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Environmental Assessment Study

Emu Point Precinct Structure Plan

17 November 2025

Prepared for:
Department of Planning, Lands and Heritage
Att: Melinda Lyons



Cover Photos L-R: *Stylidium squamosotuberosum* (Ecosystem Solutions), *Nuytsia floribunda* (Ecosystem Solutions), *Boronia spathulata* (Ecosystem Solutions).

Limitations Statement

This report has been prepared in accordance with the Agreement between Ecosystem Solutions Pty Ltd and Department of Planning, Lands and Heritage("Client"). It has been solely prepared to inform the preparation of the Precinct Structure Plan for Emu Point ("Study Area") with surveys confined to the Survey Area.

Information

In undertaking this work the authors have made every effort to ensure the accuracy of the information used. Unless otherwise stated in the report, Ecosystem Solutions Pty Ltd has not independently verified such information and cannot guarantee its accuracy or completeness.

Conclusions

Within the limitations imposed by the scope of work, preparation of this report has been undertaken and performed in a professional manner, in accordance with generally accepted practices and using a degree of skill and care ordinarily exercised by reputable ecological consultants under similar circumstances. No other warranty, expressed or implied, is made.

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Document Control

Department of Planning, Lands and Heritage

Att: Melinda Lyons

Emu Point Precinct Structure Plan

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1 Introduction

1.1 Site Details

Ecosystem Solutions were contracted by the Department of Planning, Lands and Heritage to prepare an Environmental Assessment Study (the Study) to inform the preparation of the Emu Point Precinct Structure Plan (the Precinct Structure Plan), within the City of Albany.

The Precinct Structure Plan will be a statutory planning instrument which will coordinate the future zoning, subdivision, and development of the area. The Precinct Structure Plan will also provide guidance on future land use, built form standards and the public realm, upgrades to the transport network, employment, density targets, and the protection of environmental assets.

The Precinct Structure Plan includes the localities of Emu Point, Collingwood Park, Collingwood Heights, and Bayonet Head, within the City of Albany. For the purposes of this Environmental Assessment, the Study Area is defined as the Precinct Structure Plan area (Figure 1) and is approximately 1,150 ha. The Study Area includes land that is already protected and reserved Environmental Conservation under the City of Albany Local Planning Scheme No. 2 (LPS 2). To account for land designated as Environmental Conservation, the edge areas of reserved land, where it adjoins zoned land have been included within the Study Area. The zoned land includes 18 lots of Unallocated Crown Land and Freehold land on the peripheries of the Study Area include Harbour Road and Warrangoo Road to the north, Lower Kind Road and Troode Street to the west, and the coastline to the east and south.

The area covered by the Survey Area includes 19 lots classified as Unallocated Crown Land that are fully vegetated, with one lot including a portion of road reserve (located in the northwest corner of the Study Area, Figure 1). 30 Freehold lots contain pockets of remnant vegetation. The remaining areas within the Survey Area includes the edges of Environmental Conservation which have a range of tenure.

The Survey Area includes City of Albany Local Planning Scheme 2 zones of rural, residential, urban development, recreation, foreshore reserve, industrial, and agricultural land uses (Figure 2).

The broader landscape is of similar composition, with residential development to the north and southwest, and larger agricultural lots to the northwest, with some larger areas of remnant vegetation. The Albany town centre is approximately 3 km from the southwestern extent of the Site.

The Site has the highest peak in the northwest, at 20 m AHD, with a steep slope to the east and south to a low-lying area with some undulation to a maximum heigh of 10 m AHD. Coastal dunes occur in the southeast of the Site with an undulating topography to a height of 5 m AHD. The centre has a low-lying depression, which includes tidal vegetation and sand banks with water flowing from Oyster Harbour (Miaritch) Estuary,

through the Site and to Lake Seppings (Tjuirtgellong) to the southwest and outside of the Site. Menang Noongar place names have been included throughout this report where applicable.



Figure 1 Emu Point Precinct Structure Plan Survey Area

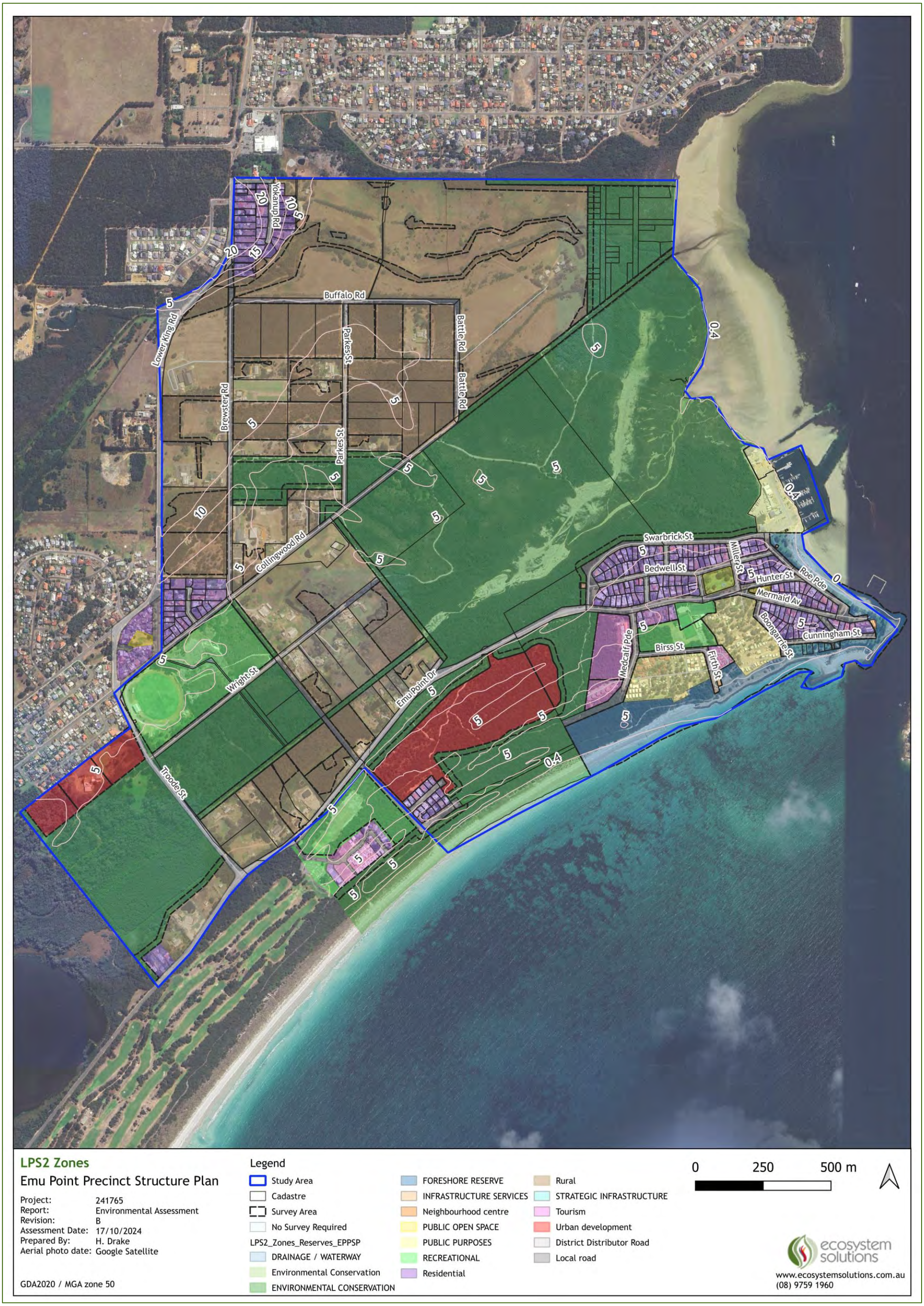


Figure 2 Emu Point Precinct Local Planning Scheme 2 Zones

1.2 Aims and Objectives

The aim of this Study is to inform the preparation of the Precinct Structure Plan and provide the basis for the protection of areas of environmental significance through such mechanisms as land use and/or development controls, public open spaces, or conservation zones or reserves in the local planning scheme.

The overall objectives of the Study are to:

- Investigate the environmental values of the area and identify their environmental significance at a district level,
- Identify native vegetation complexes, ecological linkages, and habitat values, where not previously identified by earlier environmental studies, including for threatened fauna, flora and ecological communities, waterways, wetlands, and buffers', and
- Prioritise these areas for environmental protection and provide guiding principles, objectives, and strategies to ensure ongoing protection within future land use planning stages.

1.3 Level of Assessment

The flora and vegetation survey are consistent with a targeted survey (EPA, 2016). The fauna survey is consistent with a basic survey (EPA, 2020). The project manager and team leaders have extensive experience conducting flora, fauna, and vegetation surveys across Western Australia (>10 years) (Table 1). Other team members also have extensive experience in assisting in flora, fauna, and vegetation surveys in the region. All plant specimens were collected in accordance with the relevant licences (Table 1), with reports submitted for any new populations of conservation significant species. Team members completing flora identifications have extensive experience in plant identifications for flora in the region, with any potentially significant flora species forwarded to the Western Australia Herbarium (WAH) for confirmation.

Table 1 Project Team and Licencing

Team Member	Role	Qualifications	Flora Licence Number
Danae Plowman	Field survey (project manager, flora team leader), plant identifications, reporting	B.Sc. P.G Dip. Engy & Env	FB62000342 TFL 2223-0162
Kelly Paterson	Field survey, plant identifications,	B.Sc. Hons. Nat Rs Mgmt.	FB62000182 TFL 54-2021
Dani Cuthbert	Field survey	Dip Bus & Dip TM	N/A
Hayley Drake	Field survey, reporting	B.Sc. Cons & Wildlife Bio and Molecular Bio	FB62000348

2 Flora and Vegetation

2.1 Desktop Analysis

A review of all publicly available flora, fauna, and vegetation data in proximity to the Site was undertaken, including obtaining relevant datasets from the Department of Biodiversity, Conservation and Attractions (DBCA) and the Department of Climate Change, Energy, the Environment and Water (DCCEEW). Previous ecological surveys across the Site were also reviewed. A summary of the desktop review is provided in Table 2.

Table 2 Desktop Review for the Emu Point Precinct Structure Plan

Source	Area of Search / Study	Data Type
Data		
Threatened and Priority Flora Database (TPFL). DBCA, 2024c.	Study Area, with 10km buffer.	Validated populations of Threatened and Priority flora.
Threatened and Priority Fauna Database. (DBCA, 2024d)	Study Area, with 10km buffer.	Validated populations of Threatened and Priority fauna.
City of Albany Flora Fauna records (EPPSP_Flora and EPPSP_Fauna) CoA, 2024	Study Area	Validated populations of Threatened and Priority flora and fauna.
WA Herbarium database (WAHerb). (DBCA, 2018)	Study Area, with 10km buffer.	Records of individual plant specimens of Threatened and Priority flora, including un-validated historical specimens.
DBCA Black Cockatoo data (DBCA, 2020)	Study Area, with 10km buffer.	Records of Black Cockatoo roosting sites from Birdlife WA Great Cocky Count.
Threatened and Priority Ecological Community buffers and boundaries in WA. Department of Biodiversity, Conservation and Attractions. (DBCA, 2024b)	Study Area, with 10km buffer.	Records of Threatened and Priority Ecological Communities and their buffers.
Reports, Statements & Plans		
Vegetation Survey Lots 1512 & 1523 Emu Point Drive, Albany, WA by Ellen J. Hickman October 2005.	Lots 1512 & 1523 Emu Point Drive, Albany, WA.	Vegetation survey report.

Source	Area of Search / Study	Data Type
Survey for the Western Ringtail Possum *Pseudocheirus occidentalis* within part of Lots 3000 and 1523, Emu Point Drive, Albany, Western Australia by Green Iguana August 2007.	Lots 3000 and 1523, Emu Point Drive, Albany, WA.	Targeted survey for Western Ringtail Possum report.
Report for Emu Point Development Assessment of Potential Impacts on Threatened Species Listed under the EPBC Act November 2010 by GHD.	Lots 1523 and 3000 (formerly Lot 1512), Emu Point Drive in Albany, WA.	Assessment of Potential Impacts on Threatened Species Listed under the EPBC Act report.
Report for Emu Point Development Western Ringtail Possum Assessment December 2011 by GHD	Lots 1523 and 3000 (formerly Lot 1512), Emu Point Drive in Albany, WA.	Western Ringtail Possum Assessment report.
Statement That a Proposal May Be Implemented (Pursuant to The Provisions of The Environmental Protection Act 1986) Residential Subdivision on Lots 3000 (Formerly Lot 1512) and 1523 Emu Point Drive, Albany Minister for Environment; Water April 2012.	Lots 3000 (Formerly Lot 1512) And 1523 Emu Point Drive, Albany, WA.	Statement that a proposal may be implemented.
Albany Regional Vegetation Survey Extent, Type and Status by E.M. Sandiford and S. Barrett 2010.	An area of 209,060 ha within a 35 km radius of Albany with the eastern boundary at Bettys Beach, the northern boundary just south of the Porongurup Range and the western boundary near Youngs Siding.	Flora and vegetation report.
Albany Greenways Version 3 by ATA Environmental in association with The Planning Group and Landinfo January 2002.	City of Albany at a local and regional level.	Greenways report.
Natural Reserves Strategy & Action Plan 2017-2021 by City of Albany 2017.	City of Albany.	Strategy & Action Plan.

Source	Area of Search / Study	Data Type
Vegetation and Flora Survey of Portions of Reserves 42964 & 6862, Emu Point Albany by E.M. Sandiford September 2007.	Two small areas of Reserves 42964 & 6862, Albany, WA.	Vegetation and flora survey report.
Flora Survey Portion of Emu Point Reserve 6862 by Ellen J. Hickman May 2006.	Small portion of Reserve 6862, Albany, WA.	Flora survey report.
Use of urban bushland remnants by the western ringtail possum (*Pseudocheirus occidentalis*): short-term home-range size and habitat use in Albany, Western Australia by B.E. Van Helden, P.C. Speldewinde, P.G. Close, and S.J. Comer April 2017	Two of the larger bushland remnants located within 3 km of Albany City centre, WA.	Research paper.
Fauna impact assessment of the proposed clearing of vegetation adjacent to Emu Beach Holiday Park, 8 Medcalf Pde, Albany, prepared for the City of Albany by Sandra Gilfillan, May 2021 and associated Development Application and DWER comments.	Vegetation adjacent to Emu Beach Holiday Park, 8 Medcalf Pde, Albany - Portion of R22698.	Fauna impact assessment report, development application and City of Albany response to DWER comments.
P1089A Lot 322 Troode St Revegetation Implementation Plan P1089A-01-01 City of Albany June 2024 by Tranen Pty Ltd.	Lot 322 Troode St, Alban, WA.	Revegetation Implementation Plan.
Maps		
Fauna Habitat Assessment and Western Ringtail Possum Survey - Emu Point, Albany by ATA Environmental December 2006.	Lots 1512 & 1523 Emu Point Drive, Albany, WA.	Fauna habitat assessment maps.

Source	Area of Search / Study	Data Type
Possum Monitoring - Summer 2018 & Autumn 2019 Map by the City of Albany 2019.	Four transects in the Albany Golf Course, the length of Griffiths Street to Surfers (end of Flinders Parade) and Griffiths Street, and around Lake Seppings (Tjuirtgellong), Albany, WA.	Possum Monitoring Map.

2.1.1 Soil Landscape

Soil landscape systems are areas with recurring patterns of landforms, soils and vegetation and are used by the Department of Agriculture to maintain a consistent approach to land resource surveys. The Department of Primary Industries and Regional Development (DPIRD) Natural Resource Information (WA) database was used to identify the soil and vegetation mapping within the Study Area, including a 100 m buffer around the Site.

The Study Area is located within the Albany Sandplain Zone (242) which is between Bremer Bay and Kronkup, to the east and west, respectively, Monjebup in the north and to the coasts edge in the south (DPIRD-017). This zone is defined as gently undulating plain dissected by a number of short rivers flowing south, Eocene marine sediments overlying Proterozoic granitic and metamorphic rocks, and the soils are sandy duplex soils, often alkaline and sodic, with some sands and gravels (DPIRD, 2024).

This zone is further classified into soil systems and the Study Area is situated across three systems (DPIRD-064). The King System in the northwest quarter of the Study Area, the Torbay System across the centre half of the Study Area and the Mount Manypeaks System in the southeast quarter of the Study Area. These are described as:

- King System (242Kg) - Dissected siltstone and sandstone terrain, on the southern edge of the Albany Sandplain Zone, with shallow gravel, sandy gravel, grey sandy duplex, and pale deep sand, with Jarrah-marri-sheoak woodland and mallee-heath.
- Torbay System (242Tb) - Narrow swampy coastal plain, on the southern edge of the Albany sandplain Zone. Non-saline wet soil and pale deep sand. Sedgelands, ti-tree heath and wattie-paperbark thickets.
- Mount Manypeaks System (242Mm) - Granitic hills and headlands, on the southern edge of the Albany Sandplain Zone, with shallow gravel, bare rock grey shallow sandy duplex and sandy gravel. Low woodland, scrub heath and mosses and lichens on rocks.

These systems are further classified into soil subsystems. The Study Area is within four soil subsystems (DPIRD-027, Figure 3), and they are and described as (DPIRD, 2024):

- Minor Valleys S7 slope phase (242KgS7h) - Broad valleys in sedimentary rocks; 30 m relief; smooth slopes. Deep sands and iron podzols on slopes; Albany Blackbutt-jarrah-sheoak woodland. Podzols and yellow duplex soils on floors; paperbark woodland, teatree heath.
- Minor Valleys S7 floor phase (242KgS7f) – Footslopes and swampy valley floors of minor valleys.

- Owingup subsystem (242TbOW) - Plains with swamps, lunettes, and dunes. Yellow solonetzic soils, organic loams, and diatomaceous earth; Wattle-Paperbark thickets, Teatree heath and reeds. Podzols on dunes; Banksia-Sheoak woodland.
- Meerup beach ridges phase (242MmMRr) - Beach ridges; peppermint heath and banksia woodland.



Figure 3 Emu Point Precinct Structure Plan Soil Landscape Mapping

2.1.2 Vegetation

The pre-European vegetation extent across Western Australia has been mapped at a scale of 1:250,000 as vegetation system associations (Beard *et al.*, 2013, DPIRD-006). Beard Regional Vegetation Mapping shows four vegetation systems within the Study Area, Associations 3, 51, 423 and 978 (Figure 4, Table 3).

The Statewide Vegetation Statistics (Government of WA, 2018) show that Association 3 has over 67% of the pre-European extent remaining, with 18.23% within areas of secure conservation. Association 51 has almost 56% of the pre-European extent remaining and just under 36% within lands protected for conservation. There is over 80% of association 423 remaining from the pre-European extent and over 27% vested in lands protected for conservation. Association 978 has over 35% remaining, but only 9.47% within areas of secure conservation, meeting the criteria to be classed as a Locally Significant Natural Area (LSNA) under Criterion 1a. iv) - Regional Representation - ecological community with only 10% or less protected in formal reserves (Molloy *et al.*, 2007).

Table 3 Pre-European Vegetation Extent - Vegetation Complex Statistics (Government of Western Australia, 2018).

System Association	Description	Pre-European Extent Remaining (2018)	Current extent remaining within lands protected (IUCN I-IV) for conservation
3	Medium forest; Mainly *Eucalyptus marginata* and *Corymbia calophylla.*	1,803,437.48 ha / 67.76%	485,223 ha / 18.23%
51	Sedgeland, reed swamps, occasionally with heath of Cyperaceae, Restionaceae, and Juncaceae.	33,057.98 ha / 55.95%	21,215.91 ha / 35.91%
423	Shrubland of mixed scrub-heath with scattered tall shrubs such as *Acacia* spp., Proteaceae and Myrtaceae.	22,106.10 ha / 80.91%	7,503.25 ha / 27.46%
978	Low forest or woodland with scattered trees, species include *Eucalyptus marginata*, *Eucalyptus staeri*, *Banksia* spp. and/or *Allocasuarina* spp..	18,855.77 ha / 35.42%	5,043.21 ha / 9.47%



Figure 4 Emu Point Precinct Structure Plan Pre-European Vegetation Extent

The Albany Regional Vegetation Survey (ARVS, Sandiford & Barrett, 2010) describes, maps, and assesses the conservation value of vegetation across more than 125,000 ha of the Albany region. The ARVS report and associated data forms a key information source in guiding land use planning, including by State and local government agencies. The data provided from the ARVS has been analysed, with 19 remnant vegetation units present within the Study Area and 20 units when including the 100 m buffer around the Study Area (Table 4, Figure 5).

It should be noted that vegetation units 68 and 69 are two units that have been mapped in the ARVS to differentiate the non-native vegetation from native vegetation. At the time of the ARVS report *Typha orientalis* was considered a non-native however it is now considered a native species. Unit 69 is dominated by the environmental weed *Acacia longifolia*.

Within the Study Area, the following 14 vegetation units meet various criteria to be classed as a LSNA (Less than 1500 ha of vegetation remaining and/or <10% within lands protected (IUCN I-IV) for conservation):

- 2 - Peppermint Low Forests
- 4 - Coastal *Banksia ilicifolia*/Peppermint Low Woodland
- 8 - Beach Herbland/Grassland
- 12 - Jarrah / Marri / Sheoak Laterite Forest
- 14 - *Banksia coccinea* Shrubland / *Eucalyptus staeri* / Sheoak Open Woodland
- 36 - *Callistachys* spp. Thicket
- 50 - Miscellaneous Drainage Woodland/Shrubland
- 52 - *Melaleuca cuticularis* / *M. preissiana* Open Woodland
- 56 - *Astartea scoparia* Swamp Thicket
- 57 - *Melaleuca rhaphiophylla* Woodland/Low Forest Complex
- 59 - *Taxandria juniperina* Closed Forest
- 65 - Coastal *Melaleuca cuticularis* Low Forest
- 66 - *Juncus kraussii* Sedgeland
- 67 - Coastal Saltmarsh

Vegetation Units 5 - Limestone Coastal Heath, 46 - Evandra aristate Sedgeland and 47 - *Homalospermum firmum* / *Callistemon glaucus* Peat Thicket are close to meeting the criteria, with just over 1500 ha remaining.

Table 4 Vegetation Units within the Study Area (Sandiford & Barrett, 2010)

Map Code	Vegetation Name	Remnant vegetation extent (2010)	Current extent remaining within lands protected (IUCN I-IV) for conservation	Conservation assessment (via Molloy *et al.*, 2007)
2	Peppermint Low Forest	1,232 ha / 2.8%	281 ha / 22.8%	<1500 ha remaining
4	Coastal B*anksia ilicifolia*/Peppermint Low Woodland	506 ha / 1.1%	202 ha / 39.9%	<1500 ha remaining
5	Limestone Coastal Heath	1,849 ha / 4.2%	740 ha / 40 %	
8	Beach Herbland/Grassland	22 ha / 0.1 %	5 ha / 23.1 %	<1500 ha remaining
12	Jarrah/Marri/Sheoak Laterite Forest	13,144 ha / 29.8%	1273 ha / 9.8%	<10% within conservation
13	Jarrah/Sheoak/*Eucalyptus staeri* Sandy Woodland	5,148 ha / 11.7%	1334 ha / 25.9%	
14	*Banksia coccinea* Shrubland/*Eucalyptus staeri*/Sheoak Open Woodland	1,330 ha / 3.0%	674 ha / 50.7%	<1500 ha remaining
36	*Callistachys* spp. Thicket	36 ha / 0.1%	4 ha / 10.9%	<1500 ha remaining
46	*Evandra aristata* Sedgeland	1,747 ha / 4%	219 ha / 12.5%	
47	*Homalospermum firmum*/*Callistemon glaucus* Peat Thicket (located north of Study Area, within 100 m buffer)	2,083 ha / 4.7%	263 ha / 12.6%	
50	Miscellaneous Drainage Woodland/Shrubland	259 ha / 0.6%	21 ha / 8.0 %	<1500 ha remaining, <10% within conservation

Map Code	Vegetation Name	Remnant vegetation extent (2010)	Current extent remaining within lands protected (IUCN I-IV) for conservation	Conservation assessment (via Molloy *et al.*, 2007)
52	*Melaleuca cuticularis*/*M. preissiana* Open Woodland	263 ha / 0.6%	97 ha / 36.9%	<1500 ha remaining
56	*Astartea scoparia* Swamp Thicket	15 ha / <0.1%	<1 ha / 3.0 %	<1500 ha remaining, <10% within conservation
57	*Melaleuca rhaphiophylla* Woodland/Low Forest Complex	495 ha / 1.1 %	60 ha / 12.2%	<1500 ha remaining
59	*Taxandria juniperina* Closed Forest	779 ha / 1.8%	77 ha / 9.9%	<1500 ha remaining; <10% within conservation
65	Coastal *Melaleuca cuticularis* Low Forest	208 ha / 0.5 %	10 ha / 4.8 %	<1500 ha remaining, <10% within conservation
66	*Juncus kraussii* Sedgeland	70 ha / 0.2 %	2 ha / 2.4 %	<1500 ha remaining, <10% within conservation
67	Coastal Saltmarsh	79 ha / 0.2 %	0 ha / 0%**	<1500 ha remaining, 0%** within conservation
68	**Typha orientalis* Sedgeland	40 ha / 0.1 %	56.4 %	N/A
69	**Acacia longifolia* Tall Shrubland	5 ha / <0.1 %	26.1 %	N/A

* = Introduced species

** Does not include the area of Coastal Saltmarsh within City of Albany Environmental Conservation Lots due to only 2018 data being available.

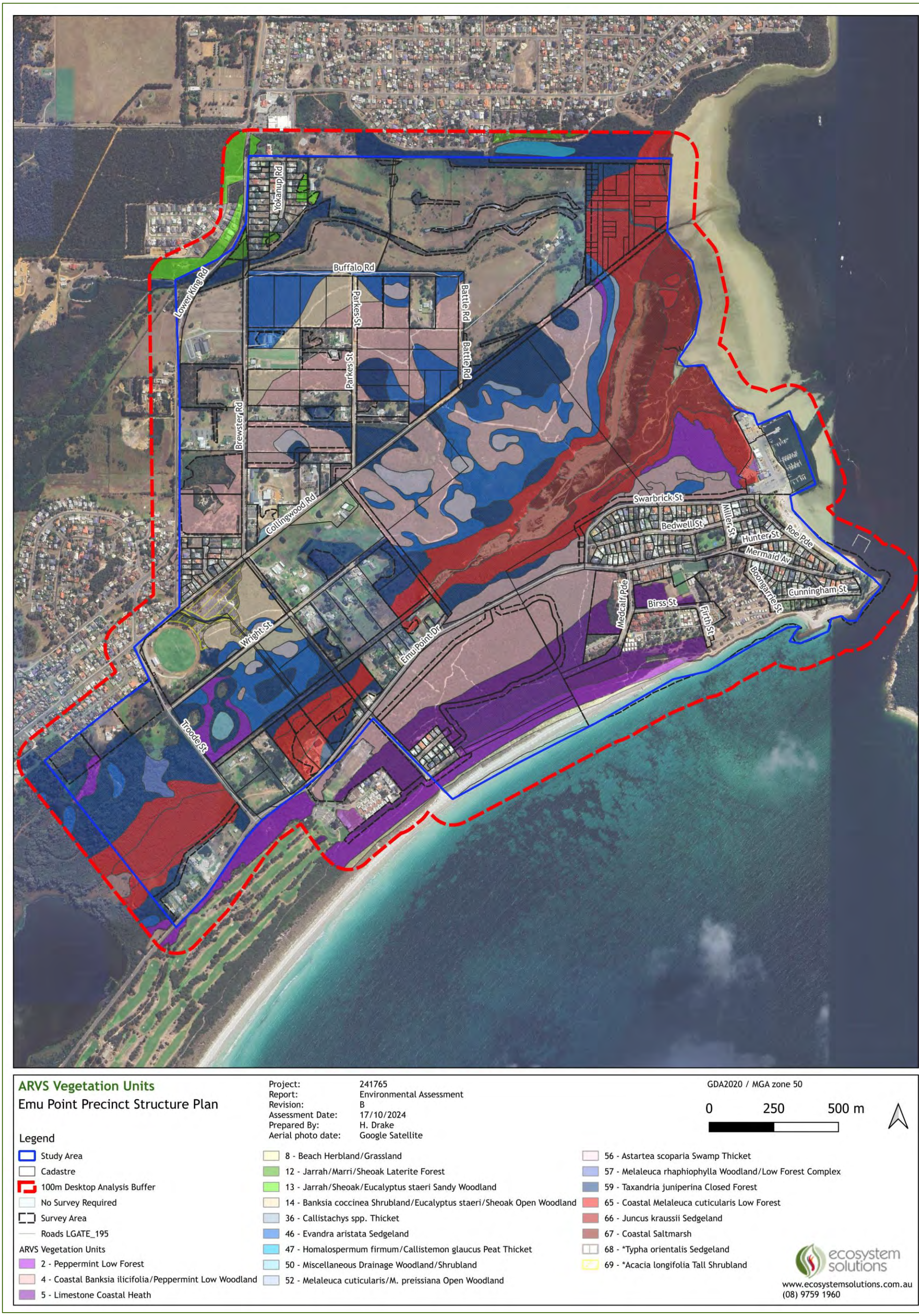


Figure 5 Emu Point Precinct Structure Plan Vegetation Unit Mapping from ARVS (Sandiford & Barrett, 2010)

2.1.3 Environmentally Sensitive Areas and Conservation Reserves

Environmentally Sensitive Areas (ESAs) are classes or areas of native vegetation, where the exemptions for clearing vegetation under the Environmental Protection (Clearing of Native Vegetation) Regulations 2004 (Clearing Regulations) do not apply. ESAs include but are not limited to declared World Heritage properties, defined wetlands, and buffer area, threatened flora and buffer, Threatened Ecological Communities, a Bush Forever Site and lakes, wetlands and fringing native vegetation covered under Environmental Protection Policies (e.g., Swan Coastal Plain Lakes).

A search of the Department of Water and Environmental Regulation's Clearing Regulations – Environmentally Sensitive Areas mapping indicated that there is one ESA that occurs in and within 100m of the Study Area (DWER-046). The ESA and associated buffer for Oyster Harbour (Miaritch), occurs within the eastern edge of the Survey Area (Figure 6) over areas zoned under the Local Planning Scheme No. 2 as environmental conservation, public purposes, foreshore reserve and a small section of residential. Other ESAs that occur outside of the Survey Area include one approximately 688m to the north near Lower King Road and another 2.6km southwest of the Survey Area.

The EPA Redbook Recommended Conservation Reserves, 1976 to 1991, (DBCA-029) is included within a portion of the Study Area, along the southern section (Figure 6). The recommended conservation reserve area is noted as being part implemented with the area zoned under the Local Planning Scheme No. 2 as foreshore reserve and public purposes, R 22698 (Figure 6).

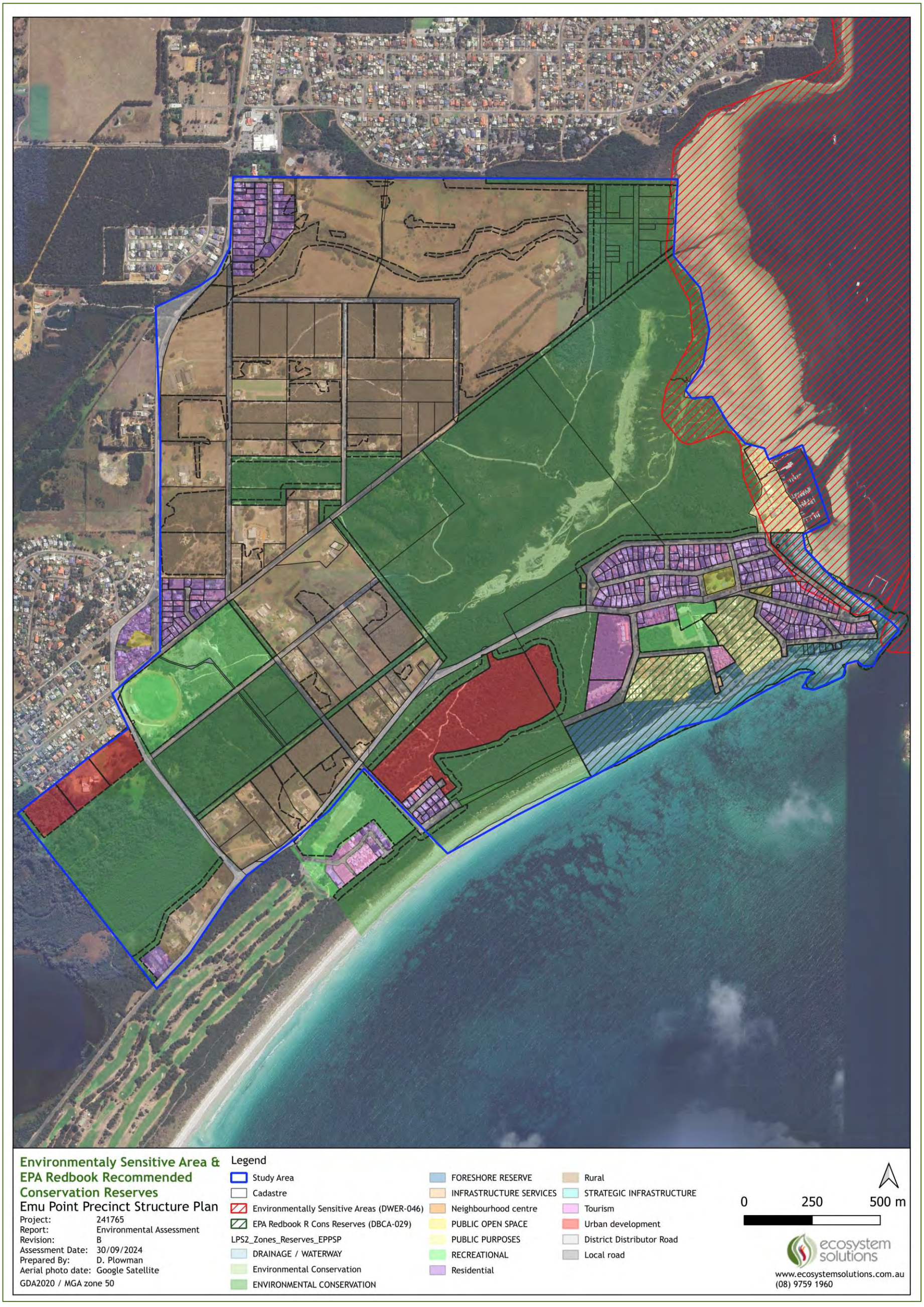


Figure 6 Emu Point Precinct Structure Plan Environmentally Sensitive Area & EPA Redbook Recommended Conservation Reserves Map

2.1.4 Waterways and Wetlands

Wetland - Lake Seppings (Tjuirtgellong)

A wetland is 'an area of seasonally, intermittently, or permanently waterlogged or inundated land, whether natural or otherwise, and includes a lake, swamp, marsh, spring, dampland and sumplands', as defined in Draft State Planning Policy 2.9 Planning for Water (Draft SPP 2.9). Wetlands require a wetland buffer, being 'an area of terrestrial land immediately surrounding a wetland that provides spatial separation between the wetland and adjacent land use(s)' (Draft SPP 2.9). DBCA manages and protects Ramsar wetlands, which are of international importance, listed under the Ramsar Convention.

Lake Seppings (Tjuirtgellong) is a freshwater lake and south coast significant wetland, approximately 215 m southwest of the Study Area (DBCA-018). There are no Ramsar wetlands within or in close proximity to the Study Area. The Study Area is within a Government Sewage Polica Area, as there a significant wetland within 1 km (Department of Planning, Lands and Heritage, 2019).

Waterway - Oyster Harbour (Miaritch)

A waterway is 'any river, creek, stream, or brook, including its foreshore area or reserve, floodplain, estuary, and inlet. This includes systems that flow permanently, for part of the year or occasionally; and parts of the waterway that have been artificially modified' (Draft SPP 2.9). The foreshore area is the land that adjoins or directly influences a waterway, whereas the foreshore reserve includes all or part of a foreshore area that is publicly owned and vested with a local government or State Government Department (Draft SPP 2.9).

The Study Area is within the Albany Waterways Management Area under the *Waterways Conservation Act 1976* (WA) and the entire Study Area is considered a sensitive water resource area as it is within 2 km of Oyster Harbour (Miaritch), under Draft SPP 2.9. Sensitive water resource areas are recognised areas in which development has the potential to affect water dependent ecosystems that are sensitive to contamination associated with land use and development.

The Study Area is located within two catchments, mostly within the Oyster Harbour (Miaritch) Kalgan King catchment and Coastal in the southeast (DWER-028).

Oyster Harbour (Miaritch) is located east of the Study Area with tributaries extending within the Study Area, classified a nationally significant waterway and listed in the directory of important wetlands in Australia (Environment, 2001 & DBCA-045). Nationally significant wetlands and waterways are recognised as environmentally sensitive areas under the *Environmental Protection Act 1986* and as critical environmental assets under the EPA Position State no. 9 (EPA, 2008a) and EPA Guidance Statement 33 (EPA, 2008b). The values of a nationally significant waterway include playing an important ecological and hydrological role in the natural surrounding ecosystem, providing important habitat for fauna, particularly during vulnerable

life stages and cycles and provides refuge during extreme climate conditions such as drought. Oyster Harbour (Miaritch) has historical and cultural significance, with two registered sites, 636 relating to the entire Oyster Harbour (Miaritch) and 637 for Green Island (Watami), which recognises the dreamtime cultural significance (*Aboriginal Heritage Act 1972*).

