. Produces flowers with red, orange and yellow parts from August to December.	Sand, loam, clay soils. Seasonally wet depressions, wetlands.	Unlikely to occur - suitable habitat unlikely present in study area.	DBCA

Species	EPBC Cons. Status	WA Cons. Status	Description	Preferred Habitat	Likelihood of Occurrence	Source
Eryngium pinnatifidum subsp. *palustre* (G.J. Keighery 13459)		Priority 3	Tuberous, perennial herb growing to 0.4 m high. Produces blue-pale blue flowers from September to November.	Sand, sandy loam, clay soils. Winter wet depression, claypans and flats.	Unlikely to occur - suitable habitat unlikely present in study area.	DBCA
Jacksonia gracillima		Priority 3	Prostrate, spreading or scrambling spindly shrub growing to 0.5-1 m high and 1 m wide. Produces flowers with yellow, red and orange parts from October and November.	Sand and loam soils. Wetlands, winter wet flats, slopes and flats.	Unlikely to occur - suitable habitat unlikely present in study area.	DBCA
Lasiopetalum membranaceum		Priority 3	Multi stemmed shrub growing to 1 m high. Produces pink-purple flowers from September to December.	Sandy soil with limestone. Limestone outcrops and ridges, slopes and coastal dunes.	May occur - species habitat likely to occur within study area.	DBCA
Pimelea calcicola		Priority 3	Erect to spreading shrub growing to 0.2 to 1 m high. Produces white flowers with some pink from September to November.	Brown sandy loam, white-grey sandy soil associated with limestone. Coastal limestone ridges.	May occur - species habitat likely to occur within study area.	DBCA
Schoenus capillifolius		Priority 3	Semi-aquatic, tufted annual sedge growing to 0.05 m high. Produces green flowers from October to November.	Brown sand, clay. Claypans and seasonally wet depressions.	Unlikely to occur - suitable habitat unlikely present in study area.	DBCA
Sphaerolobium calcicola		Priority 3	Slender, multi-stemmed, scandent or erect shrub, to 1.5 m high. Fl. orange-red, Jun or Sep to Nov. White-grey-brown sand, sandy clay over limestone, black peaty sandy clay.	All dunes, winter-wet flats, interdunal swamps, low-lying areas.	May occur - species habitat likely to occur within study area. Previous location approximately 4 km.	DBCA, Naturemap
Stylidium paludicola		Priority 3	Reed-like perennial herb growing to 0.35-1 m high. Produces pink flowers from October to December.	Peaty sand over clay soils. Winter wet habitats. Marri and Melaleuca woodland, Melaleuca shrubland.	Unlikely to occur - suitable habitat unlikely present in study area.	DBCA
Styphelia filifolia		Priority 3	Reed-like perennial herb growing to 0.35-1 m high. Produces pink flowers from October to December.	Peaty sand over clay soils. Winter wet habitats. Marri and Melaleuca woodland, Melaleuca shrubland.	Unlikely to occur - suitable habitat unlikely present in study area.	DBCA

Species	EPBC Cons. Status	WA Cons. Status	Description	Preferred Habitat	Likelihood of Occurrence	Source
Aponogeton hexatepalus		Priority 4	Rhizomatous or cormous, aquatic perennial herb with floating leaves. Produces green-white flowers from May to November.	Clay. Freshwater ponds, rivers, claypans and wetlands.	Unlikely to occur - suitable habitat unlikely present in study area.	DBCA
Eucalyptus rudis subsp. *cratyantha*		Priority 4	Tree growing between 5-20 m high with rough, box type bark. Produces white flowers from July to September.	Loam soil. Hillsides and flats.	Unlikely to occur - suitable habitat unlikely present in study area.	DBCA
Caladenia speciosa		Priority 4	Tuberous perennial herb growing to 0.2 m high with single, hairy, erect leaf 15-25 cm long. Produces up to 3 white flowers with red tinges from September to October.	Sand and loamy soils. Slopes and flats, swampy areas.	Unlikely to occur - suitable habitat unlikely present in study area.	DBCA
Conostylis pauciflora subsp. *pauciflora*		Priority 4	Dense, rhizomatous perennial grass like herb growing to 0.1-0.4 m high. Produces yellow flowers from August to October.	Sandy soil. Hillslopes, dunes often with limestone.	Unlikely to occur - suitable habitat unlikely present in study area.	DBCA
Dodonaea hackettiana		Priority 4	Erect shrub or tree growing to 1-5 m high. Produces yellow flowers with green and red parts mainly between July to October.	Sandy soils associated with limestone outcropping. Limestone ridges, slopes and dunes.	May occur - species habitat likely to occur within study area.	DBCA
Jacksonia sericea		Priority 4	Low spreading shrub growing to 0.6 m high. Produces flowers with yellow and red and orange parts usually from December to February.	Grey/white, yellow/brown sandy loam soils, often associated with limestone. Limestone ridges, slopes and flats.	May occur - species habitat likely to occur within study area. Previous record approximately 3 km.	DBCA, Naturemap
Lepidium puberulum		Priority 4	Erect annual herb growing to 0.4 m high. Produces greenish white flowers from July to November.	Sandy soil. Coastal areas, islands, often associated with limestone.	Unlikely to occur - suitable habitat unlikely present in study area.	DBCA
Myosotis australis		Priority 4	Erect to procumbent annual herb growing to 0.3 m high. Produces blue-white flowers from August to November.	Sandy soil. Coastal dunes and swales often associated with limestone.	May occur - species habitat likely to occur within study area.	DBCA
Ornduffia submersa		Priority 4	Aquatic floating herb with submerged leaves growing to 0.3 m high. Produces white-cream flowers from August to November.	Black-grey sandy clay. Permanent and seasonally inundated wetlands, swamps and claypans.	Unlikely to occur - suitable habitat unlikely present in study area.	DBCA

Species	EPBC Cons. Status	WA Cons. Status	Description	Preferred Habitat	Likelihood of Occurrence	Source
Parsonsia diaphanophleba		Priority 4	Erect shrub or tree growing to 1-5 m high. Produces yellow flowers with green and red parts mainly between July to October.	Sandy soils associated with limestone outcropping. Limestone ridges, slopes and dunes.	Unlikely to occur - suitable habitat unlikely present in study area.	DBCA
Stylidium ireneae		Priority 4	Lax perennial, herb, (0.06-0.1-0.28 m high. Leaves oblanceolate, 0.4-2 cm long, 1-3 (-5) mm wide, apex subacute to acuminate, margin entire, glandular. Scape glandular. Inflorescence racemose. Fl. pink, Oct to Dec.	Sandy loam. Valleys near creek lines, woodland, often with Agonis.	Unlikely to occur - suitable habitat unlikely present in study area.	DBCA
Stylidium longitubum		Priority 4	Erect annual (ephemeral) herb growing to 0.05-0.12 m high. Produces pink flowers with white markings from October to December.	Sandy clay, clay soils. Seasonal wetlands.	Unlikely to occur - suitable habitat unlikely present in study area.	DBCA
Verticordia lindleyi subsp. *lindleyi*		Priority 4	Erect shrub growing to 0.2 to 0.75 m high. Produces pink flowers with white fringes from November to January (also known from May).	Sand, sandy clay soils. Winter-wet depressions.	Unlikely to occur - suitable habitat unlikely present in study area.	DBCA



0 2.5 5 7.5 10 km

GDA 2020 / MGA Zone 50

N

Figure 9 - Previously Reported Priority Flora (DBCA)

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4.1.3 Threatened and Priority Ecological Communities

A review of DBCA's Threatened and Priority Ecological Communities database and the EPBC Protected Matters Search Tool (DBCA 2020e, DAWE 2020a) identified that seven ecological communities intersect with the desktop assessment area (**Appendix B**, **Figure 10**). A summary of these communities is provided in **Table 7**.

Table 7 - Summary of Threatened and Priority Ecological Communities within the Desktop Assessment Area

Abbreviated Identifier	Community Name	State Category	Commonwealth Category
Banksia WL SCP	*Banksia Dominated Woodlands of the Swan Coastal Plain IBRA Region*	Priority 3	Endangered
SCP 19a	*Sedgelands in Holocene dune swales of the southern Swan Coastal Plain (floristic community type 19 as originally described in in Gibson* et al. *(1994)*	Critically Endangered	Endangered
SCP 19b	*Woodlands over sedgelands in Holocene dune swales of the southern Swan Coastal Plain (original description; Gibson* et al. *(1994)*	Critically Endangered	Endangered
SCP 24	*Northern Spearwood shrublands and woodlands*	Priority 3	
SCP 29b	*Acacia shrublands on taller dunes, southern Swan Coastal Plain*	Priority 3	
Tuart woodlands	*Tuart (Eucalyptus gomphocephala) woodlands and forests of the Swan Coastal Plain*	Priority 3	Critically Endangered
Walyungup Microbial	*Microbial community of a coastal saline lake (Lake Walyungup)*	Priority 1	

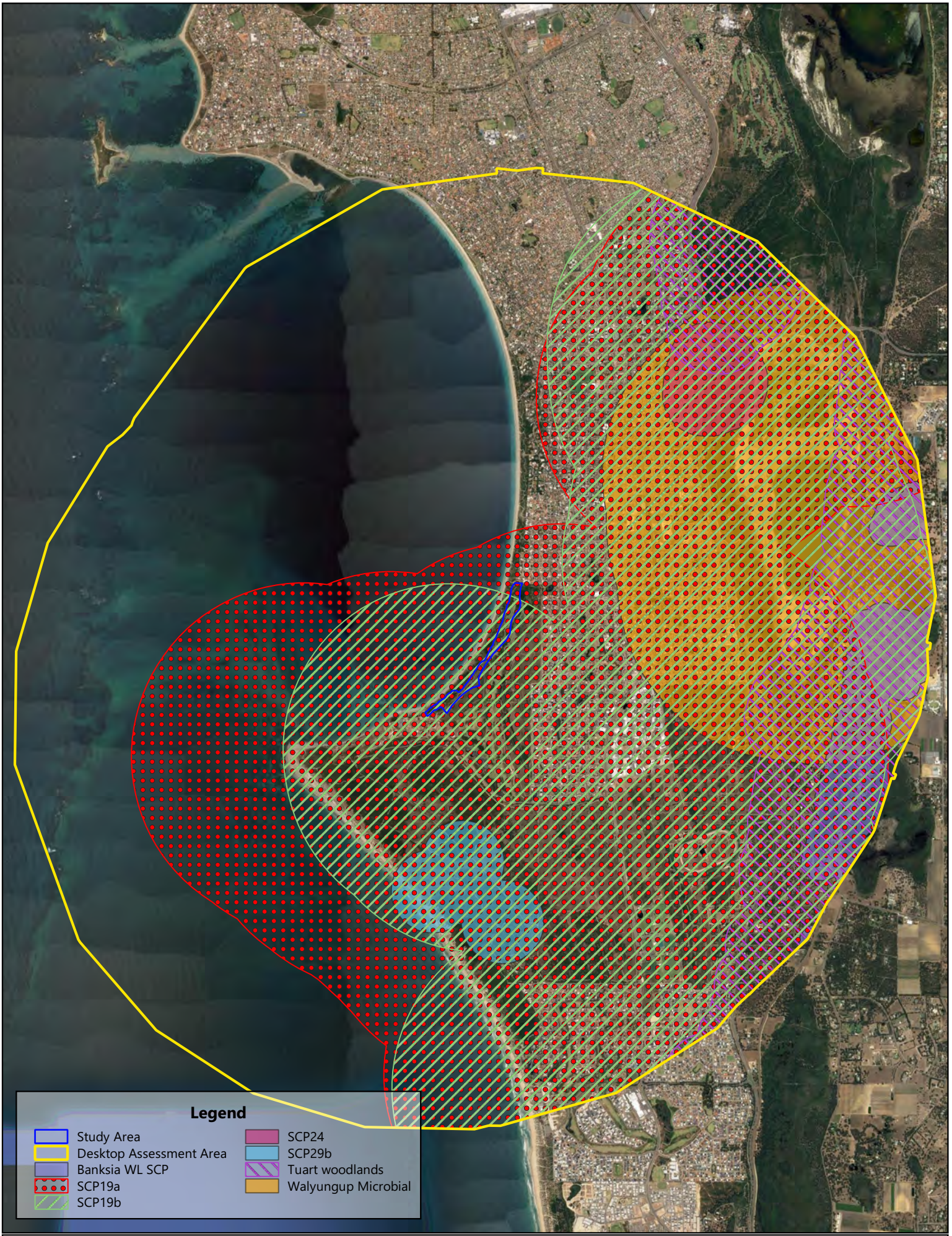

Figure 10 - Previously Recorded Threatened and Priority Ecological Communities (DBCA)

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4.2 FIELD ASSESSMENT

4.2.1 Flora

A total of 69 flora species, from 50 genera and 30 families was recorded during the survey. The dominant families were found to be Poaceae (Grass family – 10 taxa), Fabaceae (Pea family - nine taxa) and Asteraceae (Daisy family – five taxa). The total includes 47 (68%) native species and 22 (32%) introduced (weed) species. Species recorded within each vegetation unit are presented in **Appendix C**.

No species listed as Threatened flora or Priority flora were recorded.

