Native Vegetation Clearing Permit Application [Purpose Permit] - Supporting Documentation

Capricorn Yanchep Foreshore Reserve

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Client: Acumen Development Solutions

Report Version	Revision No.	Purpose	Strategen author/reviewer	Submitted to Client	
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1. Introduction

Capricorn Village Joint Venture (CVJV) is developing the Capricorn Coastal Village and Coastal Node Precinct, located in Yanchep, within the City of Wanneroo. The CVJV is proposing to clear an area of 2.3 ha (the clearing footprint) including 1.72 ha of native vegetation within the foreshore reserve to create the Capricorn Coastal Node Public Open Space (POS) (Figure 1). The Coastal Node and POS area is classified as a 'District/Potential Future Regional Beach' adjacent to a 'Coastal Tourist Activity Centre' in the Yanchep -Two Rocks District Structure Plan (2009). The purpose permit application is provided in Appendix 1.

The CVJV has prepared a Foreshore Management Plan (FMP) (Appendix 2) for the Capricorn Foreshore Reserve area (as shown in Figure 1) in accordance with condition 25 of WAPC Approval 138089, which provides for future management and enhancement of the foreshore reserve. The Capricorn Foreshore Reserve provides a link between the Indian Ocean and urban development and as such provides opportunity for both conservation and public beach access purposes.

This document has been prepared to support the granting of a Native Vegetation Clearing Permit under s 51 E of the *Environmental Protection Act 1986* (EP Act). The application includes the following information:

- an overview of the existing environmental conditions of the site
- an evaluation of potential impacts of the vegetation clearing
- an evaluation of compliance of the proposed clearing against the ten clearing principles listed under Schedule 5 of the EP Act
- environmental approvals and management requirements.

The following environmental assessments have been conducted for the site to inform this purpose permit application:

- *Flora and vegetation survey–Capricorn foreshore reserve* (Strategen 2016; 2017)
- *Capricorn Coastal Reserve Fauna Assessment* (Bamford 2017).

1.1 Location, ownership and tenure

The Project is located approximately 51 km north-northwest of the Perth Central Business District (CBD) (Figure 1). The proposed clearing area comprises 1.72 ha within:

- Lot 8024 Capricorn Esplanade, Yanchep
- Lot 8999 Two Rocks Road, Yanchep
- Lot 15452 Two Rocks Road, Two Rocks.

Site identification details for the proposed clearing area are provided in Table 1, Table 2 and Table 3.

Table 1: Site identification details for Lot 15452 Two Rocks Road, Two Rocks

Subject	Detail
Lot address (street number)	Lot 15452 (340L) on Plan 40341
Common name of site	340L Two Rocks Road, Two Rocks 6037
Reserve	Foreshore Reserve (R 20561)
Current certificate of title	LR3133-577
Current site owner	State of Western Australia
Local Government Authority	City of Wanneroo
Current MRS zoning	Parks and Recreation
Current DPS2 Zoning	Regional Parks & Recreation

Table 2: Site identification details for Lot 8024 Capricorn Esplanade, Yanchep

Subject	Detail
Lot address (street number)	Lot 8024 On Plan 49302
Common name of site	160 Capricorn Esplanade, Yanchep 6035
Reserve	Foreshore Management (R 48603)
Current certificate of title	LR3138-305
Current site owner	State of Western Australia
Local Government Authority	City of Wanneroo
Current MRS zoning	Parks and Recreation
Current DPS2 Zoning	Regional Parks & Recreation

Table 3: Site identification details for Lot 8999 Two Rocks Road, Yanchep

Subject	Detail
Lot address (street number)	Lot 8999 On Plan 10424
Common name of site	510L Two Rocks Road, Yanchep 6035
Reserve	Foreshore–Club Capricorn (R 32510)
Current certificate of title	LR3047-62
Current site owner	State of Western Australia
Local Government Authority	City of Wanneroo
Current MRS zoning	Parks and Recreation
Current DPS2 Zoning	Regional Parks & Recreation

Figure 1: Clearing footprint

Scale 1:5,000 at A4

0 50 100 150 m

N

Legend

- Clearing footprint (2.3ha)
- Existing cadastre
- Capricorn Foreshore Reserve

Coordinate System: GDA 1994 MGA Zone 50
Note that positional errors may occur in some areas
Date: 10/10/2017
Author: JCrute
Source: Aerial image: nearmap, flown 01/2017. Existing cadastre: SLIP, Landgate 2017. Master plan: Client 03/2017.

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2. Overview of existing environment

The following key investigations have been undertaken including the extent of the proposed clearing area:

- *Flora and vegetation survey–Capricorn foreshore reserve* (Strategen 2016; Strategen 2017)
- *Capricorn Coastal Reserve Fauna Assessment* (Bamford 2017).

2.1 Geology, landform and soils

2.1.1 Geology

The Capricorn Foreshore Reserve is located on the Swan Coastal Plain, which is characterised by a low-lying coastal plain, mainly covered with woodlands. Beard (1990) describes the Swan Coastal Plain as a low-lying coastal plain, often swampy, with sandhills also containing dissected country rising to the duricrusted Dandaragan plateau on Mesozoic, mainly sandy, yellow soils.