Oyster Harbour (Miaritch) is connected to coastal processes by being permanently open to King George Sound, along with the southern boundary of the Study Area which is directly exposed to King George Sound and coastal processes. Oyster Harbour (Miaritch) is a refuge for estuarine fauna species partially due to the presence of seagrass, which provides habitat and food for birds, fish, and crustaceans (DWER, 2023a). Seagrass also contributes to water quality by removing nutrients and oxygenating the water. Monitoring in 2021 identified that seagrass extent covered approximately 50% of the harbour, approximately 665 ha with the highest density (75-100%) occurring in the southern and central section (Figure 8). Overall, the water quality in Oyster Harbour (Miaritch) is considered very good with higher levels of nutrients only occurring in very wet years, where nutrients are flushed from the surrounding catchment (DWER, 2023b). High nutrient levels occurred in 2021 during the highest rainfall since 1975, with nutrient levels returning to normal by 2022 indicating a healthy system. However, algal blooms remain a potential risk and nutrient inputs from the catchment continues to be important.

Oyster Harbour (Miaritch) is connected to Lake Seppings (Tjuirtgellong) through surface water flows across a broad floodplain through predominately intact wetland vegetation (DWER per coms). This is also identified in the Albany significant wetland mapping (Hopkinson, 2007) which is further discussed in Section 2.4.1

A connection that extends from Oyster Harbour (Miaritch) towards Lake Seppings (Tjuirtgellong) is located within road reserve and informally named 'Lake Seppings drain'. The waterflow along this road reserve may have been exasperated since the surrounding area has been cleared and therefore the ability of the area to act as a floodplain has been compromised.

Floodplains within the Study Area have been determined by the Department of Water to be multiple use wetlands, with one smaller area identified as a resource enhancement wetland (DoW, 2007). It is important to note, that although floodplains are classified as a type of wetland in spatial datasets, they are by definition waterways, and foreshore areas and foreshore reserves as per the draft SPP 2.9 apply, not wetland buffers and are significant ecosystems.

Waterway - Yakamia Creek

Yakamia Creek is a waterway that passes through the northern part of the Study Area, which intersects with Oyster Harbour (Miaritch) on the eastern boundary and traverses through the Study Area to the western boundary (DWER-031) (Figure 7). It has a total stream length of nearly 9 km and approximately 2 km of its length is within the Study Area. A Foreshore Condition Assessment has been completed by DWER in 2007 by Kevin Hopkinson (DWER-009 & DWER011). The following conditions are within the Study Area:

- A2: Near pristine - located on the eastern extent connecting to Oyster Harbour (Miaritch) for both right bank (Figure 7 black label) and left bank (Figure 7 blue label) for approximately 365 m.
- B3: Degraded weed dominated – located on the western boundary within the Study Area, on both the right bank and left bank for approximately 54 m and 320 m, respectively. Weeds identified on the western boundary includes *Cortaderia sellonana* (pampas grass), *Psoralea pinnata, Rubus* species (blackberry) and *Watsonia* species.
- C1: Erosion prone – located along the remainder of the Creek within the Study Area, for approximately 1.72 km on the right bank and 1.52 km on the left bank. There is a tributary within the Study Area running north/south from the main Creekline which is also considered to be C1 condition (approximately 330 m). This area contains trees but lacks native vegetation within the understorey.

An assessment of fencing for the protection of the Creek has also occurred. The left bank (DWER-005) has been identified as requiring fencing for the area classified as C1 as (approximately 1.52 km). The right bank has a portion of the bank fenced (approximately 200 m, classified as C1) (DWER-006). The remainder of the right bank area classified as C1 has been identified as requiring fencing, which correlates with the left bank (approximately 1.52 km). The remainder of the left and right bank is noted as having no fencing (areas of A2 and B3 condition).

There are no Foreshore Erosion records within the Study Area (DWER-007), however there are three records of severe erosion along Yakamia Creek more than 2 km from the Study Area.



Figure 7 Emu Point Precinct Structure Plan Hydrology and Wetlands Map

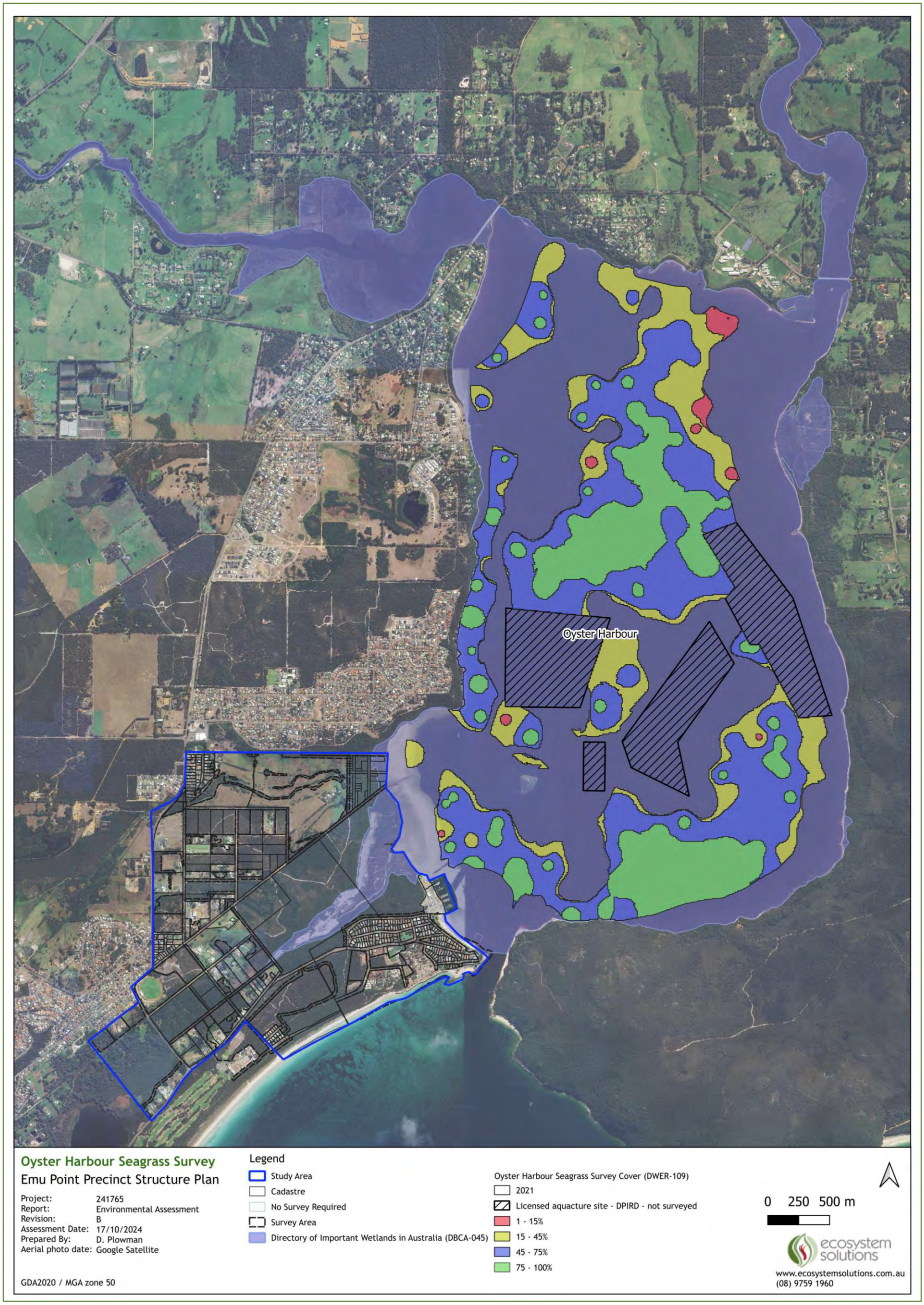


Figure 8 Oyster Harbour Seagrass Survey Cover Map (DWER-109)

2.1.5 Threatened and Priority Flora

Extracts from the following databases have been obtained, using a 10 km buffer, to determine if records of any conservation listed flora species are known within the boundary or surrounding the Study Area:

- Interim NatureMap database showing listed species under the *Biodiversity Conservation Act 2016* (WA) ('BC Act') managed by Department of Biodiversity, Conservation and Attractions (DBCA), provided in Appendix A (DBCA, 2024a).
- Protected Matters Search Tool (PMST) showing species listed under the *Environmental Protection and Biodiversity Conservation Act 1999* (Cth) ('EBPC Act') managed by Department of Climate Change, Energy, the Environment and Water (DCCEEW), provided in Appendix B.
- Department of Biodiversity, Conservation and Attractions Threatened and Priority Flora database search providing to ascertain if there are any records of threatened or priority flora within a locality (DBCA, 2024c, 10 km buffer only). Specific locality information for threatened flora is regarded as confidential therefore has not be provided in this report.

Flora species are protected based on their conservation status. DBCA recognises threats of extinction and consequently applies regulations towards population and species protection. Protected species are gazetted under the BC Act, and it is an offence to "take" or damage rare flora without Ministerial approval. The act defines "to take" as "… to gather, pick, cut, pull up, destroy, dig up, remove or injure the flora or to cause or permit the same to be done by any means" (Government of Western Australia, 2010).

Appendix C presents the definitions for conservation status under the *Biodiversity Conservation Act 2016* (WA) ('BC Act'), which was previously the *Wildlife Conservation Act 1950* (WA), and EPBC Act.

The database search results have been summarised in Table 5. A total of 14 Threatened (T) species and 69 Priority (P) species have been identified within a 10 km radius of the Survey Area according to the BC Act (Naturemap, Appendix A). A total of 16 Threatened (T) species, of which two are Critically Endangered (CR), five Endangered (EN) and nine Vulnerable (VU) species under the EPBC Act (PMST, Appendix B). From the DBCA Threatened and Priority Flora database search there are 14 Threatened (T) and 67 Priority species recorded from TPFL forms and 11 Threatened and 21 Priority species from the WA Herbarium records within a 10 km radius of the Survey Area (DBCA, 2024c). The likelihood of the species occurring within the Study Area is determined based on known distribution, last known records and the habitat expected within the Survey or buffer area.

There are two known occurrences of conservation significant flora within the Study Area (Figure 9), *Andersonia auriculata* (P3) (DBCA, 2024c) and *Adenanthos* x *cunninghamii* (P4) (Hickman, 2005). *Andersonia auriculata* is described in the database as being within Reserve 6862, behind the boat shed, however the point in the database appears in the water. Reserve 6862 is predominately outside

the Survey Area. Previous environmental reports record a number of other Priority species, including *Laxmannia jamesii* and *Chorizema reticulatum*, however the conservation code of all these additional species has since been updated to not threatened.

Previous survey results:

- *Adenanthos* x *cunninghamii* was located in three separate locations across Lots 3000 & 1523 Emu Point Drive, Albany from a vegetation survey conducted by Hickman in 2005. It was assumed there are likely to be more scattered individuals of this species present in these two lots.

Table 5 Conservation significant flora species recorded within 10 km of the Study Area.

Species	Conservation Status*	Life Form	Habitat / Known Distribution	Likelihood of occurrence within the Study Area	Data Source
Acacia prismifolia	T/CR	Shrub	Rocky slopes.	Closest record (1933) is approximately 6.6km south of the Survey Area (WAHerb). Unlikely, no evidence of habitat.	Naturemap, WAHerb
Banksia brownii	T/CR	Shrub or tree	Sand over laterite, gravel, loam over granite. In gullies.	Closest record (no date) is approximately 1.7km east of the Survey Area (WAHerb). Closest record (2023) is approximately 5.2km south of the Survey Area (TPFL). Unlikely, no evidence of habitat.	Naturemap, PMST, TPFL, WAHerb
Calectasia cyanea	T/CR	Herb	White, grey, or yellow sand, gravel.	Closest record (1836) is approximately 3km southwest of the Survey Area (WAHerb). Closest record (2021) is approximately 9.1km southwest of the Survey Area (TPFL). Possible	Naturemap, PMST, TPFL, WAHerb
Conospermum quadripetalum	T/CR	Shrub	Sandy clay, grey sand. Flats behind coastal hills.	Closest record (2000) is approximately 7.9km southwest of the Survey Area (WAHerb). Closest record (2020) is approximately 8.2km southwest of the Survey Area (TPFL). Possible	Naturemap, TPFL, WAHerb
Caladenia granitora	T/EN	Herb	Sandy and sandy clay on coastal granite outcrops. Found between Albany and Cheyne Beach.	Possible, no evidence of granite outcrops	PMST
Chordifex abortivus	T/EN	Herb	Sand. Low rises & undulating areas.	Closest record (1996) is approximately 5.4km north of the Survey Area (WAHerb). Closest record (2011) is approximately 5.7km north of the Survey Area (TPFL). Possible	Naturemap, PMST, TPFL, WAHerb

Species	Conservation Status*	Life Form	Habitat / Known Distribution	Likelihood of occurrence within the Study Area	Data Source
Conostylis misera	T/EN	Herb	White or grey sand, sandy loam. Winter-wet flats.	Closest record (no date) is approximately 3km southwest of the Survey Area (WAHerb). Possible	Naturemap, PMST, WAHerb
Isopogon uncinatus	T/EN	Shrub	Loam or sand on granite, peaty sand. Swampy depressions, hillslopes.	Closest record (1828) is approximately 4.2km southwest of the Survey Area (WAHerb). Closest record (2001) is approximately 5km south of the Survey Area (TPFL). Possible	Naturemap, PMST, TPFL, WAHerb
Lambertia orbifolia subsp. orbifolia	T/EN	Shrub	Shallow grey or light brown sand, grey sandy loams over laterite, gravel. Gently undulating plains, low slopes, low ridges, along roadsides.	Closest record (1962) is approximately 7.7km northwest of the Survey Area (WAHerb). Possible	Naturemap, WAHerb
Sphenotoma drummondii	T/EN	Shrub	Stony or shallow soils over granite or quartzite. Steep rocky slopes, crevices of rocks.	Possible, no evidence of rocky slopes	PMST
Andersonia pinaster	T/VU	Shrub	Grey/white sand, sandy clay, granite. Winter-wet slopes, outcrops, hills.	Possible	PMST
Banksia goodii	T/VU	Shrub	White or grey sand over laterite.	Closest record (1829) is approximately 4.1km southwest of the Survey Area (WAHerb). Closest record (2004) is approximately 4.2km north of the Survey Area (TPFL). Possible	Naturemap, PMST, TPFL, WAHerb
Banksia verticillata	T/VU	Shrub or tree	Sandy loam. On or beside granite outcrops.	Closest record (1957 & 1964) is approximately 3km southwest of the Survey Area (WAHerb). Closest record (1995) is approximately 8.4km southeast of the Survey Area (TPFL). Unlikely, no evidence of granite outcrops	Naturemap, PMST, TPFL, WAHerb

Species	Conservation Status*	Life Form	Habitat / Known Distribution	Likelihood of occurrence within the Study Area	Data Source
Caladenia harringtoniae	T/VU	Herb	Clay and sandy clay in seasonally wet areas, flowering best in season following summer fire, Found between Nannup and Albany.	Closest record (1983) is approximately 2.9km southwest of the Survey Area (WAHerb). Closest record (2016) is approximately 2.7km southwest of the Survey Area (TPFL). Possible	Naturemap, PMST, TPFL, WAHerb
Diuris drummondii	T/VU	Herb	Low-lying depressions, swamps.	Possible	PMST
Drakaea micrantha	T/VU	Herb	Sandy soil in forests and woodlands. Found between Perth and Albany.	Closest record (2008) is approximately 840m north of the Survey Area (WAHerb & TPFL). Possible	Naturemap, PMST, TPFL, WAHerb
Kennedia glabrata	T/VU	Shrub	Soil pockets, sandy soils. Granite outcrops.	Possible	PMST
Microtis globula	T/VU	Herb	Peaty soils in seasonally wet flats, flowering only in season following a summer fire. Found between Albany and Northcliffe.	Closest record (1997) is approximately 6.8km north of the Survey Area (WAHerb). Closest record (1998) is approximately 6.9km north of the Survey Area (TPFL). Possible	Naturemap, PMST, TPFL, WAHerb
Verticordia fimbrilepis subsp. australis	T/VU	Shrub	Among granite outcrops on Mt Melville.	Closest record (1986 & 1999) is approximately 7.7km northwest of the Survey Area (WAHerb & TPFL, respectively). Unlikely there is no evidence of granite outcrops.	Naturemap, PMST, TPFL, WAHerb
Caladenia evanescens	P1	Herb	Deep sandy soils in coastal shrublands season following a summer fire. Found between Albany and Peaceful Bay.	Closest record (1962) is approximately 3km southwest of the Survey Area (WAHerb). Possible	Naturemap, WAHerb
Drosera paleacea	P1	Herb	White sand, sandy clay.	Closest record (2019) is approximately 7.6km south of the Survey Area (WAHerb). Possible	Naturemap, WAHerb
Lepidosperma sp. Mt Chester (S. Kern et al. LCH 16596)	P1	Sedge	Clay loam, ironstone, sandstone, quartz. Slopes, undulating plains, slightly rocky outcrops, hillcrests.	Closest record (1903) is approximately 5.9km northeast of the Survey Area (WAHerb). Possible	Naturemap, WAHerb

Species	Conservation Status*	Life Form	Habitat / Known Distribution	Likelihood of occurrence within the Study Area	Data Source
Prasophyllum paulinae	P1	Herb	Black, peaty soils. Swamps. After fire in two wetland habitats in the vicinity of Albany.	Closest record (1993) is approximately 7.4km southwest of the Survey Area (WAHerb). Possible	Naturemap, WAHerb
Schoenus sp. Grey Rhizome (K.L. Wilson 2922)	P1	Sedge	Sandy clay, sand.	Closest record (2008) is approximately 8.8km northwest of the Survey Area (WAHerb). Possible	Naturemap, WAHerb
Thomasia multiflora	P1	Shrub	Black sand. Seasonally wet areas, granite outcrops.	Closest record (1901) is approximately 4.2km southwest of the Survey Area (WAHerb). Possible	Naturemap, WAHerb
Thomasia purpurea x solanacea	P1	Shrub	Grey sand over limestone. Creek sides.	Closest record (1992) is approximately 6.4km south of the Survey Area (WAHerb). Closest record (1995) is approximately 8.9km south of the Survey Area (TPFL). Possible	Naturemap, TPFL, WAHerb
Usnea pulvinata	P1	Lichen	Granite rock outcrops.	Closest record (2004) is approximately 7.5km northwest of the Survey Area (WAHerb). Closest record (2004) is approximately 8km northwest of the Survey Area (TPFL). Unlikely, there were no granite outcrops observed within the Study Area.	Naturemap, TPFL, WAHerb
Agrostocrinum scabrum subsp. *littorale*	P2	Herb	Shallow granite loams. Coastal slopes.	Closest record (1982) is approximately 4.2km southwest of the Survey Area (WAHerb). Possible	Naturemap, WAHerb
Bossiaea sp. Mt Frankland (L. Graham 2174)	P2	Shrub	Granite outcrop, sandy loam.	Closest record (1927) is approximately 3km southwest of the Survey Area (WAHerb). Possible	Naturemap, WAHerb
Caladenia startiorum	P2	Herb	Clay loam. Winter-wet swamps.	Closest record (2021) is approximately 9.7km south of the Survey Area (TPFL). Possible	Naturemap, TPFL

Species	Conservation Status*	Life Form	Habitat / Known Distribution	Likelihood of occurrence within the Study Area	Data Source
Conospermum spectabile	P2	Shrub	Sandy soils.	Closest record (no date) is approximately 4.6km southwest of the Survey Area (WAHerb). Possible	Naturemap, WAHerb
Degelia flabellata	P2	Lichen	Granite outcrops.	Closest record (2004 &2005) is approximately 4.2km southwest of the Survey Area (WAHerb & TPFL). Unlikely, there is no evidence of granite outcrops.	Naturemap, TPFL, WAHerb
Gyrostemon thesioides	P2	Shrub	Sand over limestone. Consolidated coastal dunes.	Closest record (1902) is approximately 4.2km east of the Survey Area (WAHerb). Closest record (2002) is approximately 9.8km southwest of the Survey Area (TPFL). Possible	Naturemap, TPFL, WAHerb
Leucopogon bracteolaris	P2	Shrub	Stony sand, gravelly loam.	Closest record (1964) is approximately 2.5km south of the Survey Area (WAHerb). Possible	Naturemap, WAHerb
Pterostylis heberlei	P2	Herb	Sandy soils in woodlands and shurblands. Found between Cosy Corner and Gull Rock.	Closest record (1926) is approximately 7.8km northeast of the Survey Area (WAHerb). Closest record (2021) is approximately 3.9km east of the Survey Area (TPFL). Possible	Naturemap, TPFL, WAHerb
Schoenus sp. Grassy (E. Gude & J. Harvey 250)	P2	Sedge	Black silt. Swamps	Closest record (2000) is approximately 8km southwest of the Survey Area (WAHerb). Possible	Naturemap, WAHerb
Stenanthemum sublineare	P2	Shrub	Littered white sand. Coastal plain.	Closest record (2007) is approximately 1.2km north of the Survey Area (WAHerb). Possible	Naturemap, WAHerb

Species	Conservation Status*	Life Form	Habitat / Known Distribution	Likelihood of occurrence within the Study Area	Data Source
Stylidium articulatum	P2	Herb	Sandy loam, granite. Hills, coastal heath.	Closest record (1828 & 1901) is approximately 700m south of the Survey Area (WAHerb). Possible	Naturemap, WAHerb
Stylidium falcatum	P2	Herb	Sand, gravelly clay loam. Plains, lateritic ridges.	Closest record (1995) is approximately 2km southwest of the Survey Area (WAHerb & TPFL). Possible	Naturemap, TPFL, WAHerb
Styphelia cymbiformis	P2	Shrub	Brown gravelly loam.	Closest record (1937) is approximately 4.2km west of the Survey Area (WAHerb). Possible	Naturemap, WAHerb
Thelymitra porphyrosticta	P2	Herb	Sandy soils in shrublands and woodlands. Found between Mt Lindsay and Bremer Bay.	Closest record (1930) is approximately 4.2km southwest of the Survey Area (WAHerb). Closest record (2021) is approximately 2.4km southeast of the Survey Area (TPFL). Possible	Naturemap, TPFL, WAHerb
Acacia ataxiphylla subsp. ataxiphylla	P3	Shrub	Gravelly clay loam, white/grey sand. Flats, roadsides.	Closest record (1931) is approximately 4.1km southwest of the Survey Area (WAHerb). Possible	Naturemap, WAHerb
Amanita drummondii	P3	Fungi	In leaf litter in association with Agonis flexuosa, A. theiformis, Allocasuarina fraseriana, Corymbia calophylla, Eucalyptus marginata, E. patens, E.staeri, Jacksonia furcellata, Kunzea glabrescens, Melaleuca sp., Podocarpus drouynianus, Taxandria parviceps. Occurs in the Swan Coastal Plain, Jarrah Forest, and Warren IBRA bioregions.	Closest record (2011) is approximately 1km north of the Survey Area (WAHerb). Possible	Naturemap, WAHerb

Species	Conservation Status*	Life Form	Habitat / Known Distribution	Likelihood of occurrence within the Study Area	Data Source
Amanita preissii	P3	Fungi	Sandy soil and lateritic gravel, in native vegetation; includes *Allocasuarina fraseriana, Acacia pulchella, Corymbia calophylla, Callitris* sp., *Eucalyptus gomphocephala, E. marginata, Macrozamia fraseri and Pinus pinaster*. Occurs in the Swan Coastal Plain SWA2 Perth and JAF01 Northern Jarrah Forest IBRA subregions.	Closest record (2013) is approximately 2.2km north of the Survey Area (WAHerb). Possible	Naturemap, WAHerb
Andersonia auriculata	P3	Shrub	Grey or peaty sand, often over laterite. Swampy areas, granite outcrops.	Known record within Survey Area within Reserve 6862 (1989) (TPFL). Closest record (1988) is approximately 2.7km northwest of the Survey Area (WAHerb).	Naturemap, TPFL, WAHerb
Andersonia setifolia	P3	Shrub	Sandy & gravelly soils. Hillslopes & breakaways.	Closest record (1998) is approximately 415m southeast of the Survey Area (WAHerb). Possible	Naturemap, WAHerb
Anzybas abditus	P3	Herb	Peaty soils in seasonally wet flats and drainage lines. Found between Nannup and Mt Manypeaks with disjunct populations near Esperance and Gingin.	Closest record (1985) is approximately 5.9km northwest of the Survey Area (WAHerb). Possible	Naturemap, WAHerb
Austrostipa mundula	P3	Grass	Grey sand.	Closest record (2003) is approximately 9.4km southwest of the Survey Area (WAHerb). Possible	Naturemap, WAHerb
Banksia biterax	P3	Shrub	Lateritic gravel, sand.	Closest record (2008) is approximately 1.5km northeast of the Survey Area (WAHerb). Possible	Naturemap, WAHerb

Species	Conservation Status*	Life Form	Habitat / Known Distribution	Likelihood of occurrence within the Study Area	Data Source
Boronia crassipes	P3	Shrub	Sand, peaty sand. Winter-wet swamps, creeklines. Flowers Aug to Sept	Closest record (1993) is approximately 138m north of the Survey Area (WAHerb). This record was searched for to identify if further occurrences of this species occurred within the Site however the survey occurred outside the flowering time and the species was not observed. Any development within this area should include a flora survey that targets this species. Likely	Naturemap, WAHerb
Bossiaea lalagoides	P3	Shrub	Gravelly clay, laterite, and sandy loam in *Eucalyptus marginata-Corymbia calophylla* forest, *E. diversicolor* forest, *E. marginata*/wandoo woodland, and on sandy soil in *Eucalyptus*/*Banksia* woodland, heathland, and *Hakea*/*Daviesia* scrub.	Closest record (1993) is approximately 7.7km northeast of the Survey Area (WAHerb). Possible	Naturemap, WAHerb
Caustis sp. Boyanup (G.S. McCutcheon 1706)	P3	Sedge	White or grey sand.	Closest record (2008) is approximately 5.5km north of the Survey Area (WAHerb). Possible	Naturemap, WAHerb
Chorizema carinatum	P3	Shrub	Sand or sandy clay.	Closest record (1882) is approximately 3km southwest of the Survey Area (WAHerb). Possible	Naturemap, WAHerb
Eucalyptus newbeyi	P3	Tree	Sandy clay, loam. Steep spongolite valley sides & cliffs forming riverbanks.	Closest record (2014) is approximately 6.5km northeast of the Survey Area (WAHerb). Possible	Naturemap, WAHerb
Goodenia sp. South Coast (A.R. Annels ARA 1846)	P3	Herb	Gravelly loams, sandy clays. Edge granite outcrop, roadside.	Closest record (1985) is approximately 6.6km east of the Survey Area (WAHerb). Possible	Naturemap, WAHerb

Species	Conservation Status*	Life Form	Habitat / Known Distribution	Likelihood of occurrence within the Study Area	Data Source
Hakea lasiocarpha	P3	Shrub	Sandy loam soils, organic litter over sand, clay, or gravel. Hill tops, valleys.	Closest record (1964) is approximately 5.8km northeast of the Survey Area (WAHerb). Possible	Naturemap, WAHerb
Juncus meianthus	P3	Herb	Black sand, sandy clay, seepage areas.	Closest record (1979) is approximately 5.8km southeast of the Survey Area (WAHerb). Closest record (1979) is approximately 1.7km southeast of the Survey Area (TPFL). Possible	Naturemap, TPFL, WAHerb
Kunzea pauciflora	P3	Shrub	Gravelly sandy or loamy soils over limestone, sandstone or spongolite. Hillsides, coastal slopes.	Closest record (1965 & 1969) is approximately 4.4km southwest of the Survey Area (WAHerb). Possible	Naturemap, WAHerb
Lachnagrostis billardierei subsp. billardierei	P3	Herb	Sand over granite. Hilltops. Fl. Dec	Closest record (2008) is approximately 101m north of the Survey Area (WAHerb). This record was searched for to identify if further occurrences of this species occurred within the Site. While this record was not observed, any development within this area should include a flora survey that targets this species. Likely	Naturemap, WAHerb
Lasiopetalum sp. Denmark (B.G. Hammersley 2012)	P3	Shrub	Yellow to grey sand clay loam	Closest record (1996) is approximately 4.5km southeast of the Survey Area (WAHerb). Possible	Naturemap, WAHerb
Leucopogon alternifolius	P3	Shrub	Grey/white sand. Swampy areas, seasonally wet areas.	Closest record (1933) is approximately 4.2km west of the Survey Area (WAHerb). Possible	Naturemap, WAHerb

Species	Conservation Status*	Life Form	Habitat / Known Distribution	Likelihood of occurrence within the Study Area	Data Source
Poa billardierei	P3	Grass	Foredunes, drift sands.	Closest record (1988) is approximately 88m west of the Survey Area (WAHerb). Closest record (2000) is approximately 794m south of the Survey Area (TPFL). This record was searched for to identify if further occurrences of this species occurred within the Site. While this record was not observed, any development within this area should include a flora survey that targets this species. Likely	Naturemap, TPFL, WAHerb
Synaphea preissii	P3	Shrub	Sand, gravelly loam.	Closest record (1997) is approximately 2.9km southwest of the Survey Area (WAHerb). Possible	Naturemap, WAHerb
Thysanotus gageoides	P3	Herb	Sand, clay, granite, sandstone, laterite.	Closest record (1974) is approximately 9.3km north of the Survey Area (WAHerb). Possible	Naturemap, WAHerb
Verticordia endlicheriana var. angustifolia	P3	Shrub	Sandy clay. Granite outcrops	Closest record (1828) is approximately 4.6km southwest of the Survey Area (WAHerb). Unlikely, historical record	Naturemap, WAHerb
Adenanthos x cunninghamii	P4	Shrub	Grey sand. Coastal dunes & sandplains.	Known record within Lots 3000 (Previously 1512) & 1523 Emu Point Dr, Albany (Hickman, 2005), which is not shown in DBCA dataset (Figure 9). Closest record (1986) is approximately 4.2km west of the Survey Area (WAHerb). Closest record (1996) is approximately 5.8km south of the Survey Area (TPFL).	Naturemap, TPFL, WAHerb
Andersonia grandiflora	P4	Shrub	Stony soils, sandy soils over sandstone. Boggy flats, rocky slopes.	Closest record (1981) is approximately 9.8km north of the Survey Area (WAHerb). Possible	Naturemap, WAHerb

Species	Conservation Status*	Life Form	Habitat / Known Distribution	Likelihood of occurrence within the Study Area	Data Source
Andersonia sp. Jamesii (J. Liddelow 84)	P4	Shrub	Poorly drained lateritic areas, often on hill crests in Eucalyptus marginata/E. staeri woodlands. Relatively narrow range around Albany.	Closest record (2008) is approximately 5km east of the Survey Area (WAHerb). Closest record (2005) is approximately 9.9km northwest of the Survey Area (WAHerb). Possible	Naturemap, TPFL, WAHerb
Banksia seneciifolia	P4	Shrub	Sandy loam, sand. Rocky hillslopes.	Closest record (1840) is approximately 7.5km northwest of the Survey Area (WAHerb). Possible	Naturemap, WAHerb
Banksia serra	P4	Shrub	Gravel, sand, or clay loam over laterite. Hillslopes.	Closest record (1958) is approximately 3km southwest of the Survey Area (WAHerb). Possible	Naturemap, WAHerb
Bossiaea divaricata	P4	Shrub	Sandy lateritic soils.	Closest record (1993) is approximately 7.8km northeast of the Survey Area (WAHerb). Possible	Naturemap, TPFL
Corysanthes limpida	P4	Herb	Sand. Coastal dunes.	Closest record (1971) is approximately 3.6km southeast of the Survey Area (WAHerb). Closest record (2021) is approximately 3.3km east of the Survey Area (TPFL). Possible	Naturemap, TPFL, WAHerb
Drosera fimbriata	P4	Herb	White sand, granite.	Closest record (2012) is approximately 1.2km north of the Survey Area (WAHerb). Closest record is (1999) is approximately 1.2 km north of the Survey Area (TPFL). Possible	Naturemap, TPFL, WAHerb
Gahnia sclerioides	P4	Sedge	Jarrah forest on loam, sandy soils, often along creek lines. Moist shaded situations	Closest record (2008) is approximately 9.2km southwest of the Survey Area (WAHerb). Closest record (2005) is approximately 7.8km southwest of the Survey Area (TPFL). Possible	Naturemap, TPFL, WAHerb

Species	Conservation Status*	Life Form	Habitat / Known Distribution	Likelihood of occurrence within the Study Area	Data Source
Gonocarpus pusillus	P4	Herb	Grey sandy clay. Winter-wet swamps.	Closest record (2007) is approximately 1.8km northwest of the Survey Area (WAHerb). Possible	Naturemap, WAHerb
Gonocarpus simplex	P4	Herb	Peaty sand. Swamps, seasonally inundated areas.	Closest record (2007) is approximately 4.4km east of the Survey Area (WAHerb). Possible	Naturemap, WAHerb
Lepidium pseudotasmanicum	P4	Herb	Loam, sand.	Closest record (1940) is approximately 3km southwest of the Survey Area (WAHerb). Possible	Naturemap, WAHerb
Lysinema lasianthum	P4	Shrub	Swamps, seasonally wet areas.	Closest record (1936) is approximately 4.2km west of the Survey Area (WAHerb). Closest record (1986) is approximately 4.6km southeast of the Survey Area (TPFL). Possible	Naturemap, TPFL, WAHerb
Microtis pulchella	P4	Herb	Peaty soils in seasonally wet flats. Found between Augusta and Mt Manypeaks	Closest record (1960) is approximately 3.3km southwest of the Survey Area (WAHerb). Closest record (2023) is approximately 6.9km north of the Survey Area (TPFL). Possible	Naturemap, TPFL, WAHerb
Microtis quadrata	P4	Herb	Sandy-clay and clay in coastal flats. Found between Augusta and Albany.	Closest record (1959) is approximately 3.3km southwest of the Survey Area (WAHerb). Possible	Naturemap, WAHerb
Myosotis australis subsp. australis	P4	Herb	Grey sand over limestone	Closest record (1971) is approximately 3.7km south of the Survey Area (WAHerb). Possible	Naturemap, WAHerb
Pleurophascum occidentale	P4	Cryptogam	White-grey sand-quartz.	Closest record (2004) is approximately 2.1km southeast of the Survey Area (WAHerb). Closest record (2004) is approximately 3.5km east of the Survey Area (TPFL). Possible	Naturemap, TPFL, WAHerb
Spyridium spadiceum	P4	Shrub	Sand or gravelly loam. Granitic hills.	Closest record (2017) is approximately 2.9km southwest of the Survey Area (WAHerb). Possible	Naturemap, WAHerb

Species	Conservation Status*	Life Form	Habitat / Known Distribution	Likelihood of occurrence within the Study Area	Data Source
Thomasia quercifolia	P4	Shrub	Karri loam or grey coastal sand.	Closest record (1966) is approximately 8.6km southwest of the Survey Area (WAHerb). Closest record (2005) is approximately 9.5km southwest of the Survey Area (TPFL). Possible	Naturemap, TPFL, WAHerb
Thomasia solanacea	P4	Shrub	Alluvium, sand over limestone, rocky loam. Coastal areas.	Closest record (1800) is approximately 2.4km south of the Survey Area (WAHerb). Possible	Naturemap, WAHerb
Thysanotus isantherus	P4	Herb	Granite.	Closest record (1999) is approximately 1.6km south of the Survey Area (WAHerb). Possible	Naturemap, WAHerb
Verticordia harveyi	P4	Shrub	White sand. Low hills.	Closest record (1993) is approximately 9.8km northwest of the Survey Area (WAHerb). Possible	Naturemap, WAHerb
Xanthosia eichleri	P4	Shrub	Grey sand over granite, sandy loam. Granite outcrops, jarrah/marri woodland.	Closest record (2008) is approximately 9km northeast of the Survey Area (WAHerb). Possible	Naturemap, WAHerb

* BC Act: T = Threatened, P = Priority / EPBC Act: CR = Critically Endangered, EN = Endangered, VU = Vulnerable



Figure 9 Emu Point Precinct Structure Plan - Existing DBCA Records of Priority Flora

2.1.6 Threatened and Priority Ecological Communities

An ecological community is a naturally occurring biological assemblage that occurs in a particular type of habitat. A Threatened Ecological Community (TEC) is one which is found to fit into one of the following categories: Presumed Totally Destroyed; Critically Endangered; Endangered, or Vulnerable. Possible TECs that do not meet survey criteria are added to the Department of Parks and Wildlife's Priority Ecological Community (PEC) Lists, under Priority 1, 2 and 3. These are ranked in order of priority for survey and/or definition of the community type and evaluation of its conservation status.

The database searches from the Protected Matters Search Tool (PMST) and Department Biodiversity, Conservation and Attractions Communities Data (DBCA, 2024b) identified five TECs and five PECs within 10km of the Study Area (Table 6, Figure 10).