One recorded species, *Acacia browniana* var. *intermedia*, is exhibiting an extension beyond its currently documented range, in accordance with records of the Western Australian Herbarium (DBCA 2020d).

Of the 22 introduced (weed) species recorded, one is listed as a Weed of National Significance (WoNS) and a Declared Pest plant under the BAM Act *Asparagus aethiopicus* (Asparagus fern) (DEE 2019c).

4.2.2 Vegetation Units

A total of three vegetation units were recorded and mapped within the study area as described in **Table 8** and presented spatially in **Figure 11**. The information collected within each quadrat, sampled to define the various vegetation units is presented in **Appendix D**.

Table 8 - Summary of Recorded Vegetation Units in the Study Area

Vegetation Unit Code and Description	Representative Quadrats	Area (ha)	% of the Study Area
ArAb *Acacia rostellifera* Tall Closed Shrubland over *Alyxia buxifolia*, *Rhagodia baccata* subsp. *baccata* and *Spyridium globulosum* Open Shrubland over *Lolium rigidum* and *Ehrharta calycina* Hummock Grassland over *Fumaria capreolata* Forbland.	PK02, PK04, PK07, PK08, PK09	3.265	16.617
ArLg *Acacia rostellifera*, *Alyxia buxifolia* and *Spyridium globulosum* Open Shrubland over *Lepidosperma gladiatum* Open Sedgeland over *Lomandra maritima* and *Lepidosperma calcicola* Low Open Sedgeland over *Bromus diandrus* Low Open Grassland.	PK13, PK14, PK15	0.237	1.206
SgAp *Spyridium globulosum* and *Alyxia buxifolia* Open Shrubland over *Acanthocarpus preissii* Low Open Shrubland over *Bromus diandrus* Low Open Grassland and *Lomandra maritima* Low Sparse Rushland.	PK01, PK03, PK10, PK12 PK05, PK06, PK11	10.5754	53.817
Cleared Cleared areas comprising mostly tracks and firebreaks.	NA	5.572	28.359
Total		**19.648**	**100**

Figure 11 - Vegetation Units

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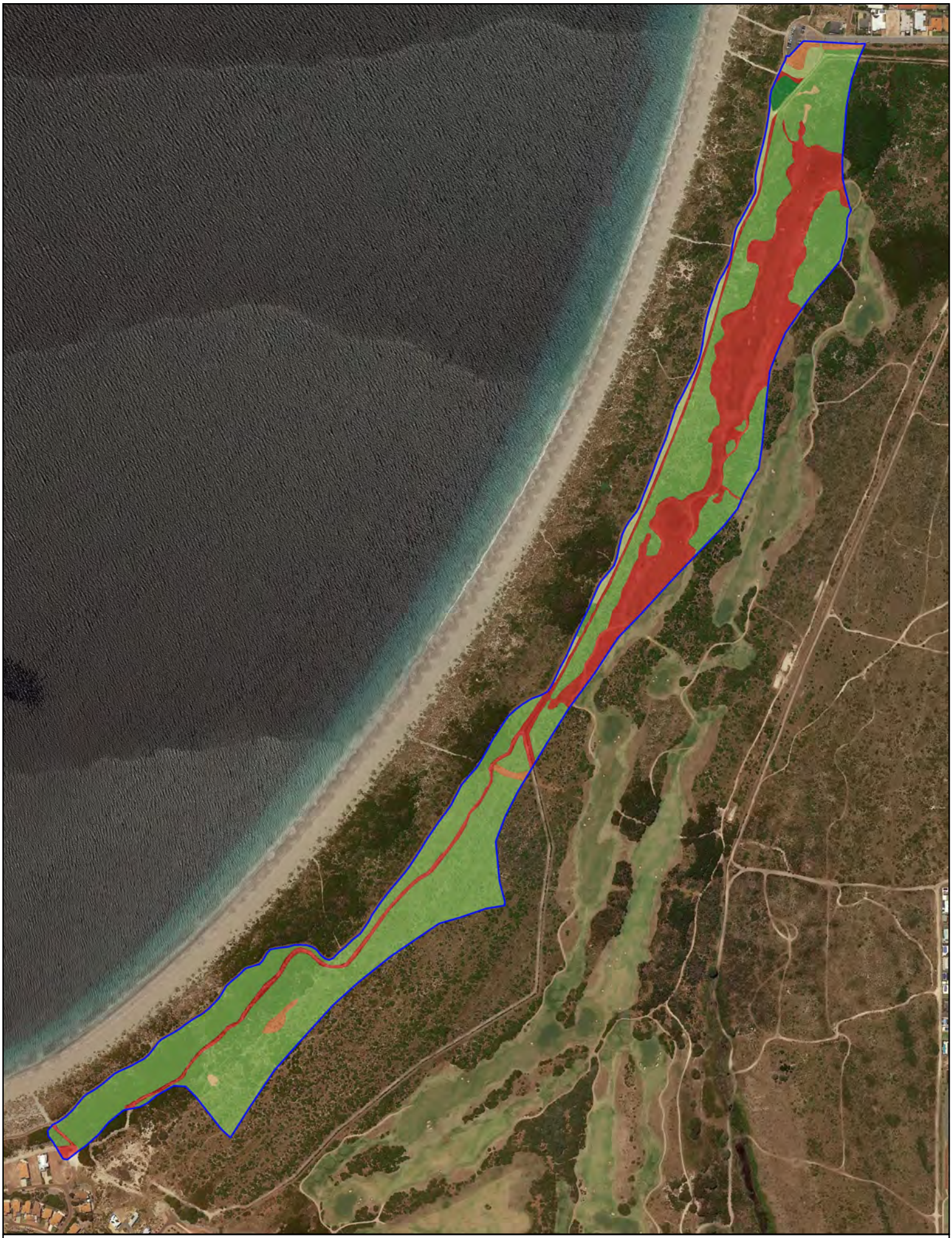
4.2.3 Vegetation Condition

The majority (66.157%) of the mapped vegetation in the study area was found to be in 'Good - Very Good' condition. Vegetation condition ranges from 'Completely Degraded' to 'Very Good' (**Table 9**). The spatial extent of the varying vegetation condition is presented in **Figure 12**).

Table 9 – Summary of Recorded Vegetation Condition

Vegetation Condition	Area (ha)	% of the Study Area
Very Good	0.107	0.545
Good - Very Good	12.998	66.154
Good	0.635	3.232
Degraded – Good	0.056	0.285
Degraded	0.280	1.425
Completely Degraded	5.572	28.359
Total	**19.648**	**100**



0 50 100 150 200 m

GDA 2020 / MGA Zone 50

N

Legend

- Study Area
- Completely Degraded
- Degraded
- Degraded-Good
- Good
- Good-Very Good
- Very Good

Figure 12 - Vegetation Condition

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COT20004 29 December 2020

5 DISCUSSION

5.1 FLORA

A total of 69 flora species, from 50 genera and 30 families was recorded during the field assessment survey. The dominant families were Poaceae, Fabaceae and Asteraceae, which is a typical floral composition for the Swan Coastal Plain, particularly in degraded areas where Poaceae (grass) and Asteraceae (daisy) weeds dominate.

Of the 45 species of conservation significance resulting from the desktop assessment, it was determined that none are likely to occur, 12 species may occur and 33 are unlikely to occur. None of the targeted species of conservation significance were recorded during the spring field assessment, despite targeted search efforts.

One of the recorded species, *Acacia browniana* var. *intermedia*, is exhibiting an extension beyond its currently documented range, in accordance with records of the Western Australian Herbarium (DBCA 2020d). This species is an erect, low, open shrub that flowers in May or July to September. It is predominantly found in shallow, sandy, rocky soils and lateritic flat ridges in Jarrah forest or mallee communities. Its distribution occurs sporadically from Boyagin Rock to Porongurup, Western Australia (DBCA 2020d). *Acacia browniana* var. *intermedia* is not of conservation significance.

Almost one third (32%) of the recorded species are introduced (weeds). The large proportion of weeds can be attributed to the metropolitan location and the close proximity of the study area to developed areas, such as the Port Kennedy Golf course and coastal recreation areas.

One of the recorded weeds (*Asparagus aethiopicus,* Asparagus fern) is listed under the BAM Act as a Declared Pest plant and a WoNS. *Asparagus aethiopicus* is a perennial herbaceous species that has become a serious environmental weed in Australia. The extensive root system and prolific seed production makes controlling this species difficult, requiring long-term repeated control action and monitoring (Vivian-Smith & Grimshaw 2006.) Asparagus fern was recorded from two locations within vegetation unit SgAp. Under the BAM Act, landholders are obliged to carry out specific control measures to prevent the spread of Declared Pest weeds. In the City of Rockingham, the 'C3 - Management' control category applies to *Asparagus aethiopicus* has, which requires landholders to apply some form of management to plants that will alleviate the harmful impact of the plant, reduce the numbers or distribution of the plant or prevent or contain the spread. The recommended control measures are to spray with metsulfuron methyl + Pulse® when flowering, optimally during August and September (DPIRD 2020).

5.2 VEGETATION

5.2.1 Vegetation Units

Floristic analysis for species presence/absence as well as multivariate cluster analysis of species presence/absence in the statistical analysis software, PATN™ was conducted in order to groups sites of similar species composition and assign vegetation units (**Appendix E**). Results of the analysis assisted in the determination that three vegetation units were recorded and mapped across the study area, based on data collected from 15 quadrats. The three recorded vegetation units are all shrublands, dominated by *Spyridium globulosum and Alyxia buxifolia* with one also dominated by *Acacia rostellifera,* each with varying understorey, ranging from weed-dominated layers to sedgelands and rushlands.

5.2.2 Threatened and Priority Ecological Communities

Floristic, multivariate cluster analysis of recorded quadrat data against the Gibson *et al.* (1994) dataset for species presence/absence was also carried out using PATN™ in order to assign Floristic Community Types (FCTs). No suitable FCT was able to be assigned to the vegetation units of the study area, based on the results of the PATN analysis (**Appendix F**), are not considered representative of any Threatened and Priority Ecological Communities. Further justification of the conclusions regarding the presence or absence of TECs and PECs in the study area is discussed below.

5.2.2.1 Banksia Woodlands TEC

The Banksia woodlands TEC is associated with some soils of the Swan Coastal Plain and has a prominent tree layer of Banksia with other tree species and an understorey of sclerophyllous shrubs, graminoids and forbs (DBCA 2020c, DEC 2011). No Banksia species were recorded within the study area and therefore, it can be confirmed that the Banksia Woodland TEC is not supported by the study area.

5.2.2.2 SCP 19a

The desktop assessment revealed that the State-listed PEC and Commonwealth-listed TEC, '*Sedgelands in Holocene dune swales of the southern Swan Coastal Plain'* (Sedgelands in Holocene dune swales (SCP 19a)) has the potential to occur in the study area. The Department of Environment and Conservation (DEC) (now DBCA) describes the broader ecological community (encompassing SCP 19a and SCP 19b, as discussed below) as occurring within wetland depressions (swales) between parallel Holocene dunes, mostly located on the Rockingham-Becher Plain but also extending further north to Lancelin and south to Dalyellup. Typical and common native species in the community are the shrubs *Acacia rostellifera* (summer-scented wattle), *Acacia saligna* (orange wattle) and *Xanthorrhoea preissii* (Balga), the sedges *Baumea juncea* (bare twigrush), *Ficinia nodosa* (knotted club rush) and *Lepidosperma gladiatum* (coastal sword-sedge) and the grass *Poa porphyroclados* (DBCA 2020c, DEC 2011).

PATN analysis against the Gibson *et al* (1994) data indicates no association with any of the FCTs that are representative of the TECs/PECs resulting from the desktop assessment, including SCP 19a and SCP 19b. Furthermore, none of the recorded vegetation units support sedgelands without any overstorey layer and therefore, SCP 19a is not considered to be supported by the study area.

5.2.2.3 SCP 19b

The *Woodlands over sedgelands in Holocene dune swales* (SCP 19b) ecological community has a woodland overstorey distinct from SCP 19a (DBCA 2020c, DEC 2011). One of the typical overstorey species is *Acacia rostellifera,* which is present in all of the vegetation units defined and mapped within the study area. Vegetation unit ArLg, recorded and mapped within the study area, supports four of the seven species characteristic of SCP 19b, including the characteristic Coast Sword Sedge (*Lepidosperma gladiatum*). This unit was found to be present in parallel dune swales in four small, discrete areas totalling 0.24 ha, recorded from quadrats PK13, PK14 and PK15. PATN analysis results did not indicate an affinity with the SCP 19b FCT.

5.2.2.4 SCP 24

The *Northern Spearwood shrublands and woodlands* (SCP 24) is defined as heaths with scattered *Eucalyptus gomphocephala* occurring on deeper soils north from Woodman Point. Most sites occur on the Cottesloe unit of the Spearwood system. The heathlands in this group typically include *Dryandra sessilis*, *Calothamnus quadrifidus* and *Schoenus grandiflorus*.

The study area is located south of Woodman Point, on the Quindalup-South System. Furthermore, the species typical to SCP 24 are not supported by the study area and therefore, this significant ecological community is confirmed to not be present.