Within the Survey Area, existing ecological communities are *Astartea scoparia* Swamp Thicket (Priority 1), *Banksia coccinea* Shrubland/*Eucalyptus staeri*/Sheoak Open Woodland (Community 14a - Sandiford & Barrett 2010) (all/or portion in EPBC listed Kwongkan community) (Priority 1 under BC Act and Endangered under EPBC Act) and Subtropical and Temperate Saltmarsh (Priority 3 under BC Act and Vulnerable under EPBC Act) (DBCA, 2024b).

The remaining Priority Ecological Communities are unlikely to be located within the Study Area as per the Albany Regional Vegetation Survey (Sandiford & Barrett, 2010)

Table 6 Threatened and Priority Ecological Communities within 10 km of the Study Area.

Ecological Community Name	WA Status (BC Act)	Commonwealth Status (EPBC Act)	Source
Astartea scoparia Swamp Thicket (Vegetation unit 56 in ARVS, Sandiford & Barrett, 2010)	Priority 1		DBCA
Banksia coccinea Shrubland/*Eucalyptus staeri*/*Sheoak* Open Woodland (Community 14a - Sandiford & Barrett 2010) (all/or portion in EPBC listed Proteaceae Dominated Kwongkan Shrublands of the Southeast Coastal Floristic Provence of Western Australia) (Vegetation unit 14 in ARVS within the Study Area)	Priority 1	Endangered	DBCA
Banksia littoralis woodland / *Melaleuca incana* Shrubland (Vegetation unit 44 in ARVS)	Priority 1		DBCA

Ecological Community Name	WA Status (BC Act)	Commonwealth Status (EPBC Act)	Source
Coastal *Melaleuca incana / Taxandria juniperina* Shrubland/Closed Forest (Vegetation unit 60 in ARVS)	Priority 1		DBCA
Empodisma peatlands of southwestern Australia		Endangered	PMST
Melaleuca striata /Banksia spp. Coastal Heath (all/or portion in EPBC listed Kwongkan community) (Vegetation unit 16 in ARVS)	Priority 1	Endangered	DBCA
Subtropical and Temperate Coastal Saltmarsh (Vegetation unit 66 and 67 in ARVS)	Priority 3	Vulnerable	PMST, DBCA



Figure 10 Emu Point Precinct Structure Plan - Existing DBCA Mapping of Threatened and Priority Ecological Communities

2.2 Survey Method

A broad, targeted flora and vegetation survey has been completed across the Survey Area, focusing on the areas of remnant vegetation. The methodology is consistent with the Technical Guidance for Flora and Vegetation Surveys (Environmental Protection Authority, 2016). The Survey Area was assessed in spring on 26 to 29 November 2024 and 15 to 16 January 2025, by staff members from Ecosystem Solutions (Table 1). Due to the broad nature of this assessment, and access restrictions to a number of private properties, additional site-based surveys will be required in areas of remnant vegetation likely to be impacted by development.

The Survey Area was walked in a systematic manner to cover as much of the remnant vegetation areas as possible. The survey included targeted searches for significant flora and vegetation communities identified in the desktop analysis. Floristic sampling relevés were completed within the Survey Area, to document and understand the floristics, vegetation units and vegetation condition of the Survey Area.

Additional data including introduced flora were recorded when opportunistically observed (Table 8). All recordings were marked by using Global Positioning System (GPS). Field observations were analysed and mapped with QGis (V3.38.0©).

2.3 Survey Limitations

The Survey Area includes parcels of remnant vegetation over many lots and tenure. Pockets of remnant vegetation within the Survey Area are privately owned and some landowners were not available to confirm their permission to access, therefore not all areas of vegetation were able to be surveyed by foot. Effort was made to assess these areas of no permission by observing on the lot boundary. Parks, reserves, Unallocated Crown Land, and other areas owned or managed by the City of Albany were accessible by vehicle and/or foot.

2.4 Results and Discussion

2.4.1 Wetlands and waterways

The entire Study Area is a sensitive water resource area with recommended protection of native vegetation, and where appropriate enhanced, and land uses with the potential to impact water quality sited appropriately (DPLH, 2021). The entire Study Area is also within a Government Sewage Policy Area, as there a significant wetland within 1 km.

During the field visits in November 2024, vegetation units were observed to correlate with wetlands classified by the wetland mapping and evaluation project (Hopkins, 2007), which also aligned with the Albany Regional Vegetation Survey (Sandiford & Barrett, 2010). Some areas of 59 - *Taxandria juniperina* Closed Forest and 65 - Coastal *Melaleuca cuticularis* Low Forest were not suitable to survey due to the waterlogged soil or water present. A definitive assessment of the high-water mark or wetland was not feasible, as the survey was not conducted during peak rainfall.

Three categories of wetland relate to the Study Area according to the wetland mapping project by Hopkins, 2007, being Conservation, Resource Enhancement and Multiple Use with descriptions and assessment within the Study Area provided in Table 7 and Figure 12.

A total 318 ha of the Study Area is considered a wetland category, comprising approximately 60% of the Study Area (Hopkins, 2007). However, there is a potential this is underestimated as some AVRS vegetation units have not been included as a wetland category, or only partially mapped, despite being hydrologically connected. For example, vegetation unit 40 - *Homalospermum firmum*/*Callistemon glaucus* Peat Thicket has not been assessed as a wetland category with vegetation units 14 - *Banksia coccinea* Shrubland/*Eucalyptus staeri*/*Sheoak* Open Woodland, 59 - *Taxandria juniperina,* 66 - *Juncus kraussii* Sedgeland and 67 - Coastal Saltmarsh (TEC/P3) is only partially included as a wetland category with some of this vegetation included within the Oyster Harbour catchment identified in the Directory of Important Wetlands. This is likely attributed to the wetland evaluation occurring at a broader scale and not specific to the Study Area. The differences in wetland classification and AVRS vegetation units is depicted in Figure 13.

The wetlands within the Study Area should be assessed against the criteria for a conservation management category, as defined in the methodology for the evaluation of wetlands on the Swan Coastal Plain, Western Australia (DBCA, 2017) as the following applies:

- Vegetation in a good or better condition; or
- Equal to or greater than 90% of the wetland supports vegetation in a good or better condition and supports one or more of the following:
    - A Threatened Ecological Community (Coastal Saltmarsh TEC)

- Priority 1 or Priority 2 ecological community (*Astartea scoparia* Swamp Thicket & *Banksia coccinea* Shrubland/*Eucalyptus staeri*/*Sheoak* Open Woodland).

The custodian of wetland delineation, boundaries and classification is DBCA and therefore any changes to the wetland boundaries should involve DBCA. The identification and delineation of a wetland boundary is also reliant upon three characteristics of hydrology, soils, and wetland vegetation. Therefore, further assessment is required to confirm wetland boundaries, and the potential impact to be assessed prior to any development in the area. It is recommended to assess these wetlands for a potential conservation management category and implement zoning changes as required.

According to the Hopkins (2007) assessment, only a portion of the vegetation units 2 - Peppermint Low Forest and 4 - Coastal B*anksia ilicifolia*/Peppermint Low Woodland within the Study Area are included as a wetland as the remaining portion is located on the coastal dunes in the south or on the mid slope. The entire vegetation unit 5- Limestone Coastal Heath and 8 - Beach Herbland/Grassland is not considered a wetland category, also occurring in the coastal south on the mid slope. Vegetation unit 12 - Jarrah/Marri/Sheoak Laterite Forest is partially classified as a wetland category and 13 - Jarrah/Sheoak/E.staeri Sandy Woodland is not considered a wetland category with these areas also occurring on the mid to upper slope of the Site in the north of the Study Area.

The areas with a wetland category, particularly the 4 - Coastal B*anksia ilicifolia*/Peppermint Low Woodland, may be considered terrestrial groundwater dependant, any urban development of these communities could have implications for groundwater (DWER, per coms). It is recommended to understand the surface and groundwater in any of these areas proposed for development. Any development within the Study Area is recommended to include additional surveys and management plans to ensure the impact to the values within the Study Area are retained.

Table 7 Southcoast wetland mapping and evaluation project (Hopkins, 2007) within the Study Area

Category & Definition	Description within the Study Area
Conservation (C) Wetlands which support a high level of ecological attributes and functions. The objective for these areas is for conservation.	Total approximate 171 ha within the Study Area with majority of the area located across lots zoned Environmental Conservation, however also within lots zoned Rural and Urban Development. The following AVRS vegetation units are within the C wetland category: • 2 Peppermint Low Forest

	• 4 Coastal *Banksia ilicifolia*/Peppermint Low Woodland • 14 *Banksia coccinea* Shrubland/*Eucalyptus staeri*/*Sheoak* Open Woodland (TEC / P1) • 46 *Evandra aristata* Sedgeland • 50 Miscellaneous Drainage Woodland/Shrubland • 52 *Melaleuca cuticularis*/*M. preissiana* Open Woodland • 56 *Astartea scoparia* Swamp Heath (P1) • 57 *Melaleuca rhaphiophylla* Woodland/Low Forest Complex • 59 *Taxandria juniperina* Closed Forest • 65 Coastal *Melaleuca cuticularis* Low Forest • 68 *Typha orientalis* Sedgeland
Resource Enhancement (R) Wetlands which may have been partially modified but still support substantial ecological attributes and functions. The wetland can be restored to a state which could be managed for conservation purposes	Total approximate 9.1 ha within the Study Area comprising of nine small damplands or sumplands on peat or sandy peat soils within the centre of the Study Area. These areas are located within Rural and Environmental Conservation lots along Collingwood Road. Two small sections are in the lot containing the sports oval, zoned recreation. Previous modification to these areas is attributable to adjacent drains, roads, and tracks. The following AVRS vegetation units are within the R wetland category: • 4 Coastal *Banksia ilicifolia*/Peppermint Low Woodland • 14 *Banksia coccinea* Shrubland/*Eucalyptus staeri*/*Sheoak* Open Woodland (TEC / P1) • 36 *Callistachys* spp Thicket • 46 *Evandra aristata* Sedgeland • 56 *Astartea scoparia* Swamp Heath (P1)

	• 50 Miscellaneous Drainage Woodland/Shrubland • 59 *Taxandria juniperina* Closed Forest • 69 **Acacia longifolia* Thicket
Multiple Use (M) Wetlands with few important ecological attributes and functions remaining. The wetland can be used for a variety of purposes.	Total approximate 138 ha within the Study Area, located within: • the north of the Study Area, along the Yakamia Creek flood plain across lots zoned Rural and a small potion in residential, comprising 73 ha. • the central floodplain across Environmental Conservation lots connecting through to the area surrounding Lake Seppings, including lots zoned Rural and partially within the Urban Development lots. Comprising 65 ha. The following AVRS vegetation units are within the M wetland category noting this category includes a large portion of cleared area, particularly within the Yakamia floodplain. This category also includes a portion of the Coastal Saltmarsh TEC/P3 which is known for having unique habitat values that support a range of conservation significant fauna species, particularly marine birds (refer to 2.7.4): • 2 Peppermint Low Forest • 4 Coastal *Banksia ilicifolia*/Peppermint Low Woodland • 12 Jarrah/Marri/Sheoak Laterite Forest • 13 Jarrah/Sheoak/E.staeri Sandy Woodland • 14 *Banksia coccinea* Shrubland/*Eucalyptus staeri*/*Sheoak* Open Woodland (TEC / P1) • 46 *Evandra aristata* Sedgeland • 52 *Melaleuca cuticularis*/*M. preissiana* Open Woodland

	• 56 *Astartea scoparia* Swamp Heath (P1) • 57 *Melaleuca rhaphiophylla* Woodland/Low Forest Complex • 59 *Taxandria juniperina* Closed Forest • 65 Coastal *Melaleuca cuticularis* Low Forest • 66 *Juncus kraussii* Sedgeland (TEC/P3) • 67 Coastal Saltmarsh (TEC/P3)

An understanding of wetlands and floodplains, for any proposed development, is also important to ensure future areas of development are adequately protected. This should also be in the context of future extreme weather events that are possible. The Study Area is considered unique as it is bordered to the east by Oyster Harbour (Miaritch) which is tidal influenced. Extreme rainfall events coupled with high tidal events can magnify water levels within the Study Area, which occurred in June 2023 (per coms DPLH, 2024).

An assessment of the Bureau of Meteorology (BOM) rainfall data for Albany (station 9500) between 1877 to 2024 concludes that the maximum rainfall can differ greatly from the average (Figure 11). While typically peak rainfall occurs in winter, June July, and August, with an average rainfall of 130 mm, 142 mm and 127 mm respectively, historical maximum rainfall data has shown rainfall over 100 mm per month can be received during any month of the year. The highest recorded rainfall occurred in June 2023 where 295.6 mm was recorded. This rainfall event was coupled with an extreme high tide event and caused significant flooding. Confirmation of where the water level reached in this event will help inform future planning decisions.

This assessment does not include the protection required for the coastal dune system and foreshore reserves required to abate coastal erosion and sea level rise. The risk of marine intrusion through Oyster Harbour into the Study Area, along the associated floodplain should be mitigated through any future development to have appropriate setbacks and foreshore areas which will also protect TEC/PECs and other fauna and flora values within the Study Area. The appropriate setbacks should be determined based on studies within the Site required as part of any development application.

A District Water Management Plan is in the process of being prepared which will address waterway, wetland, and groundwater protection. Wetlands and waterways within the Structure Plan area require adequate buffers and foreshore areas, respectively, to protect, manage and conserve water quality and quantity, native vegetation, aquatic and riparian habitats, ecological linkages, and associated biodiversity values (Draft SPP 2.9). The District Water Management Plan should identify

land to be set aside for water resources, major infrastructure, areas of Aboriginal or other heritage (WAPC, 2021) and includes flow paths for major flooding. Further details on the requirements for the District Water Management Plan are provided in the Draft SPP 2.9 and associated Guidelines.

Yakamia Creek

Yakamia Creek and its tributaries is a waterway within the Albany Waterways Management Area, declared under the *Waterways Conservation Act 1976*. There is a requirement under the Act for the preservation and enhancement of the quality of the environment and amenity of those waters and that land. Improvements to water quality in Yakamia Creek also aids in the improving the water quality and habitat within Oyster Harbour, a nationally significant waterway. Areas that are considered degraded (B3 & C1 category) should be rehabilitated with access managed appropriately such as fencing, as recommended in the DWER databases (DWER-005 & DWER-06). Managing Yakamia Creek as an ecological linkage is further discussed in Section 2.4.6 and discussions of the Creek in regard to fauna habitat is discussed in Section 2.7.4.3.

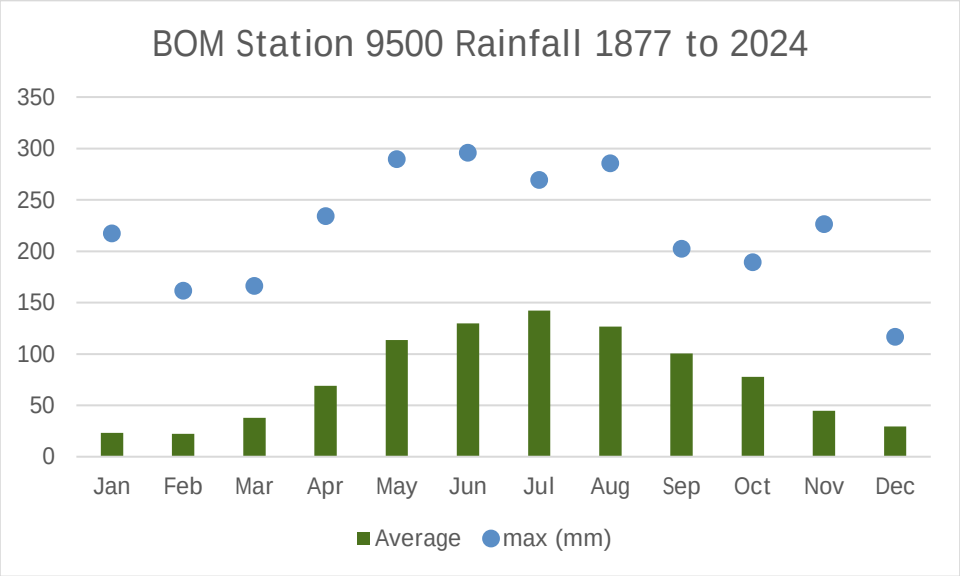


Figure 11 Graph of Rainfall data from BOM Station 9500 (Albany) 1877 to 2024

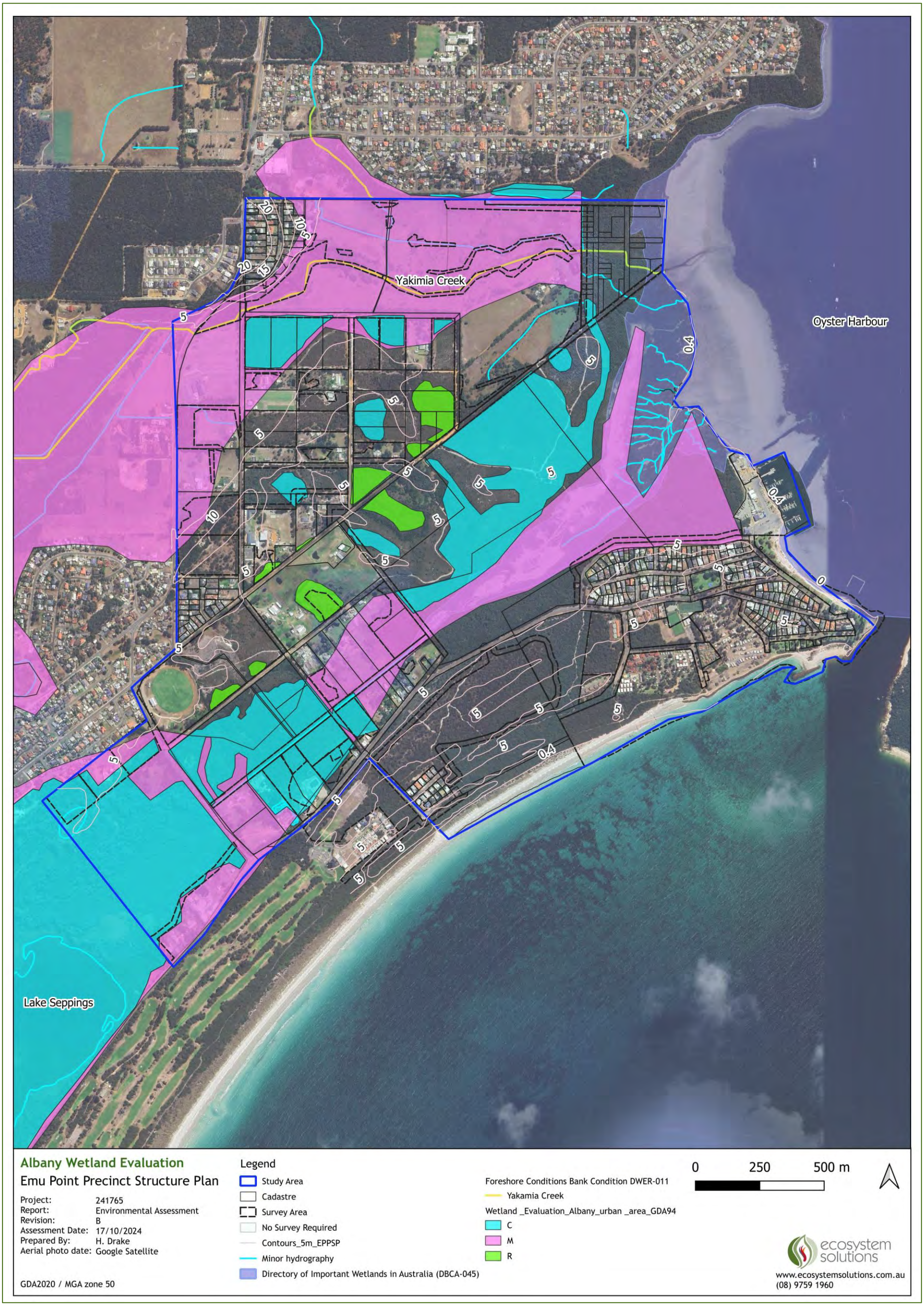


Figure 12 Wetland mapping, classification and evaluation project within the Emu Point Precinct Structure Plan (Hopkins, 2007)

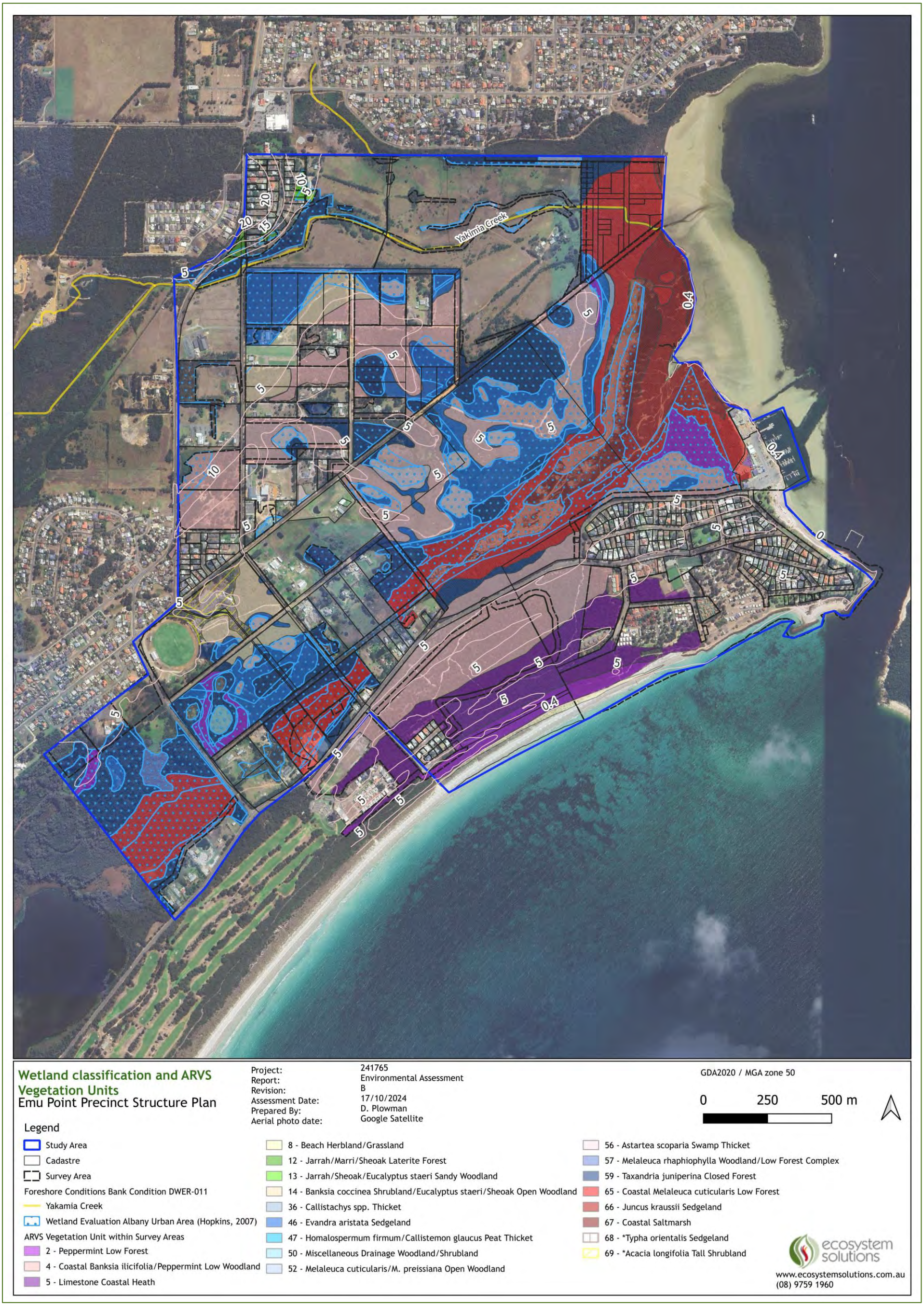


Figure 13 Wetland classification with AR Vegetation Units within the Emu Point Precinct Structure Plan

2.4.2 Threatened, Priority and Significant Flora

There was no Threatened flora recorded during the field surveys. The Survey Area includes one known priority population, *Adenanthos* x *cunninghamii* (P4). Confirmation of the presence of this species within Lots 1512 & 1523 Emu Point Drive has occurred (Figure 18). One additional priority listed species has also been recorded, *Netrostylis* sp. Blackwood River (P3). *Andersonia auriculata* is described in the database as being within Reserve 6862, this reserve is predominately outside the Survey Area.

It is recommended that areas of remnant vegetation that include these Priority species are prioritized for protection. Due to the broad nature of this assessment, and access restrictions, additional site-based surveys will be required to identify and manage impacts to conservation significant flora species through any future development approvals process. It is likely that additional observations of Threatened or Priority flora will be recorded. The survey effort is illustrated in Figure 18.

2.4.2.1 *Netrostylis* sp. *Blackwood River* (P3)

Netrostylis sp. Blackwood River is a tufted perennial herb (sedge), that can grow up to 1.7m in height (W.A. Herbarium, 1998-). It is predominately found growing along creek lines or within seasonally wet areas in loamy soil. It is listed as Priority 3 on the DBCA Priority Flora List. It is known to occur from Dwellingup in the north, Dunsborough to Forest Grove in the west, to Manypeaks in the east.

There were two observations of *Netrostylis* sp. Blackwood River, one while completing a relevé, ER07, in a seasonally wet area at 236 Wright Street, Collingwood Park (Figure 14 & 15). The other observation occurred at 204 Wright Street next to an area that has been recently cleared. The surrounding vegetation for both observations is *Taxandria juniperina* closed forest, as described by the Albany Regional Vegetation units. Due to the size of the Survey Area, there is potential for this species to occur in other pockets of *Taxandria juniperina* closed forest, particularly in remnant vegetation along the waterway that connects these two observations.



Figure 14 Scan of Netrostylis sp. Blackwood River (P3) collection



Figure 15 Habitat of Netrostylis sp. Blackwood River (P3)

2.4.2.2 *Adenanthos x cunninghamii* (P4)

Adenanthos x cunninghamii is listed as Priority 4 on the DBCA Priority Flora List. The species is an erect open shrub between 1 to 3 m high (Western Australian Herbarium, 1998-). It flowers in March or September or October, located on grey sand in coastal dunes and sandplains. This species is recognised as a hybrid between *Adenanthos sericeus* and *Adenanthos cuneatus* with the leaf form displaying an intermediate between these two species (Hickman, 2005).

There are 15 records from the TPFL, DBCA database, and 8 records from WA Herb, WA Herbarium database, within 10 km of the Study Area, from Sand Patch in the west to Two Peoples Bay to the east. These surrounding records are also discussed in the Albany Regional Vegetation Survey (Sandiford & Barrett, 2010). There are an additional 5 records within the Study Area, in three locations within Lots 1512 & 1523 Emu Point Drive (Hickman, 2005).

Ecosystem Solutions observed two specimens of the known records along the northeast corner of Lot 1512, in close proximity to Emu Point Drive (Figure 16, 17 & 18). The observations were within Sheoak woodland, as described by Hickman (2005). The remaining records by Hickman occur in Open Peppermint Woodland and Peppermint Thicket, however these were not observed in the 2024 survey.



Figure 16 Photo of Adenanthos x cunninghamii (P4) in the Study Area



Figure 17 Close up of Adenanthos x cunninghamii (P4) in the Study Area



Figure 18 Conservation Significant Flora Observations and Survey Effort within the Emu Point Precinct Structure Plan

2.4.3 Vegetation Units

Vegetation within the Survey Area has been mapped according to vegetation units established by E.M. Sandiford & S. Barrett in the Albany Regional Vegetation Survey (Sanidford & Barrett, 2010), as detailed in section 2.1.2.

During the current survey, the ARVS mapping was checked, with eleven relevés completed across the Survey Area (Figure 19, Appendix D). Sixteen of the AVRS vegetation units were confirmed and mapped within the Survey Area (Table 8). The boundary of the *Banksia coccinea* Shrubland /*Eucalyptus staeri*/Sheoak Open Woodland (14) was modified in the Unallocated Crown Lots 53 & 54 and a slight change in boundary in the vegetation adjacent to the sports oval, based on the observations of *Banksia coccinea*, with a slight increase in the respective areas.

Table 8 Updated Vegetation Units (Sandiford & Barrett, 2010) within the Survey Area

Map Code	Vegetation Name	Area within Survey Area
2	Peppermint Low Forest	2.35 ha
4	Coastal *Banksia ilicifolia*/Peppermint Low Woodland	30 ha
5	Limestone Coastal Heath	13 ha
8	Beach Herbland/Grassland	0.2 ha
12	Jarrah/Marri/Sheoak Laterite Forest	0.4 ha
13	Jarrah/Sheoak/*E. staeri* Sandy Woodland	0 ha
14	*Banksia coccinea* Shrubland/*Eucalyptus staeri*/Sheoak Open Woodland	8.1 ha
36	*Callistachys* spp. Thicket	0.07 ha
46	*Evandra aristata* Sedgeland	9.9 ha
47	*Homalospermum firmum*/*Callistemon glaucus* Peat Thicket	0 ha
50	Miscellaneous Drainage Woodland/Shrubland	0.1 ha
52	*Melaleuca cuticularis*/*M. preissiana* Open Woodland	0.01 ha
56	*Astartea scoparia* Swamp Heath	0.7 ha

Map Code	Vegetation Name	Area within Survey Area
57	*Melaleuca rhaphiophylla* Woodland/Low Forest Complex	0 ha
59	*Taxandria juniperina* Closed Forest	12.7 ha
65	*Coastal Melaleuca cuticularis* Low Forest	6.9 ha
66	*Juncus kraussii* Sedgeland	0.03 ha
67	*Coastal Saltmarsh*	0.06 ha
68	**Typha orientalis* Sedgeland	0 ha
69	*Acacia longifolia Thicket*	0.7 ha

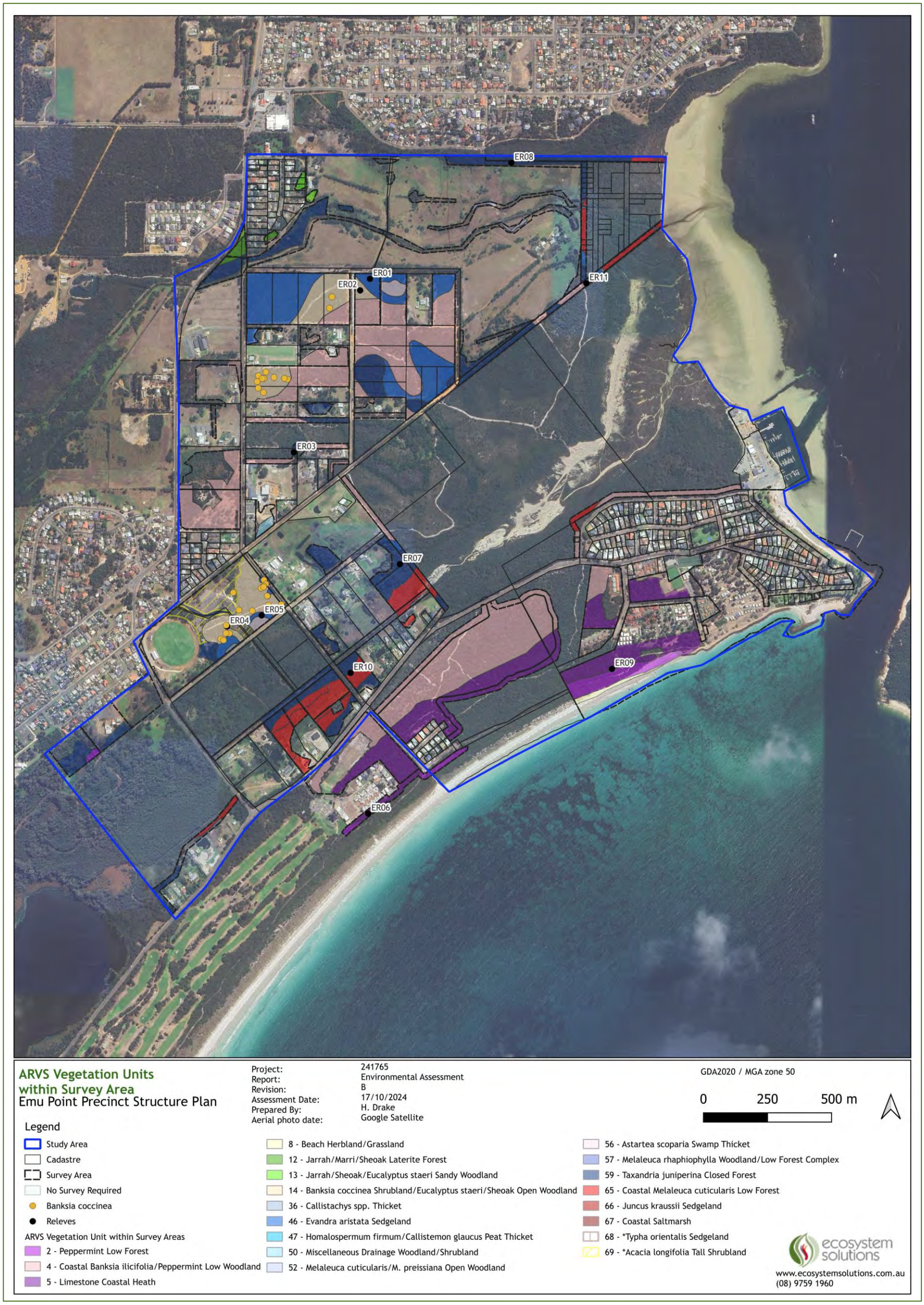


Figure 19 Emu Point Precinct Structure Plan Vegetation Units Map

2.4.4 Vegetation Condition

The condition of the vegetation across the Survey Area was mapped using the assessment methodology defined by Keighery (1994) This information is provided in Table 9 and Figure 22 with definitions of the Vegetation Condition provided in Table 10. Areas that have been historically cleared of native vegetation were not included, and non-native vegetation was only included when it formed a small area within native vegetation.

Majority of the Survey Area is considered Very Good to Excellent condition (40 ha, 32%), located predominately in the Unallocated Crown Land lots in the northwest and within Lots 3000 & 1523 Emu Point Drive, Emu Point. While the remnant vegetation in these areas was highly intact, the presence of a number of weeds and the open nature of the vegetation, which makes the vegetation vulnerable to further degradation, is a concern. A number of tracks separated the remnant vegetation within the Unallocated Crown Land which is also a disturbance which could allow further degradation on the edge of the patch. However, with ongoing weed control these areas of vegetation can be considered excellent in the future.

The areas of Excellent vegetation, 16.2 ha/15% were in general surrounded and connected to other areas of native vegetation, offering a level of protection from degradation from weed invasion and access. The areas of Very Good, 20 ha,16% included areas that were smaller in patch size and contained more weeds slightly altering vegetation structure.

Good vegetation, 12.6 ha, 10%, has experienced an alteration in vegetation structure and contains a number of weeds. Of note is the Unallocated Crown Lot 65 which is likely to have been partially modified, with major disturbance affecting the health of the overstorey species. Recent clearing at the High School at Brewster Road was also noted, for the modification of the driveway and stormwater drainage. The remaining vegetation within this lot is considered very small and vulnerable to further degradation.

Degraded (20.6 ha/16%) and Completely Degraded (13.3 ha, 11%) areas are devoid of native vegetation, with the Degraded areas containing regrowth with a majority of weeds.

R 22698, which the EPA Redbook recommended to be a conservation reserve (DBCA-029) includes native vegetation that is Very Good to Excellent and Excellent vegetation condition where native vegetation occurs. The remainder of the Reserve is cleared or contains few native vegetation species. As there is existing development within the public purpose lot, there is limited ability to fully implement this conservation area recommendation. It is recommended to maintain remnant vegetation for conservation and manage any impacts from the development on the conservation values. It is also recommended to revegetate areas along the foreshore area for erosion protection.

Table 9 Vegetation Condition within the Survey Area

Category	Total Area	Percentage of Area Mapped
Excellent	19.2 ha	15%
Very Good to Excellent	40.0 ha	32%
Very Good	20.0 ha	16%
Good	12.6 ha.	10%
Degraded	20.6 ha	16%
Completely Degraded	13.3 ha	11%
Total	125.7 ha	100%

A total of 36 weeds species were observed opportunistically within the Survey Area (Table 11, Figure 23) with only notable populations recorded, therefore this number is an underestimate of the number of weed species within the Survey Area. The weeds recorded includes four Weeds of National Significance (WONs) which includes *Asparagus asparagoides (*Bridal Creeper)*, Asparagus scandens* (Climbing Bridal)*, Rubus* sp. (Blackberry) and *Ulex eruopaeus* (Gorse) (Government of Western Australia, 2023). There is one additional declared pest, *Zantedeschia aethiopica* under Section 22 of the *Biosecurity and Agriculture Management Act 2007*. The WONs are declared under the Agricultural Management Act 2010, recognising the invasiveness and potential impact for spread. These WONs are further depicted in Figure 24 to aid in the management of them, recognising that further occurrences are likely due to the survey being limited in only recording opportunistic observations. *Asparagus scandens* was observed in two locations growing vigorously (Figure 20). *Rubus* sp. (Blackberry) was noted across Yakamia Creek with *Tropaeolum majus* (Nasturtium, Figure 21). There were multiple observations of Bridal Creeper, particularly in Emu Point Reserve 27974 which also contained a large amount of Ivy growing into the canopy. It is recommended to remove these weed species with a priority on the removal of WoNs. Degraded and cleared areas have the potential to be restored as part of an environmental offset.

Acacia longifolia was observed the most, with 218 records identifying one plant or a group of plants, and it was observed in majority of the Survey Area. *Psoralea pinnata* was also an abundant weed, with 20 records identifying one plant or a group of plants. While their invasiveness is considered moderate (Government of Western Australia, 2023), the number of plants and the ability to recruit from the established seed bank highlights the likely ability for these species to further invade areas of Excellent vegetation.

Previous survey results identified the following vegetation condition:

- Lots 3000 & 1523 Emu Point Drive, Albany from a vegetation survey conducted by Hickman in 2005 flagged a pocket of dieback in the Sheoak Woodland evident by a number of freshly deceased plants from the Papilionaceae and Xanthorrhoeaceae families.
- Flora Survey Portion of Emu Point Reserve 6862 by Ellen J. Hickman May 2006 identified that there is no physical boundary between reserve 6862 and reserve 42964 and there is rubbish dumping encroaching into reserve 6862.

Table 10 Keighery Condition Scale (Keighery, 1994)

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

Table 11 Weed species opportunistically identified within the Survey Area, including status (Government of Western Australia, 2023), ecological impact and invasiveness (DBCA, 2014).

Species Name	Common Name	Status[1]	Ecological Impact[2]	Invasiveness[2]
Acacia baileyana	Cootamundra wattle		Low	Slow
Acacia longifolia	Sydney Golden Wattle		Unknown	Moderate
Agapanthus sp.	Agapanthus		High	Rapid
Agave americana	Century Plant		Low	Slow
Asparagus asparagoides	Bridal Creeper	Declared Pest - s22(2) & WoNS	High	Rapid
Asparagus scandens	Climbing Asparagus	Declared Pest - s22(2) & WoNS	High	Rapid
Bulbous weed	Unknown		Unknown	Unknown
Centranthus macrosiphon	Pretty Betsy		High	Rapid
Cortaderia selloana	Pampas grass		High	Rapid
Delairea odorata / Senecio angulatus	Ivy Groundsel (*D odorata*)		High (*S. angulatus*)	Slow (*S. angulatus*)
Dipogon lignosus	Dolichos Pea		High	Moderate
Eucalyptus sp.			Unknown	Unknown
Euphorbia paralias	Sea spurge		High	Rapid
Ficus carica	Common Fig		High	Slow
Foeniculum vulgare	Fennel		Low	Moderate
Gaudium laevigatum	Victorian Teatree		High	Moderate
Hedera sp.	Ivy		Low	Slow
Homalanthus populifolius	Bleeding heart		Unknown	Rapid
Ipomoea indica	Morning glory		High	Slow
Passiflora sp.	Passionfruit		Low	Slow
Pelargonium sp.	Rose Pelargonium		High	Rapid
Phytolacca octandra	Inkweed		Unknown	Moderate
Pinus pinaste	Pine tree		Moderate	Rapid
Pittosporum undulatum	Sweet Pittosporum		High	Rapid
Polygala myrtifolia	Myrtleleaf Milkwort		Medium	Moderate
Psoralea pinnata	African Scurfpea		Medium	Moderate
Rubus sp.	Blackberry	Declared Pest - s22(2) & WoNS	High	Moderate
Senecio elegans	Purple Groundsel		Low	Moderate
Solanum nigrum	Black Berry Nightshade		Unknown	Moderate
Sonchus olearceus	Common Sowthistle		Medium	Rapid

[1] Western Australian Organism List (WAOL) for declared pests in WA as per Department of Primary Industries and Regional Development and Biosecurity and Agriculture Management Act 2007 (Government of Western Australia, 2023).
[2] Ecological Impact and invasiveness ratings as per Department of Parks and Wildlife Southwest Region Species Prioritisation Process (DBCA 2014).

Species Name	Common Name	Status[1]	Ecological Impact[2]	Invasiveness[2]
Sphaeropteris cooperi	Rough Tree Fern		Medium	Rapid
Tropaeolum majus	Nasturtium		Low	Slow
Ulex europaeus	Gorse	Declared Pest - s22(2) & WoNS	High	Moderate
Vitis vinifera	Grape		Unknown	Unknown
Watsonia sp.	Bugle Lily		High	Moderate
Zantedeschia aethiopica	Arum Lily	Declared Pest - s22(2)	High	Moderate



Figure 20 Asparagus scandens observed within the Survey Area



Figure 21 Rubus sp. and Tropaeolum majus within Yakamia Creek



Figure 22 Emu Point Precinct Structure Plan Vegetation Condition Map



Figure 23 Emu Point Precinct Structure Plan Opportunistic Weeds Map



Figure 24 Emu Point Precinct Structure Plan Opportunistic Weeds of National Significance

2.4.5 Threatened and Priority Ecological Communities

2.4.5.1 *Banksia coccinea* Shrubland/*Eucalyptus staeri*/Sheoak Open Woodland ('Community type 14a') (Endangered TEC (part) / Priority 1)

The mapping obtained from DBCA identifies occurrences of this ecological community within the Survey Area, being a Priority 1 ecological community, with part of this community also being an Endangered TEC, listed as Proteaceae Dominated Kwongkan Shrublands of the southeast coastal floristic province of Western Australia.

The key diagnostic characteristics for the TEC (Department of the Environment, 2014a).:

- Occurs within the Southeast Coastal Floristic Province; and
- Characterised by Proteaceae species having 30% or greater cover of Proteaceae species across all layers where these shrubs occur (crowns measured as if they are opaque); or
- Two or more diagnostic Proteaceae species are present that are likely to form a significant vegetative component when regenerated (see list of diagnostic species in Table 1). The use of diagnostic species is for situations in which the cover of Proteaceae species is reduced due to recent disturbance (e.g. fire).

The Location of the TEC is shown as east of Albany, with Emu Point on the boundary of the Southeast Coastal Floristic Province (Department of the Environment, 2014b). There is no indication of an occurrence of the TEC appearing at Emu Point however a formal assessment against the above key diagnostic criteria is required. Further on ground survey of AVRS vegetation unit - 14a - *Banksia coccinea* Shrubland is required to determine if the vegetation meets the requirements of the Proteaceae Dominated Kwongkan Shrublands TEC.

The Priority Ecological Community is based on an AVRS vegetation unit - 14a - *Banksia coccinea* Shrubland/*Eucalyptus staeri*/Sheoak Open Woodland which is localised within the Albany region and contains high species diversity. The key identifying features for the Priority Ecological Community are:

- Presence of *Banksia coccinea* tall shrub layer over a diverse heath dominated by *Melaleuca thymoides* and *Jacksonia spinosa*.
- An open upper tree layer including *Allocasuarina fraseriana* and/or *Eucalyptus staeri, Banksia attenuata* and *B. ilicifolia*.
- Occurs on deep white sand on lower slopes and valleys.

The ecological community is highly susceptible to *Phytophthora* dieback that results in the loss of *Banksia* species, as well as *Jacksonia* and many other heathland species (Mattiske & Barrett, 2005). *B. coccinea* is listed as highly susceptible, being frequently and easily killed in the wild following infection, with *J. spinosa* listed as having low susceptibility, being rarely but occasionally found dead on infested sites (O'Gara, 2005). The northern portion of the ecological community, within the Unallocated Crown Lots 44 and 56 to 58, contain few *B. coccinea* species which could be attributable to dieback (Figure 25).

Condition thresholds are included within the Conservation Advice to ensure national listing includes patches of the ecological community that are most functional, relatively natural and in relatively good condition (Department of the Environment, 2014). The Conservation Advice identifies patches over 1 ha, with less than 30% weeds and no known dieback infestations as High.

There is approximately 15 ha of *Banksia coccinea* Shrubland/*Eucalyptus staeri*/Sheoak Open Woodland within the DBCA database (DBCA, 2024b), however recent clearing of vegetation in the area adjacent to the sports oval results in a reduction in area, and a slight boundary change in the Unallocated Crown Lots after mapping the *Banksia coccinea,* results in approximately 8.1 ha present within the Study Area (Figure 25). This includes 3.4 ha next to the sports oval, 1.9 ha within Unallocated Crown Lots 53 & 54 and 2.8 ha within Unallocated Crown Lots 44 and 56 to 58.

Banksia coccinea Shrubland/*Eucalyptus staeri*/Sheoak Open Woodland is fragmented within the Study area and further investigation is required to adequately determine if the community meets the key diagnostic characteristics for the TEC listing. Regardless, protection of the vegetation as a Priority 1 ecological community should be prioritised with an indicative 50 m included in Figure 25 to support ecological function. Note 50 m has been used as a guide as per EPA Guidance Statement 33 recommends minimum 50 m development setback for estuaries and minimum 30 m foreshore reserve to maintain wetland values and mitigate impacts from adjacent land uses. As this ecosystem could be hydrologically dependent, a 50 m buffer has been provided as a guide.

2.4.5.2 *Coastal Saltmarsh* (Vulnerable / Priority 3)

The Subtropical and Temperate Coastal Saltmarsh (Coastal Saltmarsh) TEC is listed as Vulnerable under the EPBC Act and Priority 3 under the BC Act, occurs within the Study Area, within areas zoned for environmental conservation. This TEC did not occur within the Survey Area.

The TEC is a relatively narrow margin of the Australian coastline spanning across six States, located south of the 26° latitude in Western Australian (Dept of Sustainability, Environment, Water, Population and Communities, 2013). The TEC occurs on sandy or muddy substrate consisting of dense to patchy areas of coastal saltmarsh plant species (herbs, sedges, rushes, succulent shrubs, and grasses) that are salt tolerant with less than 50% tree canopy or seagrasses. Species diversity is high in the southwest of Western Australian

TEC occurrence, with the area being an important region globally for high diversity and endemism of several flora groups.

A key characteristic of the TEC is the tidal interaction that occurs either regularly or intermittently, with the TEC occurring in the intertidal zone (Dept of Sustainability, Environment, Water, Population and Communities, 2013). Due to the tidal interaction, the TEC has a strong link to climate, with summer creating dry hypersaline areas and the salinity decreasing after high rainfall in winter. A risk to the TEC is sea level rise, which will result in the saltmarshes being 'squeezed' into a narrower area, between the ocean and area of human habitation.

Another risk to the TEC is eutrophication from agriculture derived nitrogen run off. With increased nitrogen in the TEC changing the species composition with non-saltmarsh species and potentially causing algae growth, resulting in overall decline in vegetation condition. The protection of fringing and buffer vegetation, that intercept the majority of the nutrient load from the surrounding area, is vital for the protection of this TEC.

Other risks to the TEC, which may be present within the Study Area, includes acid sulphate soils, vehicle access (with human access noted as an issue by the City of Albany), litter and invasive species. These risks need to be monitored and managed, if it is determined to be impacting the condition of the TEC.

The area of Coastal Saltmarsh within the Study Area is approximately 31.4 ha, which includes the vegetation units of 66 – *Juncus kraussii* sedgeland and 67 – Coastal Saltmarsh. Vegetation unit 65 - *Melaleuca cuticularis* Low Forest occurs adjacent to the TEC, on the landward fringe (ARVS, 2010). The TEC is located in the eastern portion of the Study Area, adjacent to Oyster Harbour (Miaritch) (Figure 25). The western extent is currently mapped to the lot boundary of 236 Wright Street, Collingwood Park. It is likely the waterway adjacent to the TEC, informally named Lake Seppings Drain located within a road reserve, which is a narrow link between the environmental conservation lots to the west, plays an important role in the water movement through this TEC, to Lake Seppings (Tjuirtgellong). It is recommended to retain the vegetation within this road reserve and drain. Any development in this area is to have waterway setbacks to protect the TEC vegetation.

Protection of the areas of 65 - *Melaleuca cuticularis* Low Forest, which are currently in Rural zoning and in proximity to the Coastal Saltmarsh as a buffer, should be prioritised, to protect against sea level rise, nutrient loads and other impacts as recommended in the TEC Conservation Advice. While vegetation within the buffer of a TEC is not formally part of the TEC, impacts to this vegetation need to be taken into account when considering likely 'significant impacts' during any EPBC Act referral for clearing of this vegetation.

2.4.5.3 *Astartea scoparia Swamp Thicket* (Priority 1)

Astartea scoparia Swamp Thicket is a vegetation unit, 56, identified in the Albany Regional Vegetation Survey within the Study Area in 10 different patches (Sandiford & Barret, 2010). The vegetation unit is

confined to the Albany region and listed under the BC Act as Priority 1, a poorly known ecological community that is within a restricted distribution.

The *Astartea scoparia* Swamp Thickets are relatively small, seasonally inundated sumplands dominated by *Astartea scoparia*, and contains low diversity and cover of other species (Sandiford & Barret, 2010). Patches within the Study Area are between 0.3 ha and 1.2 ha in size, with a total area of 5.9 ha. The adjacent vegetation is either 56 - *Taxandria juniperina* Closed Forest or 46 - *Evandra aristata* Sedgeland.

Eight of the occurrences are located in lots zoned Environmental Conservation, which were outside the Survey Area. One occurrence is located in an area zoned recreational (adjacent to the sports oval) and one occurrence is within an Unallocated Crown Land lot 64, zoned rural, considered in Very Good to Excellent Condition, respectively. There is one additional occurrence that is included in the DBCA database, but is no longer present, recorded at 253 Collingwood Road, Collingwood Heights, which was 0.2 ha in size.

Threats to this ecological community include fragmentation, altered fire regimes, hydrological change, weed invasion, dieback disease (DBCA, 2023)

Protection of the two occurrences in the Unallocated Crown Lot and Recreation zone should be prioritised given the restricted nature of this ecological community. Protection of a buffer area is also recommended to ensure hydrological changes do not occur; an indicative buffer of 50 m is provided in Figure 25. Note 50 m has been used as a guide as per EPA Guidance Statement 33 recommends minimum 50 m development setback for estuaries and minimum 30 m foreshore reserve buffer to maintain wetland values and mitigate impacts from adjacent land uses. As this ecosystem is hydrologically dependent and includes Oyster Harbour, a nationally significant wetland, an indicative 50 m buffer has been provided.



Figure 25 TECs and PECs within the Emu Point Precinct Structure Plan

2.4.6 Ecological Linkages

Ecological Linkages are defined as "a series of (both contiguous and non-contiguous) patches of vegetation which act as stepping stones of habitat, which facilitate the maintenance of ecological processes and the movement of organisms within, and across, a landscape" (Molloy *et al*., 2009b). The purpose of ecological linkages is to protect and enhance remnant vegetation to provide opportunity for the movement of flora and fauna across the landscape. Ecological connectivity increases the long-term viability of ecosystems.

The Study Area is outside of the area mapped as part of the South West Ecological Linkages Technical Report (Molloy *et al.*, 2009). The City of Albany commissioned a Greenways report to identify existing and potential vegetation links across the City, to incorporate into the Local Planning Strategy and Scheme (ATA Environmental, 2002), labelled as Ecological Link A in Figure 26. This report identified an ecological corridor through Emu Point which connects vegetation in the northeast, through the Environmental Conservation lots in centre the Study Area, and connecting to vegetation in the southwest, providing a link to vegetation within the Albany Townsite (Figure 26).

The ecological corridor recommended by ATA Environmental (2000), is predominately in place with majority of the lots zoned for Environmental Conservation, particularly within the centre which are waterways and contain substantial areas of remnant vegetation. There are a few lots along this ecological corridor that are cleared of native vegetation and are zoned Rural, specifically 212, 220 and 228 Wright Street, Collingwood Park. Revegetation within these areas would greatly improve the corridor link.

204 Wright Street contains a small pocket of remnant vegetation, and it was noted that further recent clearing has occurred. 236 Wright Street is also a rural lot that contains remnant vegetation. Protection of the vegetation in these two lots will ensure this vegetation is maintained to support the ecological corridor.

There is a waterway, within a road reserve, which provides a narrow link along the ecological corridor, to the south of the above-mentioned rural lots, providing some linkage. This area is considered narrow and vulnerable to degradation along edges. This area should be prioritised for management and weed control to ensure the narrow corridor is maintained.

Rural lots 245, 239 & 271 Emu Point Drive include remnant vegetation along this ecological corridor. While there is environmental conservation lots to the north supporting the ecological link, protection of the vegetation within these lots while ensure the hydrological flow is protected, as these lots contain 65- Coastal *Melaleuca cuticularis* Low Forest, which is vegetation surrounding the Coastal Saltmarsh TEC.

An additional ecological link that could be considered is one across Emu Point Drive, connecting habitat within the Environmental Conservation lots from the northeast, through the Study Area and along the foreshore reserves, labelled Ecological Link B in Figure 26. Opportunities to enhance this link across Emu

Point Drive should be considered, including road crossings for turtles and other ground dwelling fauna. Western Ringtail Possums and Turtles are further discussed in Section 3.

Ecological Link C is proposed for consideration, connecting Ecological Link A with remnant vegetation northwest of the Study Area. This link passes through lots zoned Rural, which includes Unallocated Crown Land lots and one freehold lot, which again connects to the Environmental Conservation lots within the centre of the Study Area. Protection of remnant vegetation along this ecological link, in the Unallocated Crown lots and the Freehold lot, should be considered. Opportunities to enhance this link across Lower King Road and Brewster Road could be considered.

Ecological Link D is also proposed along Yakamia Creek, providing a link along the north of the Study Area to support terrestrial and aquatic species. Lot 102, northeast of Buffalo Road and 14 Harbour Road, Bayonet Head includes a portion of Yakamia Creek within the Study Area. Identifying Yakamia Creek as an ecological linkage is recommended as it is a major waterway and has a direct tributary to a major waterway (Oyster Harbour, Miaritch). Vegetation within this area is currently classified as Degraded and revegetation would be required to establish native aquatic species along the creek, as well as further overstorey species.

Continued movement of organisms is required to allow them to forage, migrate and disperse to locate essential habitat resources. Populations may be compromised if movement does not allow the maintenance of genetic diversity, with this being a known threat to Western Ringtail Possums and other species. Connectivity is an important part of long-term ecological resistance, with the maintenance of ecological linkages a priority in conservation strategies. It is highly recommended that the vegetation along these proposed linkages is protected and enhanced with appropriate rehabilitation, prioritising areas in better condition, to facilitate ecological connectivity and provide opportunities for restoration.

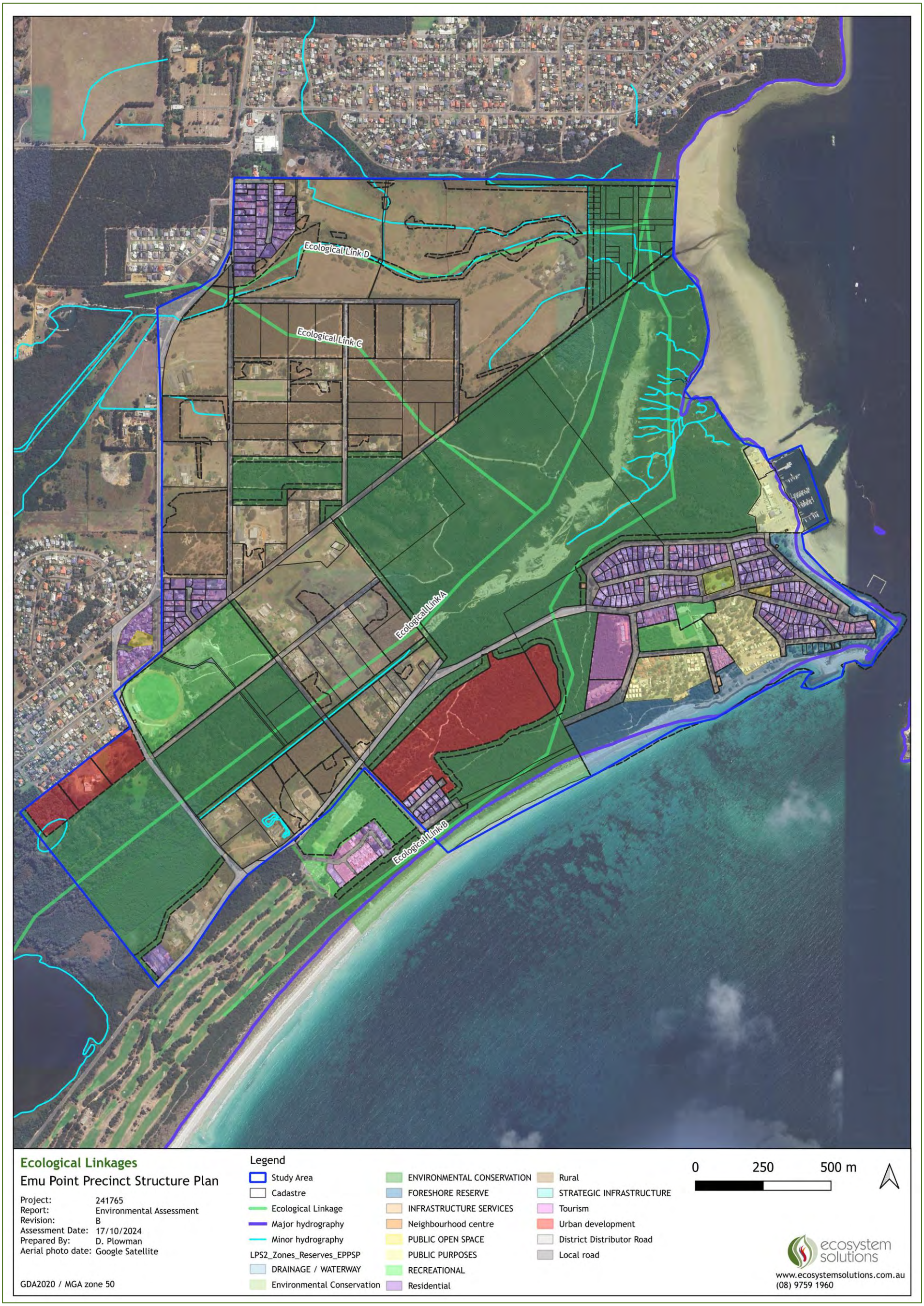


Figure 26 Proposed Ecological Linkages within the Emu Point Precinct Structure Plan

Fauna

2.5 Desktop Analysis

Extracts from the following databases have been obtained, using a 10 km buffer, to determine if records of any conservation listed fauna species or fauna assemblages are known within the boundary or surrounding the Study Area:

- Interim NatureMap database showing listed species under the BC Act managed by Department of Biodiversity, Conservation and Attractions (DBCA, 2024a), provided in Appendix A.
- Protected Matters Search Tool (PMST) showing species listed under the EPBC Act managed by Department of Climate Change, Energy, the Environment and Water (DCCEEW), provided in Appendix B.
- Department Biodiversity, Conservation and Attractions Threatened and Priority Fauna database search providing to ascertain if there are any records of threatened or priority fauna within a locality (DBCA, 2024d, 10km buffer). Specific locality information for threatened fauna is regarded as confidential therefore has not be provided in this report.

The conservation status of fauna within WA is determined by two acts of legislation, the EPBC Act and the BC Act. The conservation codes for fauna under the BC Act are presented in Appendix C. These categories are consistent with the International Union for Conservation of Nature (IUCN) classifications and link into a global ranking system for taxa at risk of extinction. Appendix C presents the definitions for conservation status under the *BC Act* 2016, which was previously the *Wildlife Conservation Act 1950*, and *EPBC Act 1999.*

Marine mammals and reptiles have been included due to the location of the Study Area with records of sea turtles and the sea lion within close proximity to the Study Area, however it is highly unlikely they are relying on the Study Area and any observations are rare. Invertebrates have also been excluded as this is a specialist area not covered under the Scope of this report. However, species specifically known to occur in the area have been included in the below table.

The database search results have been summarised in Table 12, with species listed as only Migratory (MI) in a separate table (Table 13). The NatureMap Database identified 30 Threatened (T) species, which are rare or are likely to become extinct, 11 Priority (P) listed species, one Conservation Dependent (CD) species, one other specifically protected (OS) species and 37 specifically protected - Migratory (MI) species within a 10 km radius of the Study Area (Table 13). The Protected Matters Search Tool identified 45 Threatened (T) species, within a 10 km radius of the Study Area. Three of which is are Critically Endangered (CR) species, 15 Endangered (EN) species and 27 Vulnerable (VU) species (Table 12). From the DBCA Threatened and Priority Fauna database search there are 14 Threatened (T) and 67 Priority species recorded within a 10 km

radius of the Survey Area (DBCA, 2024d). The likelihood of the species occurring within the Study Area is determined based on known distribution, last known records and the habitat expected within the Survey or buffer area.

A total of 18 bird species that only have Migratory conservation status are listed in Table 13 with observations for eight of these species within the Study Area (DBCA, 2024d). Observations of the following conservation significant species have occurred within the Study Area and are further discussed in Table 12:

- Western Ringtail Possum – Critically Endangered
- Baudin's Cockatoo - Endangered
- Carnaby's Cockatoo - Endangered
- Common Greenshank – Endangered & Migratory
- Red-Tailed Tropicbird – Endangered / Priority 4 & Migratory
- Ruddy Turnstone – Vulnerable & Migratory
- Sharp-Tailed Sandpiper – Vulnerable & Migratory
- Red Knot – Vulnerable & Migratory
- Great Knot - Vulnerable & Migratory
- Greater Sandplover - Vulnerable & Migratory
- Grey Plover - Vulnerable & Migratory
- Quenda – Priority 4
- Blue-billed Duck - Priority 4
- Brown Skua - Priority 4

A number of other conservation significant species are likely to frequent the Study Area due to the suitable habitat and significance of the wetlands and coastal saltmarsh that supports a range of species.

Table 12 Conservation significant fauna species recorded within 10 km of the Study Area

Species	Common Name	Conservation Status*	Habitat	Likelihood of occurrence within the Study Area	Data Source
Pezoporus flaviventris	Western Ground Parrot	T/CR	Low, dry, or swampy near-coastal heathland, remained unburnt for long periods of time.	Unlikely due to the fragmented suitable habitat.	Naturemap, DBCA
Potorous gilbertii	Gilbert's Potoroo	T/CR	Dense, long unburnt shrubland.	Unlikely due to the fragmented suitable habitat.	Naturemap, DBCA
Pseudocheirus occidentalis	Western Ringtail Possum	T/CR	Coastal Areas of peppermint woodland and peppermint woodland and peppermint / tuart associations.	33 records within the Survey Area from 1990-2021 (DBCA).	PMST, Naturemap, DBCA
Calidris ferruginea	Curlew Sandpiper	T/CR & MI	Marine. Intertidal mudflats in sheltered coastal areas, such as estuaries, bays, inlets and lagoons, and around non-tidal swamps, lakes and lagoons near the coast, and ponds in saltworks and sewage farms. They are also recorded inland, though less often, including around ephemeral and permanent lakes, dams, waterholes and bore drains, usually with bare edges of mud or sand. They occur in both fresh and brackish waters. Occasionally they are recorded around floodwaters. around the coasts and are also quite widespread inland, though in smaller numbers. In WA they are concentrated from Cape Arid to south-west Kimberley Division but are more sparsely distributed between Carnarvon and Dampier Archipelago.	Potential within the Coastal Saltmarsh.	PMST, Naturemap, DBCA
Numenius madagascariensis	Eastern Curlew	T/CR & MI	Marine. Sheltered coasts, especially estuaries, bays, harbours, inlets, and coastal lagoons, with large intertidal mudflats or sandflats, often with beds of seagrass. In Australia in August to feed on crabs and molluscs in intertidal mudflats. Barrow Island and Dampier Archipelago, Western Australia, through the Kimberley.	Potential within the Coastal Saltmarsh.	PMST, Naturemap, DBCA

Species	Common Name	Conservation Status*	Habitat	Likelihood of occurrence within the Study Area	Data Source
Atrichornis clamosus	Noisy Scrub-Bird	T/EN	Dense vegetation, including low forest, scrub/thicket and (rarely) heath. These vegetation formations generally occur in the gullies and drainage lines of hills and granite mountains and, in lowland areas, in overgrown swamps, lake margins and beside streams. Unburnt understorey vegetation of low forest, scrub thicket and occasionally heath that occur in gullies, drainage lines and lowland areas. Dense clumps of sedges and shrubs, and small, open areas with a thick accumulation of leaf litter.	Unlikely due to the fragmented suitable habitat.	Naturemap, DBCA
Botaurus poiciloptilus	Australasian Bittern	T/EN	Wetlands with tall, dense vegetation, favours permanent and seasonal freshwater habitats, dominated by sedges rushes and reeds, growing over a muggy or peaty substrate.	Potential to frequent the Study Area with Lake Seppings (Tjuirtgellong) containing suitable habitat.	PMST, Naturemap, DBCA
Dasyornis longirostris	Western Bristlebird	T/EN	Restricted to floristically diverse low dense coastal heathland, comprising a diverse variety of shrubs such as banksias, paperbarks, hakeas, Lambertia spp., Dryandra spp., Adenanthos spp., Leptospermum spp., Daviesia reversifolia and Dwarf Sheoak (Allocasuarina humilis). Their habitat usually has abundant sedges and, sometimes, thickets of stunted eucalypts, especially Mallee eucalypts. Jarrah (Eucalyptus marginata) and Marri (E. calophylla). They also occur on Grass Tree (Xanthorrhoea spp.) flats with dense heathland that is about 1 m tall, and abundant Sword-sedges (Anarthria spp.). Typically, long unburnt.	Potential to occur however suitable habitat is fragmented.	PMST, Naturemap, DBCA
Limosa lapponica menzbieri	Northern Siberian Bar-Tailed Godwit	T/EN	Mainly in coastal habitats such as large intertidal sandflats, banks, mudflats, estuaries, inlets, harbours, coastal lagoons, and bays. Widespread around the coast, from Eyre to Derby.	Potential to frequent the Coastal Saltmarsh.	PMST

Species	Common Name	Conservation Status*	Habitat	Likelihood of occurrence within the Study Area	Data Source
Parantechinus apicalis	Dibbler	T/EN	Long unburnt (10 years or more) dense heathland, typified by sandy substrates and occasionally lateritic soils and leaf litter. Restricted to the coastline near Jurien on three small offshore islands and a small number of widely scattered mainland sites.	Potential due to the fragmented suitable habitat.	PMST, Naturemap, DBCA
Psophodes nigrogularis nigrogularis	Western Whipbird	T/EN	Heath-like thicket associations, 2-3m high of varied floristic composition, on coastal dunes and in low, dense mallee woodland or shrubland with understorey of dense, stunted shrubs.	Potential to occur however suitable habitat is fragmented.	PMST, Naturemap, DBCA
Zanda baudinii listed as *Calyptorhynchus baudinii*	Baudin's Cockatoo	T/EN	Dense Jarrah, Karri, and Marri forests. Species nest in large hollows in these species.	Four records of *Zanda* sp. 'white-tailed black cockatoo' within the Survey Area from 1978-2008 (DBCA).	PMST, Naturemap, DBCA
Zanda latirostris listed as *Calyptorhynchus latirostris*	Carnaby's Cockatoo	T/EN	Dense Jarrah, Karri, and Marri forests. Species nest in large hollows in these species.	21 records within Survey Area from 1998-2012 (DBCA). Four records of *Zanda* sp. 'white-tailed black cockatoo' within the Survey Area from 1978-2008 (DBCA).	PMST, Naturemap, DBCA
Balaenoptera musculus	Blue whale	T/EN & MI	Marine waters, species known core range known to occur off Albany.	Unlikely. Requires open water off the coast.	PMST, Naturemap, DBCA
Balaenoptera musculus brevicauda	Pygmy blue whale	T/EN & MI	Marine. Coastal littoral and estuarine environments.	Unlikely. Requires open water off the coast.	Naturemap, DBCA
Eubalaena australis	Southern Right Whale	T/EN & MI	Marine waters with breeding and aggregation known to occur off Albany.	Unlikely. Requires open water off the coast.	PMST, Naturemap, DBCA
Caretta caretta	Loggerhead turtle	T/EN & MI		Potential to frequent the southern coastal boundary.	PMST, Naturemap, DBCA

Species	Common Name	Conservation Status*	Habitat	Likelihood of occurrence within the Study Area	Data Source
Charadrius mongolus	Lesser Sand Plover, Mongolian Plover	T/EN & MI	Marine. Coastal littoral and estuarine environments. It inhabits large intertidal sandflats or mudflats in sheltered bays, harbours, and estuaries.	Potential to frequent the Coastal Saltmarsh.	PMST, Naturemap, DBCA
Dermochelys coriacea	Leatherback turtle	T/EN & MI	Temperate waters, rarely close to shore often migrates to breed in tropical areas.	Unlikely.	PMST, Naturemap, DBCA
Diomedea dabbenena	Tristan Albatross	T/EN & MI	Marine, pelagic, forages in open water in the Atlantic Ocean near the Cape of Good Hope, South Africa. It sleeps and rests on ocean waters when not breeding.	Potential to occur in marine waters in proximity to Study Area and frequent the coastal shore.	PMST
Diomedea sanfordi	Northern Royal Albatross	T/EN & MI	Marine, pelagic and aerial. Its habitat includes subantarctic, subtropical, and occasionally Antarctic waters, surface temperature of the water is between 6–20 °C. Nests among vegetation on flat or gently sloping ground, on slopes, ridges, gullies, and plateaux of large islands, and on the summits of islet. Widely over the Southern Ocean.	Potential to occur in marine waters in proximity to Study Area and frequent the coastal shore.	PMST
Galaxias truttaceus	western trout minnow, western spotted galaxias	T/EN	Coastal drainages of southern Australia, known from three catchments in WA: Goodga River, Angove River and Kent River.	Potential within Oyster Harbour and its tributaries.	Naturemap
Limosa limosa	Black-Tailed Godwit	T/EN & MI	Marine. Primarily coastal habitat environment. Commonly in sheltered bays, estuaries and lagoons with large intertidal mudflats or sandflats, or spits and banks of mud, sand, or shell-grit; occasionally recorded on rocky coasts or coral islets. all states and territories of Australia, however, it prefers coastal regions, and the largest populations are found on the north coast between Darwin and Weipa.	Potential to frequent the Coastal Saltmarsh.	PMST, Naturemap, DBCA

Species	Common Name	Conservation Status*	Habitat	Likelihood of occurrence within the Study Area	Data Source
Macronectes giganteus	Southern Giant-Petrel	T/EN & MI	Marine. Breeds on six subantarctic and Antarctic islands in Australian territory; Macquarie Island, Heard Island and McDonald Island in the Southern Ocean, and Giganteus Island, Hawker Island, and Frazier Island in the Australian Antarctic Territories.	Potential to occur in marine waters in proximity to Study Area and frequent the coastal shore.	PMST, Naturemap, DBCA
Neophoca cinerea	Australian sea lion	T/EN	Breeds on at least 50 different islands off the coast of Western Australia and South Australia.	One record in 1998 from Oyster Harbour (DBCA).	PMST, Naturemap, DBCA
Thalassarche cauta	Shy Albatross	T/EN & MI	Marine. Nesting typically occurs on small islands scattered throughout the Southern Ocean. Breeding in Tasmania.	Unlikely due to unsuitable habitat.	PMST
Tringa nebularia	Common Greenshank	T/EN & MI	Marine. Does not breed in Australia, however, the species occurs in all types of inland wetlands and sheltered coastal habitats of varying salinity and has the widest distribution of any shorebird in Australia, occurs around most of the coast from Cape Arid in the south to Carnarvon in the north-west of WA.	17 records within the Survey Area from 1998-2018 (DBCA).	PMST, Naturemap, DBCA
Phaethon rubricauda	Red-Tailed Tropicbird	T/EN & MI or P4	Marine. Breeds in tropical and subtropical zones on volcanic and other islands, stacks, atolls, cays away from mainland areas. Nests in rugged terrain, on coastal cliffs and slopes but also on cays, at the base of trees with dense leaf canopy that reaches the ground, and coral atolls.	One record within the Survey Area from 2000 (DBCA).	PMST, Naturemap, DBCA
Aphelocephala leucopsis	Southern Whiteface	T/VU	Wide range of open woodlands and shrublands where there is an understorey of grasses or shrubs, or both. These areas are usually in habitats dominated by acacias or eucalypts on ranges, foothills and lowlands, and plains.	Unlikely due to unsuitable habitat.	PMST
Calyptorhynchus banksii naso	Forest Red-Tailed Black-Cockatoo	T/VU	Dense Jarrah, Karri, and Marri forests. Species nest in large hollows in these species.	Highly likely. There are no DBCA records within the Study Area however there are 42 observations within 10 km (DBCA).	PMST, Naturemap, DBCA