5.2.2.5 SCP 29b

The Acacia shrublands on taller dunes, southern Swan Coastal Plain (SCP 29b) ecological community is dominated by Acacia shrublands or mixed heaths on the larger dunes. This community stretches from Seabird to south of Mandurah. There are no consistent dominant species, but some, such as *Acacia rostellifera*, *Acacia lasiocarpa* and *Melaleuca acerosa* are important (DBCA 2020c, DEC 2011).

All of the vegetation units recorded and mapped within the study area are dominated by *Acacia rostellifera* with other shrub species. However, the dunes within the study area are not considered 'large' dunes as such (D. Roberts, pers. obs.), and the results of PATN™ analysis do not support an affinity with SCP 29b. It is considered unlikely that this PEC is represented within the study area.

5.2.2.6 Tuart Woodlands and Forests TEC

The Tuart Woodland and Forests TEC was approved for inclusion as an Endangered TEC under the EPBC Act on 4 July 2019. This ecological community occurs as woodland, forest or other structural forms associated with soils of the Swan Coastal Plain with a prominent tree layer of *Eucalyptus gomphocephala* (Tuart) as the defining feature (DBCA 2020e).

No Tuart trees are present within the study area and therefore, it can be confirmed that the Tuart woodland and forests TEC is not supported by the study area.

5.2.2.7 Walyungup Microbial

The Microbial community of Lake Walyungup is a brackish ecological community associated with the lake. Lake Walyungup is situated more than 3 km to the east of the study area and no saline or brackish vegetation was recorded within the study area. Therefore, it can be confirmed that the Walyungup Microbial PEC is not supported by the study area.

5.2.3 Vegetation Condition

The condition of the vegetation within the study area ranges from 'Good - Very Good' to 'Completely Degraded', with the majority, more than two thirds of the total study area (66.157%) found to be in 'Good - Very Good' condition. Areas that have been and continue to be subject to disturbance, and those areas affected by historic clearing, support vegetation of poorer quality, which is evident along tracks and fire breaks. Areas of better-quality vegetation were recorded throughout the study area within all of the four recorded vegetation units.

5.2.4 Ramsar and Geomorphic Wetlands of the Swan Coastal Plain

The desktop assessment revealed the nearby occurrence of the Becher Point Wetlands Ramsar site. Also CCW wetlands, these occur approximately 260 m from the boundary of the study area at their closest point. The Becher Point Wetlands are an example of shrub swamps and seasonal marshes formed in an extensive sequence of inter-dunal depressions that have arisen from seaward advancement over a period of time. The wetlands support plant communities typical of seasonal and shallow wetlands and support a TEC listed under the EPBC Act (Sedgelands in Holocene dune swales). The sedgelands are also unusual due to their small size and scattered nature and they are dominated by *Baumea articulata*, *B. juncea* and *Lepidosperma gladiatum*. The wetlands of Becher Point Wetlands are all located within Bush Forever Site 377. The main threats to the Becher Point Wetlands include recreational activities (unauthorised vehicle access), weed invasion and inappropriate fire regimes (DEE 2019b, DEC 2011).

6 CONCLUSIONS

The key findings and conclusions arising from the flora and vegetation assessment within the study area are as follows:

- No Threatened or Priority flora were recorded in the field and none of the Threatened or Priority flora resulting from the desktop assessment are considered likely to occur in the study area.
- One of the recorded species, *Acacia browniana* var. *intermedia*, is exhibiting an extension beyond its currently documented range, however, this species is not of conservation significance.
- One weed species, *Asparagus aethiopicus* (Asparagus fern), listed as a WoNS and as a Declared Pest plant, was recorded within vegetation unit SgAp. Under the Act, landholders are obliged to carry out specific control measures to prevent the spread of pest weeds (Declared Pests). Any disturbance from the proposed development should ensure that further spread of this weed species resulting in degradation of the surrounding environment does not occur. Management measures applicable to the control of this species within the City of Rockingham may be required.
- Three vegetation units were recorded and mapped within the study area, which are all shrublands, dominated by *Spyridium globulosum* and *Alyxia buxifolia* with one also dominated by *Acacia rostellifera*, and each with varying understorey, ranging from weed-dominated layers to sedgelands and rushlands.
- The condition of the vegetation within the study area ranges from 'Good - Very Good' to 'Completely Degraded', with the majority found to be in 'Good - Very Good' condition.
- The desktop assessment revealed that seven ecological communities have the potential to occur within the study area, as they are known to, or have the potential to occur within the desktop assessment area follows:
    - Banksia Dominated Woodlands of the Swan Coastal Plain IBRA Region
    - Tuart (*Eucalyptus gomphocephala*) woodlands and forests of the Swan Coastal Plain
    - Microbial community of a coastal saline lake (Lake Walyungup)
    - SCP 24 - Northern Spearwood shrublands and woodlands
    - SCP 19a - Sedgelands in Holocene dune swales of the southern Swan Coastal Plain
    - SCP 19b - Woodlands over sedgelands in Holocene dune swales of the southern Swan Coastal Plain
    - SCP 29b - Acacia shrublands on taller dunes, southern Swan Coastal Plain

  Review of species present, including via PATN analysis for the recorded vegetation units, did not confirm the presence of any of these ecological communities within the study area.
- The study area does not support any defined wetlands, however, 17 Geomorphic Wetlands of the Swan Coastal Plain occur within the desktop assessment area and of these, one, the Becher Point Wetlands is also listed as a Ramsar site. The Becher Point Wetlands occurs 282 m from the boundary of the study area at its closest point.

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APPENDIX A - DBCA NATUREMAP SEARCH REPORT

NatureMap
Mapping Western Australia's biodiversity

COT20004

Created By Guest user on 26/10/2020

Current Names Only Yes
Core Datasets Only Yes
Method 'By Circle'
Centre 115° 44' 45" E,32° 21' 33" S
Buffer 5km
Group By Conservation Status

Conservation Status	Species	Records
Non-conservation taxon	388	1811
Priority 2	1	1
Priority 3	6	19
Priority 4	4	40
Protected under international agreement	11	59
Rare or likely to become extinct	11	41
TOTAL	**421**	**1971**

	Name ID	Species Name	Naturalised	Conservation Code	[1]Endemic To Query Area
Rare or likely to become extinct					
1.	24506	*Anous tenuirostris subsp. melanops (Australian Lesser Noddy)*		T	
2.	24162	*Bettongia penicillata subsp. ogilbyi (Woylie, Brush-tailed Bettong)*		T	
3.	24790	*Calidris tenuirostris (Great Knot)*		T	
4.	24731	*Calyptorhynchus banksii subsp. naso (Forest Red-tailed Black Cockatoo)*		T	
5.	24734	*Calyptorhynchus latirostris (Carnaby's Cockatoo, White-tailed Short-billed Black Cockatoo)*		T	
6.	48400	*Calyptorhynchus sp. (white-tailed black cockatoo)*		T	
7.	34031	*Carcharodon carcharias (Great White Shark)*		T	
8.	25335	*Caretta caretta (Loggerhead Turtle)*		T	
9.	25575	*Charadrius leschenaultii (Greater Sand Plover)*		T	
10.	25344	*Natator depressus (Flatback Turtle)*		T	
11.	34113	*Westralunio carteri (Carter's Freshwater Mussel)*		T	
Protected under international agreement					
12.	41323	*Actitis hypoleucos (Common Sandpiper)*		IA	
13.	25736	*Arenaria interpres (Ruddy Turnstone)*		IA	
14.	24780	*Calidris alba (Sanderling)*		IA	
15.	24788	*Calidris ruficollis (Red-necked Stint)*		IA	
16.	48587	*Hydroprogne caspia (Caspian Tern)*		IA	
17.	30932	*Limosa lapponica (Bar-tailed Godwit)*		IA	
18.	24691	*Macronectes halli (Northern Giant Petrel)*		IA	
19.	25742	*Numenius phaeopus (Whimbrel)*		IA	
20.	48593	*Sternula albifrons (Little Tern)*		IA	
21.	48597	*Thalasseus bergii (Crested Tern)*		IA	
22.	24808	*Tringa nebularia (Common Greenshank, greenshank)*		IA	
Priority 2					
23.	3237	*Acacia benthamii*		P2	
Priority 3					
24.	34236	*Beyeria cinerea subsp. cinerea*		P3	
25.	44226	*Calandrinia oraria*		P3	
26.	48935	*Idiosoma sigillatum (Swan Coastal Plain shield-backed trapdoor spider)*		P3	
27.	25147	*Lerista lineata (Perth Slider, Lined Skink)*		P3	
28.	25249	*Neelaps calonotos (Black-striped Snake, black-striped burrowing snake)*		P3	
29.	20348	*Sphaerolobium calcicola*		P3	
Priority 4					
30.	48588	*Isoodon fusciventer (Quenda, southwestern brown bandicoot)*		P4	
31.	4027	*Jacksonia sericea (Waldjumi)*		P4	
32.	24328	*Oxyura australis (Blue-billed Duck)*		P4	
33.	33992	*Synemon gratiosa (Graceful Sunmoth)*		P4	
Non-conservation taxon					

	Name ID	Species Name	Naturalised	Conservation Code	[1]Endemic To Query Area
34.	15466	*Acacia applanata*			
35.	3262	*Acacia cochlearis (Rigid Wattle)*			
36.	3409	*Acacia lasiocarpa (Panjang)*			
37.	11611	*Acacia lasiocarpa var. lasiocarpa*			
38.	3525	*Acacia rostellifera (Summer-scented Wattle)*			
39.	3527	*Acacia saligna (Orange Wattle, Kudjong)*			
40.	30033	*Acacia saligna subsp. lindleyi*			
41.	30032	*Acacia saligna subsp. saligna*			
42.	3602	*Acacia willdenowiana (Grass Wattle)*			
43.		*Acanthaluteres brownii*			
44.	24260	*Acanthiza apicalis (Broad-tailed Thornbill, Inland Thornbill)*			
45.	24261	*Acanthiza chrysorrhoa (Yellow-rumped Thornbill)*			
46.	24262	*Acanthiza inornata (Western Thornbill)*			
47.	1208	*Acanthocarpus preissii*			
48.	25535	*Accipiter cirrocephalus (Collared Sparrowhawk)*			
49.	25536	*Accipiter fasciatus (Brown Goshawk)*			
50.	42368	*Acritoscincus trilineatus (Western Three-lined Skink)*			
51.	25755	*Acrocephalus australis (Australian Reed Warbler)*			
52.	4582	*Adriana quadripartita (Bitter Bush)*			
53.		*Afurcagobius suppositus*			
54.	6565	*Alyxia buxifolia (Dysentery Bush)*			
55.	7821	*Ambrosia psilostachya (Perennial Ragweed)*	Y		
56.		*Aname mainae*			
57.	24313	*Anas platyrhynchos (Mallard)*			
58.	24315	*Anas rhynchotis (Australasian Shoveler)*			
59.	24316	*Anas superciliosa (Pacific Black Duck)*			
60.	47414	*Anhinga novaehollandiae (Australasian Darter)*			
61.	1409	*Anigozanthos humilis (Catspaw)*			
62.	44629	*Anilios australis*			
63.	6949	*Anthocercis littorea (Yellow Tailflower)*			
64.	24561	*Anthochaera carunculata (Red Wattlebird)*			
65.	24562	*Anthochaera lunulata (Western Little Wattlebird)*			
66.	25670	*Anthus australis (Australian Pipit)*			
67.	6210	*Apium annuum*			
68.	6211	*Apium prostratum (Sea Celery)*			
69.	24991	*Aprasia repens (Sand-plain Worm-lizard)*			
70.	46393	*Arctotheca calendula x populifolia*	Y		
71.	7840	*Arctotis stoechadifolia (White Arctotis, Silver Arctotis)*	Y		
72.	41324	*Ardea modesta (great egret, white egret)*			
73.	24340	*Ardea novaehollandiae (White-faced Heron)*			
74.	24341	*Ardea pacifica (White-necked Heron)*			
75.	25566	*Artamus cinereus (Black-faced Woodswallow)*			
76.	24353	*Artamus cyanopterus (Dusky Woodswallow)*			
77.	8779	*Asparagus asparagoides (Bridal Creeper)*	Y		
78.	2471	*Atriplex prostrata (Hastate Orache)*	Y		
79.	2480	*Atriplex suberecta*			
80.	47713	*Austronomus australis (White-striped Free-tailed Bat)*			
81.	17240	*Austrostipa flavescens*			
82.	233	*Avena barbata (Bearded Oat)*	Y		
83.	234	*Avena fatua (Wild Oat)*	Y		
84.	1830	*Banksia littoralis (Swamp Banksia, Pungura)*			
85.		*Barnardius zonarius*			
86.	743	*Baumea juncea (Bare Twigrush)*			
87.	744	*Baumea laxa*			
88.	748	*Baumea vaginalis (Sheath Twigrush)*			
89.	7046	*Bellardia trixago (Bellardia)*	Y		
90.	24319	*Biziura lobata (Musk Duck)*			
91.	42381	*Brachyurophis semifasciatus (Southern Shovel-nosed Snake)*			
92.	247	*Bromus arenarius (Sand Brome)*			
93.	249	*Bromus diandrus (Great Brome)*	Y		
94.	25715	*Cacatua roseicapilla (Galah)*			
95.	25716	*Cacatua sanguinea (Little Corella)*			
96.	25598	*Cacomantis flabelliformis (Fan-tailed Cuckoo)*			
97.	42307	*Cacomantis pallidus (Pallid Cuckoo)*			
98.	3002	*Cakile maritima (Sea Rocket)*	Y		
99.	1599	*Caladenia latifolia (Pink Fairy Orchid)*			
100.	15361	*Caladenia longicauda subsp. calcigena*			
101.	2845	*Calandrinia brevipedata (Short-stalked Purslane)*			
102.	2848	*Calandrinia corrigioloides (Strap Purslane)*			
103.	2856	*Calandrinia liniflora (Parakeelya)*			