Species	Common Name	Conservation Status*	Habitat	Likelihood of occurrence within the Study Area	Data Source
Cereopsis novaehollandiae grisea	Cape Barren Goose (South-Western)	T/VU	Marine. Offshore islands and rocks, and at adjacent sites on the mainland. It inhabits grasslands and low fields of succulent herbs.	Unlikely due to lack of suitable habitat.	PMST, Naturemap, DBCA
Chelonia mydas	Green turtle	T/VU	Occur in seaweed-rich coral reefs and inshore seagrass pastures in tropical and subtropical areas of the Indo-Pacific region.	Unlikely due to lack of suitable habitat.	PMST,
Dasyurus geoffroii	Chuditch, Western Quoll	T/VU	Variety, most dense in riparian jarrah forests. Require large, unfragmented habitats.	Potential within native vegetation however unlikely to rely on the Study Area as it is fragmented.	PMST, Naturemap, DBCA
Falco hypoleucos	Grey Falcon	T/VU	Areas where annual rainfall is less than 500 mm. Known to frequent timbered lowland plains and acacia shrublands crossed by tree lined water courses. Hunts in open areas, grassland, and open woodland.	Unlikely due to unsuitable habitat.	PMST
Halobaena caerulea	Blue Petrel	T/VU	Marine. Rock crevices or burrows dug among rocks or tussock grasses and forages in Antarctic and subantarctic waters. Breeding is restricted to offshore stacks near Macquarie Island.	Unlikely due to unsuitable habitat.	PMST
Leipoa ocellata	Malleefowl	T/VU	Semi-arid to arid shrublands and low woodlands dominated by mallee and/or acacia.	One DBCA record next to Lake Seppings (Tjuirtgellong) in 2000. Potential to occur within the Study Area however it does not contain suitable habitat.	Naturemap, DBCA
Macrotis lagotis	Bilby	T/VU	Open tussock grassland on uplands and hills, *Acacia aneura* (mulga) woodland/shrubland growing on ridges and rises, and hummock grassland in plains and alluvial areas.	Unlikely due to unsuitable habitat.	Naturemap, DBCA

Species	Common Name	Conservation Status*	Habitat	Likelihood of occurrence within the Study Area	Data Source
Pachyptila turtur subantarctica	Fairy Prion (Southern)	T/VU	Digs burrows among rocks or low vegetation in which to nest. Burrows may be dug below mat forming herbs. Feeds by plucking food from the ocean surface. Breeds on Macquarie Island and a number of other subantarctic islands outside of Australia.	Unlikely due to unsuitable habitat.	PMST
Pterodroma mollis	Soft-Plumaged Petrel	T/VU	Marine, oceanic over temperate and subantarctic waters in the South Atlantic, southern Indian and western South Pacific Oceans. Burrow among tussock grass and ferns on slopes and valleys.	Potential to occur in marine waters in proximity to Study Area and frequent the coastal shore.	PMST
Setonix brachyurus	Quokka	T/VU	Mainly dense riparian vegetation, other areas with dense vegetated understory with close proximity to freshwater	Unlikely due to fragmented suitable habitat.	Naturemap, DBCA
Sternula nereis nereis	Australian Fairy Tern	T/VU	Nests on sheltered sandy beaches, spits, and banks above the high tide line and below vegetation. Embayment of a variety of habitats including offshore, estuarine, or lacustrine (lake) islands, wetlands, and mainland coastline. The bird roosts on beaches at night.	Potential within the coastal zone of the Study Area.	PMST
Westralunio carteri	Carter's Freshwater Mussel	T/VU	Coastal freshwater rivers and lakes of the south-west region. Also occurs in water supply and farm dams. Prefers slower flowing waters where sediments stable. Species has low salinity tolerance.	Potential within Yakamia creek.	PMST, Naturemap, DBCA
Ardenna grisea	Sooty Shearwater	T/VU & MI	Marine. Sub-tropical, sub-Antarctic and Antarctic waters and islands. Nest in burrows or rock crevices on coastal slopes, ridges, and cliff tops, in herb fields, tussock grassland or forest.	Potential to occur in marine waters in proximity to Study Area and frequent the coastal shore.	PMST
Arenaria interpres	Ruddy Turnstone	T/VU & MI	Marine. Rocky shores or beaches where there are large deposits of rotting seaweed. widespread coastal areas within Australia during its non-breeding period of the year.	Two records within the Survey Area from 2002 and 2007 (DBCA).	PMST

Species	Common Name	Conservation Status*	Habitat	Likelihood of occurrence within the Study Area	Data Source
Calidris acuminata	Sharp-Tailed Sandpiper	T/VU & MI	Marine. Muddy edges of shallow fresh or brackish wetlands, with inundated or emergent sedges, grass, saltmarsh, or other low vegetation. non-breeding season in Australia, mostly to the south-east and are widespread in both inland and coastal locations and in both freshwater and saline habitats.	Two records within the Survey Area from 2002 and 2006 (DBCA).	PMST, Naturemap, DBCA
Calidris canutus	Red Knot, Knot	T/VU & MI	Marine. Intertidal mudflats, sandflats, and sandy beaches of sheltered coasts, in estuaries, bays, inlets, lagoons and harbours; sometimes on sandy ocean beaches or shallow pools on exposed wave-cut rock platforms or coral reefs. They are occasionally seen on terrestrial saline wetlands near the coast, such as lakes, lagoons, pools, and pans, and recorded on sewage ponds and saltworks, but rarely use freshwater swamps. Suitable habitats around the coast of Australia but is less numerous in south-west Australia than elsewhere.	Four records within the Survey Area from 2001-2008 (DBCA).	PMST, Naturemap, DBCA
Calidris tenuirostris	Great Knot	T/VU & MI	Sheltered coastal habitats, with large intertidal mudflats or sandflats. This includes inlets, bays, harbours, estuaries, and lagoons. They are occasionally found on exposed reefs or rock platforms, shorelines with mangrove vegetation, ponds in saltworks, at swamps near the coast, salt lakes and non-tidal lagoons. Open areas, often at the water's edge or in shallow water close to feeding grounds. Less common in south-west Australia, common on the coasts of the Pilbara and Kimberley, from the Dampier Archipelago to the Northern Territory border.	Seven records within the Survey Area from 2001-2012 (DBCA).	PMST, Naturemap, DBCA

Species	Common Name	Conservation Status*	Habitat	Likelihood of occurrence within the Study Area	Data Source
Charadrius leschenaultii	Greater Sand Plover, Large Sand Plover	T/VU & MI	Almost entirely coastal, inhabiting littoral and estuarine habitats. They mainly occur on sheltered sandy, shelly, or muddy beaches with large intertidal mudflats or sandbanks, as well as sandy estuarine lagoons and inshore reefs, rock platforms, small rocky islands, or sand cays on coral reefs. Occasionally occurs along the coast of southern Western Australia.	Six records within the Survey Area from 2000-2012 (DBCA).	PMST, Naturemap, DBCA
Diomedea antipodensis	Antipodean Albatross	T/VU & MI	Marine, pelagic and aerial. It sleeps and rests on ocean waters when not breeding. Nests in open patchy vegetation, such as among tussock grassland or shrubs on ridges, slopes, and plateaus.	Unlikely. Endemic to NZ and forages in open water off the coast of NSW.	PMST
Diomedea epomophora	Southern Royal Albatross	T/VU & MI	Marine. Australia is within the foraging range.	Potential to occur in marine waters in proximity to Study Area and frequent the coastal shore.	PMST
Diomedea exulans	Wandering Albatross	T/VU & MI	Marine, inshore, offshore and in pelagic waters and aerial, water surface temperatures range from -2° to 24°C. Breeds on Macquarie Island, feeds in Australian portions of the Southern Ocean.	Potential to occur in marine waters in proximity to Study Area and frequent the coastal shore.	PMST
Carcharias taurus	Grey nurse shark	T/VU	Grey nurse sharks have a broad inshore distribution, primarily in subtropical to cool temperate waters around Australia.	Unlikely due to unsuitable habitat.	PMST
Carcharodon carcharias	Great White Shark	T/VU	Throughout temperate and sub-tropical oceans.	Unlikely due to unsuitable habitat.	PMST

Species	Common Name	Conservation Status*	Habitat	Likelihood of occurrence within the Study Area	Data Source
Macronectes halli	Northern Giant Petrel	T/VU & MI	Marine and oceanic. It mainly occurs in sub-Antarctic waters but regularly occurs in Antarctic waters. continental shelves, slopes, and cold eastern boundary currents. Breeds in the sub-Antarctic, and visits areas off the Australian mainland mainly during the winter months (May-October). Immature and some adult birds are commonly seen during this period in offshore and inshore waters from around Fremantle (WA) to around Sydney (NSW).	Potential to occur in marine waters in proximity to Study Area and frequent the coastal shore.	PMST
Nannatherina balstoni	Balston's Pygmy Perch	T/VU	Slow-flowing, low salinity, acidic and tannin-stained waters, and complex instream habitat.	Potential.	PMST
Phoebetria fusca	Sooty Albatross	T/VU & MI	Marine and pelagic. Foraging in inshore waters in southern Australia, mostly in the autumn-winter months.	Potential to frequent the Coastal Saltmarsh.	PMST
Pluvialis squatarola	Grey Plover	T/VU & MI	Marine. Almost entirely in coastal areas, where they usually inhabit sheltered embayment's, estuaries and lagoons with mudflats and sandflats, and occasionally on rocky coasts with wave-cut platforms or reef-flats, or on reefs within muddy lagoons. They also occur around terrestrial wetlands. Recorded in all states, abundant on the western and southern coastlines, mainly between The Coorong and western beaches of the Eyre Peninsula in South Australia, and the coast of Western Australia between Albany and the northern Kimberley coast.	17 records within the Survey Area from 1980-2018 (DBCA).	PMST, Naturemap, DBCA
Physeter macrocephalus	Sperm whale	T/VU & MI	Foraging known to occur in marine waters off Albany.	Unlikely. Requires open water off the coast.	Naturemap, DBCA
Rhincodon typus	Whale Shark	T/VU	Tropical and warm temperate seas.	Unlikely. Requires open water off the coast.	PMST

Species	Common Name	Conservation Status*	Habitat	Likelihood of occurrence within the Study Area	Data Source
Thalassarche carteri	Indian Yellow-Nosed Albatross	T/VU & MI	Marine, subtropical and warmer subantarctic waters Forages mostly in the southern Indian Ocean. Nests on tussock-covered coastal cliffs and slopes, often in rocky situations.	Potential to occur in marine waters in proximity to Study Area and frequent the coastal shore.	PMST, Naturemap, DBCA
Thalassarche impavida	Campbell Albatross	T/VU & MI	Marine. Sub-Antarctic and subtropical waters from pelagic to shelf-break water habitats. Most seen foraging over the oceanic continental slopes off Tasmania, Victoria, and New South Wales.	Potential to occur in marine waters in proximity to Study Area and frequent the coastal shore.	PMST
Thalassarche melanophris	Black-Browed Albatross	T/VU & MI	Marine, Antarctic, subantarctic and temperate waters and occasionally enters the tropics. Breeds on subantarctic and peri-Antarctic islands, terraces of coastal cliffs, slopes of nearby hills, summits of rocky islets or on flat or gently sloping ground. Less common but observed on continental shelf break of southern and south-western Western Australia.	Potential to occur in marine waters in proximity to Study Area and frequent the coastal shore.	PMST, Naturemap, DBCA
Thalassarche steadi	White-Capped Albatross	T/VU & MI	Marine, subantarctic, and subtropical waters. Common off the coast of south-east Australia throughout the year.	Potential to occur in marine waters in proximity to Study Area and frequent the coastal shore.	PMST
Xenus cinereus	Terek Sandpiper	T/VU & MI	Marine. Forages in the open, on soft wet intertidal mudflats or in sheltered estuaries, embayment's, harbours, or lagoons. Roost in or among mangroves.	Potential within Coastal Saltmarsh.	PMST, Naturemap, DBCA
Ardenna carneipes	Flesh-Footed Shearwater	T/VU & MI	Marine. Subtropics over continental shelves and slopes and occasionally inshore waters. Breed on islands in burrows on sloping ground in coastal forest, scrubland, shrubland or grassland. Waters of the continental shelf and continental slope off southern Australia and breed on 41 islands off the coast of south-western Western Australia.	Two records within the Survey Area from 2014 and 2024 (DBCA).	Naturemap, DBCA

Species	Common Name	Conservation Status*	Habitat	Likelihood of occurrence within the Study Area	Data Source
Thalassarche chlororhynchos	Atlantic Yellow-Nosed Albatross	T/MI	Marine. Rarely seen in Australian waters.	Potential to occur in marine waters in proximity to Study Area and frequent the coastal shore.	Naturemap, DBCA
Puffinus huttoni	Hutton's Shearwater	T	Marine. Non-breeding season, birds migrate to waters off Australia, particularly southern, western, and north-western Australia.	Potential to occur in marine waters in proximity to Study Area and frequent the coastal shore.	Naturemap, DBCA
Elapognathus minor	Short-Nosed Snake	P2	Heath, swamps, and wet sclerophyll forest.	Potential within and in proximity to wetlands.	Naturemap, DBCA
Geotria australis	Pouched lamprey	P3	From many of the rivers of the south-west coast from Perth through to Albany.	Potential within and in proximity to wetlands.	Naturemap
Tyto novaehollandiae novaehollandiae	Masked Owl (Southwest)	P3	Tall forests, woodlands, timbered waterways, and open country on the fringe of these areas.	Potential within native vegetation within the Study Area.	Naturemap, DBCA
Hydromys chrysogaster	Water-Rat, Rakali	P4	Found Near permanent fresh or brackish waters, Areas of permanent fresh or brackish water, drainage swamps.	Records are within Lake Seppings (Tjuirtgellong) and potential Rakali would frequent wetlands in the Study Area as part of its home range.	Naturemap, DBCA
Isoodon fusciventer	Quenda, Southwestern Brown Bandicoot	P4	Forest, woodland, shrub and heath, usually in sandy soils with dense healthy vegetation in lower stratum.	Three records within the Survey Area from 1976, 1980, and 2014 (DBCA).	Naturemap, DBCA
Neophema petrophila	Rock Parrot	P4	Restricted to coastlines and offshore rocky islands, frequenting windswept coastal dunes, mangroves, saline swamps, and rocky islets.	Historical records of breeding at Green Island (Watami), within 1 km of the Study Area, within Oyster Harbour (Miaritch). Potential to be within the coastal area of the Study Area.	DBCA per coms

Species	Common Name	Conservation Status*	Habitat	Likelihood of occurrence within the Study Area	Data Source
Notamacropus irma	Western Brush Wallaby	P4	Favours open, seasonal damp areas with low grasses and open scrubby brush.	Unlikely due to the fragmented suitable habitat.	Naturemap, DBCA
Oxyura australis	Blue-Billed Duck	P4	Deep freshwater areas with dense vegetation.	Five records within Survey Area from 1978-2007 (DBCA).	Naturemap, DBCA
Stercorarius antarcticus lonnbergi	Brown Skua, Subantarctic Skua	P4	Marine. Subantarctic islands, with nests located from the coast up to several kilometres inland. They also nest on offshore islets. Over oceanic waters away from their nesting localities. Two populations within Australian jurisdiction only breed at two locations: Heard Island and Macquarie Island.	One record within Survey Area from 1978 (DBCA).	Naturemap, DBCA
Thinornis cucullatus	Hooded Plover, Hooded Dotterel	P4	Sandy beaches between Jervis Bay, New South Wales and the Eyre Peninsula, South Australia, Tasmania, Esperance, and is found as far north as Jurien Bay.	Potential within the coastal shore.	Naturemap, DBCA
Tringa brevipes	Grey-Tailed Tattler	P4/MI	Marine. Sheltered coasts with reefs and rock platforms or with intertidal mudflats. Primarily northern coastal distribution and is found in most coastal regions, few scattered records in WA.	Potential to occur within Coastal Saltmarsh.	Naturemap, DBCA
Phascogale tapoatafa wambenger	South-Western Brush-Tailed Phascogale	CD	Highly arboreal, prefers open forest with sparse groundcover.	Potential to occur in areas of native vegetation.	Naturemap, DBCA
Falco peregrinus	Peregrine Falcon	OS	Wide variety. Prefers coastal and inland cliffs or open woodlands near water.	Potential to occur within the Study Area.	Naturemap, DBCA
Arctocephalus forsteri	New Zealand fur seal, long-nosed fur seal	OS	Rocky coastlines and offshore islands.	Potential to occur within the Study Area.	Naturemap, DBCA
Caperea marginata	Pygmy right whale	MI	Unknown specific distribution within marine open water.	Unlikely. Requires open water off the coast.	Naturemap, DBCA
Megaptera novaeangliae	Humpback whale	CD & MI	Migration known to occur in marine waters off Albany.	Unlikely. Requires open water off the coast.	Naturemap, DBCA

Species	Common Name	Conservation Status*	Habitat	Likelihood of occurrence within the Study Area	Data Source
Galeorhinus galeus	School Shark	CD	Marine waters off the coast of southern Australia.	Unlikely. Requires open water off the coast.	PMST
Orcinus orca	Killer whale	MI	Marine waters off the coast of southern Australia.	Unlikely. Requires open water off the coast.	Naturemap, DBCA

Highlighted cells indicate DBCA records have confirmed species observation within the Study Area.

*BC Act: T = Threatened, P = Priority; CD = Conservation Dependent / EPBC Act: CR = Critically Endangered, EN= Endangered, VU = Vulnerable, MI = Migratory

Table 13 Migratory (MI) Bird Species recorded within 10 km of the Study Area

Taxon	Common Name	Source
Actitis hypoleucos	Common Sandpiper	Naturemap, DBCA
Apus pacificus	Fork-Tailed Swift	Naturemap, DBCA
Ardenna tenuirostris	Short-Tailed Shearwater	Naturemap, DBCA
Calidris alba	Sanderling	Naturemap, DBCA
Calidris pugnax	Ruff	Naturemap, DBCA
Calidris ruficollis	Red-Necked Stint	Naturemap, DBCA
Calidris subminuta	Long-Toed Stint	Naturemap, DBCA
Hydroprogne caspia	Caspian Tern	Naturemap, DBCA
Limosa lapponica	Bar-Tailed Godwit	Naturemap, DBCA
Numenius phaeopus	Whimbrel	Naturemap, DBCA
Oceanites oceanicus	Wilson's Storm-Petrel	Naturemap, DBCA
Pandion haliaetus	Osprey	Naturemap, DBCA
Pluvialis fulva	Pacific Golden Plover	Naturemap, DBCA
Stercorarius parasiticus	Arctic Jaeger, Arctic Skua	Naturemap, DBCA
Sterna dougallii	Roseate Tern	Naturemap, DBCA
Thalasseus bergii	Crested Tern	Naturemap, DBCA
Tringa glareola	Wood Sandpiper	Naturemap, DBCA
Tringa stagnatilis	Marsh Sandpiper	Naturemap, DBCA

Highlighted cells indicate DBCA records have confirmed species observation within the Study Area.

2.6 Survey Method

Ecosystem Solutions conducted a basic terrestrial fauna survey, consistent with the EPA's Technical Guidance: Terrestrial Fauna Surveys (2020). This method specifies a minimum requirement of a desktop study to gather information on the subject site and a reconnaissance survey to verify the accuracy of the background study and delineate fauna and faunal assemblages.

This survey has minimal impact on the fauna within the property and provides sufficient data on the presence and relative abundance and distribution of taxa. During the field surveys, the habitat within the Survey Area was assessed to determine its potential suitability to host any of the anticipated threatened or rare species.

The survey method included the following:

- Direct and secondary fauna observations were recorded using a Global Positioning System (GPS). Field observations were analysed and mapped with QGis (V3.38.0©).

- The field surveys recorded the presence of flora known to be foraging species for Western Ringtail Possums and Black Cockatoos, with an assessment of area and quality of vegetation. Actual foraging evidence observed or any other secondary signs of fauna (e.g., scats, diggings, dreys, nests, burrows, feeding signs) were noted.
- The surveys were conducted with the Development Planning Guidelines for Western Ringtail Possums (CALM 2003, now DBCA) and the referral guidelines for the three threatened Black Cockatoo species (Department of Agriculture, Water and The Environment, 2022) in mind. The surveys however do not meet the requirements for the appropriate level of surveys for these species due to the broad scale nature of this assessment, and additional site-based surveys will be required in areas of remnant vegetation likely to be impacted by development.

2.7 Results and Discussion

The Survey Area was assessed for terrestrial fauna from 26 to 29 November 2024 and 15 to 16 January 2025 by staff members from Ecosystem Solutions (Table 1). Migratory and wetland species were not included in the scope of this report. There were five conservation significant fauna species recorded during the field survey, through direct observation or secondary evidence:

- *Pseudocheirus occidentalis* (Western Ringtail Possum, Critically Endangered)
- *Calyptorhynchus/Zanda baudinii* (Baudin's Cockatoo, Endangered)
- *Calyptorhynchus/Zanda latirostris* (Carnaby's Black Cockatoos, Endangered)
- *Calyptorhynchus banksii* subsp. *naso* (Forest Red-tailed Black Cockatoo, Vulnerable)
- *Isoodon fusciventer* (Quenda, Priority 4)

Further conservation significant species may occur within the Study Area with any development proposed required to undertake specific surveys to identify and manage impacts to conservation significant fauna species.

2.7.1 *Pseudocheirus occidentalis* (Western Ringtail Possum, CR)

The Western Ringtail Possum (WRP) is a Threatened species listed as Critically Endangered under the EPBC Act and BC Act. The Study Area is located within the known distribution for WRP, as shown by the Western Ringtail Possum (*Pseudocheirus occidentalis*) Recovery Plan (Department of Parks and Wildlife, 2017), with a patchy occurrence along the south coast that includes Albany. There are urban and peri-urban areas in Albany that have local government reserves with significant habitat where WRP are frequently seen (Department of Parks and Wildlife, 2017). DBCA Threatened and Priority Fauna database has 1,360 WRP records within 10 km of the Study Area, from 1964 to 2024 (DBCA, 2024d). There are an additional 33 recorded WRP observations from within the Study Area (CoA, 2024).

The Study Area is within the South Coast Management Zone of the three key management zones for Western Ringtail Possums (Department of Parks and Wildlife, 2017). This management zone has a diverse range of habitats, and advice from DCCEEW is that all remnant vegetation that WRP reside in is considered critical habitat (pers comm., Nature Positive Regulation Division, DCCEEW, 13 August 2024). Even though the Study Area is not on the Swan Coastal Plain, the Significant Impact Guidelines for the species can still be used to guide development decisions and the Study Area can be considered supporting habitat (Area 3) (Department of the Environment, Water, Heritage, and the Arts, 2009).

Clearing of WRP habitat should be avoided, with even small areas (<0.5 ha) likely to be considered a significant impact. The cumulative impact also needs to be considered during the approvals process, to

avoid 'chipping away' at the remaining habitat within the Study Area with applications on different lots or at different times. The preservation and enhancement of ecological linkages is essential to the long-term survival of this species, without these there is increased risk of the collapse of local populations and genetic isolation. There are other opportunities to support WRP during the development process, including the installation of rope bridges (more suitable across narrow roads), WRP friendly landscaping and the exclusion of domestic pets via fencing or local planning laws. For any clearing of habitat that is approved, offset requirements are likely to be substantial, particularly due to the Critically Endangered status of this species (pers comm., Nature Positive Regulation Division, DCCEEW, 13 August 2024).

There were 27 WRPs dreys observed within the Survey Area, and an additional 2 observations of scats (Figure 27). The observations were recorded in a range of vegetation communities, including 2- Peppermint Low Forest, 4- Coastal B*anksia ilicifolia*/Peppermint Low Woodland, 59 - *Taxandria juniperina* Closed Forest, degraded areas on the edges of remnant vegetation where weeds provided high protection and degraded areas of 52 – *Melaleuca cuticularis*/*M. preissiana* Open Woodland again where canopy connection is present with often weed species.

An assessment of suitable WRP habitat has been made based on the vegetation communities within the Study Area based on the presence of foraging species and protection provided by canopy connection (Table 14, Figure 27). WRP predominately forage on the leaves of myrtaceous plants, including native species being Peppermint, Marri, Jarrah and Melaleuca, exotic species, and a range of shrub species (Department of Parks and Wildlife, 2014). Habitat includes native remnant vegetation and extends into the urban interface and backyards/gardens. Any clearing of habitat (native and exotic species) should occur with a DBCA approved fauna spotter to minimise the impact on the species.

An assessment of native vegetation and habitat suitability for Western Ringtail Possums is included in Table 14 and Figure 28. Within the Study Area, majority of the vegetation units (12) provide high habitat value due to foraging species and high canopy connection There were four vegetation units that are considered moderate habitat value, based on the more limited canopy connection. All existing and any future connections across and surrounding this habitat will be very important to support the population. A total four vegetation units are considered to offer low habitat value for WRPs based on no canopy cover and no foraging species. Degraded areas that offer canopy connection are considered moderate habitat suitability, which includes within urban gardens and vegetation along Yakamia Creek, not mapped in Figure 28. Figure 28 depicts vegetation outside the Survey Area and therefore should be considered an indication only.

It is important to note that any connection of remnant vegetation is important to support the movement of fauna through their home range. It is recommended that areas of remnant vegetation that provide suitable habitat for WRP are prioritised for protection.

Previous survey results:

Lots 3000 (Formerly Lot 1512) and 1523 Emu Point Drive, Albany contains four habitat types as identified from ATA environmental fauna habitat assessment and WRP survey and the vegetation was considered mostly in excellent condition with a small patch of very good condition vegetation (2006).

- AfT Closed Peppermint (Agonis flexuosa) Thicket over Sedgeland
- AfH Open Peppermint (Agonis flexuosa)/ Banksia attenuata Woodland over Adenanthos sp./ Spyridium globulosum Shrubland over Closed Heathland
- AfW Open Sheoak (Allocasuarina fraseriana)/ Banksia attenuata Woodland with occasional Peppermints (Agonis flexuosa) over Open Heathland
- OH Open Heathland and Grassland

Lots 3000 & 1523 Emu Point Drive, Albany from a vegetation survey conducted by Hickman in 2005 said "Given the nature of the vegetation the Western Ringtail Possum (*Pseudocheirus occidentalis*) is a potential inhabitant of the area."

Green Iguana (2007) Survey for the Western Ringtail Possum *Pseudocheirus occidentalis* within part of Lots 3000 and 1523, Emu Point Drive, Albany, Western Australia.

- total of 92 WRP dreys were recorded, of which 78 (85%) were considered to be possibly active, whilst another 14 (15%) dreys were obviously old and disused (in various stages of falling apart). Dreys were distributed across most of the Study Area
- seven WRP during the day, and eight WRP observed during the first night-time and eight during the second night-time survey.

Possum Monitoring conducted around in the City of Albany, with four transects completed in Summer 2018 and Autumn 2019 in the Albany Golf Course, the length of Griffiths Street to Surfers (end of Flinders Parade) and Griffiths Street, and around Lake Seppings (Tjuirtgellong) (2019). With 79 possums in total observed over the two periods.

Fauna impact assessment (Gilfillan, 2021) Emu Beach Holiday Park, 8 Medcalf Pde, Albany

- Two WRPs were spotlighted, however this was possibly the same individual. One possible drey was observed within Area 1 in thick vines (*Senecio angulate*) that cover some of the Peppermint trees.
- considered core habitat for WRP.

Report for Emu Point Development Western Ringtail Possum Assessment December 2011 by GHD:

- Dreys were observed both within the study area and regionally. In total, 94 dreys were recorded. With old, potentially inactive, active and some with possums in. Scats observed. No hollows present. In total, 91 WRP were recorded during the survey period.

Table 14 WRP habitat likelihood based on vegetation communities

Map Code	Vegetation Name	WRP Value	WRP Habitat Suitability
2	Peppermint Low Forest	High value foraging species and high connectivity	High
4	Coastal B*anksia ilicifolia*/Peppermint Low Woodland	High value foraging species and high connectivity	High
5	Limestone Coastal Heath	High value foraging species and high connectivity	High
8	Beach Herbland/Grassland	No foraging species or protection	Low
12	Jarrah/Marri/Sheoak Laterite Forest	High value foraging species and high connectivity	High
13	Jarrah/Sheoak/*Eucalyptus staeri* Sandy Woodland	High value foraging species and high connectivity	High
14	*Banksia coccinea* Shrubland/*Eucalyptus staeri*/Sheoak Open Woodland	Contains foraging species but more open and offers less protection	Moderate
36	*Callistachys* spp. Thicket	Some foraging species but offers good connectivity and protection	High
46	*Evandra aristata* Sedgeland	Contains foraging species but more open and offers less protection	Moderate
47	*Homalospermum firmum*/*Callistemon glaucus* Peat Thicket	High value foraging species and high connectivity	High
50	Miscellaneous Drainage Woodland/Shrubland	High value foraging species and high connectivity	High
52	*Melaleuca cuticularis*/*M. preissiana* Open Woodland	High value foraging species and high connectivity	High

Map Code	Vegetation Name	WRP Value	WRP Habitat Suitability
56	*Astartea scoparia* Swamp Thicket	High value foraging species and high connectivity	High
57	*Melaleuca rhaphiophylla* Woodland/Low Forest Complex	High value foraging species and high connectivity	High
59	*Taxandria juniperina* Closed Forest	High value foraging species and high connectivity	High
65	Coastal *Melaleuca cuticularis* Low Forest	High value foraging species and high connectivity	High
66	*Juncus kraussii* Sedgeland	Poor quality foraging species and low canopy connectivity	Low
67	Coastal Saltmarsh	Poor quality foraging species and low canopy connectivity	Low
68	**Typha orientalis* Sedgeland	Poor quality foraging species and low canopy connectivity	Low
69	**Acacia longifolia* Tall Shrubland	Provides canopy connection	Moderate

2.7.2 Three Black Cockatoos Species (*Calyptorhynchus/Zanda baudinii, Calyptorhynchus/Zanda latirostris, Calyptorhynchus banksii* subsp. *naso*, EN/VU)

The three Black Cockatoo species in WA are all listed as Threatened species under the EPBC Act and BC Act. The Study Area is located within the South Coast, Region 4, as defined by the Referral Guidelines for the three Black Cockatoo Species (DAWE, 2022). This region consists of Jarrah (*Eucalyptus marginata*) Marri (*Corymbia calophylla*) Forest, Karri (*E. diversicolor*) and areas of low heath and scrub. The region provides a range of foraging resources for all three Black Cockatoo species. Using the modelled distribution maps (DAWE, 2022), the Study Area is within the:

- Known breeding range for Baudin's Black Cockatoo (*Calyptorhynchus/Zanda baudinii)*,
- Breeding range for Carnaby's Black Cockatoo (*Calyptorhynchus/Zanda latirostris*), and
- Likely to occur range for Forest Red-tailed Black Cockatoo (*Calyptorhynchus banksii* subsp. *naso*).

The surveys occurred within the South Coast foraging period for Baudin's Cockatoo, breeding period for Carnaby's Cockatoo and within the breeding and foraging in proximity period for Baudin's and Forest Red-tailed Black Cockatoos. Using Table 2 of the Referral Guideline (DAWE, 2022), the Black Cockatoo foraging and breeding timing for the South Coast is:

- **Baudin's Black Cockatoo**
  Foraging habitat: March to September
  Breeding habitat and foraging habitat in proximity: August to January
- **Carnaby's Black Cockatoo**
  Foraging habitat and night roosts: January to July
  Breeding habitat: July to December
- Forest Red-tailed Black Cockatoo
  Breeding habitat and foraging habitat in proximity: at any time of year in forested areas, with peaks in April to June and August to October

The DBCA database includes records of all three Black Cockatoo species within and surrounding the Study Area. Records within the Site are located in the 2 - Peppermint Low Forest and 4 – Coastal *Banksia ilicifolia* / Peppermint Low Woodland. A number of records are located southwest of the Study Area, around Lake Seppings (Tjuirtgellong), including a roosting site for white-tailed Black Cockatoos. The Black Cockatoo Guidelines note the likely habitat for roosting sites are generally near riparian environments, indicating the value of this roosting site despite some years there are no Black Cockatoos recorded utilising the roost.

A number of areas of tall Eucalyptus trees were noted within the Study Area, however many were planted, introduced species, and isolated, resulting in them being unlikely to be utilised by Black Cockatoos for nesting (Figure 29). The Jarrah Marri vegetation within the northwest of the Study Area contains suitable habitat, and is located near a water source, Yakamia Creek. This area is isolated and may not be preferred due to the small area.

The survey identified three Forest Red-tailed Black Cockatoos flying overhead on 29 November in the southern portion of Brewster Road. Five white-tailed Black Cockatoos were observed in Pine trees in two locations, and observed flying overhead, on 28 November around 107 and 135 Wright Street Collingwood. These observations are included in Figure 27.

The Study Area includes significant areas of remnant vegetation which is suitable foraging habitat and within 12 km of a known roosting site. The preferred foraging species that are dominant in the Study Area include proteaceous plants (Banksia and Hakea), Marri, some introduced eucalyptus species, Pine, with Forest Red-tailed Black Cockatoos also preferring *Allocasurina* (Sheoak) cones. The limestone coastal heath and coastal banksia vegetation represents suitable foraging habitat with anecdotal sightings from locals. Figure 29 includes indicative potential foraging habitat for the three Black Cockatoos including Peppermint Forest as an as records occur in this vegetation unit.

Black Cockatoos have been confirmed within the Study Area and protection of foraging habitat within the Study Area should be prioritised, particularly in proximity to the known roosting site adjacent to Lake Seppings (Tjuirtgellong).

The Referral Guideline includes a number of triggers that are likely to require Ministerial referral including clearing of more than 1 ha of high-quality foraging habitat and removal of breeding trees (which includes trees with suitable hollows within known breeding areas). The cumulative impact of proposed clearing across the landscape needs to be considered during the approvals process, as well as the protection of trees that do not currently have hollows but are likely to form them in the future (pers comm., Nature Positive Regulation Division, DCCEEW, 13 August 2024). Area for rehabilitation is to be identified as part of the structure plan.

Previous reports results:

- Report for Emu Point Development Assessment of Potential Impacts on Threatened Species Listed under the EPBC Act November 2010 by GHD. Limited feeding habitat to support White-tailed Black Cockatoos within the development site, however LandCorp recognise that cockatoos may use the area for opportunistic grazing. No suitable breeding trees were recorded on the site through the Hickman (2005) and Coffey (2009) surveys. This was also confirmed by the preliminary comments on the Albany Regional Vegetation Survey (Sandiford and Rathbone, 2008). An area will be rehabilitated

to provide foraging habitat for white-tailed black cockatoos. No suitable breeding trees within the proposed EPRA site, and none will develop within the vegetation types present.

2.7.3 *Isoodon fusciventer* (Quenda, P4)

Quenda (*Isoodon fusciventer*) are a Priority 4 species under the BC Act. The DBCA Threatened and Priority Fauna database has 131 Quenda records within 10 km of the Study Area, from 1980 to 2022. Their preferred habitat includes forest, woodland, shrub, and heath, usually in sandy soils with dense healthy vegetation in lower stratum. The species is also associated with watercourses in forests.

Quendas dig into the soil with their strong foreclaws to produce a characteristic conical hole. There were numerous observations of Quenda diggings, as well as some Quenda runnels, seen throughout remnant vegetation within the Survey Area. Opportunistic observations were taken; however not all sightings were recorded with a GPS due to the number observed, highlighting the high numbers of Quenda utilising the remnant vegetation throughout the Study Area. (Figure 27).

It is likely that Quenda are present throughout the Study Area. It is recommended that areas of remnant vegetation that provide suitable habitat for Quenda are prioritised for protection.

Previous survey results:

- Direct sightings and diggings observed from Lots 3000 & 1523 Emu Point Drive, Albany from a vegetation survey conducted by Hickman in 2005, observations were recorded under the previous name of *Isoodon obesulus*.
- Fauna impact assessment (Gilfillan, 2021) Emu Beach Holiday Park, 8 Medcalf Pde, Albany Southern Brown Bandicoot (Quenda) (under the previous name *Isoodon obesulus* subsp. *fusciventer*) - Thick sedge layer is suitable habitat for Quenda, and Quenda are known to occur in vegetation behind the dunes along Middleton Beach (SG pers. obs). No Quenda were seen during spotlighting and no diggings were observed.
- P1089A Lot 322 Troode St Revegetation Implementation Plan 2024 revegetating and rehabilitating a portion of land within Lot 322 on Plan P222010 Troode St, Collingwood Park (the site). The site forms part of a habitat corridor to protect the Western Ringtail Possum (WRP) and is based on requirements associated with a preliminary assessment of a nearby clearing permit application likely to require offset rehabilitation of 0.22ha of suitable land. rehabilitated area will become subject to a conservation covenant.

2.7.4 Wetland and Waterway Fauna Species (Third Party Data)

The wetlands within the Study Area hold unique habitat values that support a range of conservation significant fauna species. The survey by Ecosystem Solutions did not include wetland fauna species. The following information is a summary of third-party data, collated for the specific purpose of understanding the importance of wetlands at Emu Point.

2.7.4.1 Migratory Bird Species

The Coastal Saltmarsh TEC is noted in the Conservation Advice as being an important feeding and roosting habitat for migratory birds, protected under the EPBC Act and international treaties (Department of Environment, Water, Heritage and the Arts (2010). There are records of two Endangered, six Vulnerable, two Priority 4, and eight Migratory listed bird species within the Study Area (Table 12 & 13). The Coastal Saltmarsh is suitable habitat for a further two Critically Endangered, four Endangered, two Vulnerable and one Priority 4 species that have been determined as potential to occur within the Study Area. (Table 12)

Lake Seppings (Tjuirtgellong) is also a recognised important freshwater habitat for migratory birds with a number of records for the Caspian Tern - Migratory, Blue-billed duck - Priority 4 (seasonally nomadic, Australian Museum, 2024) and Osprey - Migratory. While the Caspian Tern and Osprey can feed in marine and freshwater, the Blue-billed duck relies on the freshwater habitat. A known threat to the Blue-billed Duck is salinity.