	Name ID	Species Name	Naturalised	Conservation Code	[1]Endemic To Query Area
104.	40827	*Calandrinia tholiformis*			
105.	25717	*Calyptorhynchus banksii (Red-tailed Black-Cockatoo)*			
106.		*Candelariella sp.*			
107.	43241	*Carex thecata*			
108.	2798	*Carpobrotus virescens (Coastal Pigface, Kolboko, Bain)*			
109.	2951	*Cassytha flava (Dodder Laurel)*			
110.	2957	*Cassytha racemosa (Dodder Laurel)*			
111.	6214	*Centella asiatica*			
112.	2889	*Cerastium glomeratum (Mouse Ear Chickweed)*	Y		
113.	24186	*Chalinolobus gouldii (Gould's Wattled Bat)*			
114.	1280	*Chamaescilla corymbosa (Blue Squill)*			
115.	24377	*Charadrius ruficapillus (Red-capped Plover)*			
116.	24321	*Chenonetta jubata (Australian Wood Duck, Wood Duck)*			
117.	2483	*Chenopodium album (Fat Hen)*	Y		
118.	2490	*Chenopodium glaucum (Glaucous Goosefoot)*	Y		
119.	2494	*Chenopodium murale (Nettle-leaf Goosefoot)*	Y		
120.		*Chroicocephalus novaehollandiae*			
121.	24288	*Circus approximans (Swamp Harrier)*			
122.	24289	*Circus assimilis (Spotted Harrier)*			
123.	24774	*Cladorhynchus leucocephalus (Banded Stilt)*			
124.	10804	*Clematis linearifolia*			
125.	25675	*Colluricincla harmonica (Grey Shrike-thrush)*			
126.	24399	*Columba livia (Domestic Pigeon)*	Y		
127.	4552	*Comesperma confertum*			
128.	1418	*Conostylis aculeata (Prickly Conostylis)*			
129.	11826	*Conostylis aculeata subsp. aculeata*			
130.	1427	*Conostylis candicans (Grey Cottonhead)*			
131.	1443	*Conostylis pauciflora (Dawesville Conostylis)*			
132.	20074	*Conyza sumatrensis*	Y		
133.	25568	*Coracina novaehollandiae (Black-faced Cuckoo-shrike)*			
134.	25592	*Corvus coronoides (Australian Raven)*			
135.	25595	*Cracticus tibicen (Australian Magpie)*			
136.	25596	*Cracticus torquatus (Grey Butcherbird)*			
137.	3137	*Crassula colorata (Dense Stonecrop)*			
138.	11563	*Crassula colorata var. colorata*			
139.	3140	*Crassula glomerata*	Y		
140.	25400	*Crinia insignifera (Squelching Froglet)*			
141.	4802	*Cryptandra mutila*			
142.	30893	*Cryptoblepharus buchananii*			
143.	30899	*Ctenophorus adelaidensis (Southern Heath Dragon, Western Heath Dragon)*			
144.	25027	*Ctenotus australis*			
145.	25039	*Ctenotus fallens*			
146.	6663	*Cuscuta epithymum (Lesser Dodder, Greater Dodder)*	Y		
147.	24322	*Cygnus atratus (Black Swan)*			
148.	283	*Cynodon dactylon (Couch)*	Y		
149.	285	*Cynosurus echinatus (Rough Dogstail)*	Y		
150.	816	*Cyperus tenuiflorus (Scaly Sedge)*	Y		
151.	30901	*Dacelo novaeguineae (Laughing Kookaburra)*	Y		
152.		*Dactylophora nigricans*			
153.		*Dactylopus dactylopus*			
154.	25673	*Daphoenositta chrysoptera (Varied Sittella)*			
155.	6218	*Daucus glochidiatus (Australian Carrot)*			
156.	17663	*Desmocladus asper*			
157.	1259	*Dianella revoluta (Blueberry Lily)*			
158.		*Dingosa serrata*			
159.	18541	*Diplopeltis huegelii subsp. huegelii*			
160.	7054	*Dischisma arenarium*	Y		
161.		*Egretta novaehollandiae*			
162.		*Elanus axillaris*			
163.	25540	*Elanus caeruleus (Black-shouldered Kite)*			
164.	25250	*Elapognathus coronatus (Crowned Snake)*			
165.		*Eolophus roseicapillus*			
166.	6131	*Epilobium billardiereanum (Glabrous Willow Herb)*			
167.	11992	*Epilobium billardiereanum subsp. intermedium*			
168.	24567	*Epthianura albifrons (White-fronted Chat)*			
169.	17175	*Eremophila glabra subsp. albicans*			
170.		*Eriophora biapicata*			
171.	4333	*Erodium cicutarium (Common Storksbill)*	Y		
172.		*Eubalichthys mosaicus*			
173.	5649	*Eucalyptus foecunda (Narrow-leaved Red Mallee)*			

	Name ID	Species Name	Naturalised	Conservation Code	[1]Endemic To Query Area
174.	5659	*Eucalyptus gomphocephala (Tuart, Duart)*			
175.	4648	*Euphorbia terracina (Geraldton Carnation Weed)*	Y		
176.	10765	*Exocarpos sparteus (Broom Ballart, Djuk)*			
177.	25621	*Falco berigora (Brown Falcon)*			
178.	25622	*Falco cenchroides (Australian Kestrel, Nankeen Kestrel)*			
179.	25623	*Falco longipennis (Australian Hobby)*			
180.	24041	*Felis catus (Cat)*	Y		
181.	20216	*Ficinia nodosa (Knotted Club Rush)*			
182.	25727	*Fulica atra (Eurasian Coot)*			
183.	24761	*Fulica atra subsp. australis (Eurasian Coot)*			
184.	907	*Gahnia trifida (Coast Saw-sedge)*			
185.	34028	*Galaxias occidentalis (Western Minnow)*			
186.	20482	*Gastrolobium nervosum*			
187.	4339	*Geranium molle (Dove's Foot Cranesbill)*	Y		
188.	4340	*Geranium retrorsum*			
189.	4341	*Geranium solanderi (Native Geranium)*			
190.	25530	*Gerygone fusca (Western Gerygone)*			
191.	26860	*Gloiocladia halymenioides*			
192.	3957	*Gompholobium tomentosum (Hairy Yellow Pea)*			
193.	24443	*Grallina cyanoleuca (Magpie-lark)*			
194.	1982	*Grevillea crithmifolia*			
195.	15839	*Grevillea preissii subsp. preissii*			
196.	24487	*Haematopus longirostris (Pied Oystercatcher)*			
197.	2197	*Hakea prostrata (Harsh Hakea)*			
198.	24295	*Haliastur sphenurus (Whistling Kite)*			
199.	24689	*Halobaena caerulea (Blue Petrel)*			
200.	3961	*Hardenbergia comptoniana (Native Wisteria)*			
201.	25410	*Heleioporus eyrei (Moaning Frog)*			
202.	3016	*Heliophila pusilla*	Y		
203.	6839	*Hemiandra pungens (Snakebush)*			
204.	25232	*Hemidactylus frenatus (Asian House Gecko)*	Y		
205.	25119	*Hemiergis quadrilineata*			
206.	5117	*Hibbertia cuneiformis (Cutleaf Hibbertia)*			
207.	25734	*Himantopus himantopus (Black-winged Stilt)*			
208.	24491	*Hirundo neoxena (Welcome Swallow)*			
209.	6229	*Hydrocotyle diantha*			
210.	6232	*Hydrocotyle hispidula*			
211.	6241	*Hydrocotyle tetragonocarpa*			
212.	25366	*Hydrophis elegans (Elegant Seasnake, Bar-bellied Seasnake)*			
213.	43384	*Hydrophis platurus (Yellow-bellied Seasnake)*			
214.	8086	*Hypochaeris glabra (Smooth Catsear)*	Y		
215.	17841	*Hypolaena pubescens*			
216.		*Idiommata blackwalli*			
217.	48504	*Inocybe acaciae*			
218.	48545	*Inocybe sabulosa*			
219.	910	*Isolepis cernua (Nodding Club-rush)*			
220.	20200	*Isolepis cernua var. setiformis*			
221.	917	*Isolepis marginata (Coarse Club-rush)*			
222.		*Isometroides vescus*			
223.	4012	*Jacksonia furcellata (Grey Stinkwood)*			
224.	20454	*Juncus acutus subsp. acutus*	Y		
225.	1185	*Juncus kraussii (Sea Rush)*			
226.	11922	*Juncus kraussii subsp. australiensis*			
227.	4037	*Kennedia coccinea (Coral Vine)*			
228.	4044	*Kennedia prostrata (Scarlet Runner)*			
229.	13562	*Lachenalia aloides*	Y		
230.	467	*Lagurus ovatus (Hare's Tail Grass)*	Y		
231.	25637	*Larus novaehollandiae (Silver Gull)*			
232.	25638	*Larus pacificus (Pacific Gull)*			
233.	1309	*Laxmannia squarrosa*			
234.	44490	*Leontodon rhagadioloides*	Y		
235.	925	*Lepidosperma angustatum*			
236.	42742	*Lepidosperma calcicola*			
237.	933	*Lepidosperma gladiatum (Coast Sword-sedge, Kerbin)*			
238.	937	*Lepidosperma longitudinale (Pithy Sword-sedge)*			
239.		*Lepidosperma sp.*			
240.	2352	*Leptomeria preissiana*			
241.	17852	*Leptorhynchos scaber (Lanky Buttons)*			
242.	6360	*Leucopogon australis (Spiked Beard-heath)*			
243.	6427	*Leucopogon parviflorus (Coast Beard-heath)*			

	Name ID	Species Name	Naturalised	Conservation Code	[1]Endemic To Query Area
244.	25005	*Lialis burtonis*			
245.	25661	*Lichmera indistincta (Brown Honeyeater)*			
246.	24582	*Lichmera indistincta subsp. indistincta (Brown Honeyeater)*			
247.	25415	*Limnodynastes dorsalis (Western Banjo Frog)*			
248.	25388	*Litoria moorei (Motorbike Frog)*			
249.	7408	*Lobelia tenuior (Slender Lobelia)*			
250.	6515	*Logania vaginalis (White Spray)*			
251.	476	*Lolium perenne (Perennial Ryegrass)*	Y		
252.	478	*Lolium rigidum (Wimmera Ryegrass)*	Y		
253.	11073	*Lolium x hybridum*	Y		
254.	1231	*Lomandra maritima*			
255.	1232	*Lomandra micrantha (Small-flower Mat-rush)*			
256.	36375	*Lysimachia arvensis (Pimpernel)*	Y		
257.	24132	*Macropus fuliginosus (Western Grey Kangaroo)*			
258.	25654	*Malurus splendens (Splendid Fairy-wren)*			
259.	24552	*Malurus splendens subsp. splendens (Splendid Fairy-wren)*			
260.	36480	*Malva arborea (Tree Mallow)*	Y		
261.	4961	*Malva parviflora (Marshmallow)*	Y		
262.	31351	*Malva preissiana*			
263.	34676	*Meionectes brownii (Swamp Raspwort)*			
264.	5959	*Melaleuca rhaphiophylla (Swamp Paperbark)*			
265.	18598	*Melaleuca systena*			
266.	5978	*Melaleuca teretifolia (Banbar)*			
267.	13280	*Melaleuca viminea subsp. viminea*			
268.	4085	*Melilotus indicus*	Y		
269.	25184	*Menetia greyii*			
270.	24598	*Merops ornatus (Rainbow Bee-eater)*			
271.		*Microcarbo melanoleucos*			
272.	16693	*Minuartia mediterranea*	Y		
273.		*Missulena granulosa*			
274.	25240	*Morelia spilota subsp. imbricata (Carpet Python)*			
275.	25191	*Morethia lineoocellata*			
276.	48008	*Morus serrator (Australasian Gannet)*			
277.	2412	*Muehlenbeckia adpressa (Climbing Lignum)*			
278.	24223	*Mus musculus (House Mouse)*	Y		
279.	7289	*Myoporum caprarioides (Slender Myoporum)*			
280.	7291	*Myoporum insulare (Blueberry Tree, boobialla)*			
281.	24738	*Neophema elegans (Elegant Parrot)*			
282.		*Nicodamus mainae*			
283.	25252	*Notechis scutatus (Tiger Snake)*			
284.	25564	*Nycticorax caledonicus (Rufous Night Heron)*			
285.	24407	*Ocyphaps lophotes (Crested Pigeon)*			
286.	8127	*Olearia axillaris (Coastal Daisybush)*			
287.	18255	*Opercularia vaginata (Dog Weed)*			
288.	24085	*Oryctolagus cuniculus (Rabbit)*	Y		
289.	25680	*Pachycephala rufiventris (Rufous Whistler)*			
290.	24692	*Pachyptila belcheri (Slender-billed Prion)*			
291.	24693	*Pachyptila desolata (Antarctic Prion)*			
292.	25707	*Pachyptila salvini (Salvin's Prion)*			
293.	25253	*Parasuta gouldii*			
294.	25681	*Pardalotus punctatus (Spotted Pardalote)*			
295.	25682	*Pardalotus striatus (Striated Pardalote)*			
296.	7089	*Parentucellia latifolia (Common Bartsia)*	Y		
297.	1762	*Parietaria debilis (Pellitory)*			
298.	4343	*Pelargonium capitatum (Rose Pelargonium)*	Y		
299.	4346	*Pelargonium littorale*			
300.	24648	*Pelecanus conspicillatus (Australian Pelican)*			
301.	48061	*Petrochelidon nigricans (Tree Martin)*			
302.	48066	*Petroica boodang (Scarlet Robin)*			
303.	25697	*Phalacrocorax carbo (Great Cormorant)*			
304.	25698	*Phalacrocorax melanoleucos (Little Pied Cormorant)*			
305.	24667	*Phalacrocorax sulcirostris (Little Black Cormorant)*			
306.	25699	*Phalacrocorax varius (Pied Cormorant)*			
307.	24668	*Phalacrocorax varius subsp. hypoleucos (Pied Cormorant)*			
308.	24409	*Phaps chalcoptera (Common Bronzewing)*			
309.	18529	*Philotheca spicata (Pepper and Salt)*			
310.	48071	*Phylidonyris niger (White-cheeked Honeyeater)*			
311.	24596	*Phylidonyris novaehollandiae (New Holland Honeyeater)*			
312.	4675	*Phyllanthus calycinus (False Boronia)*			
313.	42281	*Pithocarpa cordata*			

	Name ID	Species Name	Naturalised	Conservation Code	[1]Endemic To Query Area
314.	24841	*Platalea flavipes (Yellow-billed Spoonbill)*			
315.	25720	*Platycercus icterotis (Western Rosella)*			
316.	24747	*Platycercus spurius (Red-capped Parrot)*			
317.	25721	*Platycercus zonarius (Australian Ringneck, Ring-necked Parrot)*			
318.	24750	*Platycercus zonarius subsp. semitorquatus (Twenty-eight Parrot)*			
319.	573	*Poa drummondiana (Knotted Poa)*			
320.	577	*Poa poiformis (Coastal Poa)*			
321.	578	*Poa porphyroclados*			
322.	25704	*Podiceps cristatus (Great Crested Grebe)*			
323.	25510	*Pogona minor (Dwarf Bearded Dragon)*			
324.	24907	*Pogona minor subsp. minor (Dwarf Bearded Dragon)*			
325.	24681	*Poliocephalus poliocephalus (Hoary-headed Grebe)*			
326.	582	*Polypogon monspeliensis (Annual Beardgrass)*	Y		
327.	25722	*Polytelis anthopeplus (Regent Parrot)*			
328.	25731	*Porphyrio porphyrio (Purple Swamphen)*			
329.	24767	*Porphyrio porphyrio subsp. bellus (Purple Swamphen)*			
330.	1672	*Prasophyllum fimbria (Fringed Leek Orchid)*			
331.	25511	*Pseudonaja affinis (Dugite)*			
332.	25259	*Pseudonaja affinis subsp. affinis (Dugite)*			
333.	24702	*Pterodroma brevirostris (Kerguelen Petrel)*			
334.	25710	*Pterodroma macroptera (Great-winged Petrel)*			
335.	1686	*Pterostylis barbata (Bird Orchid)*			
336.	17267	*Pterostylis brevisepala*			
337.	2718	*Ptilotus drummondii (Narrowleaf Mulla Mulla)*			
338.	24711	*Puffinus assimilis subsp. assimilis (Little Shearwater)*			
339.		*Purpureicephalus spurius*			
340.	30867	*Pycnonotus jocosus subsp. jocosus (Red-whiskered Bulbul)*	Y		Y
341.	24245	*Rattus rattus (Black Rat)*	Y		
342.		*Raveniella peckorum*			
343.	11341	*Rhagodia baccata subsp. baccata*			
344.	11930	*Rhagodia baccata subsp. dioica (Sea Berry Saltbush)*			
345.	48096	*Rhipidura albiscapa (Grey Fantail)*			
346.	25614	*Rhipidura leucophrys (Willie Wagtail)*			
347.	24454	*Rhipidura leucophrys subsp. leucophrys (Willie Wagtail)*			
348.	13300	*Rhodanthe citrina*			
349.		*Rhycherus gloveri*			
350.	1556	*Romulea rosea (Guildford Grass)*	Y		
351.	2433	*Rumex crispus (Curled Dock)*	Y		
352.	40426	*Rytidosperma occidentale*			
353.	48430	*Salicornia quinqueflora*			
354.	48431	*Salicornia quinqueflora subsp. quinqueflora (Beaded Glasswort)*			
355.	6484	*Samolus repens (Creeping Brookweed)*			
356.	7595	*Scaevola anchusifolia*			
357.	7626	*Scaevola nitida (Shining Fanflower)*			
358.	973	*Schoenus asperocarpus (Poison Sedge)*			
359.	978	*Schoenus brevisetis*			
360.	992	*Schoenus grandiflorus (Large Flowered Bogrush)*			
361.	1004	*Schoenus nitens (Shiny Bog-rush)*			
362.	32433	*Sematophyllum homomallum*			
363.	25878	*Senecio condylus*			
364.	20161	*Senecio pinnatifolius*			
365.	25534	*Sericornis frontalis (White-browed Scrubwren)*			
366.	2909	*Silene gallica (French Catchfly)*	Y		
367.	25266	*Simoselaps bertholdi (Jan's Banded Snake)*			
368.		*Siphonognathus radiatus*			
369.	30948	*Smicrornis brevirostris (Weebill)*			
370.	7022	*Solanum nigrum (Black Berry Nightshade)*	Y		
371.	7037	*Solanum symonii*			
372.	8230	*Sonchus asper (Rough Sowthistle)*	Y		
373.	9367	*Sonchus hydrophilus (Native Sowthistle)*			
374.	8231	*Sonchus oleraceus (Common Sowthistle)*	Y		
375.	635	*Sporobolus virginicus (Marine Couch)*			
376.	4828	*Spyridium globulosum (Basket Bush)*			
377.		*Squatina australis*			
378.	9069	*Stackhousia huegelii*			
379.	4733	*Stackhousia monogyna*			
380.	20397	*Stellaria pallida*	Y		
381.	48113	*Stenella coeruleoalba (Striped Dophin)*			
382.	24522	*Sterna bergii (Crested Tern)*			
383.	48594	*Sternula nereis (Fairy Tern)*			

	Name ID	Species Name	Naturalised	Conservation Code	[1]Endemic To Query Area
384.	25590	*Streptopelia senegalensis (Laughing Turtle-Dove)*	Y		
385.	25518	*Strophurus spinigerus*			
386.	2639	*Suaeda australis (Seablite)*			
387.	25705	*Tachybaptus novaehollandiae (Australasian Grebe, Black-throated Grebe)*			
388.	24682	*Tachybaptus novaehollandiae subsp. novaehollandiae (Australasian Grebe, Black-throated Grebe)*			
389.	24331	*Tadorna tadornoides (Australian Shelduck, Mountain Duck)*			
390.	4256	*Templetonia retusa (Cockies Tongues)*			
391.	2820	*Tetragonia decumbens (Sea Spinach)*	Y		
392.	2644	*Threlkeldia diffusa (Coast Bonefruit)*			
393.	24845	*Threskiornis spinicollis (Straw-necked Ibis)*			
394.	1319	*Thysanotus arenarius*			
395.	1351	*Thysanotus sparteus*			
396.	25203	*Tiliqua occipitalis (Western Bluetongue)*			
397.	25519	*Tiliqua rugosa*			
398.	25207	*Tiliqua rugosa subsp. rugosa*			
399.	25549	*Todiramphus sanctus (Sacred Kingfisher)*			
400.	32445	*Tortula muralis*			
401.	1368	*Trachyandra divaricata*	Y		
402.	6266	*Trachymene coerulea (Blue Lace Flower)*			
403.	6280	*Trachymene pilosa (Native Parsnip)*			
404.	1361	*Tricoryne elatior (Yellow Autumn Lily)*			
405.	4297	*Trifolium glomeratum (Cluster Clover)*	Y		
406.	147	*Triglochin mucronata*			
407.	151	*Triglochin striata*			
408.	152	*Triglochin trichophora*			
409.	11665	*Trymalium ledifolium var. ledifolium*			
410.	30954	*Tursiops aduncus (Indo-Pacific Bottlenose Dolphin)*			
411.		*Urodacus novaehollandiae*			
412.	24386	*Vanellus tricolor (Banded Lapwing)*			
413.	25218	*Varanus gouldii (Bungarra or Sand Monitor)*			
414.	24040	*Vulpes vulpes (Red Fox)*	Y		
415.	11137	*Vulpia fasciculata*	Y		
416.	724	*Vulpia myuros (Rat's Tail Fescue)*	Y		
417.	33101	*Vulpia myuros forma myuros*	Y		
418.	1398	*Wurmbea monantha*			
419.	1256	*Xanthorrhoea preissii (Grass tree, Palga)*			
420.	25765	*Zosterops lateralis (Grey-breasted White-eye, Silvereye)*			
421.	36218	*Zygodon menziesii*			

Conservation Codes
T - Rare or likely to become extinct
X - Presumed extinct
IA - Protected under international agreement
S - Other specially protected fauna
1 - Priority 1
2 - Priority 2
3 - Priority 3
4 - Priority 4
5 - Priority 5

[1] For NatureMap's purposes, species flagged as endemic are those whose records are wholely contained within the search area. Note that only those records complying with the search criterion are included in the calculation. For example, if you limit records to those from a specific datasource, only records from that datasource are used to determine if a species is restricted to the query area.

APPENDIX B - EPBC PROTECTED MATTERS SEARCH REPORT

Australian Government

Department of Agriculture, Water and the Environment

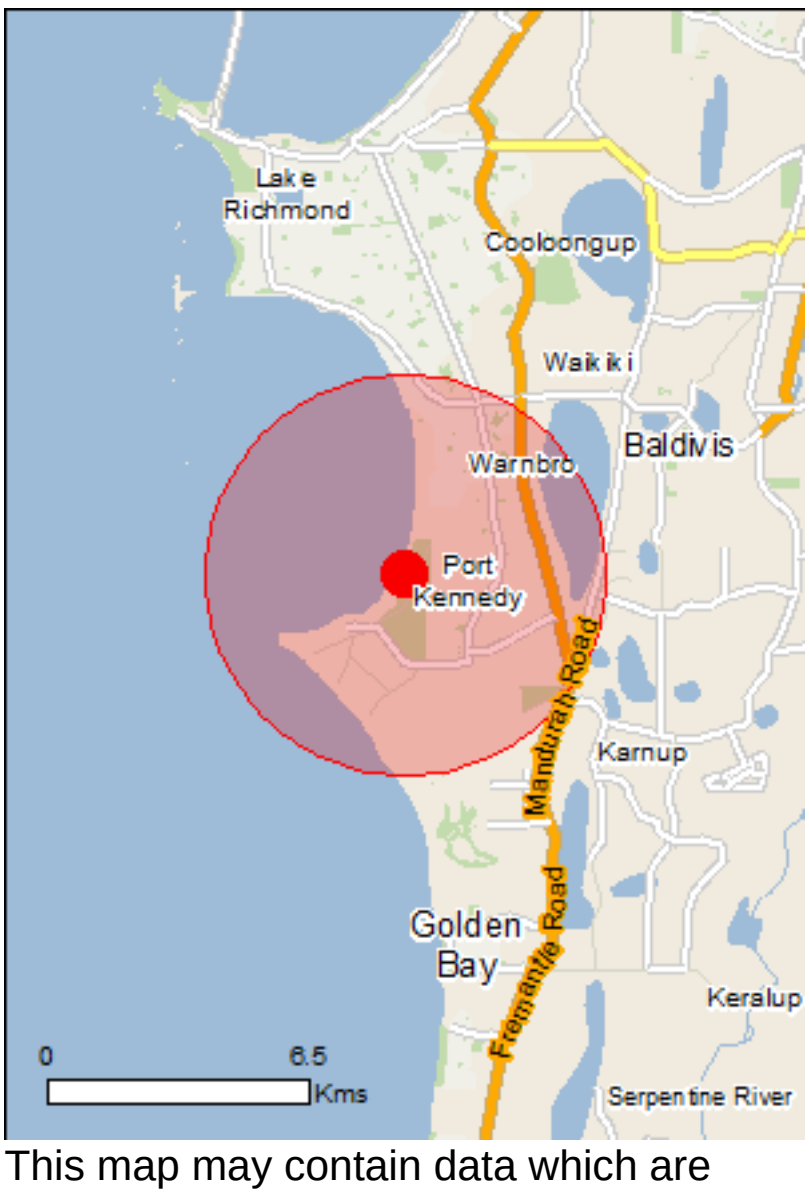
EPBC Act Protected Matters Report

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.