The wetlands that connect the saline Coastal Saltmarsh to the east and freshwater lake in the west are important to ensure the salinity between the two systems are maintained, and therefore the suitable habitat for the freshwater bird species and marine bird species. Fauna records and conservation advice recognise the Coastal Saltmarsh, Lake Seppings (Tjuirtgellong) and the associated floodplain as being an important feeding and roosting habitat for migratory birds. It is recommended to monitor and manage any impacts on migratory birds in the Coastal Saltmarsh TEC area.

2.7.4.2 Turtle Species (TurtleSAT)

The South-western snake-necked turtle, *Chelodina oblonga*, is currently a widespread and abundant species within the southwest of Western Australia (north of Perth to Bremer Bay), living in a range of seasonal and permanent freshwater habitats (DWER, 2025). The species is characterised by a long neck that retracts sideways into the shell and a distinct shell that narrows slightly at the front. Females leave the wetland during nesting season, between September and January, typically venturing 500 m from the wetland to find a nest site with open vegetation (Santoro, 2023-24). Females can spend over an hour searching for a nest site and digging the nest, which is when they are most vulnerable to predation by foxes and ravens, and injury from traffic. A threat, particularly in urban areas, is a lack of accessibility to areas surrounding wetlands, limiting the ability for the species to access nesting sites. This is showing a decline in the

population, with urban areas expanding and exasperating this threat. Further threats include human induced barriers within their migration and destruction to habitat. There is a growing concern that these threats will create local extinctions of the species.

TurtleSAT is a national community conservation citizen science program by 1 Million Turtles. The aim of the program is to increase the knowledge of freshwater turtles across Australia to track the populations and inform locations for future conservation. Ideally, volunteers walk around a wetland at least once a week during the peak turtle breeding season (mid-September to mid-November) to report any sightings.

Lake Seppings (Tjuirtgellong) is considered a hotspot for the southwestern snake-necked turtle with over 500 observations recorded within 500 m of Lake Seppings (Tjuirtgellong) between 2018 and 2024 (Atlas of Living Australia, 2025a), shown in Figure 30. Many of these observations have occurred in the Golf Course bordering Lake Seppings (Tjuirtgellong) to the southeast and within residential areas on the western and southern boundary of Lake Seppings (Tjuirtgellong). There have been 36 observations of the southwestern snake-necked turtle within the Study Area between 2020 and 2024, with the majority of these observations occurring along Emu Point Drive, which are likely turtles migrating or looking for a nesting site from Lake Seppings (Tjuirtgellong).

There have been twelve records of southwestern snake-necked turtle sightings within proximity to the upper catchment of Yakamia Creek. Low records could partially be attributed to a lack of monitoring and recording. Further assessment of Yakamia Creek would improve the understanding of the importance of this wetland for the southwestern snake-necked turtle.

While the southwestern snake-necked turtle is not listed under the BC or EPBC Act, the species is under threat with deaths reported along roadsides and nests damaged from predators (Atlas of Living Australia, 2025b). A recommendation from Dr Ricky Spencer, from TurtleSAT, to improve the survival of females when looking for nesting sites is to construct a barrier along the kerb of a road and create designated crossings, which would ideally utilise existing culverts. This could be implemented along Emu Point Drive and would benefit other fauna species trying to cross the road, noting this would create an ecological link discussed in Section 2.4.6. To ensure predators are not benefiting from a consistent passage of turtles, multiple crossings will need to be installed, and monitoring of the success of these crossings will need to occur.

2.7.4.3 Fish And Aquatic Species (DWER)

DWER have undertaken monitoring of Yakamia Creek as part of their Healthy Rivers program, with an assessment site located at Lower King Road, approximately 100 m west of the Study Area with the results on the data currently unpublished.



Figure 27 Fauna Observations within the Emu Point Precinct Structure Plan



Figure 28 Western Ringtail Possum Assessment of Native Vegetation Habitat within the Emu Point Precinct Structure Plan



Figure 29 Habitat Trees within the Emu Point Precinct Structure Plan



Figure 30 TurtleSAT data from the surrounding catchment of the Emu Point Precinct Structure Plan

3 Survey Constraints

Survey limitations are summarised in Table 15 and 16 below.

Table 15 Summary of flora survey limitations

Constraint	Impact	Comment
Availability of contextual information at a regional and local scale	Nil	Broad scale vegetation and soil mapping data were available. The DBCA Threatened and Priority Flora and Ecological community's databases, interim NatureMap and PMST database extracts for conservation significant flora and ecological communities were obtained. A search of other relevant databases also occurred.
Competency / experience of the survey team	Nil	The ecologist leading the field survey has conducted numerous flora surveys across the southwest of WA and has over 10 years' experience. The ecologist completing the flora identifications has over 10 years' experience identifying Western Australian flora, specialising in southwest flora. Any potential conservation significant flora specimens were submitted to the Western Australian Herbarium for formal identification.
Proportion of flora recorded and/or collected, any identification issues	Nil	A focus was placed on identifying any potential conservation significant flora species, with these collections all identified to species level with specimens sent to the Western Australian Herbarium for formal identification. Specimens that were not potentially conservation significant species have been identified to genus level, or species where this can be easily ascertained, or sent to the Western Australian Herbarium for identification.
Was the appropriate area fully surveyed (effort and extent)	Moderate	The current survey is of a broad nature, for the purposes of guiding the planning of future development. Additional site-specific surveys will be required if there is proposed impact to areas of remnant vegetation.
Access restrictions within the Site	Moderate	Pockets of remnant vegetation within the Survey Area were inaccessible due to water or permission was not granted from the privately landowners and therefore not all areas of vegetation were able to be surveyed.
Survey timing, rainfall, season of survey	Nil	The survey was conducted in Spring (November) which is the recommended time to survey for flora in the south-west botanical province (EPA, 2016). The assessment was limited to observing species that were present during the time of the surveys.
Inconsistent flowering habit of some species	Moderate	Some species do not flower every season and may require environmental triggers to promote flowering such as rainfall, fire, presence of suitable pollinators etc.

Constraint	Impact	Comment
Disturbance that may have affected the results of the survey, such as fire, flood or clearing	Nil	There was recent clearing at 204 Wright Street, Collingwood Park.

Table 16 Summary of fauna survey limitations

Constraint	Impact	Comment
Availability of data and information	Nil	The DBCA Threatened and Priority Fauna database, interim NatureMap and PMST database extracts for conservation significant fauna were obtained.
Competency / experience of the survey team, including experience in the bioregion surveyed	Nil	The ecologist leading the field surveys has conducted numerous fauna surveys across the southwest of Western Australia and has over 20 years' experience.
Scope of the survey, e.g., where faunal groups were excluded from the survey	Minor	This survey focussed on conservation significant birds, mammals and other vertebrate species that are likely to occur within the survey area. Marine species were not included, due to distance to the coast. Invertebrates were not included in the scope of this survey.
Timing, weather, and season	Minor	The surveys were conducted in Spring (November). Spring is the optimum time for bird and mammal surveys in the Southern climatic region (EPA, 2020). Weather conditions did not impact surveys. The assessment was limited to observing species that were present during the time of the surveys.
Timing Western Ringtail Possums (WRP) may arise from rest sites & likelihood of rest sites being located outside the Site	Moderate	As WRP use up to 2-7 rest sites at any one time and up to 20 throughout the year there is potential that they are not observed on Site at the time of survey, even though they are utilising the Site. The time WRP arise from a rest Site is also variable and may prevent WRP being observed during survey.
Disturbance that may have affected results, e.g., fire, flood	Nil	There were no disturbances that constrained the survey of the Site.
The proportion of fauna identified, recorded, or collected	Nil	Any potential conservation significant fauna species observed during the surveys have been identified.
Adequacy of the survey intensity and proportion of survey achieved, e.g., the extent to which the area was surveyed	Moderate	Pockets of remnant vegetation within the Survey Area were inaccessible due to water or permission was not granted from the privately landowners and therefore not all areas of vegetation were able to be surveyed. However, as this survey was a high-level assessment, and any specific clearing will require a targeted flora and fauna survey, the survey conducted is adequate.

Constraint	Impact	Comment
Access problems	Moderate	Pockets of remnant vegetation within the Survey Area were inaccessible due to water or permission was not granted from the privately landowners and therefore not all areas of vegetation were able to be surveyed. Parks and reserves owned by the City of Albany were accessible by vehicle and/or foot.

4 Conclusions and Recommendations

The following summary is provided with recommendations in Table 17.

4.1 Conservation Significant Flora

There was no Threatened flora recorded during the field surveys.

The Survey Area includes one known priority population, *Adenanthos* x *cunninghamii* (P4). Confirmation of the presence of this species within Lots 1512 & 1523 Emu Point Drive has occurred.

One additional priority listed species has also been recorded, *Netrostylis* sp. Blackwood River (P3) within 204 and 236 Wright Street, Collingwood. Further occurrences of this species within the *Taxandria juniperina* closed forest, particularly in remnant vegetation along the waterway that connects these two observations, is likely.

Andersonia auriculata is described in the database as being within Reserve 6862, this reserve is predominately outside the Survey Area and was not observed.

4.2 Vegetation

The Study Area has been previously mapped by the Albany Regional Vegetation Survey (ARVS, Sandiford & Barrett, 2010). The data provided from the ARVS has been analysed, with 19 remnant vegetation units present within the Study Area. Fourteen of these vegetation units have less than 1,500 ha of vegetation remaining and/or <10% within lands protected (IUCN I-IV) for conservation and are considered locally significant.

Majority of the vegetation within Study Area is considered Excellent or Very Good to Excellent. The presence of weeds that have the ability to affect structure were located within the areas of Very Good to Excellent and it is recommend prioritising the removal of these weeds.

A total of 36 weed species were observed opportunistically within the Survey Area with only notable populations recorded, therefore this number is an underestimate of the number of weed species within the Survey Area. The weeds recorded includes four Weeds of National Significance (WONs) which includes *Asparagus asparagoides (*Bridal Creeper)*, Asparagus scandens* (Climbing Bridal)*, Rubus* sp. (Blackberry) and *Ulex eruopaeus* (Gorse) (Government of Western Australia, 2023). Also, one declared pest, *Zantedeschia aethiopica* (Arum Lily) was noted within the Survey Area.

There are three Threatened and Priority Ecological Communities within the Study Area:

- *Banksia coccinea* Shrubland/*Eucalyptus staeri*/Sheoak Open Woodland (14) is listed as Priority 1 under the BC Act and further investigation is required to adequately determine if the community meets the key diagnostic characteristics for the TEC listing.

  Protection of the vegetation as a Priority 1 ecological community should be prioritised with an appropriate buffer to support ecological function and protect against threats, including *Phytophthora* dieback which results in the loss of Banksia species. Note 50 m has been used as a guide as per EPA Guidance Statement 33 recommends minimum 50 m development setback for estuaries and minimum 30 m foreshore reserve to maintain wetland values and mitigate impacts from adjacent land uses. As this ecosystem could be hydrologically dependent, a 50 m buffer has been provided as a guide.

- The Subtropical and Temperate Coastal Saltmarsh (Coastal Saltmarsh) TEC is listed as Vulnerable under the EPBC Act and Priority 3 under the BC Act, within areas zoned for environmental conservation. This TEC did not occur within the Survey Area.

  Protection of the fringing vegetation, 65 - *Melaleuca cuticularis* Low Forest, that is currently in Rural zoning and in proximity to the Coastal Saltmarsh as a buffer or connecting the wetlands, should be prioritised, to protect against sea level rise, nutrient loads, ecological function and other impacts as recommended in the TEC Conservation Advice. Note 50 m has been used as a guide as per EPA Guidance Statement 33 recommends minimum 50 m development setback for estuaries and minimum 30 m foreshore reserve to maintain wetland values and mitigate impacts from adjacent land uses. As this ecosystem is hydrologically dependent, a 50 m buffer has been provided as a guide.

- *Astartea scoparia* Swamp Thicket (56) under the BC Act as Priority 1 and located within the Study Area in 10 different patches (Sandiford & Barret, 2010). The vegetation unit is confined to the Albany region.

  Eight of the occurrences are in lots zoned Environmental Conservation. Protection of the two occurrences in the Unallocated Crown Lot and Recreation zone should be prioritised given the restricted nature of this ecological community. Note 50 m has been used as a guide as per EPA Guidance Statement 33 recommends minimum 50 m development setback for estuaries and minimum 30 m foreshore reserve to maintain wetland values and mitigate impacts from adjacent land uses. As this ecosystem could be hydrologically dependent, a 50 m buffer has been provided as a guide.

4.3 Wetlands and Waterways

The entire Study Area is a sensitive water resource area with recommended protection of native vegetation, and where appropriate enhanced, and land uses with the potential to impact water quality sited appropriately. The entire Study Area is also within a Government Sewage Policy Area, as there a significant wetland within 1 km.

Three categories of wetland relate to the Study Area, being Conservation, Resource Enhancement and Multiple Use (Hopkins, 2007). A total 318 ha of the Study Area is considered a wetland category, comprising approximately 60% of the Study Area. However, there is a potential this is underestimated as some AVRS vegetation units have not been included as a wetland category.

Oyster Harbour (Miaritch) is located east of the Study Area with tributaries extending within the Study Area, classified a nationally significant waterway and listed in the directory of important wetlands in Australia. Oyster Harbour is connected through wetlands and floodplains to Lake Seppings (Tjuirtgellong), a freshwater lake and south coast significant wetland, approximately 215 m southwest of the Study Area. An important connection is within a road reserve known as Lake Seppings drain.

Yakamia Creek is a waterway that passes through the northern part of the Study Area, which intersects with Oyster Harbour (Miaritch) on the eastern boundary and traverses through the Study Area to the western boundary. It has a total stream length of nearly 9 km and approximately 2 km of its length is within the Study Area. Yakamia Creek and its tributaries is a waterway within the Albany Waterways Management Area, declared under the *Waterways Conservation Act 1976*.

4.4 Conservation Significant Fauna

Western Ringtail Possum

The Study Area is within the South Coast Management Zone of the three key management zones for Western Ringtail Possums, listed as Critically Endangered under the EPBC Act and BC Act (Department of Parks and Wildlife, 2017).

There are 33 recorded WRP observations from within the Study Area (CoA, 2024). Ecosystem Solutions identified 27 WRPs dreys observed within the Survey Area, and an additional 2 observations of scats, located in a variety of vegetation units. Previous surveys within and surrounding the Study Area have also recorded a high number of observations of direct sightings and dreys, highlighting the presence and likely reliance of this habitat within the Study Area.

Majority, 12, of the vegetation units within the Study Area provide high habitat value due to foraging species and high canopy connection. There were four vegetation units that are considered moderate habitat value,

based on the more limited canopy connection. All existing and future connections across and surrounding this habitat will be very important to support the WRP population.

Habitat includes native and exotic vegetation. Clearing of WRP habitat should be avoided, with even small areas (<0.5 ha) likely to be considered a significant impact. The cumulative impact also needs to be considered during the approvals process, to avoid 'chipping away' at the remaining habitat within the Study Area with applications on different lots or at different times. The preservation and enhancement of ecological linkages is essential to the long-term survival of this species, without these there is increased risk of the collapse of local populations and genetic isolation. Any clearing of habitat (native and exotic species) should occur with a DBCA approved fauna spotter to minimise the impact on the species.

Three Black Cockatoos species

The three Black Cockatoo species in WA are all listed as Threatened species under the EPBC Act and BC Act. The Study Area is located within the South Coast, Region 4, as defined by the Referral Guidelines for the three Black Cockatoo Species (DAWE, 2022). The DBCA database includes records of all three Black Cockatoo species within and surrounding the Study Area, which includes a roosting site for white-tailed Black Cockatoos southwest of the Study Area, adjacent to Lake Seppings (Tjuirtgellong).

The survey identified three Forest Red-tailed Black Cockatoos flying overhead and five white-tailed Black Cockatoos were observed in Pine trees in two locations.

A number of areas of tall Eucalyptus trees were noted within the Study Area, however many were planted, introduced species, and considered unlikely to be used for nesting. However, the Study Area includes significant areas of remnant vegetation which is suitable foraging habitat and within 12 km of a known roosting site. Protection of foraging habitat, particularly in proximity to the known roosting site adjacent to Lake Seppings (Tjuirtgellong), should be prioritised.

The Referral Guidelines for Black Cockatoos includes a number of triggers that are likely to require Ministerial referral including clearing of more than 1 ha of high-quality foraging habitat. Area for rehabilitation is to be identified as part of the structure plan.

Quenda

Quendas are a Priority 4 species under the BC Act. There were direct observations of Quenda within the Survey Area with numerous signs of their presence with diggings and runnels, seen throughout remnant vegetation within the Survey Area. Opportunistic observations were taken; however not all sightings were recorded with a GPS due to the number observed, highlighting the high numbers of Quenda utilising the remnant vegetation throughout the Study Area.

Wetland and Waterway Fauna Species

The Coastal Saltmarsh is an important habitat for migratory bird species with records of two Endangered, six Vulnerable, two Priority 4, and eight Migratory (only) listed bird species within the Study Area. The Coastal Saltmarsh is also suitable habitat for a further two Critically Endangered, four Endangered, two Vulnerable and one Priority 4 species that have been determined as potential to occur within the Study Area.

Lake Seppings (Tjuirtgellong) is also an important water source for bird species and Blue-billed duck - Priority 4. The wetlands that connect the saline Coastal Saltmarsh to the east and freshwater lake in the west are important to ensure the salinity between the two systems are maintained, and therefore the suitable habitat for the freshwater bird species and marine bird species.

Lake Seppings (Tjuirtgellong) is also considered a hotspot for the southwestern snake-necked turtle with over 500 observations recorded within 500 m of Lake Seppings (Tjuirtgellong) between 2018 and 2024 (Atlas of Living Australia, 2025a). There have been 36 observations of the southwestern snake-necked turtle within the Study Area between 2020 and 2024, with the majority of these observations occurring along Emu Point Drive, which are likely turtles migrating or looking for a nesting site from Lake Seppings (Tjuirtgellong). A recommendation from Dr Ricky Spencer, from TurtleSAT, to improve the survival of females when looking for nesting sites is to construct a barrier along the kerb of a road and create designated crossings, which would ideally utilise existing culverts. To ensure predators are not benefiting from a consistent passage of turtles, multiple crossings will need to be installed, and monitoring of the success of these crossings will need to occur. These crossings would benefit other fauna species trying to cross the road.

DWER have undertaken monitoring of Yakamia Creek as part of their Healthy Rivers program, with an assessment site located at Lower King Road, approximately 100 m west of the Study Area with data currently unpublished.

4.5 Ecological Linkages

An ecological corridor recommended by ATA Environmental, 2002, is predominately in place with majority of the lots zoned for Environmental Conservation, which are waterways and contain substantial areas of remnant vegetation. There are a total of four ecological links identified and discussed (A to D) with the potential to improve ecological link throughout the Study Area.

Table 17 Summary of Recommendations

Reference	Recommendation
2.4.1 Wetlands and Waterways	
	Understanding of wetlands and floodplains boundaries are required as part of any development to ensure future areas of development are adequately protected. Protection of flood plains prevents impacts from future extreme weather events that are possible. Confirmation of where historical high-water levels reached will help inform future planning decisions.
	Assess wetlands within the Study Area (in liaison with DBCA as data custodians) against the criteria for a conservation management category, as defined in a methodology for the evaluation of wetlands on the Swan Coastal Plain, Western Australia (DBCA, 2017) and implement zoning changes as required, particularly for areas that include: o A Threatened Ecological Community (Coastal Saltmarsh TEC), and o Priority 1 or Priority 2 ecological community (*Astartea scoparia* Swamp Thicket & *Banksia coccinea* thicket). Prior to any development in proximity to a wetland, it is required to understand the delineation of wetland boundaries and the potential impacts from development and mitigation strategies.
	For any proposed development within the area, implement the appropriate setbacks and foreshore areas (buffers) based on studies within the Site required as part of any development application which will: • Mitigate the risk of flood and marine intrusion through Oyster Harbour into the Study Area, along the associated floodplain; • protect TEC/PECs; and • other fauna and flora values within the Study Area. EPA Guidance Statement 33 recommends minimum 50 m development setback for estuaries and minimum 30 m foreshore reserve to maintain wetland values and mitigate impacts from adjacent land uses.

	It is recommended to understand the surface and groundwater in any of the areas proposed for development, particularly near 4 - Coastal B*anksia ilicifolia*/Peppermint Low Woodland which may be groundwater dependant. Any development within the Study Area is recommended to include additional surveys and management plans to ensure the impact to the values within the Study Area are retained and impacts mitigated.
	For any development within the area, consider the impact on coastal processes, particularly with run off into Oyster Harbour impacting seagrass population, and along the southern boundary of the Study Area.
	Finalise a District Water Management Plan which will address waterway, wetland and groundwater protection as required under SPP 2.9.
Lake Seppings Drain	Any further development or rezoning of the lots abutting the Lake Seppings Drain should provide a foreshore area for the modified waterway, protect the wetland vegetation, and restrict development to higher areas near Emu Point Drive.
Yakamia Creek	Preservation and enhance the quality of the environment and amenity of Yakamia Creek, as required under the *Waterways Conservation Act 1976* Albany Waterways Management Area. Areas that are considered degraded (B3 & C1 category) should be rehabilitated with access managed appropriately such as fencing, as recommended in the DWER databases.
Oyster Harbour and associated floodplain connecting to Lake Seppings	Ensure any development with the Study Area considers the impacts to Oyster Harbour as the entire Study Area is a Sensitive water resource and complies with the Government Sewage Policy Area.
2.4.2 Threatened, Priority and Significant Flora	
	Areas of remnant vegetation that include *Netrostylis* sp. Blackwood River (P3) and *Adenanthos* x *cunninghamii* (P4) should be prioritised for protection.
	Ensure additional site-based surveys occur to target and manage impacts to conservation significant flora species through any future development approvals process.
2.4.3 Vegetation Units	

	Investigate the ability to increase the area within protected land for the fourteen vegetation units that have less than 1,500 ha of vegetation remaining and/or <10% within lands protected (IUCN I-IV) for conservation and are considered locally significant.
	As the entire Study Area is a sensitive water resource area, it indicates that all native vegetation should be protected, and where appropriate enhanced, with the priority for protection to be according to Vegetation Condition.
2.4.4 Vegetation Condition	
	R 22698 EPA Redbook Recommended Conservation Areas: It is recommended to maintain remnant vegetation for conservation and manage any impacts from the development on the conservation values. It is also recommended to revegetate areas along the foreshore area for coastal erosion protection.
	It is recommended to remove weed species identified within the Study Area, with a priority on the removal of WoNS. Degraded and cleared areas have the potential to be restored as part of an environmental offset.
2.4.5 Threatened and Priority Ecological Communities	
Banksia coccinea Shrubland/Eucalyptus staeri/Sheoak Open **Woodland ('Community type 14a') (Endangered** TEC (part) / Priority 1)	*Banksia coccinea* Shrubland/*Eucalyptus staeri*/Sheoak Open Woodland is fragmented within the Study area and further investigation is required to adequately determine if the community meets the key diagnostic characteristics for the TEC listing. Regardless, protection of the vegetation as a Priority 1 ecological community should be prioritised to support ecological function with an adequate buffer.
Coastal Saltmarsh (Vulnerable / Priority 3)	It is recommended to retain the vegetation within the road reserve and Lake Seppings drain. Any development in this area is to have waterway setbacks to protect the TEC vegetation.
	Protection of the areas of 65 - *Melaleuca cuticularis* Low Forest, that are currently in Rural zoning and in proximity to the Coastal Saltmarsh as a buffer, should be prioritised, to protect against sea level rise, nutrient loads and other impacts as recommended in the TEC Conservation Advice.

Astartea scoparia Swamp Thicket (Priority 1)	Protection of the two occurrences of *Astartea scoparia* Swamp Thickets in the Unallocated Crown Lot and Recreation zone should be prioritised given the restricted nature of this ecological community. Protection of a buffer area is also recommended to ensure hydrological changes do not occur, within 56 - *Taxandria juniperina* Closed Forest or 46 - *Evandra aristata* Sedgeland.
2.4.6 Ecological Linkages	
	Implement the Ecological Linkages as discussed in Section 2.4.6, in particular for development impacting Western Ringtail Possums to consider habitat connectivity.
	Investigate the ability to revegetate within lots zoned Rural, specifically 212, 220 and 228 Wright Street, Collingwood Park to greatly improve the ecological link Ecological Link that are cleared of native vegetation
	Prioritise the management and weed control along a narrow waterway within the road reserve, Lake Seppings Drain, as it is vulnerable to degradation along edges.
	Protect remnant vegetation along Ecological Link A within rural lots 245, 239 & 271 Emu Point Drive to ensure the hydrological flow is protected, as these lots contain 65- Coastal *Melaleuca cuticularis* Low Forest, which is vegetation surrounding the Coastal Saltmarsh TEC.
	Restore areas along the foreshore of Yakamia Creek, within the rural zoned freehold lots on the northern boundary of the Study Area, as an ecological linkage for terrestrial and aquatic species (Ecological Link D).
2.7.4.2 Turtle species	
	Improving habitat connectivity through raised kerb and designated crossings for turtles along Emu Point Drive.
2.7 Conservation Significant Fauna	

	Further conservation significant species may occur within the Study Area with any development proposed required to undertake specific surveys to identify and manage impacts to conservation significant fauna species.
Pseudocheirus occidentalis (Western Ringtail Possum, CR)	It is recommended that areas of remnant vegetation that provide suitable habitat for WRP are prioritised for protection. Noting that WRP habitat includes native remnant vegetation and extends into the urban interface and backyards/gardens. Clearing of WRP habitat should be avoided, with even small areas (<0.5 ha) likely to be considered a significant impact. The cumulative impact also needs to be considered during the approvals process with potential consideration of applications on different lots or at different times. Any clearing of habitat (native and exotic species) offset requirements are likely to be substantial, particularly due to the Critically Endangered status of this species. A DBCA approved fauna spotter should be present during clearing to minimise the impact on the species. Opportunities to support WRP during the development process, include the installation of rope bridges (more suitable across narrow roads), WRP friendly landscaping and the exclusion of domestic pets via fencing or local planning laws. For any clearing of habitat that is approved,

Three Black Cockatoos Species (*Calyptorhynchus/Zanda baudinii, Calyptorhynchus/Zanda latirostris, Calyptorhynchus banksii subsp. naso*, EN/VU)	The three Black Cockatoo species (Endangered / Vulnerable) have been confirmed within the Study Area and protection of foraging habitat within the Study Area should be prioritised, particularly in proximity to the known roosting site adjacent to Lake Seppings (Tjuirtgellong). The Referral Guideline includes a number of triggers that are likely to require Ministerial referral including clearing of more than 1 ha of high-quality foraging habitat and removal of breeding trees (which includes trees with suitable hollows within known breeding areas). The cumulative impact of proposed clearing across the landscape needs to be considered during the approvals process, as well as the protection of trees that do not currently have hollows but are likely to form them in the future. Areas of degraded habitat that could benefit from rehabilitation is to be identified as part of the structure plan.
Isoodon fusciventer (Quenda, P4)	Quenda (P4) are utilising the remnant vegetation throughout the Study Area with numerous signs of their presence with diggings and runnels, seen throughout remnant vegetation within the Survey Area. It is recommended that areas of remnant vegetation that provide suitable habitat for Quenda are prioritised for protection.
Migratory Bird Species	Fauna records and conservation advice recognise the Coastal Saltmarsh, Lake Seppings, and the associated floodplain as being an important feeding and roosting habitat for migratory birds. It is recommended to monitor and manage any impacts on migratory birds in these areas.
Fish and Aquatic Species (DWER)	It is recommended DWER install a monitoring site, as part of their Healthy Rivers program, within the Coastal Saltmarsh TEC or connected wetlands, with results to inform planning decisions in the area.

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Appendix A Interim NatureMap Extract

Interim Naturemap Extract of Flora Recorded within 10 km of the Study Area (DBCA, 2024a)

Taxon	EPBC Status	WA Status
Acacia ataxiphylla subsp. ataxiphylla	3	
Acacia prismifolia	T	
Adenanthos x *cunninghamii*	4	
Agrostocrinum scabrum subsp. *littorale*	2	
Amanita drummondii	3	
Amanita preissii	3	
Andersonia auriculata	3	
Andersonia grandiflora	4	
Andersonia setifolia	3	
Andersonia sp. Jamesii (J. Liddelow 84)	4	
Anzybas abditus	3	
Austrostipa mundula	3	
Banksia biterax	3	
Banksia brownii	T	CR
Banksia goodii	T	VU
Banksia seneciifolia	4	
Banksia serra	4	
Banksia verticillata	T	CR
Boronia crassipes	3	
Bossiaea divaricata	4	
Bossiaea lalagoides	3	
Bossiaea sp. Mt Frankland (L. Graham 2174*)*	2	
Caladenia evanescens	1	
Caladenia harringtoniae	T	VU
Caladenia startiorum	2	
Calectasia cyanea	T	CR
Caustis sp. Boyanup (G.S. McCutcheon 1706)	3	
Chordifex abortivus	T	VU
Chorizema carinatum	3	
Conospermum quadripetalum	T	CR
Conospermum spectabile	2	
Conostylis misera	T	
Corysanthes limpida	4	
Degelia flabellata	2	
Drakaea micrantha	T	EN

Taxon	EPBC Status	WA Status
Drosera fimbriata	4	
Drosera paleacea	1	
Eucalyptus newbeyi	3	
Gahnia sclerioides	4	
Gonocarpus pusillus	4	
Gonocarpus simplex	4	
Goodenia sp. South Coast (A.R. Annels ARA 1846)	3	
Gyrostemon thesioides	2	
Hakea lasiocarpha	3	
Isopogon uncinatus	T	CR
Juncus meianthus	3	
Kunzea pauciflora	4	
Lachnagrostis billardierei subsp. *billardierei*	3	
Lambertia orbifolia subsp. *orbifolia*	T	
Lasiopetalum sp. Denmark (B.G. Hammersley 2012)	3	
Lepidium pseudotasmanicum	4	
Lepidosperma sp. Mt Chester (S. Kern et al. LCH 16596)	1	
Leucopogon alternifolius	3	
Leucopogon bracteolaris	2	
Lysinema lasianthum	4	
Microtis globula	T	EN
Microtis pulchella	4	
Microtis quadrata	4	
Myosotis australis subsp. *australis*	4	
Pleurophascum occidentale	4	
Poa billardierei	3	
Prasophyllum paulinae	1	
Pterostylis heberlei	2	
Schoenus sp. Grassy (E. Gude & J. Harvey 250)	2	
Schoenus sp. Grey *Rhizome (K.L. Wilson 2922)*	1	
Spyridium spadiceum	4	
Stenanthemum sublineare	2	
Stylidium articulatum	2	
Stylidium falcatum	2	
Styphelia cymbiformis	2	
Synaphea preissii	3	

Taxon	EPBC Status	WA Status
Thelymitra porphyrosticta	2	
Thomasia multiflora	1	
Thomasia purpurea x *solanacea*	1	
Thomasia quercifolia	4	
Thomasia solanacea	4	
Thysanotus gageoides	3	
Thysanotus isantherus	4	
Usnea pulvinata	1	
Verticordia endlicheriana var. *angustifolia*	3	
Verticordia fimbrilepis subsp. *australis*	T	EN
Verticordia harveyi	4	
Xanthosia eichleri	4	

Interim Naturemap Extract of Fauna Recorded within 10 km of the Study Area (DBCA, 2024a)

Taxon	Common Name	Class	WA Status	EPBC Status
Actitis hypoleucos	Common Sandpiper	Bird	MI	MI
Apus pacificus	Fork-Tailed Swift	Bird	MI	MI
Arctocephalus forsteri	New Zealand Fur Seal, Long-Nosed Fur Seal	Mammal	OS	
Ardenna carneipes	Flesh-Footed Shearwater	Bird	VU	MI
Ardenna tenuirostris	Short-Tailed Shearwater	Bird	MI	MI
Arenaria interpres	Ruddy Turnstone	Bird	MI	MI
Atrichornis clamosus	Noisy Scrub-Bird, Tjimiluk	Bird	EN	EN
Balaenoptera musculus	Blue Whale	Mammal	EN	EN & MI
Balaenoptera musculus brevicauda	Pygmy Blue Whale	Mammal	EN	EN & MI
Botaurus poiciloptilus	Australasian Bittern	Bird	EN	EN
Calidris acuminata	Sharp-Tailed Sandpiper	Bird	MI	MI
Calidris alba	Sanderling	Bird	MI	MI
Calidris canutus	Red Knot	Bird	EN	EN & MI
Calidris ferruginea	Curlew Sandpiper	Bird	CR	CR & MI
Calidris pugnax	Ruff	Bird	MI	MI
Calidris ruficollis	Red-Necked Stint	Bird	MI	MI
Calidris subminuta	Long-Toed Stint	Bird	MI	MI
Calidris tenuirostris	Great Knot	Bird	CR	CR & MI
Calyptorhynchus banksii naso	Forest Red-Tailed Black Cockatoo	Bird	VU	VU
Caperea marginata	Pygmy Right Whale	Mammal	MI	MI
Caretta caretta	Loggerhead Turtle	Reptile	EN	EN & MI
Cereopsis novaehollandiae grisea	Recherche Cape Barren Goose	Bird	VU	VU
Charadrius leschenaultii	Greater Sand Plover, Large Sand Plover	Bird	VU	VU & MI
Charadrius mongolus	Lesser Sand Plover	Bird	EN	EN & MI
Dasyornis longirostris	Western Bristlebird	Bird	EN	EN
Dasyurus geoffroii	Chuditch, Western Quoll	Mammal	VU	VU
Dermochelys coriacea	Leatherback Turtle	Reptile	VU	EN & MI
Elapognathus minor	Short-Nosed Snake	Reptile	P2	
Eubalaena australis	Southern Right Whale	Mammal	VU	EN & MI
Falco peregrinus	Peregrine Falcon	Bird	OS	
Galaxias truttaceus (Western Australian population)	Western Trout Minnow, Western Spotted Galaxias	Fish	EN	EN
Geotria australis	Pouched Lamprey	Fish	P3	

Taxon	Common Name	Class	WA Status	EPBC Status
Helicarion castanea	A Helicarionid Land Snail	Invertebrate	EX	
Hydromys chrysogaster	Water-Rat, Rakali	Mammal	P4	
Hydroprogne caspia	Caspian Tern	Bird	MI	MI
Hylaeus globuliferus	Woolybush Bee	Invertebrate	P3	
Isoodon fusciventer	Quenda, Southwestern Brown Bandicoot	Mammal	P4	
Leipoa ocellata	Malleefowl	Bird	VU	VU
Limosa lapponica	Bar-Tailed Godwit	Bird	MI	MI
Limosa limosa	Black-Tailed Godwit	Bird	MI	MI
Macronectes giganteus	Southern Giant Petrel	Bird	MI	EN & MI
Macrotis lagotis	Bilby, Dalgyte, Ninu	Mammal	VU	VU
Megaptera novaeangliae	Humpback Whale	Mammal	CD & MI	MI
Neophoca cinerea	Australian Sea Lion	Mammal	EN	EN
Notamacropus irma	Western Brush Wallaby	Mammal	P4	
Numenius madagascariensis	Eastern Curlew	Bird	CR	CR & MI
Numenius phaeopus	Whimbrel	Bird	MI	MI
Oceanites oceanicus	Wilson's Storm-Petrel	Bird	MI	MI
Orcinus orca	Killer Whale	Mammal	MI	MI
Oxyura australis	Blue-Billed Duck	Bird	P4	
Pandion haliaetus	Osprey	Bird	MI	MI
Parantechinus apicalis	Dibbler	Mammal	EN	EN
Pezoporus flaviventris	Western Ground Parrot	Bird	CR	CR
Phaethon rubricauda	Red-Tailed Tropicbird	Bird	MI & P4	MI
Phascogale tapoatafa wambenger	South-Western Brush-Tailed Phascogale, Wambenger	Mammal	CD	
Physeter macrocephalus	Sperm Whale	Mammal	VU	MI
Pluvialis fulva	Pacific Golden Plover	Bird	MI	MI
Pluvialis squatarola	Grey Plover	Bird	MI	MI
Potorous gilbertii	Gilbert's Potoroo	Mammal	CR	CR
Pseudocheirus occidentalis	Western Ringtail Possum, Ngwayir	Mammal	CR	CR
Psophodes nigrogularis	Western Whipbird	Bird	EN or P4	
Psophodes nigrogularis nigrogularis	Western Whipbird (Western Heath)	Bird	EN	EN
Puffinus huttoni	Hutton's Shearwater	Bird	EN	
Setonix brachyurus	Quokka	Mammal	VU	VU
Stercorarius antarcticus lonnbergi	Brown Skua, Subantarctic Skua	Bird	P4	
Stercorarius parasiticus	Arctic Jaeger, Arctic Skua	Bird	MI	MI

Taxon	Common Name	Class	WA Status	EPBC Status
Sterna dougallii	Roseate Tern	Bird	MI	MI
Thalassarche carteri	Indian Yellow-Nosed Albatross	Bird	EN	VU & MI
Thalassarche chlororhynchos	Atlantic Yellow-Nosed Albatross	Bird	VU	MI
Thalassarche melanophris	Black-Browed Albatross	Bird	EN	VU & MI
Thalasseus bergii	Crested Tern	Bird	MI	MI
Thinornis cucullatus	Hooded Plover, Hooded Dotterel	Bird	P4	
Tringa brevipes	Grey-Tailed Tattler	Bird	MI & P4	MI
Tringa glareola	Wood Sandpiper	Bird	MI	MI
Tringa stagnatilis	Marsh Sandpiper	Bird	MI	MI
Trioza barrettae	Banksia Brownii Plant-Louse	Invertebrate	EN	EN
Tyto novaehollandiae novaehollandiae	Masked Owl (Southwest)	Bird	P3	
Westralunio carteri	Carter's Freshwater Mussel	Invertebrate	VU	VU
Xenus cinereus	Terek Sandpiper	Bird	MI	MI
Zanda baudinii	Baudin's Cockatoo	Bird	EN	EN
Zanda latirostris	Carnaby's Cockatoo	Bird	EN	EN
Zanda sp. 'white-tailed black cockatoo'	White-Tailed Black Cockatoo	Bird	EN	EN
Zephyrarchaea mainae	Main's Assassin Spider	Invertebrate	VU	

Appendix B Protected Matters Search Tool Extract

Australian Government

Department of Climate Change, Energy, the Environment and Water

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. Please see the caveat for interpretation of information provided here.