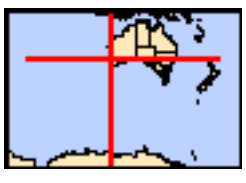
Report created: 26/10/20 19:06:46



This map may contain data which are ©Commonwealth of Australia (Geoscience Australia), ©PSMA 2015

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:	2
Great Barrier Reef Marine Park:	None
Commonwealth Marine Area:	None
Listed Threatened Ecological Communities:	3
Listed Threatened Species:	49
Listed Migratory Species:	45

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:	72
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:	2
Regional Forest Agreements:	None
Invasive Species:	36
Nationally Important Wetlands:	1
Key Ecological Features (Marine)	None

Details

Matters of National Environmental Significance

Wetlands of International Importance (Ramsar) [Resource Information]

Name	Proximity
Becher point wetlands	Within Ramsar site
Peel-yalgorup system	10 - 20km upstream

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
Sedgelands in Holocene dune swales of the southern Swan Coastal Plain	Endangered	Community known 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 likely 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 likely 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 baudinii Baudin's Cockatoo, Long-billed Black-Cockatoo [769]	Endangered	Species or species habitat likely to occur within area
Calyptorhynchus latirostris Carnaby's Cockatoo, Short-billed Black-Cockatoo [59523]	Endangered	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

Name	Status	Type of Presence
		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 baueri Bar-tailed Godwit (baueri), Western Alaskan Bar-tailed Godwit [86380]	Vulnerable	Species or species habitat known to occur within area
Limosa lapponica menzbieri Northern Siberian Bar-tailed Godwit, Bar-tailed Godwit (menzbieri) [86432]	Critically Endangered	Species or species habitat may 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 may occur within area
Pachyptila turtur subantarctica Fairy Prion (southern) [64445]	Vulnerable	Species or species habitat likely to occur within area
Phoebetria fusca Sooty Albatross [1075]	Vulnerable	Species or species habitat may 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 likely 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

Name	Status	Type of Presence
		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
Mammals		
Balaenoptera musculus Blue Whale [36]	Endangered	Species or species habitat likely to occur within area
Bettongia penicillata ogilbyi Woylie [66844]	Endangered	Species or species habitat known to occur within area
Dasyurus geoffroii 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]	Vulnerable	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		
Caladenia huegelii King Spider-orchid, Grand Spider-orchid, Rusty Spider-orchid [7309]	Endangered	Species or species habitat may occur within area
Diuris drummondii Tall Donkey Orchid [4365]	Vulnerable	Species or species habitat may occur within area
Diuris micrantha Dwarf Bee-orchid [55082]	Vulnerable	Species or species habitat likely to occur within area
Diuris purdiei Purdie's Donkey-orchid [12950]	Endangered	Species or species habitat may occur within area
Drakaea elastica Glossy-leafed 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
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

Name	Status	Type of Presence
[Dermochelys coriacea](#)		
Leatherback Turtle, Leathery Turtle, Luth [1768]	Endangered	Foraging, feeding or related behaviour known to occur within area
[Natator depressus](#)		
Flatback Turtle [59257]	Vulnerable	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 may 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

Name	Threatened	Type of Presence
		to occur within area
Phoebetria fusca Sooty Albatross [1075]	Vulnerable	Species or species habitat may 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
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 likely to occur within area

Name	Threatened	Type of Presence
Manta birostris		
Giant Manta Ray, Chevron Manta Ray, Pacific Manta Ray, Pelagic Manta Ray, Oceanic Manta Ray [84995]		Species or species habitat likely to occur within area
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
Calidris acuminata		
Sharp-tailed Sandpiper [874]		Species or species habitat likely 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 likely to occur within area
Calidris melanotos		
Pectoral Sandpiper [858]		Species or species habitat likely to occur within area
Limosa lapponica		
Bar-tailed Godwit [844]		Species or species habitat known to occur within area
Numenius madagascariensis		
Eastern Curlew, Far Eastern Curlew [847]	Critically Endangered	Species or species habitat may occur within area
Pandion haliaetus		
Osprey [952]		Species or species habitat likely to occur within area
Tringa nebularia		
Common Greenshank, Greenshank [832]		Species or species habitat likely 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		
Actitis hypoleucos Common Sandpiper [59309]		Species or species habitat known to occur within area
Anous stolidus Common Noddy [825]		Species or species habitat may 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 alba Great Egret, White Egret [59541]		Species or species habitat known to occur within area
Ardea ibis Cattle Egret [59542]		Species or species habitat may occur within area
Calidris acuminata Sharp-tailed Sandpiper [874]		Species or species habitat likely 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 likely to occur within area
Calidris melanotos Pectoral Sandpiper [858]		Species or species habitat likely to occur within area
Catharacta skua Great Skua [59472]		Species or species habitat may 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

Name	Threatened	Type of Presence
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 likely to occur within area
Halobaena caerulea Blue Petrel [1059]	Vulnerable	Species or species habitat may occur within area
Larus pacificus Pacific Gull [811]		Foraging, feeding or related behaviour may occur within area
Limosa lapponica Bar-tailed Godwit [844]		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
Numenius madagascariensis Eastern Curlew, Far Eastern Curlew [847]	Critically Endangered	Species or species habitat may occur within area
Pachyptila turtur Fairy Prion [1066]		Species or species habitat likely to occur within area
Pandion haliaetus Osprey [952]		Species or species habitat likely to occur within area
Phoebetria fusca Sooty Albatross [1075]	Vulnerable	Species or species habitat may 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
Rostratula benghalensis (sensu lato) Painted Snipe [889]	Endangered*	Species or species habitat likely to occur within area

Name	Threatened	Type of Presence
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
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 may occur within area
Tringa nebularia		
Common Greenshank, Greenshank [832]		Species or species habitat likely 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

Name	Threatened	Type of Presence
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
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]	Vulnerable	Species or species habitat known to occur within area
Reptiles		
Caretta caretta Loggerhead Turtle [1763]	Endangered	Foraging, feeding or related behaviour known

Name	Threatened	Type of Presence
		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 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 Dophin, 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
Port Kennedy Scientific Park	WA
Unnamed WA44004	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 Resouces 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

Name	Status	Type of Presence
		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
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		
Asparagus asparagoides Bridal Creeper, Bridal Veil Creeper, Smilax, Florist's Smilax, Smilax Asparagus [22473]		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

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

Nationally Important Wetlands	[Resource Information]
Name	State
Becher Point Wetlands	WA

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

-32.35861 115.74111

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.

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APPENDIX C - FLORA SPECIES BY VEGETATION UNIT

*denotes introduced (weed) species

Family	Species	Vegetation Unit		
		SgAp	ArAb	ArLg
Aizoaceae	*Carpobrotus* sp.			
Aizoaceae	* *Tetragonia decumbens*		+	
Anacardiaceae	* *Schinus terebinthifolia*			
Apocynaceae	*Alyxia buxifolia*	+	+	+
Asparagaceae	*Acanthocarpus preissii*	+	+	+
Asparagaceae	* *Asparagus aethiopicus*	+		
Asparagaceae	*Dianella revoluta*			
Asparagaceae	*Lomandra maritima*	+		+
Asphodelaceae	* *Asphodelus fistulosus*	+	+	+
Asteraceae	*Olearia axillaris*	+		
Asteraceae	*Senecio condylus*	+		+
Asteraceae	*Senecio ramosissimus*	+		
Asteraceae	*Senecio* sp.	+		+
Asteraceae	* *Sonchus oleraceus*	+	+	
Caryophyllaceae	* *Minuartia mediterranea*	+		
Chenopodiaceae	* *Chenopodium glaucum*		+	
Chenopodiaceae	*Rhagodia baccata*	+	+	
Chenopodiaceae	*Rhagodia baccata* subsp. *baccata*	+	+	+
Crassulaceae	*Crassula colorata* var. *colorata*	+		
Crassulaceae	* *Crassula glomerata*	+	+	+
Cupressaceae	*Callitris preissii*			
Cyperaceae	*Isolepis cernua* var. *cernua*	+		+
Cyperaceae	*Lepidosperma ?calcicola*	+		
Cyperaceae	*Lepidosperma calcicola*	+		+
Cyperaceae	*Lepidosperma gladiatum*		+	+
Cyperaceae	*Lepidosperma squamatum*		+	
Ericaceae	*Leucopogon parviflorus*	+	+	+
Euphorbiaceae	* *Euphorbia peplus*	+	+	
Euphorbiaceae	* *Euphorbia terracina*	+	+	+
Fabaceae	*Acacia browniana* var. *intermedia*	+		
Fabaceae	*Acacia pulchella*			+
Fabaceae	*Acacia pulchella* var. *glaberrima*	+		
Fabaceae	*Acacia rostellifera*	+	+	+
Fabaceae	*Acacia saligna*	+		
Fabaceae	*Hardenbergia comptoniana*	+		
Fabaceae	*Kennedia prorepens*	+		
Fabaceae	*Kennedia prostrata*			+
Fabaceae	*Kennedia* sp.	+	+	
Geraniaceae	* *Pelargonium capitatum*			
Geraniaceae	*Pelargonium* sp.	+		
Haemodoraceae	*Conostylis aculeata*	+		+
Haloragaceae	*Gonocarpus* sp.	+		
Iridaceae	* *Romulea rosea*	+		+
Myrtaceae	* *Leptospermum laevigatum*	+		
Myrtaceae	*Melaleuca systena*	+		+
Papaveraceae	* *Fumaria capreolata*		+	
Phyllanthaceae	*Phyllanthus calycinus*	+		
Poaceae	*Austrostipa flavescens*	+	+	+
Poaceae	* *Avena barbata*	+		+
Poaceae	* *Briza maxima*	+		
Poaceae	* *Bromus diandrus*	+		+

Family	Species	Vegetation Unit		
		SgAp	ArAb	ArLg
Poaceae	* *Ehrharta calycina*	+	+	
Poaceae	* *Ehrharta longiflora*	+	+	
Poaceae	* *Lagurus ovatus*	+	+	+
Poaceae	* *Lolium rigidum*	+	+	+
Poaceae	*Poa porphyroclados*	+		
Poaceae	*Poaceae* sp.	+		
Polygalaceae	*Comesperma ? integerrimum*	+		
Primulaceae	*Lysimachia arvensis*	+	+	
Ranunculaceae	*Clematis linearifolia*	+	+	+
Restionaceae	*Desmocladus asper*	+		+
Restionaceae	*Desmocladus flexuosus*	+		
Rhamnaceae	*Spyridium globulosum*	+	+	+
Rhamnaceae	*Spyridium* sp.	+		
Rubiaceae	*Opercularia vaginata*	+		
Scrophulariaceae	* *Dischisma arenarium*	+		
Scrophulariaceae	*Eremophila glabra* subsp. *albicans*	+		
Urticaceae	*Parietaria cardiostegia*		+	
Urticaceae	*Parietaria debilis*	+	+	

APPENDIX D – VEGETATION QUADRAT DATA

Site PK01

Date	27th October 2020
Botanist	Daniel Roberts and Jeni Alford
Quadrat Size	10 x 10 m
NW Corner Coordinates	381829mE, 6419782mN
Vegetation Unit	SgAp - *Spyridium globulosum* and *Alyxia buxifolia* Open Shrubland over *Acanthocarpus preissii* Low Open Shrubland over *Bromus diandrus* Low Open Grassland and *Lomandra maritima* Low Sparse Rushland.
Slope	Moderate
Landform	Upper Slope
Soil Colour	Grey
Soil Type	Sand
Litter	35%
Bare Ground	5%
Fire Age	>10 Years
Vegetation Condition	Good-Very Good
Disturbances/Impacts	Weeds

Species	Height (cm)	% Cover
Olearia axillaris	2.4	15
Spyridium globulosum	2.4	40
Acacia rostellifera	1.4	1
Alyxia buxifolia	1	1
Acanthocarpus preissii	0.7	15
Rhagodia baccata	0.7	1
Conostylis aculeata	0.5	10
Asparagus aethiopicus		+
Bromus diandrus		+
Crassula glomerata		+
Desmocladus asper		+
Euphorbia terracina		+
Hardenbergia comptoniana		+
Lagurus ovatus		+
Leucopogon parviflorus		+
Lolium rigidum		+
Lysimachia arvensis		+
Pelargonium sp.		+
Phyllanthus calycinus		+
Poa porphyroclados		+
Senecio condylus		+
Senecio sp.		+

Site PK02

Date	27th October 2020
Botanist	Daniel Roberts and Jeni Alford
Quadrat Size	10 x 10 m
NW Corner Coordinates	381820mE, 6419712mN
Vegetation Unit	ArAb - *Acacia rostellifera* tall Closed shrubland over *Alyxia buxifolia*,*Rhagodia baccata* subsp. *baccata* and *Spyridium globulosum* Open Shrubland over *Lolium rigidum* and *Ehrharta calycina* Hummock Grassland over *Fumaria capreolata* Forbland.
Slope	Gentle
Landform	Lower Slope
Soil Colour	Grey
Soil Type	Sand
Litter	55%
Bare Ground	5%
Fire Age	>10 Years
Vegetation Condition	Good-Very Good
Disturbances/Impacts	Weeds

Species	Height (cm)	% Cover
Acacia rostellifera	4	70
Spyridium globulosum	3	5
Rhagodia baccata	1.5	5
Parietaria cardiostegia	0.3	5
Acanthocarpus preissii		+
Alyxia buxifolia		+
Austrostipa flavescens		+
Clematis linearifolia		+
Crassula glomerata		+
Lepidosperma gladiatum		+
Lysimachia arvensis		+

Site PK03

Date	27th October 2020
Botanist	Daniel Roberts and Jeni Alford
Quadrat Size	10 x 10 m
NW Corner Coordinates	381738mE, 6419633mN
Vegetation Unit	SgAp - *Spyridium globulosum* and *Alyxia buxifolia* Open Shrubland over *Acanthocarpus preissii* Low Open Shrubland over *Bromus diandrus* Low Open Grassland and *Lomandra maritima* Low Sparse Rushland.
Slope	Flat
Landform	Upper Slope
Soil Colour	Grey
Soil Type	Sand
Litter	35%
Bare Ground	20%
Fire Age	>10 Years
Vegetation Condition	Good-Very Good
Disturbances/Impacts	Weeds

Species	Height (cm)	% Cover
Acacia rostellifera	2.5	5
Spyridium globulosum	2.3	40
Alyxia buxifolia	1.4	1
Melaleuca systena	1.1	2
Acanthocarpus preissii	0.9	2
Lomandra maritima	0.4	20
Asphodelus fistulosus		+
Austrostipa flavescens		+
Clematis linearifolia		+
Conostylis aculeata		+
Crassula glomerata		+
Desmocladus flexuosus		+
Dischisma arenarium		+
Ehrharta calycina		+
Ehrharta longiflora		+
Euphorbia terracina		+
Gonocarpus sp.		+
Lagurus ovatus		+
Leucopogon parviflorus		+
Lolium rigidum		+
Lysimachia arvensis		+
Parietaria debilis		+
Pelargonium capitatum		+
Phyllanthus calycinus		+
Rhagodia baccata		+
Senecio condylus		+
Senecio sp.		+
Sonchus oleraceus		+

Site PK04

Date	27th October 2020
Botanist	Daniel Roberts and Jeni Alford
Quadrat Size	10 x 10 m
NW Corner Coordinates	381816mE, 6419599mN
Vegetation Unit	ArAb - *Acacia rostellifera* tall Closed shrubland over *Alyxia buxifolia*,*Rhagodia baccata* subsp. *baccata* and *Spyridium globulosum* Open Shrubland over *Lolium rigidum* and *Ehrharta calycina* Hummock Grassland over *Fumaria capreolata* Forbland.
Slope	Flat
Landform	Valley Floor
Soil Colour	Grey
Soil Type	Sand
Litter	45%
Bare Ground	5%
Fire Age	>10 Years
Vegetation Condition	Good-Very Good
Disturbances/Impacts	Weeds

Species	Height (cm)	% Cover
Acacia rostellifera	6	60
Alyxia buxifolia	2	20
Austrostipa flavescens	0.8	5
Ehrharta calycina	0.6	15
Parietaria cardiostegia	0.6	2
Leucopogon parviflorus		+
Lolium rigidum		+
Lysimachia arvensis		+
Sonchus oleraceus		+
Spyridium globulosum		Associated

Site PK05

Date	27th October 2020
Botanist	Daniel Roberts and Jeni Alford
Quadrat Size	10 x 10 m
NW Corner Coordinates	381422mE, 6418867mN
Vegetation Unit	SgAp - *Spyridium globulosum* and *Alyxia buxifolia* Open Shrubland over *Acanthocarpus preissii* Low Open Shrubland over *Bromus diandrus* Low Open Grassland and *Lomandra maritima* Low Sparse Rushland.
Slope	Gentle
Landform	Mid Slope
Soil Colour	Grey
Soil Type	Sand
Litter	25%
Bare Ground	15%
Fire Age	>10 Years
Vegetation Condition	Good-Very Good
Disturbances/Impacts	Weeds

Species	Height (cm)	% Cover
Melaleuca systena	1.5	5
Alyxia buxifolia	1.4	15
Acanthocarpus preissii	0.6	2
Bromus diandrus	0.3	10
Acacia saligna		+
Asphodelus fistulosus		+
Austrostipa flavescens		+
Avena barbata		+
Clematis linearifolia		+
Conostylis aculeata		+
Desmocladus asper		+
Ehrharta calycina		+
Euphorbia terracina		+
Hardenbergia comptoniana		+
Lagurus ovatus		+
Leucopogon parviflorus		+
Lolium rigidum		+
Opercularia vaginata		+
Rhagodia baccata subsp. *baccata*		+
Romulea rosea		+
Senecio condylus		+
Senecio ramosissimus		+

Site PK06

Date	27th October 2020
Botanist	Daniel Roberts and Jeni Alford
Quadrat Size	10 x 10 m
NW Corner Coordinates	381317mE, 6418656mN
Vegetation Unit	SgAp - *Spyridium globulosum* and *Alyxia buxifolia* Open Shrubland over *Acanthocarpus preissii* Low Open Shrubland over *Bromus diandrus* Low Open Grassland and *Lomandra maritima* Low Sparse Rushland.
Slope	Gentle
Landform	Lower Slope
Soil Colour	Grey
Soil Type	Sand
Litter	15%
Bare Ground	15%
Fire Age	>10 Years
Vegetation Condition	Good-Very Good
Disturbances/Impacts	Weeds

Species	Height (cm)	% Cover
Alyxia buxifolia	1.8	10
Spyridium sp.	1.8	8
Leucopogon parviflorus	1.3	4
Melaleuca systena	0.5	2
Lepidosperma ? calcicola	0.2	5
Poaceae sp.	0.2	60
Acacia browniana var. *intermedia*		+
Acacia pulchella var. *glaberrima*		+
Asphodelus fistulosus		+
Avena barbata		+
Briza maxima		+
Bromus diandrus		+
Conostylis aculeata		+
Crassula glomerata		+
Desmocladus asper		+
Euphorbia terracina		+
Isolepis cernua var. *cernua*		+
Kennedia prorepens		+
Lagurus ovatus		+
Lolium rigidum		+
Minuartia mediterranea		+
Olearia axillaris		+
Opercularia vaginata		+
Poa porphyroclados		+
Romulea rosea		+

Site PK07

Date	28th October 2020
Botanist	Daniel Roberts and Jeni Alford
Quadrat Size	10 x 10 m
NW Corner Coordinates	380780mE, 6418305mN
Vegetation Unit	ArAb - *Acacia rostellifera* tall Closed shrubland over *Alyxia buxifolia*,*Rhagodia baccata* subsp. *baccata* and *Spyridium globulosum* Open Shrubland over *Lolium rigidum* and *Ehrharta calycina* Hummock Grassland over *Fumaria capreolata* Forbland.
Slope	Gentle
Landform	Valley Floor
Soil Colour	Grey
Soil Type	Sand
Litter	55%
Bare Ground	5%
Fire Age	>10 Years
Vegetation Condition	Good-Very Good
Disturbances/Impacts	Weeds

Species	Height (cm)	% Cover
Acacia rostellifera	3 - 4	90
Alyxia buxifolia	2 - 2	1
Acanthocarpus preissii	0.8	2
Fumaria capreolata	0.4	50
Lolium rigidum	0.4	40
Asphodelus fistulosus		+
Chenopodium glaucum		+
Clematis linearifolia		+
Ehrharta longiflora		+
Euphorbia terracina		+
Lagurus ovatus		+
Rhagodia baccata subsp. *baccata*		+
Sonchus oleraceus		+

Site PK08

Date	28th October 2020
Botanist	Daniel Roberts and Jeni Alford
Quadrat Size	10 x 10 m
NW Corner Coordinates	380940mE, 6418424mN
Vegetation Unit	ArAb - *Acacia rostellifera* tall Closed shrubland over *Alyxia buxifolia*,*Rhagodia baccata* subsp. *baccata* and *Spyridium globulosum* Open Shrubland over *Lolium rigidum* and *Ehrharta calycina* Hummock Grassland over *Fumaria capreolata* Forbland.
Slope	Gentle
Landform	Valley Floor
Soil Colour	Grey
Soil Type	Sand
Litter	45%
Bare Ground	5%
Fire Age	>10 Years
Vegetation Condition	Good-Very Good
Disturbances/Impacts	Weeds

Species	Height (cm)	% Cover
Acacia rostellifera	3	80
Rhagodia baccata subsp. *baccata*	2.5	8
Alyxia buxifolia	1.5	2
Parietaria debilis	0.5	1
Lolium rigidum	0.4	70
Acanthocarpus preissii		5
Asphodelus fistulosus		+
Austrostipa flavescens		+
Chenopodium glaucum		+
Euphorbia terracina		+
Fumaria capreolata		+
Kennedia sp.		+
Lagurus ovatus		+

Site PK09

Date	28th October 2020
Botanist	Daniel Roberts and Jeni Alford
Quadrat Size	10 x 10 m
NW Corner Coordinates	381017mE, 6418510mN
Vegetation Unit	ArAb - *Acacia rostellifera* tall Closed shrubland over *Alyxia buxifolia*,*Rhagodia baccata* subsp. *baccata* and *Spyridium globulosum* Open Shrubland over *Lolium rigidum* and *Ehrharta calycina* Hummock Grassland over *Fumaria capreolata* Forbland.

Slope	Flat
Landform	Valley Floor
Soil Colour	Grey
Soil Type	Sand
Litter	55%
Bare Ground	5%
Fire Age	>10 Years
Vegetation Condition	Good-Very Good
Disturbances/Impacts	Weeds

Species	Height (cm)	% Cover
Acacia rostellifera	4	70
Spyridium globulosum	3.5	10
Rhagodia baccata subsp. *baccata*	2.4	2
Alyxia buxifolia	2	6
Acanthocarpus preissii	1.2	2
Fumaria capreolata	1.0	70
Asphodelus fistulosus		+
Euphorbia peplus		+
Lolium rigidum		+
Parietaria debilis		+
Tetragonia decumbens		+

Site PK10

Date	28th October 2020
Botanist	Daniel Roberts and Jeni Alford
Quadrat Size	10 x 10 m
NW Corner Coordinates	381045mE, 6418392mN
Vegetation Unit	SgAp - *Spyridium globulosum* and *Alyxia buxifolia* Open Shrubland over *Acanthocarpus preissii* Low Open Shrubland over *Bromus diandrus* Low Open Grassland and *Lomandra maritima* Low Sparse Rushland.
Slope	Flat
Landform	Valley Floor
Soil Colour	Grey
Soil Type	Sand
Litter	30%
Bare Ground	15%
Fire Age	>10 Years
Vegetation Condition	Good-Very Good
Disturbances/Impacts	Weeds

Species	Height (cm)	% Cover
Spyridium globulosum	2.5	25
Alyxia buxifolia	2.3	60
Melaleuca systena	0.6	1
Acanthocarpus preissii	0.5	1
Lolium rigidum	0.3	2
Lomandra maritima	0.3	1
Euphorbia peplus	0.1	15
Acacia saligna		+
Asphodelus fistulosus		+
Bromus diandrus		+
Clematis linearifolia		+
Comesperma ? integerrimum		+
Conostylis aculeata		+
Crassula glomerata		+
Dischisma arenarium		+
Kennedia sp.		+
Lagurus ovatus		+
Lepidosperma calcicola		+
Lolium rigidum		+
Minuartia mediterranea		+
Olearia axillaris		+
Romulea rosea		+
Senecio condylus		+

Site PK11

Date	28th October 2020
Botanist	Daniel Roberts and Jeni Alford
Quadrat Size	10 x 10 m
NW Corner Coordinates	380972mE, 6418327mN
Vegetation Unit	SgAp - *Spyridium globulosum* and *Alyxia buxifolia* Open Shrubland over *Acanthocarpus preissii* Low Open Shrubland over *Bromus diandrus* Low Open Grassland and *Lomandra maritima* Low Sparse Rushland.
Slope	Gentle
Landform	Mid Slope
Soil Colour	Grey
Soil Type	Sand
Litter	15%
Bare Ground	35%
Fire Age	>10 Years
Vegetation Condition	Good
Disturbances/Impacts	Weeds

Species	Height (cm)	% Cover
Alyxia buxifolia	1.5	15
Spyridium globulosum	1.4	5
Acanthocarpus preissii	0.9	20
Bromus diandrus	0.3	10
Lomandra maritima	0.2	4
Asparagus aethiopicus		+
Clematis linearifolia		+
Conostylis aculeata		+
Crassula colorata var. *colorata*		+
Eremophila glabra subsp. *albicans*		+
Hardenbergia comptoniana		+
Isolepis cernua var. *cernua*		+
Lagurus ovatus		+
Leptospermum laevigatum		+
Leucopogon parviflorus		+
Lolium rigidum		+
Melaleuca systena		+
Poa porphyroclados		+
Romulea rosea		+
Senecio condylus		+

Site PK12

Date	28th October 2020
Botanist	Daniel Roberts and Jeni Alford
Quadrat Size	10 x 10 m
NW Corner Coordinates	381629mE, 6419248mN
Vegetation Unit	SgAp - *Spyridium globulosum* and *Alyxia buxifolia* Open Shrubland over *Acanthocarpus preissii* Low Open Shrubland over *Bromus diandrus* Low Open Grassland and *Lomandra maritima* Low Sparse Rushland.
Slope	Flat
Landform	Valley Floor
Soil Colour	Grey
Soil Type	Sand
Litter	30%
Bare Ground	25%
Fire Age	>10 Years
Vegetation Condition	Good-Very Good
Disturbances/Impacts	Weeds