Report created: 04-Oct-2024

Summary

Details

- Matters of NES
- Other Matters Protected by the EPBC Act
- Extra Information

Caveat

Acknowledgements

Summary

Matters of National Environment 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 (Ramsar	None
Great Barrier Reef Marine Park:	None
Commonwealth Marine Area:	None
Listed Threatened Ecological Communities:	3
Listed Threatened Species:	73
Listed Migratory Species:	63

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 https://www.dcceew.gov.au/parks-heritage/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 Lands:	15
Commonwealth Heritage Places:	None
Listed Marine Species:	91
Whales and Other Cetaceans:	12
Critical Habitats:	None
Commonwealth Reserves Terrestrial:	None
Australian Marine Parks:	None
Habitat Critical to the Survival of Marine Turtles:	None

Extra Information

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

State and Territory Reserves:	17
Regional Forest Agreements:	None
Nationally Important Wetlands:	1
EPBC Act Referrals:	25
Key Ecological Features (Marine):	None
Biologically Important Areas:	8
Bioregional Assessments:	None
Geological and Bioregional Assessments:	None

Details

Matters of National Environmental Significance

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.
Status of Vulnerable, Disallowed and Ineligible are not MNES under the EPBC Act.

Community Name	Threatened Category	Presence Text	Buffer Status
Empodisma peatlands of southwestern Australia	Endangered	Community likely to occur within area	In feature area
Proteaceae Dominated Kwongkan Shrublands of the Southeast Coastal Floristic Province of Western Australia	Endangered	Community may occur within area	In feature area
Subtropical and Temperate Coastal Saltmarsh	Vulnerable	Community likely to occur within area	In feature area

Listed Threatened Species [Resource Information]

Status of Conservation Dependent and Extinct are not MNES under the EPBC Act.
Number is the current name ID.

Scientific Name	Threatened Category	Presence Text	Buffer Status
BIRD			
Apheloceph ala leucopsis Southern Whiteface [529]	Vulnerable	Species or species habitat may occur within area	In buffer area only
Ardenna grisea Sooty Shearwater [82651]	Vulnerable	Species or species habitat may occur within area	In feature area
Arenaria interpres Ruddy Turnstone [872]	Vulnerable	Roosting known to occur within area	In feature area
Botaurus poiciloptilus Australasian Bittern [1001]	Endangered	Species or species habitat known to occur within area	In feature area
Calidris acuminata Sharp-tailed Sandpiper [874]	Vulnerable	Roosting known to occur within area	In feature area

Scientific Name	Threatened Category	Presence Text	Buffer Status
Calidris canutus Red Knot, Knot [855]	Vulnerable	Species or species habitat known to occur within area	In feature area
Calidris ferruginea Curlew Sandpiper [856]	Critically Endangered	Species or species habitat known to occur within area	In feature area
Calidris tenuirostris Great Knot [862]	Vulnerable	Roosting known to occur within area	In feature area
Calyptorhynchus banksii naso Forest Red-tailed Black-Cockatoo, Karrak [67034]	Vulnerable	Species or species habitat known to occur within area	In feature area
Cereopsis novaehollandiae grisea Cape Barren Goose (south-western), Recherche Cape Barren Goose [25978]	Vulnerable	Species or species habitat known to occur within area	In feature area
Charadrius leschenaultii Greater Sand Plover, Large Sand Plover [877]	Vulnerable	Species or species habitat known to occur within area	In feature area
Charadrius mongolus Lesser Sand Plover, Mongolian Plover [879]	Endangered	Roosting known to occur within area	In feature area
Dasyornis longirostris Western Bristlebird [515]	Endangered	Species or species habitat likely to occur within area	In feature area
Diomedea antipodensis Antipodean Albatross [64458]	Vulnerable	Foraging, feeding or related behaviour likely to occur within area	In feature area
Diomedea dabbenena Tristan Albatross [66471]	Endangered	Species or species habitat may occur within area	In feature area
Diomedea epomophora Southern Royal Albatross [89221]	Vulnerable	Species or species habitat may occur within area	In feature area

Scientific Name	Threatened Category	Presence Text	Buffer Status
Diomedea exulans Wandering Albatross [89223]	Vulnerable	Foraging, feeding or related behaviour likely to occur within area	In feature area
Diomedea sanfordi Northern Royal Albatross [64456]	Endangered	Species or species habitat may occur within area	In feature area
Falco hypoleucos Grey Falcon [929]	Vulnerable	Species or species habitat may occur within area	In feature area
Halobaena caerulea Blue Petrel [1059]	Vulnerable	Species or species habitat may occur within area	In buffer area only
Limosa lapponica menzbieri Northern Siberian Bar-tailed Godwit, Russkoye Bar-tailed Godwit [86432]	Endangered	Species or species habitat known to occur within area	In feature area
Limosa limosa Black-tailed Godwit [845]	Endangered	Roosting known to occur within area	In feature area
Macronectes giganteus Southern Giant-Petrel, Southern Giant Petrel [1060]	Endangered	Species or species habitat may occur within area	In feature area
Macronectes halli Northern Giant Petrel [1061]	Vulnerable	Foraging, feeding or related behaviour likely to occur within area	In feature area
Numenius madagascariensis Eastern Curlew, Far Eastern Curlew [847]	Critically Endangered	Species or species habitat known to occur within area	In feature area
Pachyptila turtur subantarctica Fairy Prion (southern) [64445]	Vulnerable	Species or species habitat likely to occur within area	In feature area
Phaethon rubricauda westralis Red-tailed Tropicbird (Indian Ocean), Indian Ocean Red-tailed Tropicbird [91824]	Endangered	Species or species habitat may occur within area	In feature area

Scientific Name	Threatened Category	Presence Text	Buffer Status
Phoebetria fusca Sooty Albatross [1075]	Vulnerable	Species or species habitat likely to occur within area	In buffer area only
Pluvialis squatarola Grey Plover [865]	Vulnerable	Roosting known to occur within area	In feature area
Psophodes nigrogularis nigrogularis Western Heath Whipbird [64449]	Endangered	Species or species habitat known to occur within area	In feature area
Pterodroma mollis Soft-plumaged Petrel [1036]	Vulnerable	Species or species habitat may occur within area	In buffer area only
Sternula nereis nereis Australian Fairy Tern [82950]	Vulnerable	Foraging, feeding or related behaviour known to occur within area	In feature area
Thalassarche carteri Indian Yellow-nosed Albatross [64464]	Vulnerable	Species or species habitat likely to occur within area	In feature area
Thalassarche cauta Shy Albatross [89224]	Endangered	Foraging, feeding or related behaviour likely to occur within area	In feature area
Thalassarche impavida Campbell Albatross, Campbell Black-browed Albatross [64459]	Vulnerable	Species or species habitat may occur within area	In feature area
Thalassarche melanophris Black-browed Albatross [66472]	Vulnerable	Foraging, feeding or related behaviour likely to occur within area	In feature area
Thalassarche steadi White-capped Albatross [64462]	Vulnerable	Species or species habitat may occur within area	In feature area
Tringa nebularia Common Greenshank, Greenshank [832]	Endangered	Species or species habitat known to occur within area	In feature area

Scientific Name	Threatened Category	Presence Text	Buffer Status
Xenus cinereus			
Terek Sandpiper [59300]	Vulnerable	Roosting known to occur within area	In feature area
Zanda baudinii listed as Calyptorhynchus baudinii			
Baudin's Cockatoo, Baudin's Black-Cockatoo, Long-billed Black-cockatoo [87736]	Endangered	Breeding known to occur within area	In feature area
Zanda latirostris listed as Calyptorhynchus latirostris			
Carnaby's Black Cockatoo, Short-billed Black-cockatoo [87737]	Endangered	Breeding known to occur within area	In feature area
FISH			
Nannatherina balstoni			
Balston's Pygmy Perch [66698]	Vulnerable	Species or species habitat known to occur within area	In feature area
INSECT			
Trioza barrettae			
Banksia brownii plant louse [87805]	Endangered	Species or species habitat known to occur within area	In feature area
MAMMAL			
Balaenoptera musculus			
Blue Whale [36]	Endangered	Species or species habitat likely to occur within area	In feature area
Dasyurus geoffroii			
Chuditch, Western Quoll [330]	Vulnerable	Species or species habitat likely to occur within area	In feature area
Eubalaena australis			
Southern Right Whale [40]	Endangered	Breeding known to occur within area	In feature area
Neophoca cinerea			
Australian Sea-lion, Australian Sea Lion [22]	Endangered	Species or species habitat may occur within area	In feature area
Parantechinus apicalis			
Dibbler [313]	Endangered	Species or species habitat known to occur within area	In feature area
Pseudocheirus occidentalis			
Western Ringtail Possum, Ngwayir, Womp, Woder, Ngoor, Ngoolangit [25911]	Critically Endangered	Species or species habitat known to occur within area	In feature area
OTHER			

Scientific Name	Threatened Category	Presence Text	Buffer Status
Westralunio carteri Carter's Freshwater Mussel, Freshwater Mussel [86266]	Vulnerable	Species or species habitat likely to occur within area	In feature area
PLANT			
Andersonia pinaster Two Peoples Bay Andersonia [67444]	Vulnerable	Species or species habitat may occur within area	In buffer area only
Banksia brownii Brown's Banksia, Feather-leaved Banksia [8277]	Critically Endangered	Species or species habitat known to occur within area	In feature area
Banksia goodii Good's Banksia [16727]	Vulnerable	Species or species habitat known to occur within area	In feature area
Banksia verticillata Granite Banksia, Albany Banksia, River Banksia [8333]	Vulnerable	Species or species habitat known to occur within area	In feature area
Caladenia granitora [65292]	Endangered	Species or species habitat may occur within area	In feature area
Caladenia harringtoniae Harrington's Spider-orchid, Pink Spider-orchid [56786]	Vulnerable	Species or species habitat known to occur within area	In feature area
Calectasia cyanea Blue Tinsel Lily [7669]	Critically Endangered	Species or species habitat known to occur within area	In buffer area only
Chordifex abortivus Manypeaks Rush [64868]	Endangered	Species or species habitat known to occur within area	In feature area
Conostylis misera Grass Conostylis [21320]	Endangered	Species or species habitat likely to occur within area	In buffer area only
Diuris drummondii Tall Donkey Orchid [4365]	Vulnerable	Species or species habitat may occur within area	In buffer area only

Scientific Name	Threatened Category	Presence Text	Buffer Status
Drakaea micrantha Dwarf Hammer-orchid [56755]	Vulnerable	Species or species habitat known to occur within area	In feature area
Isopogon uncinatus Albany Cone Bush, Hook-leaf Isopogon [20871]	Endangered	Species or species habitat known to occur within area	In feature area
Kennedia glabrata Northcliffe Kennedia [16452]	Vulnerable	Species or species habitat may occur within area	In feature area
Microtis globula South-Coast Mignonette Orchid [6780]	Vulnerable	Species or species habitat likely to occur within area	In buffer area only
Sphenotoma drummondii Mountain Paper-heath [21160]	Endangered	Species or species habitat may occur within area	In feature area
Verticordia fimbrilepis subsp. australis Southern Shy Featherflower [24630]	Vulnerable	Species or species habitat known to occur within area	In buffer area only
REPTILE			
Caretta caretta Loggerhead Turtle [1763]	Endangered	Breeding likely to occur within area	In feature area
Chelonia mydas Green Turtle [1765]	Vulnerable	Species or species habitat may occur within area	In feature area
Dermochelys coriacea Leatherback Turtle, Leathery Turtle, Luth [1768]	Endangered	Breeding likely to occur within area	In feature area
SHARK			
Carcharias taurus (west coast population) Grey Nurse Shark (west coast population) [68752]	Vulnerable	Species or species habitat likely to occur within area	In feature area
Carcharodon carcharias White Shark, Great White Shark [64470]	Vulnerable	Foraging, feeding or related behaviour known to occur within area	In feature area

Scientific Name	Threatened Category	Presence Text	Buffer Status
Galeorhinus galeus			
School Shark, Eastern School Shark, Snapper Shark, Tope, Soupfin Shark [68453]	Conservation Dependent	Species or species habitat may occur within area	In buffer area only
Rhincodon typus			
Whale Shark [66680]	Vulnerable	Species or species habitat may occur within area	In feature area

Listed Migratory Species		[Resource Information]	
Scientific Name	Threatened Category	Presence Text	Buffer Status
Migratory Marine Birds			
Apus pacificus			
Fork-tailed Swift [678]		Species or species habitat likely to occur within area	In feature area
Ardenna carneipes			
Flesh-footed Shearwater, Fleshy-footed Shearwater [82404]		Breeding known to occur within area	In feature area
Ardenna grisea			
Sooty Shearwater [82651]	Vulnerable	Species or species habitat may occur within area	In feature area
Diomedea antipodensis			
Antipodean Albatross [64458]	Vulnerable	Foraging, feeding or related behaviour likely to occur within area	In feature area
Diomedea dabbenena			
Tristan Albatross [66471]	Endangered	Species or species habitat may occur within area	In feature area
Diomedea epomophora			
Southern Royal Albatross [89221]	Vulnerable	Species or species habitat may occur within area	In feature area
Diomedea exulans			
Wandering Albatross [89223]	Vulnerable	Foraging, feeding or related behaviour likely to occur within area	In feature area
Diomedea sanfordi			
Northern Royal Albatross [64456]	Endangered	Species or species habitat may occur within area	In feature area

Scientific Name	Threatened Category	Presence Text	Buffer Status
Hydroprogne caspia			
Caspian Tern [808]		Breeding known to occur within area	In feature area
Macronectes giganteus			
Southern Giant-Petrel, Southern Giant Petrel [1060]	Endangered	Species or species habitat may occur within area	In feature area
Macronectes halli			
Northern Giant Petrel [1061]	Vulnerable	Foraging, feeding or related behaviour likely to occur within area	In feature area
Onychoprion anaethetus			
Bridled Tern [82845]		Foraging, feeding or related behaviour likely to occur within area	In buffer area only
Phoebetria fusca			
Sooty Albatross [1075]	Vulnerable	Species or species habitat likely to occur within area	In buffer area only
Thalassarche carteri			
Indian Yellow-nosed Albatross [64464]	Vulnerable	Species or species habitat likely to occur within area	In feature area
Thalassarche cauta			
Shy Albatross [89224]	Endangered	Foraging, feeding or related behaviour likely to occur within area	In feature area
Thalassarche impavida			
Campbell Albatross, Campbell Black-browed Albatross [64459]	Vulnerable	Species or species habitat may occur within area	In feature area
Thalassarche melanophris			
Black-browed Albatross [66472]	Vulnerable	Foraging, feeding or related behaviour likely to occur within area	In feature area
Thalassarche steadi			
White-capped Albatross [64462]	Vulnerable	Species or species habitat may occur within area	In feature area
Migratory Marine Species			

Scientific Name	Threatened Category	Presence Text	Buffer Status
Balaenoptera edeni Bryde's Whale [35]		Species or species habitat may occur within area	In feature area
Balaenoptera musculus Blue Whale [36]	Endangered	Species or species habitat likely to occur within area	In feature area
Caperea marginata Pygmy Right Whale [39]		Species or species habitat may occur within area	In feature area
Carcharhinus longimanus Oceanic Whitetip Shark [84108]		Species or species habitat may occur within area	In feature area
Carcharias taurus Grey Nurse Shark [64469]		Species or species habitat likely to occur within area	In feature area
Carcharodon carcharias White Shark, Great White Shark [64470]	Vulnerable	Foraging, feeding or related behaviour known to occur within area	In feature area
Caretta caretta Loggerhead Turtle [1763]	Endangered	Breeding likely to occur within area	In feature area
Chelonia mydas Green Turtle [1765]	Vulnerable	Species or species habitat may occur within area	In feature area
Dermochelys coriacea Leatherback Turtle, Leathery Turtle, Luth [1768]	Endangered	Breeding likely to occur within area	In feature area
Eubalaena australis as Balaena glacialis australis Southern Right Whale [40]	Endangered	Breeding known to occur within area	In feature area
Lagenorhynchus obscurus Dusky Dolphin [43]		Species or species habitat may occur within area	In feature area
Lamna nasus Porbeagle, Mackerel Shark [83288]		Species or species habitat may occur within area	In feature area

Scientific Name	Threatened Category	Presence Text	Buffer Status
Megaptera novaeangliae Humpback Whale [38]		Species or species habitat known to occur within area	In feature area
Mobula alfredi as Manta alfredi Reef Manta Ray, Coastal Manta Ray [90033]		Species or species habitat known to occur within area	In feature area
Mobula birostris as Manta birostris Giant Manta Ray [90034]		Species or species habitat known to occur within area	In feature area
Orcinus orca Killer Whale, Orca [46]		Species or species habitat may occur within area	In feature area
Rhincodon typus Whale Shark [66680]	Vulnerable	Species or species habitat may occur within area	In feature area
Migratory Terrestrial Species			
Motacilla cinerea Grey Wagtail [642]		Species or species habitat may occur within area	In feature area
Migratory Wetlands Species			
Actitis hypoleucos Common Sandpiper [59309]		Species or species habitat known to occur within area	In feature area
Arenaria interpres Ruddy Turnstone [872]	Vulnerable	Roosting known to occur within area	In feature area
Calidris acuminata Sharp-tailed Sandpiper [874]	Vulnerable	Roosting known to occur within area	In feature area
Calidris alba Sanderling [875]		Roosting known to occur within area	In feature area
Calidris canutus Red Knot, Knot [855]	Vulnerable	Species or species habitat known to occur within area	In feature area

Scientific Name	Threatened Category	Presence Text	Buffer Status
Calidris ferruginea Curlew Sandpiper [856]	Critically Endangered	Species or species habitat known to occur within area	In feature area
Calidris melanotos Pectoral Sandpiper [858]		Species or species habitat known to occur within area	In feature area
Calidris ruficollis Red-necked Stint [860]		Roosting known to occur within area	In feature area
Calidris tenuirostris Great Knot [862]	Vulnerable	Roosting known to occur within area	In feature area
Charadrius bicinctus Double-banded Plover [895]		Roosting known to occur within area	In feature area
Charadrius leschenaultii Greater Sand Plover, Large Sand Plover [877]	Vulnerable	Species or species habitat known to occur within area	In feature area
Charadrius mongolus Lesser Sand Plover, Mongolian Plover [879]	Endangered	Roosting known to occur within area	In feature area
Gallinago megala Swinhoe's Snipe [864]		Roosting likely to occur within area	In feature area
Gallinago stenura Pin-tailed Snipe [841]		Roosting likely to occur within area	In feature area
Limosa lapponica Bar-tailed Godwit [844]		Species or species habitat known to occur within area	In feature area
Limosa limosa Black-tailed Godwit [845]	Endangered	Roosting known to occur within area	In feature area
Numenius madagascariensis Eastern Curlew, Far Eastern Curlew [847]	Critically Endangered	Species or species habitat known to occur within area	In feature area
Numenius minutus Little Curlew, Little Whimbrel [848]		Roosting likely to occur within area	In feature area

Scientific Name	Threatened Category	Presence Text	Buffer Status
Numenius phaeopus Whimbrel [849]		Roosting known to occur within area	In feature area
Pandion haliaetus Osprey [952]		Breeding known to occur within area	In feature area
Pluvialis fulva Pacific Golden Plover [25545]		Roosting known to occur within area	In feature area
Pluvialis squatarola Grey Plover [865]	Vulnerable	Roosting known to occur within area	In feature area
Thalasseus bergii Greater Crested Tern [83000]		Breeding known to occur within area	In buffer area only
Tringa brevipes Grey-tailed Tattler [851]		Roosting known to occur within area	In feature area
Tringa nebularia Common Greenshank, Greenshank [832]	Endangered	Species or species habitat known to occur within area	In feature area
Tringa stagnatilis Marsh Sandpiper, Little Greenshank [833]		Roosting known to occur within area	In feature area
Xenus cinereus Terek Sandpiper [59300]	Vulnerable	Roosting known to occur within area	In feature area

Other Matters Protected by the EPBC Act

Commonwealth Lands [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.

Commonwealth Land Name	State	Buffer Status
Defence		
Defence - ALBANY TRAINING DEPOT [50136]	WA	In buffer area only
Defence - ALBANY TRAINING DEPOT [50137]	WA	In buffer area only
Defence - ALBANY TRAINING DEPOT ; AIRTC ALBANY [50115]	WA	In buffer area only
Defence - ALBANY TRAINING DEPOT ; AIRTC ALBANY [50116]	WA	In buffer area only

Commonwealth Land Name	State	Buffer Status
Unknown		
Commonwealth Land - [50308]	WA	In buffer area only
Commonwealth Land - [51035]	WA	In buffer area only
Commonwealth Land - [51033]	WA	In buffer area only
Commonwealth Land - [51036]	WA	In buffer area only
Commonwealth Land - [51398]	WA	In buffer area only
Commonwealth Land - [51038]	WA	In feature area
Commonwealth Land - [51399]	WA	In buffer area only
Commonwealth Land - [51032]	WA	In buffer area only
Commonwealth Land - [50309]	WA	In buffer area only
Commonwealth Land - [51030]	WA	In buffer area only
Commonwealth Land - [51034]	WA	In buffer area only

Listed Marine Species [Resource Information]

Scientific Name	Threatened Category	Presence Text	Buffer Status
Bird			
Actitis hypoleucos Common Sandpiper [59309]		Species or species habitat known to occur within area	In feature area
Apus pacificus Fork-tailed Swift [678]		Species or species habitat likely to occur within area overfly marine area	In feature area
Ardenna carneipes as Puffinus carneipes Flesh-footed Shearwater, Fleshy-footed Shearwater [82404]		Breeding known to occur within area	In feature area
Ardenna grisea as Puffinus griseus Sooty Shearwater [82651]	Vulnerable	Species or species habitat may occur within area	In feature area
Arenaria interpres Ruddy Turnstone [872]	Vulnerable	Roosting known to occur within area	In feature area

Scientific Name	Threatened Category	Presence Text	Buffer Status
Bubulcus ibis as Ardea ibis Cattle Egret [66521]		Species or species habitat may occur within area overfly marine area	In feature area
Calidris acuminata Sharp-tailed Sandpiper [874]	Vulnerable	Roosting known to occur within area	In feature area
Calidris alba Sanderling [875]		Roosting known to occur within area	In feature area
Calidris canutus Red Knot, Knot [855]	Vulnerable	Species or species habitat known to occur within area overfly marine area	In feature area
Calidris ferruginea Curlew Sandpiper [856]	Critically Endangered	Species or species habitat known to occur within area overfly marine area	In feature area
Calidris melanotos Pectoral Sandpiper [858]		Species or species habitat known to occur within area overfly marine area	In feature area
Calidris ruficollis Red-necked Stint [860]		Roosting known to occur within area overfly marine area	In feature area
Calidris tenuirostris Great Knot [862]	Vulnerable	Roosting known to occur within area overfly marine area	In feature area
Cereopsis novaehollandiae grisea Cape Barren Goose (south-western), Recherche Cape Barren Goose [25978]	Vulnerable	Species or species habitat known to occur within area overfly marine area	In feature area
Chalcites osculans as Chrysococcyx osculans Black-eared Cuckoo [83425]		Species or species habitat likely to occur within area overfly marine area	In feature area

Scientific Name	Threatened Category	Presence Text	Buffer Status
Charadrius bicinctus Double-banded Plover [895]		Roosting known to occur within area overfly marine area	In feature area
Charadrius leschenaultii Greater Sand Plover, Large Sand Plover [877]	Vulnerable	Species or species habitat known to occur within area	In feature area
Charadrius mongolus Lesser Sand Plover, Mongolian Plover [879]	Endangered	Roosting known to occur within area	In feature area
Charadrius ruficapillus Red-capped Plover [881]		Roosting known to occur within area overfly marine area	In feature area
Chroicocephalus novaehollandiae as Larus novaehollandiae Silver Gull [82326]		Breeding known to occur within area	In feature area
Diomedea antipodensis Antipodean Albatross [64458]	Vulnerable	Foraging, feeding or related behaviour likely to occur within area	In feature area
Diomedea dabbenena Tristan Albatross [66471]	Endangered	Species or species habitat may occur within area	In feature area
Diomedea epomophora Southern Royal Albatross [89221]	Vulnerable	Species or species habitat may occur within area	In feature area
Diomedea exulans Wandering Albatross [89223]	Vulnerable	Foraging, feeding or related behaviour likely to occur within area	In feature area
Diomedea sanfordi Northern Royal Albatross [64456]	Endangered	Species or species habitat may occur within area	In feature area
Eudyptula minor Little Penguin [1085]		Breeding known to occur within area	In buffer area only

Scientific Name	Threatened Category	Presence Text	Buffer Status
Gallinago megala Swinhoe's Snipe [864]		Roosting likely to occur within area overfly marine area	In feature area
Gallinago stenura Pin-tailed Snipe [841]		Roosting likely to occur within area overfly marine area	In feature area
Haliaeetus leucogaster White-bellied Sea-Eagle [943]		Species or species habitat known to occur within area	In feature area
Halobaena caerulea Blue Petrel [1059]	Vulnerable	Species or species habitat may occur within area	In buffer area only
Himantopus himantopus Pied Stilt, Black-winged Stilt [870]		Roosting known to occur within area overfly marine area	In feature area
Hydroprogne caspia as Sterna caspia Caspian Tern [808]		Breeding known to occur within area	In feature area
Larus pacificus Pacific Gull [811]		Breeding known to occur within area	In buffer area only
Limosa lapponica Bar-tailed Godwit [844]		Species or species habitat known to occur within area	In feature area
Limosa limosa Black-tailed Godwit [845]	Endangered	Roosting known to occur within area overfly marine area	In feature area
Macronectes giganteus Southern Giant-Petrel, Southern Giant Petrel [1060]	Endangered	Species or species habitat may occur within area	In feature area
Macronectes halli Northern Giant Petrel [1061]	Vulnerable	Foraging, feeding or related behaviour likely to occur within area	In feature area

Scientific Name	Threatened Category	Presence Text	Buffer Status
Merops ornatus Rainbow Bee-eater [670]		Species or species habitat may occur within area overfly marine area	In feature area
Motacilla cinerea Grey Wagtail [642]		Species or species habitat may occur within area overfly marine area	In feature area
Numenius madagascariensis Eastern Curlew, Far Eastern Curlew [847]	Critically Endangered	Species or species habitat known to occur within area	In feature area
Numenius minutus Little Curlew, Little Whimbrel [848]		Roosting likely to occur within area overfly marine area	In feature area
Numenius phaeopus Whimbrel [849]		Roosting known to occur within area	In feature area
Onychoprion anaethetus as Sterna anaethetus Bridled Tern [82845]		Foraging, feeding or related behaviour likely to occur within area	In buffer area only
Pachyptila turtur Fairy Prion [1066]		Species or species habitat likely to occur within area	In feature area
Pandion haliaetus Osprey [952]		Breeding known to occur within area	In feature area
Pelagodroma marina White-faced Storm-Petrel [1016]		Breeding known to occur within area	In buffer area only
Phoebetria fusca Sooty Albatross [1075]	Vulnerable	Species or species habitat likely to occur within area	In buffer area only
Pluvialis fulva Pacific Golden Plover [25545]		Roosting known to occur within area	In feature area

Scientific Name	Threatened Category	Presence Text	Buffer Status
Pluvialis squatarola Grey Plover [865]	Vulnerable	Roosting known to occur within area overfly marine area	In feature area
Pterodroma macroptera Great-winged Petrel [1035]		Breeding known to occur within area	In buffer area only
Pterodroma mollis Soft-plumaged Petrel [1036]	Vulnerable	Species or species habitat may occur within area	In buffer area only
Puffinus assimilis Little Shearwater [59363]		Foraging, feeding or related behaviour known to occur within area	In buffer area only
Recurvirostra novaehollandiae Red-necked Avocet [871]		Roosting known to occur within area overfly marine area	In feature area
Stercorarius antarcticus as Catharacta skua Brown Skua [85039]		Species or species habitat may occur within area	In buffer area only
Thalassarche carteri Indian Yellow-nosed Albatross [64464]	Vulnerable	Species or species habitat likely to occur within area	In feature area
Thalassarche cauta Shy Albatross [89224]	Endangered	Foraging, feeding or related behaviour likely to occur within area	In feature area
Thalassarche impavida Campbell Albatross, Campbell Black-browed Albatross [64459]	Vulnerable	Species or species habitat may occur within area	In feature area
Thalassarche melanophris Black-browed Albatross [66472]	Vulnerable	Foraging, feeding or related behaviour likely to occur within area	In feature area
Thalassarche steadi White-capped Albatross [64462]	Vulnerable	Species or species habitat may occur within area	In feature area

Scientific Name	Threatened Category	Presence Text	Buffer Status
Thalasseus bergii as Sterna bergii Greater Crested Tern [83000]		Breeding known to occur within area	In buffer area only
Thinornis cucullatus as Thinornis rubricollis Hooded Plover, Hooded Dotterel [87735]		Species or species habitat known to occur within area overfly marine area	In feature area
Tringa brevipes as Heteroscelus brevipes Grey-tailed Tattler [851]		Roosting known to occur within area	In feature area
Tringa nebularia Common Greenshank, Greenshank [832]	Endangered	Species or species habitat known to occur within area overfly marine area	In feature area
Tringa stagnatilis Marsh Sandpiper, Little Greenshank [833]		Roosting known to occur within area overfly marine area	In feature area
Xenus cinereus Terek Sandpiper [59300]	Vulnerable	Roosting known to occur within area overfly marine area	In feature area
Fish			
Acentronura australe Southern Pygmy Pipehorse [66185]		Species or species habitat may occur within area	In feature area
Campichthys galei Gale's Pipefish [66191]		Species or species habitat may occur within area	In feature area
Heraldia nocturna Upside-down Pipefish, Eastern Upside-down Pipefish, Eastern Upside-down Pipefish [66227]		Species or species habitat may occur within area	In feature area
Hippocampus breviceps Short-head Seahorse, Short-snouted Seahorse [66235]		Species or species habitat may occur within area	In feature area
Histiogamphelus cristatus Rhino Pipefish, Macleay's Crested Pipefish, Ring-back Pipefish [66243]		Species or species habitat may occur within area	In feature area

Scientific Name	Threatened Category	Presence Text	Buffer Status
Leptoichthys fistularius Brushtail Pipefish [66248]		Species or species habitat may occur within area	In feature area
Lissocampus caudalis Australian Smooth Pipefish, Smooth Pipefish [66249]		Species or species habitat may occur within area	In feature area
Lissocampus runa Javelin Pipefish [66251]		Species or species habitat may occur within area	In feature area
Maroubra perserrata Sawtooth Pipefish [66252]		Species or species habitat may occur within area	In feature area
Nannocampus subosseus Bonyhead Pipefish, Bony-headed Pipefish [66264]		Species or species habitat may occur within area	In feature area
Notiocampus ruber Red Pipefish [66265]		Species or species habitat may occur within area	In feature area
Phycodurus eques Leafy Seadragon [66267]		Species or species habitat may occur within area	In feature area
Phyllopteryx taeniolatus Common Seadragon, Weedy Seadragon [66268]		Species or species habitat may occur within area	In feature area
Pugnaso curtirostris Pugnose Pipefish, Pug-nosed Pipefish [66269]		Species or species habitat may occur within area	In feature area
Solegnathus lettiensis Gunther's Pipehorse, Indonesian Pipefish [66273]		Species or species habitat may occur within area	In feature area
Stigmatopora argus Spotted Pipefish, Gulf Pipefish, Peacock Pipefish [66276]		Species or species habitat may occur within area	In feature area

Scientific Name	Threatened Category	Presence Text	Buffer Status
Stigmatopora nigra Widebody Pipefish, Wide-bodied Pipefish, Black Pipefish [66277]		Species or species habitat may occur within area	In feature area
Urocampus carinirostris Hairy Pipefish [66282]		Species or species habitat may occur within area	In feature area
Vanacampus margaritifer Mother-of-pearl Pipefish [66283]		Species or species habitat may occur within area	In feature area
Vanacampus phillipi Port Phillip Pipefish [66284]		Species or species habitat may occur within area	In feature area
Vanacampus poecilolaemus Longsnout Pipefish, Australian Long-snout Pipefish, Long-snouted Pipefish [66285]		Species or species habitat may occur within area	In feature area
Mammal			
Arctocephalus forsteri Long-nosed Fur-seal, New Zealand Fur-seal [20]		Species or species habitat likely to occur within area	In feature area
Neophoca cinerea Australian Sea-lion, Australian Sea Lion [22]	Endangered	Species or species habitat may occur within area	In feature area
Reptile			
Caretta caretta Loggerhead Turtle [1763]	Endangered	Breeding likely to occur within area	In feature area
Chelonia mydas Green Turtle [1765]	Vulnerable	Species or species habitat may occur within area	In feature area
Dermochelys coriacea Leatherback Turtle, Leathery Turtle, Luth [1768]	Endangered	Breeding likely to occur within area	In feature area

Whales and Other Cetaceans			[Resource Information]
Current Scientific Name	Status	Type of Presence	Buffer Status
Mammal			

Current Scientific Name	Status	Type of Presence	Buffer Status
Balaenoptera acutorostrata Minke Whale [33]		Species or species habitat may occur within area	In feature area
Balaenoptera edeni Bryde's Whale [35]		Species or species habitat may occur within area	In feature area
Balaenoptera musculus Blue Whale [36]	Endangered	Species or species habitat likely to occur within area	In feature area
Caperea marginata Pygmy Right Whale [39]		Species or species habitat may occur within area	In feature area
Delphinus delphis Common Dolphin, Short-beaked Common Dolphin [60]		Species or species habitat may occur within area	In feature area
Eubalaena australis Southern Right Whale [40]	Endangered	Breeding known to occur within area	In feature area
Grampus griseus Risso's Dolphin, Grampus [64]		Species or species habitat may occur within area	In feature area
Lagenorhynchus obscurus Dusky Dolphin [43]		Species or species habitat may occur within area	In feature area
Megaptera novaeangliae Humpback Whale [38]		Species or species habitat known to occur within area	In feature area
Orcinus orca Killer Whale, Orca [46]		Species or species habitat may occur within area	In feature area
Tursiops aduncus Indian Ocean Bottlenose Dolphin, Spotted Bottlenose Dolphin [68418]		Species or species habitat likely to occur within area	In feature area

Current Scientific Name	Status	Type of Presence	Buffer Status
Tursiops truncatus s. str. Bottlenose Dolphin [68417]		Species or species habitat may occur within area	In feature area

Extra Information

State and Territory Reserves			[Resource Information]
Protected Area Name	Reserve Type	State	Buffer Status
Bakers Junction	Nature Reserve	WA	In buffer area only
Bon Accord Road	Nature Reserve	WA	In buffer area only
Breaksea Island	Nature Reserve	WA	In buffer area only
Gledhow	Nature Reserve	WA	In buffer area only
Green Island	Nature Reserve	WA	In buffer area only
Gull Rock	National Park	WA	In buffer area only
Michaelmas Island	Nature Reserve	WA	In buffer area only
Mistaken Island	Nature Reserve	WA	In buffer area only
Mount Mason	Nature Reserve	WA	In buffer area only
Seal Island (WA32199)	Nature Reserve	WA	In buffer area only
Torndirrup	National Park	WA	In buffer area only
Unnamed WA23088	Conservation Park	WA	In buffer area only
Unnamed WA23923	Nature Reserve	WA	In buffer area only
Unnamed WA30791	Nature Reserve	WA	In buffer area only
Unnamed WA33308	5(1)(h) Reserve	WA	In feature area
Voyagers Park	5(1)(h) Reserve	WA	In feature area
West Mount Mason	Nature Reserve	WA	In buffer area only

Nationally Important Wetlands		[Resource Information]
Wetland Name	State	Buffer Status
Oyster Harbour	WA	In feature area

EPBC Act Referrals				[Resource Information]
Title of referral	Reference	Referral Outcome	Assessment Status	Buffer Status
Sydney Street Subdivision	2023/09530		Completed	In buffer area only
Controlled action				
Albany Heritage Park Link Trail, WA	2019/8480	Controlled Action	Assessment Approach	In buffer area only
Albany Heritage Park Trail Network Concept Plan	2017/7943	Controlled Action	Completed	In buffer area only
Albany Port Authority dredging project	2006/2540	Controlled Action	Post-Approval	In buffer area only
Albany Ring Road Stages 2 and 3B, WA	2020/8769	Controlled Action	Post-Approval	In buffer area only
Bayonet Head Residential Development, Albany, WA	2015/7624	Controlled Action	Further Information Request	In buffer area only
Emu Point Residential Area Project	2010/5479	Controlled Action	Completed	In feature area
Southdown Magnetite Mine	2006/2544	Controlled Action	Completed	In buffer area only
Not controlled action				
Albany Port Maintenance Dredging, Albany, WA	2014/7246	Not Controlled Action	Completed	In buffer area only
Anzac Centre Develpment, Albany, WA	2012/6571	Not Controlled Action	Completed	In buffer area only
Anzac Interpretive Centre Development, Albany, WA	2013/6903	Not Controlled Action	Completed	In buffer area only
Development of Grasmere Wind Farm	2008/4368	Not Controlled Action	Completed	In buffer area only
Eradication of the European House Borer, Perth metropolitan area, WA	2009/5027	Not Controlled Action	Completed	In buffer area only
Firebreak Creation, Kalgan, WA	2020/8681	Not Controlled Action	Completed	In buffer area only
Improving rabbit biocontrol: releasing another strain of RHDV, sthrn two thirds of Australia	2015/7522	Not Controlled Action	Completed	In feature area
INDIGO Central Submarine Telecommunications Cable	2017/8127	Not Controlled Action	Completed	In feature area
Mount Barker to Albany Water Supply Pipeline	2013/6720	Not Controlled Action	Completed	In buffer area only

Title of referral	Reference	Referral Outcome	Assessment Status	Buffer Status
Not controlled action				
Prescribed burn of Cells 5, 6 & 8 of Crown Land Reserve 35381, Napier, WA	2013/6798	Not Controlled Action	Completed	In buffer area only
Protected Harbour Development	2006/3091	Not Controlled Action	Completed	In buffer area only
Scuttling of the HMAS Perth	2001/171	Not Controlled Action	Completed	In buffer area only
Seismic Survey, Bremer Basin, Mentelle Basin and Zeewyck Sub-basin	2004/1700	Not Controlled Action	Completed	In feature area
South Coast Highway Widening 8.2-14.16 SLK	2017/8009	Not Controlled Action	Completed	In buffer area only
Sth Coast Hwy Road Widening, Albany, WA	2018/8279	Not Controlled Action	Completed	In buffer area only
Not controlled action (particular manner)				
INDIGO Marine Cable Route Survey (INDIGO)	2017/7996	Not Controlled Action (Particular Manner)	Post-Approval	In feature area
Referral decision				
Albany Port Maintenance Dredging	2010/5527	Referral Decision	Completed	In buffer area only

Biologically Important Areas			[Resource Information]
Scientific Name	Behaviour	Presence	Buffer Status
Seabirds			
Eudyptula minor Little Penguin [1085]	Foraging (provisioning young)	Known to occur	In feature area
Hydroprogne caspia Caspian Tern [808]	Foraging (provisioning young)	Known to occur	In feature area
Larus pacificus Pacific Gull [811]	Foraging (in high numbers)	Known to occur	In buffer area only
Onychoprion anaethetus Bridled Tern [82845]	Foraging (in high numbers)	Known to occur	In buffer area only

Scientific Name	Behaviour	Presence	Buffer Status
Puffinus assimilis tunneyi			
Little Shearwater [59363]	Foraging (in high numbers)	Known to occur	In buffer area only
Sternula nereis			
Fairy Tern [82949]	Foraging (in high numbers)	Known to occur	In buffer area only
Sharks			
Carcharodon carcharias			
White Shark [64470]	Foraging	Known to occur	In feature area
Whales			
Megaptera novaeangliae			
Humpback Whale [38]	Migration (north)	Known to occur	In feature area

Caveat

1 PURPOSE

This report is designed to assist in identifying the location of matters of national environmental significance (MNES) and other matters protected by the Environment Protection and Biodiversity Conservation Act 1999 (Cth) (EPBC Act) which may be relevant in determining obligations and requirements under the EPBC Act.