Species	Height (cm)	% Cover
Spyridium globulosum	2.5	5
Alyxia buxifolia	2	30
Acacia rostellifera	1.3	10
Acacia saligna	1.3	1
Melaleuca systena	1	5
Leucopogon parviflorus	0.9	3
Lomandra maritima	0.3	5
Bromus diandrus	0.1	2
Lepidosperma calcicola	0.1	3
Asphodelus fistulosus		+
Avena barbata		+
Conostylis aculeata		+
Crassula glomerata		+
Desmocladus asper		+
Ehrharta longiflora		+
Euphorbia terracina		+
Isolepis cernua var. *cernua*		+
Lagurus ovatus		+
Lolium rigidum		+
Lysimachia arvensis		+
Opercularia vaginata		+
Pelargonium capitatum		+
Poa porphyroclados		+
Senecio condylus		+
Sonchus oleraceus		+

Site PK13

Date	28th October 2020
Botanist	Daniel Roberts and Jeni Alford
Quadrat Size	10 x 10 m
NW Corner Coordinates	381204.38, 641856mN
Vegetation Unit	ArAbSgLg - *Acacia rostellifera*, *Alyxia buxifolia* and *Spyridium globulosum* Open Shrubland over *Lepidosperma gladiatum* Open Sedgland over *Lomandra maritima* and *Lepidosperma calcicola* Low Open Sedgeland over *Bromus diandrus* Low Open Grassland.
Slope	Flat
Landform	Valley Floor
Soil Colour	Grey
Soil Type	Sand
Litter	15%
Bare Ground	15%
Fire Age	>10 Years
Vegetation Condition	Good
Disturbances/Impacts	Weeds

Species	Height (cm)	% Cover
Rhagodia baccata subsp. *baccata*	1.4	2
Spyridium globulosum	1.4	2
Alyxia buxifolia	1.3	4
Austrostipa flavescens	0.9	1
Lepidosperma gladiatum	0.8	15
Lomandra maritima	0.5	4
Bromus diandrus	0.4	25
Asphodelus fistulosus		+
Clematis linearifolia		+
Crassula glomerata		+
Euphorbia terracina		+
Lagurus ovatus		+
Lolium rigidum		+
Romulea rosea		+
Senecio condylus		+

Site PK14

Date	6th November 2020
Botanist	Daniel Roberts
Quadrat Size	10 x 10 m
NW Corner Coordinates	381118mE 6418470mN
Vegetation Unit	ArAbSgLg - *Acacia rostellifera*, *Alyxia buxifolia* and *Spyridium globulosum* Open Shrubland over *Lepidosperma gladiatum* Open Sedgland over *Lomandra maritima* and *Lepidosperma calcicola* Low Open Sedgeland over *Bromus diandrus* Low Open Grassland.
Slope	Moderate
Landform	Valley Floor
Soil Colour	Grey
Soil Type	Sand
Litter	30%
Bare Ground	5%
Fire Age	>10 Years
Vegetation Condition	Good-Very Good
Disturbances/Impacts	Weeds

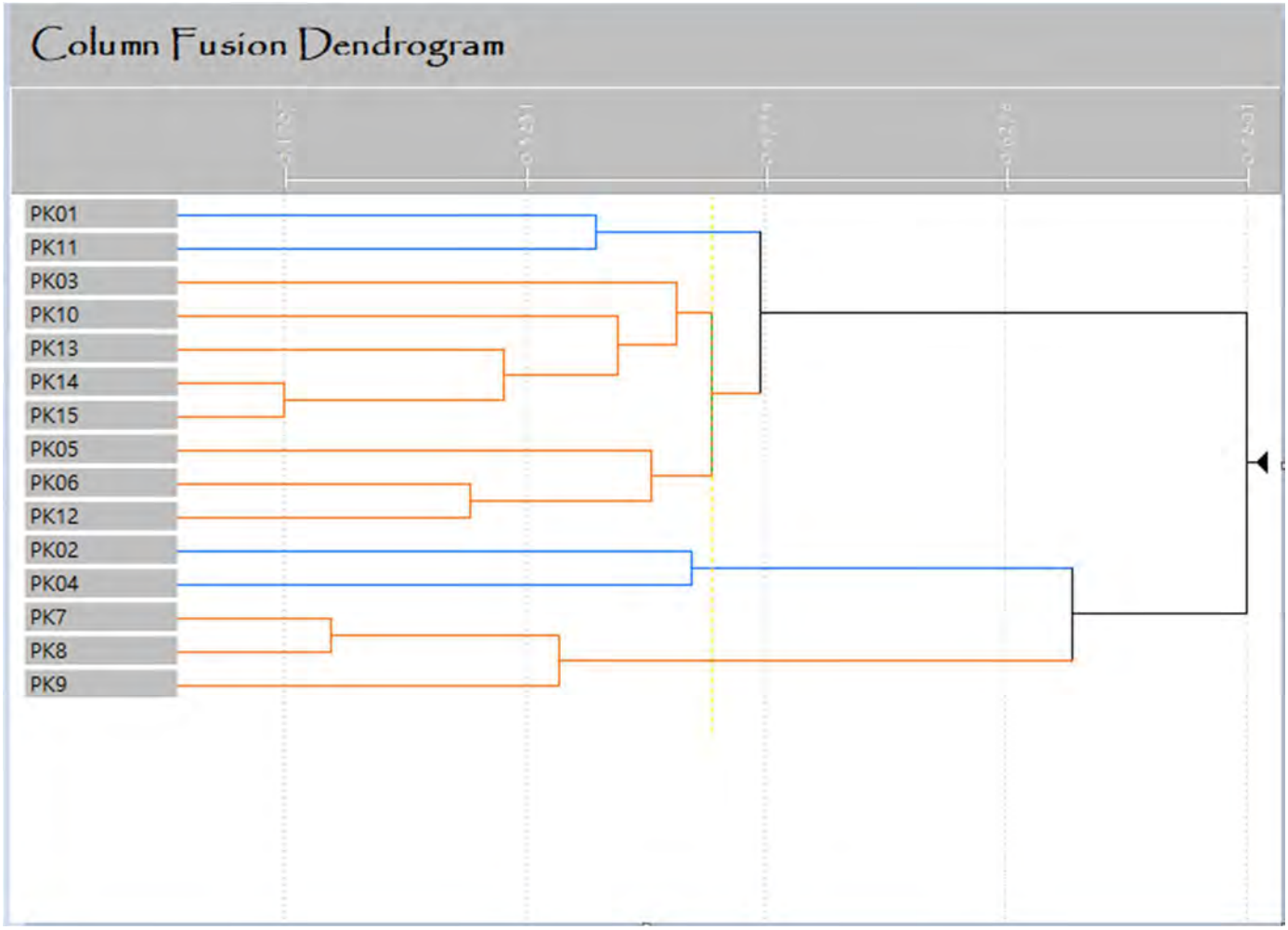
Species	Height (cm)	% Cover
Acacia rostellifera	1.5	10
Alyxia buxifolia	1.5	2
Lepidosperma gladiatum	1.2	15
Melaleuca systena	1	10
Lomandra maritima	0.5	10
Lepidosperma calcicola	0.3	2
Bromus diandrus	0.2	20
Acanthocarpus preissii		+
Asphodelus fistulosus		+
Austrostipa flavescens		+
Clematis linearifolia		+
Conostylis aculeata		+
Crassula glomerata		+
Desmocladus asper		+
Euphorbia terracina		+
Isolepis cernua var. *cernua*		+
Kennedia prostrata		+
Lagurus ovatus		+
Lolium rigidum		+
Rhagodia baccata subsp. *baccata*		+
Romulea rosea		+
Spyridium globulosum		+

Site PK15

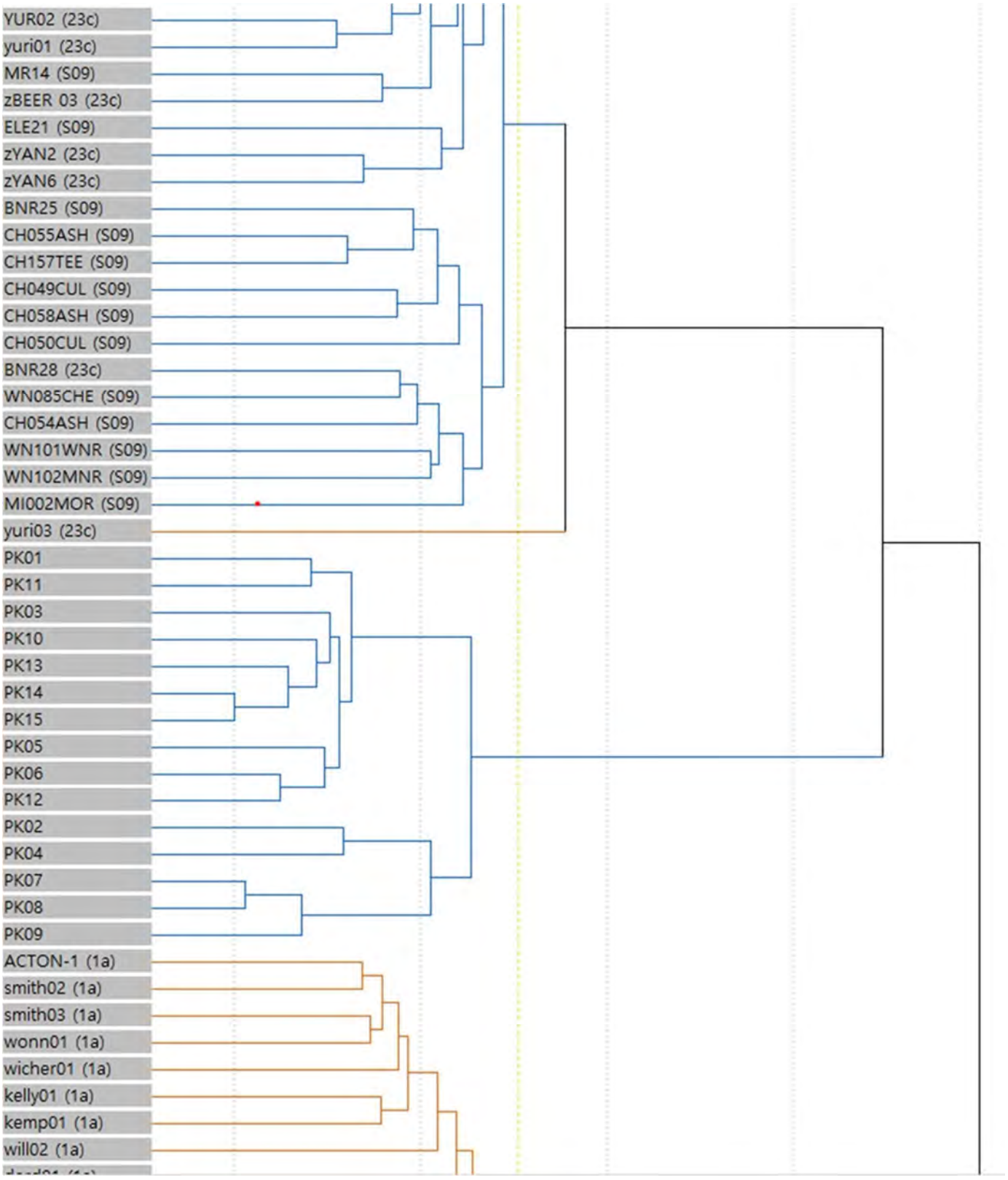
Date	6th November 2020
Botanist	Daniel Roberts
Quadrat Size	10 x 10 m
NW Corner Coordinates	381250mE 6418622mN
Vegetation Unit	ArAbSgLg - *Acacia rostellifera*, *Alyxia buxifolia* and *Spyridium globulosum* Open Shrubland over *Lepidosperma gladiatum* Open Sedgland over *Lomandra maritima* and *Lepidosperma calcicola* Low Open Sedgeland over *Bromus diandrus* Low Open Grassland.
Slope	Gentle
Landform	Valley Floor
Soil Colour	Grey
Soil Type	Sand
Litter	30%
Bare Ground	5%
Fire Age	>10 Years
Vegetation Condition	Good-Very Good
Disturbances/Impacts	Weeds

Species	Height (cm)	% Cover
Acacia rostellifera	1.5	2
Alyxia buxifolia	1.5	10
Spyridium globulosum	1.5	1
Lepidosperma gladiatum	1	30
Lepidosperma calcicola	0.5	37
Bromus diandrus	0.3	10
Acacia pulchella		+
Acanthocarpus preissii		+
Asphodelus fistulosus		+
Austrostipa flavescens		+
Avena barbata		+
Clematis linearifolia		+
Conostylis aculeata		+
Crassula glomerata		+
Euphorbia terracina		+
Isolepis cernua var. *cernua*		+
Leucopogon parviflorus		+
Lolium rigidum		+
Melaleuca systena		+
Romulea rosea		+
Senecio sp.		+

APPENDIX E – QUADRAT CLUSTER ANALYSIS (DENDROGRAM)



APPENDIX F – REGIONAL DATA CLUSTER ANALYSIS (DENDROGRAM)



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