The report contains the mapped locations of:

- World and National Heritage properties;
- Wetlands of International and National Importance;
- Commonwealth and State/Territory reserves;
- distribution of listed threatened, migratory and marine species;
- listed threatened ecological communities; and
- other information that may be useful as an indicator of potential habitat value.

2 DISCLAIMER

This report is not intended to be exhaustive and should only be relied upon as a general guide as mapped data is not available for all species or ecological communities listed under the EPBC Act (see below). Persons seeking to use the information contained in this report to inform the referral of a proposed action under the EPBC Act should consider the limitations noted below and whether additional information is required to determine the existence and location of MNES and other protected matters.

Where data are available to inform the mapping of protected species, the presence type (e.g. known, likely or may occur) that can be determined from the data is indicated in general terms. It is the responsibility of any person using or relying on the information in this report to ensure that it is suitable for the circumstances of any proposed use. The Commonwealth cannot accept responsibility for the consequences of any use of the report or any part thereof. To the maximum extent allowed under governing law, the Commonwealth will not be liable for any loss or damage that may be occasioned directly or indirectly through the use of, or reliance

3 DATA SOURCES

Threatened ecological communities

For threatened ecological communities where the distribution is well known, maps are generated based on information contained in recovery plans, State vegetation maps and 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

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

Where little information is available for a 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 detailed distribution mapping methods are used to update these distributions

4 LIMITATIONS

The following species and ecological communities have not been mapped and do not appear in this report:

- threatened species listed as extinct or considered vagrants;
- some recently listed species and ecological communities;
- some listed migratory and listed marine species, which are not listed as threatened species; and
- migratory species that are very widespread, vagrant, or only occur in Australia in small numbers.

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

- listed migratory and/or listed marine seabirds, which are not listed as threatened, have only been mapped for recorded
- seals which have only been mapped for breeding sites near the Australian continent

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

Refer to the metadata for the feature group (using the Resource Information link) for the currency of the information.

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 Conservation Codes for WA Flora and Fauna

Department of **Biodiversity, Conservation and Attractions**

GOVERNMENT OF WESTERN AUSTRALIA

Biodiversity and Conservation Science

CONSERVATION CATEGORY DEFINITIONS

For Western Australian Fauna and Flora

Threatened, Extinct and Specially Protected fauna or flora[1] are species[2] which have been adequately searched for and are deemed to be, in the wild, threatened, extinct or in need of special protection, and have been gazetted as such.

Categories of Threatened, Extinct and Specially Protected fauna and flora are:

T Threatened species

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

Threatened fauna is the species of fauna that are listed as critically endangered, endangered or vulnerable threatened species.

Threatened flora is the species of flora that are listed as critically endangered, endangered or vulnerable threatened species.

The assessment of the conservation status of threatened species is in accordance with the BC Act listing criteria and the requirements of Ministerial Guideline Number 1 and Ministerial Guideline Number 2 that adopts the use of the International Union for Conservation of Nature (IUCN) Red List of Threatened Species Categories and Criteria[3], and is based on the national distribution of the species.

CR Critically endangered species

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

Listed as critically endangered under section 19(1)(a) of the BC Act in accordance with the criteria set out in section 20 and the ministerial guidelines.

Examples of use:

- The western ringtail possum (*Pseudocheirus occidentalis*) is listed as a critically endangered threatened species under the *Biodiversity Conservation Act 2016.*
- Western ringtail possum is listed as critically endangered under the *Biodiversity Conservation Act 2016.*
- Listing reference in a table: column heading: BC Act, row text: CR.

EN Endangered species

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

Listed as endangered under section 19(1)(b) of the BC Act in accordance with the criteria set out in section 21 and the ministerial guidelines.

Examples of use:

- *Caladenia hopperiana* is listed as an endangered threatened species under the *Biodiversity Conservation Act 2016.*
- *Caladenia hopperiana* is listed as endangered under the *Biodiversity Conservation Act 2016.*
- Listing reference in a table: column heading: BC Act, row text: EN.

VU **Vulnerable species**

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

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

Examples of use:

- The forest red-tailed black cockatoo (*Calyptorhynchus banksii naso*) is listed as a vulnerable threatened species under the *Biodiversity Conservation Act 2016*.
- Forest red-tailed black cockatoo is listed as vulnerable under the *Biodiversity Conservation Act 2016*.
- Listing reference in a table: column heading: BC Act, row text: VU.

Extinct species

Listed by order of the Minister as extinct under section 23(1) of the BC Act as extinct or extinct in the wild.

EX **Extinct species**

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

Examples of use:

- *Acacia kingiana* is listed as an extinct species under the *Biodiversity Conservation Act 2016*.
- *Acacia kingiana* is listed as extinct under the *Biodiversity Conservation Act 2016*.
- Listing reference in a table: column heading: BC Act, row text: EX.

EW **Extinct in the wild species**

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

Currently there are no fauna or flora species listed as extinct in the wild.

SP Specially protected species

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

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

MI **Migratory species**

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

Migratory species include birds that are subject to an agreement between the government of Australia and the governments of Japan (JAMBA)[4], China (CAMBA)[5] or The Republic of Korea (ROKAMBA)[6], and fauna subject to the *Convention on the Conservation of Migratory Species of Wild Animals* (Bonn Convention)[7], an environmental treaty under the United Nations Environment Program. Migratory species listed under the BC Act are a subset of the migratory animals, that are known to visit Western Australia, protected under the international agreements or treaties, excluding species that are listed as Threatened species.

Examples of use:

- The wedge-tailed shearwater (*Ardenna pacifica*) is listed as a specially protected migratory species under the *Biodiversity Conservation Act 2016*.
- Wedge-tailed shearwater is listed as migratory under the *Biodiversity Conservation Act 2016*.
- Listing reference in a table: column heading: BC Act, row text: MI.

CD **Species of special conservation interest (conservation dependent)**

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

Currently only fauna are listed as species of special conservation interest.

Examples of use:

- The wambenger, south-western brush-tailed phascogale (*Phascogale tapoatafa wambenger*) is listed as a specially protected species of special conservation interest under the *Biodiversity Conservation Act 2016*.
- Wambenger, south-western brush-tailed phascogale, is listed as conservation dependent under the *Biodiversity Conservation Act 2016*.
- Listing reference in a table: column heading: BC Act, row text: CD.

OS **Species otherwise in need of special protection (other specially protected)**

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

Currently only fauna are listed as species otherwise in need of special protection.

Examples of use:

- The dugong (*Dugong dugon*) is listed as a specially protected species otherwise in need of special protection under the *Biodiversity Conservation Act 2016*.
- Dugon is listed as other specially protected fauna under the *Biodiversity Conservation Act 2016*.
- Listing reference in a table: column heading: BC Act, row text: OS.

P **Priority species**

Priority is not a listing category under the BC Act. The Priority Flora and Fauna lists are maintained by the department and are published on the department's website.

All fauna and flora are protected in WA following the provisions in Part 10 of the BC Act. The protection applies even when a species is not listed as threatened or specially protected, and regardless of land tenure (State managed land (Crown land), private land, or Commonwealth land).

Species that may possibly be threatened species that do not meet the criteria for listing under the BC Act because of insufficient survey or are otherwise data deficient, are added to the Priority Fauna or Priority Flora Lists under Priorities 1, 2 or 3. These three categories are ranked in order of prioritisation for survey and evaluation of conservation status so that consideration can be given to potential listing as threatened.

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

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

1 **Priority 1: Poorly-known species - known from few locations, none on conservation lands**

Species that are known from one or a few locations (generally five or less) which are potentially at risk. All occurrences are either: very small; or on lands not managed for conservation, for example, agricultural or pastoral lands, urban areas, road and rail reserves, gravel reserves and active mineral leases; or otherwise under threat of habitat destruction or degradation.

Species may be included if they are comparatively well known from one or more locations but do not meet adequacy of survey requirements for threatened listing and appear to be under immediate threat from known threatening processes. These species are in urgent need of further survey.

Examples of use:

- *Borya stenophylla* is listed as a Priority 1 species by the Department of Biodiversity, Conservation and Attractions.
- *Borya stenophylla* is listed as Priority 1 on the DBCA Priority Flora List.
- Listing reference in a table: column heading: DBCA, row text: P1.

2 Priority 2: Poorly-known species - known from few locations, some on conservation lands

Species that are known from one or a few locations (generally five or less), some of which are on lands managed primarily for nature conservation, for example, national parks, conservation parks, nature reserves and other lands with secure tenure being managed for conservation.

Species may be included if they are comparatively well known from one or more locations but do not meet adequacy of survey requirements for threatened listing and appear to be under threat from known threatening processes. These species are in urgent need of further survey.

Examples of use:

- *Caladenia nivalis* is listed as a Priority 2 species by the Department of Biodiversity, Conservation and Attractions.
- *Caladenia nivalis* is listed as Priority 2 on the DBCA Priority Flora List.
- Listing reference in a table: column heading: DBCA, row text: P2.

3 Priority 3: Poorly-known species - known from several locations

Species that are known from several locations and the species does not appear to be under imminent threat or from few but widespread locations with either large population size or significant remaining areas of apparently suitable habitat, much of it not under imminent threat.

Species may be included if they are comparatively well known from several locations but do not meet adequacy of survey requirements and known threatening processes exist that could affect them. These species need further survey.

Examples of use:

- *Acacia nitidula* is listed as a Priority 3 species by the Department of Biodiversity, Conservation and Attractions.
- *Acacia nitidula* is listed as Priority 3 on the DBCA Priority Flora List.
- Listing reference in a table: column heading: DBCA, row text: P3.

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

(a) Rare. Species that are considered to have been adequately surveyed, or for which sufficient knowledge is available, and that are considered not currently threatened or in need of special protection but could be if present circumstances change. These species are usually represented on conservation lands.

(b) Near Threatened. Species that are considered to have been adequately surveyed and that are close to qualifying for vulnerable but are not listed as a conservation dependent specially protected species.

(c) Species that have been removed from the list of threatened species or lists of conservation dependent or other specially protected species, during the past five years for reasons other than taxonomy.

(d) Other species in need of monitoring.

Examples of use:

- *Banksia aculeata* is listed as a Priority 4 species by the Department of Biodiversity, Conservation and Attractions.
- *Banksia aculeata* is listed as Priority 4 on the DBCA Priority Flora List.
- Listing reference in a table: column heading: DBCA, row text: P4.

[1] The definition of flora includes algae, fungi, and lichens.

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

[3] Western Australia has assigned species to threat categories using the *IUCN Red List of Threatened Species Categories and Criteria* since 1996 (referencing all criteria).

[4] JAMBA - first included in the WA migratory species list in 1980.

[5] CAMBA - first included in the WA migratory species list in 2010.

[6] ROKAMBA - first included in the WA migratory species list in 2010.

[7] Bonn Convention (Birds) - first included in the WA migratory species list in 2015.

Updated 8/08/2023

Appendix D Relevé Field Sheet

STRUCTURAL VEGETATION, FLORA - Relevé 1		Relevé: ER01 *Evandra aristata* Sedgeland (46)
Date: 26/11/24	GPS: 584596.313322, 6127893.408279	
Recorder: HD	Photo No.: 1-4	

Location: Lot 44 - Corner of Buffalo Rd and Parkes St, near northern boundary. Survey Area - Freehold Remnant Vegetation.	
Condition: Excellent	Disturbance Factors: Potential hydrology changes (Quite dry), herbivore foraging (rabbit scats), weeds
Aspect: E	Slope: Flat
Geology: Granite?	Rock: 0
Soil Colour: Dark Grey	Soil Type: Sand - Damp
Litter (% cover & depth): 80%, 4cm (organic matter)	Bare Ground (% cover): 5%
Hydrology: Seasonally wet	Topographic position: Flat

Layer	Height (m)	Cover (%)	Plant Species (Dominant 3 first)
Tree (T2)	10-30	0	N/A
Tree (T3)	<10	0	N/A
Shrub (S1)	>2	30-70	*Taxandria juniperina, Homalospermum firmum*
Shrub (S2)	1-2	10-30	*Leucopogon australis, Beaufortia sparsa*
Shrub (S3)	0-1	10-30	*Dampiera leptoclada, Adenanthos obovatus, Sphenotoma capitatum, Sphenotoma squarrosum, Astartea sp. sterile*
Sedge/Rush (VR)		>70	*Anarthria scabra, Leptocarpus (tenax)., Schoenus sp. Desmocladus sp.*
Herb (H)		<2	*Thelymitra flexuosa*
Grass (G)		0	N/A
Other (climbers) (C)		<2	*Cassytha sp.*

* = Introduced, () = Tentative ID

Surrounding plants: *Gymnoschoenus anceps, Anarthria prolifera, Evandra aristata, Billardiera heterophylla*



Photo 1 - Relevé 1 (ER01)



Photo 2 - Relevé 1 (ER01)



Photo 3 - Relevé 1 (ER01)



Photo 4 - Relevé 1 (ER01)

STRUCTURAL VEGETATION, FLORA - Relevé 2		Releve: ER02 Coastal *Banksia ilicifolia*/Peppermint Low Woodland (4)
Date: 26/11/24	GPS: 584558.106200, 6127848.289000	
Recorder: HD	Photo No.: 5-8	

Location: Lot 44 - Corner of Buffalo Rd and Parkes St, near western boundary. Survey Area - Freehold Remnant Vegetation.	
Condition: Excellent	Disturbance Factors: Weeds, herbivore digging and grazing, impacted by nearby tracks and changes in hydrology
Aspect: N/NW	Slope: Flat
Geology: Granite?	Rock: 0
Soil Colour: Grey	Soil Type: Sand
Litter (% cover & depth): 50%, 1cm	Bare Ground (% cover): 30%
Hydrology: Seasonally damp, good drainage	Topographic position: Flat

Layer	Height (m)	Cover (%)	Plant Species (Dominant 3 first)
Tree (T2)	10-30	0	N/A
Tree (T3)	<10	2-10	*Allocasuarina fraseriana*
Shrub (S1)	>2	2-10	*Agonis theiformis, *Acacia longifolia, Adenanthos obovatus*
Shrub (S2)	1-2	10-30	*Melaleuca thymoides, Jacksonia horrida, Agonis theiformis, Pultenaea reticulata*
Shrub (S3)	0-1	30-70	*Adenanthos obovatus, Melaleuca thymoides, Leucopogon glabellus, Boronia spathulata, Hibbertia depressa, Lysinema conspicuum, Petrophila (rigida), Leucopogon obovatus* subsp. *revolutus, Bossiaea praetermissa, Gompholobium capitatum, Darwinia sp., Schoenus sp.*
Sedge/Rush (VR)		30-70	*Anarthria scabra, Anarthria gracilis, Anarthria prolifera, Lygenia (barbata)., Chordifex sp, Hypolaena (exsulca)*
Herb (H)		10-30	*Dasypogon bromeliifolius, Burchardia congesta, Platysace filiformis, Xanthosia huegellii, Comesperma calymega, Amperea ericoides*
Grass (G)		<2	*Aira cupaniana*
Other (climbers) (C)		<2	*Billardiera sp.*

* = Introduced, () = Tentative ID



Photo 5 - Relevé 2 (ER02)



Photo 6- Relevé 2 (ER02)



Photo 7 - Relevé 2 (ER02)



Photo 8 - Relevé 2 (ER02)

STRUCTURAL VEGETATION, FLORA - Relevé 3		Relevé: ER03 *Taxandria juniperina* Closed Forest (59)
Date: 27/11/24	GPS: 584299.518100, 6127216.275000	
Recorder: DP	Photo No.: 9-12 (Below)	

Location: Lot 7566, R 39351 - East of Brewster Rd in lot behind Australian Christian College - Southlands. Survey Area - Edge of Environmental Conservation areas abutting freehold land.

Condition: Good	Disturbance Factors: Weeds, nearby clearing, changing hydrology
Aspect: Southwest	Slope: Gentle
Geology: Unknown	Rock: 0
Soil Colour: Grey	Soil Type: Peat
Litter (% cover & depth): 95%, 15cm	Bare Ground (% cover): 0%
Hydrology: Wet all year	Topographic position: Wetland

Layer	Height (m)	Cover (%)	Plant Species (Dominant 3 first)
Tree (T2)	10-30	30-70	*Taxandria juniperina*
Tree (T3)	<10	0	*N/A*
Shrub (S1)	>2	10-30	*Astartea pulchella, *Acacia longifolia*
Shrub (S2)	1-2	0	*N/A*
Shrub (S3)	0-1	0	**Acacia longifolia emerging*
Sedge/Rush (VR)		30-70	*Leptocarpus scariosus*
Herb (H)		0	*N/A*
Grass (G)		0	*N/A*
Other (climbers) (C)		<2	*Cassytha sp.*

* = Introduced, () = Tentative ID

Surrounding plants: *Gaudium laevigatum, Callistachys lanceolata*



Photo 9 - Relevé 3 (ER03)



Photo 10 - Relevé 3 (ER03)



Photo 11 - Relevé 3 (ER03)

STRUCTURAL VEGETATION, FLORA - Relevé 4		Relevé: ER04 *Banksia coccinea* Shrubland / *Eucalyptus staeri*/Sheoak Woodland (14)
Date: 27/11/24	GPS: 584038.977500, 6126537.024000	
Recorder: DP	Photo No.: 12-15(Below)	

Location: Approx in the centre of Lot 1193 (88) Troode St, Collingwood Park - North of Wright Street. Survey Area - Edge of Environmental Conservation areas abutting freehold land.

Condition: Very Good	Disturbance Factors: Mulch, weeds, clearing nearby and herbivores
Aspect: Northeast	Slope: Gentle
Geology: Unknown	Rock: 0
Soil Colour: Grey	Soil Type: Sand
Litter (% cover & depth): 90%, 5 cm, mulch	Bare Ground (% cover): 10%
Hydrology: Good drainage	Topographic position: Lower and middle slope

Layer	Height (m)	Cover (%)	Plant Species (Dominant 3 first)
Tree (T2)	10-30	0	N/A
Tree (T3)	<10	0	*N/A*
Shrub (S1)	>2	2-10	*Banksia coccinea, Agonis flexuosa, Allocasuarina fraseriana*
Shrub (S2)	1-2	2-10	**Gaudium laevigatum, Jacksonia spinosa*
Shrub (S3)	0-1	10-30	**Gaudium laevigatum, Jacksonia spinosa, Melaleuca thymoides, Adenanthos obovatus, *Acacia longifolia, Leucopogon glabellus, Darwinia vestita, Lysinema conspicuum, Andersonia caerulea,* Andersonia micrantha *Emerging Banksia coccinea*
Sedge/Rush (VR)		30-70	*Anarthria scabra, Anarthria gracilis, Chaetospora curvifolia, Hypolaena exsulca, Lyginia imberbis*
Herb (H)		10-30	*Comesperma calymega*, *Dasypogon bromeliifolius, Burchardia congesta, Stylidium repens, Lomandra sp., Amperea protensa*
Grass (G)		0	*N/A*
Other (climbers) (C)		2-10	*Billardiera fusiformis*

* = Introduced, () = Tentative ID

Surrounding plants: *Thysanotus sp., Johnsonia lupulina, Thelymitra sp.*



Photo 12 - Relevé 4 (ER04)



Photo 13- Relevé 4 (ER04)



Photo 14 - Relevé 4 (ER04)



Photo 15 - Relevé 4 (ER04)

STRUCTURAL VEGETATION, FLORA - Relevé 5		Relevé: ER05 *Evandra aristata* Sedgeland (46)
Date: 27/11/24	GPS: 584173.808400, 6126580.366000	
Recorder: HD	Photo No.: 16-19 (Below)	

Location: Eastern half of Lot 1193 (88) Troode St, Collingwood Park - North of Wright Street. Survey Area - Edge of Environmental Conservation areas abutting freehold land.	
Condition: Very Good	Disturbance Factors: Altered hydrology, potential historical clearing (mulch), grazing from rabbits and kangaroos (scats observed)
Aspect: South	Slope: Gentle
Geology: Unknown	Rock: 0
Soil Colour: Grey	Soil Type: Sand
Litter (% cover & depth): 80%, 2cm	Bare Ground (% cover): 5%
Hydrology: Seasonally wet	Topographic position: Wetland

Layer	Height (m)	Cover (%)	Plant Species (Dominant 3 first)
Tree (T2)	10-30	0	*N/A*
Tree (T3)	<10	<2	*Nuytsia floribunda*
Shrub (S1)	>2	<2	**Acacia longifolia*
Shrub (S2)	1-2	0	*N/A*
Shrub (S3)	0-1	30-70	*Astartea pulchella, Beaufortia sparsa, Sphenotoma capitatum, Taxandria juniperina*
Sedge/Rush (VR)		10-30	*Leptocarpus sp., Schoenus sp., Mesomelaena graciliceps, Evandra aristata*
Herb (H)		<2	*Stylidium squamosotuberosum, Stylidium assimile, Stylidium sp.*
Grass (G)		0	*N/A*
Other (climbers) (C)		0	*N/A*

* = Introduced, () = Tentative ID

Surrounding plants: *Dampiera (leptoclada)*



Photo 16 - Relevé 5 (ER05)



Photo 17 - Relevé 5 (ER05)



Photo 18 - Relevé 5 (ER05)



Photo 19 - Relevé 5 (ER05)

STRUCTURAL VEGETATION, FLORA - Relevé 6		Relevé: ER06 Limestone Coastal Heath (5)
Date: 27/11/24	GPS: 584589.271400, 6125806.910000	
Recorder: DP	Photo No.: 19-23 (Below)	

Location: In Lot 1474 (10) Flinders Pde, Middleton Beach R14789. South of Albany Golf Course estate. Survey Area - Edge of Environmental Conservation areas abutting freehold land.

Condition: Very Good	Disturbance Factors: Weeds on edge, clearing on edge and rabbits
Aspect: Southeast	Slope: Gentle
Geology: Unknown	Rock: 0
Soil Colour: Grey	Soil Type: Sand
Litter (% cover & depth): 80%, 10cm	Bare Ground (% cover): 5%
Hydrology: Good drainage	Topographic position: Coastal dune

Layer	Height (m)	Cover (%)	Plant Species (Dominant 3 first)
Tree (T2)	10-30	0	*N/A*
Tree (T3)	<10	0	*N/A*
Shrub (S1)	>2	>70	*Agonis flexuosa, Spyridium globulosum*
Shrub (S2)	1-2	0	*N/A*
Shrub (S3)	0-1	0	*N/A*
Sedge/Rush (VR)		>70	*Lepidosperma (gladiatum)*
Herb (H)		2-10	*Desmocladus flexuosa*
Grass (G)		0	*N/A*
Other (climbers) (C)		<2	*Rhagodia baccata, Hardenbergia comptonia.*

* = Introduced, () = Tentative ID

Surrounding plants: *Acacia littorea*



Photo 20 - Relevé 6 (ER06)



Photo 21 - Relevé 6 (ER06)



Photo 22 - Relevé 6 (ER06)



Photo 23 - Relevé 6 (ER06)

STRUCTURAL VEGETATION, FLORA - Relevé 7		Relevé: ER07 *Taxandria juniperina* Closed Forest (59)
Date: 28/11/24	GPS: 584712.933400, 6126780.002000	
Recorder: HD	Photo No.: 24-27 (Below)	

Location: Lot 342. 236 Wright Street, Colling Wood Park. Survey Area - Freehold Remnant Vegetation	
Condition: Very Good	Disturbance Factors: Weeds, nearby firebreak
Aspect: East/Southeast	Slope: Flat
Geology: Limestone?/Unknown	Rock: 0
Soil Colour: Black/Dark grey	Soil Type: Sand, peaty
Litter (% cover & depth): 60%, patchy, up to 10cm	Bare Ground (% cover): <2%
Hydrology: Seasonally wet, damp all year	Topographic position: Flat, wetland

Layer	Height (m)	Cover (%)	Plant Species (Dominant 3 first)
Tree (T2)	10-30	0	*N/A*
Tree (T3)	<10	0	*N/A*
Shrub (S1)	>2	10-30	*Taxandria juniperina, *Acacia longifolia*
Shrub (S2)	1-2	<2	*Chorilaena anceps*
Shrub (S3)	0-1	0	*N/A*
Sedge/Rush (VR)		>70	*Gahnia sp, Machaerina juncea, Lepidosperma effusum, Netrostylis sp. Blackwood* (P3), *Macherina vaginalis*
Herb (H)		<2	*Lobelia anceps, Centella asiatica, Patersonia sp., Amperea protensa, *Lotus sp.*
Grass (G)		<2	*Cynodon dactylon*
Other (climbers) (C)		0	*N/A*

* = Introduced, () = Tentative ID

Surrounding plants: *Cassytha sp., Callistachys lanceolata, Agonis flexuosa*



Photo 24- Relevé 7 (ER07)



Photo 25 - Relevé 7 (ER07)



Photo 26 - Relevé 7 (ER07)



Photo 27 - Relevé 7 (ER07)

STRUCTURAL VEGETATION, FLORA - Relevé 8		Relevé: ER08 *Taxandria juniperina* Closed Forest (59)
Date: 28/11/24	GPS: 585148.109000, 6128345.889000	
Recorder: HD	Photo No.: 28-31 (Below)	

Location: Lot 102 accessed from Buffalo Road. Survey Area - Freehold Remnant Vegetation.	
Condition: Very Good	Disturbance Factors: Weeds, edge effects
Aspect: North/East	Slope: Undulating - Next to a drainage line
Geology: Unknown	Rock: 0
Soil Colour: Orange/brown	Soil Type: Loam
Litter (% cover & depth): 95%, up to 7cm	Bare Ground (% cover): 5% - Only on banks of drainage line
Hydrology: Damp all year	Topographic position: Drainage line

Layer	Height (m)	Cover (%)	Plant Species (Dominant 3 first)
Tree (T2)	10-30	30-70	*Taxandria juniperina*
Tree (T3)	<10	0	*N/A*
Shrub (S1)	>2	30-70	*Callistachys lanceolata, Melaleuca preissiana, Melaleuca rhaphiophylla, Chorilaena anceps, *Acacia longifolia*
Shrub (S2)	1-2	0	*N/A*
Shrub (S3)	0-1	2-10	*Pteridium esculentum, Leucopogon obovatus* subsp. *revolutus*
Sedge/Rush (VR)		>70	*Gahnia decomposita, Machaerina juncea, Empodisma gracillimum, Lepidosperma effusum, Juncus sp., Baumea sp., Leptocarpus scariosus*
Herb (H)		<2	*Cycnogeton huegelii, Zantedeschia aethiopica*
Grass (G)		0	*N/A*
Other (climbers) (C)		<2	*Cassytha sp.*

* = Introduced, () = Tentative ID

Surrounding plants: *Schoenus nitens*



Photo 28 - Relevé 8 (ER08)



Photo 29 - Relevé 8 (ER08)



Photo 30 - Relevé 8 (ER08)



Photo 31 - Relevé 8 (ER08)

STRUCTURAL VEGETATION, FLORA - Relevé 9		Relevé: ER09 Limestone Heath (5)
Date: 28/11/24	GPS: 585540.716800, 6126371.661000	
Recorder: HD	Photo No.: 32-35 (Below)	

Location: Lot 1461 (19) Cunningham St, Emu Point R22698. Southeast of BIG4 Emu Beach Holiday Park. Survey Area - Edge of Environmental Conservation areas abutting freehold land.

Condition: Excellent	Disturbance Factors: Human made track, rabbits and weeds
Aspect: East	Slope: Gentle
Geology: Unknown	Rock: 0
Soil Colour: Grey	Soil Type: Sand
Litter (% cover & depth): 70%, 1 cm	Bare Ground (% cover): 5%
Hydrology: Good drainage	Topographic position: Coastal dune

Layer	Height (m)	Cover (%)	Plant Species (Dominant 3 first)
Tree (T2)	10-30	0	*N/A*
Tree (T3)	<10	30-70	*Agonis flexuosa*
Shrub (S1)	>2	30-70	*Spyridium globulosum*
Shrub (S2)	1-2	2-10	*Leucopogon parviflorus, Hibbertia cuneiformis*
Shrub (S3)	0-1	0	*N/A*
Sedge/Rush (VR)		30-70	*Desmocladus flexuosus, Lepidosperma gladiatum, Lepidosperma squamatum group*
Herb (H)		<2	*Opercularia hispidula*
Grass (G)		2-10	**Lagurus ovatus, Poa poiformis, Poaceae sp.*
Other (climbers) (C)		<2	*Clematis pubescens, Hardenbergia comptoniana*

* = Introduced, () = Tentative ID



Photo 32 - Relevé 9 (ER09)



Photo 33 - Relevé 9 (ER09)



Photo 34 - Relevé 9 (ER09)



Photo 35 - Relevé 9 (ER09)

STRUCTURAL VEGETATION, FLORA - Relevé 10		Relevé: ER10 Coastal *Melaleuca cuticularis* Low Forest
Date: 28/11/24	GPS: 584520.719200, 6126355.889000	
Recorder: DP	Photo No.: 36-39 (Below)	

Location: Lot 190. 273 Emu Point Dr, Collingwood Park. Survey Area - Freehold Remnant Vegetation.	
Condition: Excellent	Disturbance Factors: Nearby residential clearing, potential change in hydrology
Aspect: N/A	Slope: Flat
Geology: Unknown	Rock: 0
Soil Colour: Dark brown	Soil Type: Peat
Litter (% cover & depth): Peat - 5% 2 cm	Bare Ground (% cover): Peat – 60%
Hydrology: Wet all year	Topographic position: Wetland

Layer	Height (m)	Cover (%)	Plant Species (Dominant 3 first)
Tree (T2)	10-30	0	*N/A*
Tree (T3)	<10	>70	*Melaleuca cuticularis, Taxandria juniperina*
Shrub (S1)	>2	0	*N/A*
Shrub (S2)	1-2	0	*N/A*
Shrub (S3)	0-1	0	*N/A*
Sedge/Rush (VR)		>70	*Machaerina juncea, Gahnia trifida, Lepidosperma effusum*
Herb (H)		30-70	
Grass (G)		0	*N/A*
Other (climbers) (C)		0	*N/A*

* = Introduced, () = Tentative ID

Surrounding plants: *Callistachys lanceolata, Ficinia nodosa, Lobelia anceps,*



Photo 37 - Relevé 10 (ER10)



Photo 38 - Relevé 10 (ER10)



Photo 39 - Relevé 10 (ER10)



Photo 40 - Relevé 10 (ER10)

STRUCTURAL VEGETATION, FLORA - Relevé 11		Relevé: ER11 Coastal *Banksia ilicifolia* / Peppermint Low Woodland (4)
Date: 28/11/24	GPS: 585440.462200, 6127875.888000	
Recorder: DP	Photo No.: 40 - 43 (Below)	

Location: Road reserve at end of Collingwood Rd, adjacent to southeast corner of Lot 102 accessed from Buffalo Road. Survey Area - Edge of Environmental Conservation areas abutting freehold land.

Condition: Excellent	Disturbance Factors: Quenda diggings, firebreak and tracks
Aspect: East	Slope: Gentle
Geology: Unknown	Rock: 0
Soil Colour: Grey	Soil Type: Sand
Litter (% cover & depth): 95%, 10cm, lots of organic matter	Bare Ground (% cover): 0%
Hydrology: Good drainage	Topographic position: Lower slope, transition to coastal

Layer	Height (m)	Cover (%)	Plant Species (Dominant 3 first)
Tree (T2)	10-30	0	*N/A*
Tree (T3)	<10	0	*N/A*
Shrub (S1)	>2	70	*Agonis flexuosa, Allocasuarina fraseriana, Taxandria parviceps*
Shrub (S2)	1-2	2-10	*Leucopogon obovatus* subsp. *revolutus, Taxandria parviceps*
Shrub (S3)	0-1	2-10	*Aotus intermedia, Opercularia hispidula, Acacia pulchella, *Acacia longifolia, Melaleuca thymoides*
Sedge/Rush (VR)		30-70	*Anarthria scabra, Anarthria prolifera, Hypolaena sp., Lepidosperma sp., Schoenus efoliatus, Johnsonia lupulina*
Herb (H)		30-70	*Dasypogon bromeliifolius, Opercularia sp., Comesperma (virgatum), Mycrotis sp., Conostylis sp. sterile, Dampiera leptoclada, Orianthera serpyllifolia subsp. serpyllifolia*
Grass (G)		<2	*Tetrarrhena laevis*
Other (climbers) (C)		<2	*Billardiera sp., Marianthus sp. sterile, Drosera sp.*

* = Introduced, () = Tentative ID

Surrounding plants:



Photo 40 - Relevé 11 (ER11)



Photo 41 - Relevé 11 (ER11)



Photo 42 - Relevé 11 (ER11)



Photo 43 - Relevé 11 (ER11)