The surface geology of the Capricorn Foreshore Reserve is dominated by Safety Bay sand overlying Tamala Limestone. Safety Bay sand is comprised of a mixture of coastal dune sand and shallow marine eolian sands with its distribution aligning with the Quindalup Dunal System. Safety Bay sand is still productively accumulating along the coastline. Tamala Limestone is a unit of friable to hard, medium grained eolian calcarenite composed of wind-blown shell fragments with variable amounts of quartz sand.

2.1.2 Topography

The Capricorn Foreshore Reserve is characterised by an undulating dunal system running discontinuously parallel to the coast which consists primarily of a large primary dune fronted by a reasonably sized foredune. The clearing footprint ranges from 4 mAHD in the south-west (at the beach terminus of the access tracks) to a high point of approximately 16 mAHD in the east of the site based on regional topographic contour data.

2.1.3 Soils

The surface soils of the proposed clearing footprint were assessed using the geological spatial dataset mapping at 1:50 000 on geological units for Two Rocks region of Western Australia (GSWA 2013). Soils relating to the proposed clearing area are described as calcareous sand, specifically:

- S_2: Calcareous Sand – white, fine to medium grained, sub-rounded quartz and shell debris, of eolian origin.

2.1.4 Karst risk

A karst risk desktop study was undertaken by Galt Geotechnics (Galt 2016) in accordance with *Local Planning Policy 4.13: Caves and Karstic Features* (CoW 2016c) to support the Capricorn Yanchep Foreshore Management Plan (Appendix 2). The objectives of the study were to:

- conduct a karst risk desk study along the Capricorn Foreshore Reserve, in line with City of Wanneroo planning requirements, including a map showing areas of karst risk
- provide advice on further geotechnical investigations (if required) to support a Karst Risk Management Plan.

The CoW karst risk mapping identifies the Capricorn Foreshore Reserve as occurring within a 'low karst risk' zone (Galt 2016). The study concluded that a Karstic Features Management Plan is not required to support the proposed development, however notes that geotechnical studies will be required within the clearing footprint area where structures, such as changerooms, toilet facilities etc are proposed to certify that the land is capable of development (Galt 2016). The requirement for a geotechnical investigation is not specifically related to karst risk, but is required as part of standard pre-development requirements (Galt 2016).

2.1.5 Acid Sulfate Soils

Acid Sulfate Soils (ASS) are naturally occurring, iron-sulphide rich soils, sediments or organic substrates, formed under waterlogged conditions. If exposed to air, these sulphides can oxidise and release sulphuric acid and heavy metals. This process can occur due to drainage, dewatering or excavation.

A search of the Swan Coastal Plain ASS risk maps (Landgate 2017) indicates that there is no mapped risk of ASS occurring within 3 m of natural soil surface within the clearing footprint area.

2.2 Hydrology

2.2.1 Surface water

The clearing footprint is located immediately east of Indian Ocean within the Capricorn Foreshore Reserve. Based on the DoW Geographic Data Atlas mapping, the site is not located within the DoW 100-year ARI floodplain mapping of rivers and major watercourses (DoW 2017).

Surface water runoff is not expected due to the sandy nature of onsite soils and their infiltration capacity. However, in high intensity rainfall events, runoff may occur in a west-southwest direction towards the Indian Ocean following the natural topography of the site.

No wetlands are located within or adjacent to the proposed clearing footprint, with the nearest wetland located approximately 5 km east.

2.2.2 Groundwater

Groundwater is estimated to be encountered approximately 1.0 mAHD based on review of the DoW Perth Groundwater Atlas (DoW 2016). Groundwater flows in a westerly direction, towards the Indian Ocean.

2.3 Vegetation and flora

Strategen undertook a Level 2 flora and vegetation survey (Strategen 2016; Strategen 2017; Appendix 3) of the proposed foreshore disturbance area and balance of the foreshore reserve. The survey was undertaken on 25 November 2016, in accordance with Level 2 survey requirements of Guidance Statement 51 Terrestrial flora and vegetation surveys for environmental impact assessment in Western Australia and Technical Guide – Flora and Vegetation Surveys for Environmental Impact Assessment (EPA 2004a). Supplementary surveys were undertaken on 23 May 2017 and 3 October 2017. A summary of the findings of the survey are detailed in the following sections.

The surveys included a desktop assessment using Florabase, Parks and Wildlife, Department of the Environment (DEE) databases and available literature to identify the possible occurrence of Threatened Ecological Communities (TECs), Priority Ecological Communities (PECs), Threatened and Priority (P) flora and vegetation communities potentially occurring within the site (the survey area) (Strategen 2016; Strategen 2017).

The field survey involved systematic flora and vegetation sampling at each quadrat and additional opportunistic collecting was undertaken wherever previously unrecorded plants were observed. At each site, the following floristic and environmental parameters were noted:

- GPS location
- topography
- soil type and colour
- outcropping rocks and their type
- percentage cover and average height of each vegetation stratum.

For each vascular plant species, the average height, number of plants and percent cover were recorded.

All plant specimens collected during the field surveys were identified using appropriate reference material or through comparisons with pressed specimens housed at the Western Australian Herbarium where necessary. Nomenclature of the species recorded is in accordance with Western Australian Herbarium (1998-).

Regional vegetation

Beard (1990) Botanical Subdistrict

The proposed clearing area occurs within the Drummond Botanical Subdistrict which is characterised by low *Banksia* woodlands on leached sands; *Melaleuca* swamps on poorly-drained depressions; and *Eucalyptus gomphocephala* (Tuart), *Eucalyptus marginata* (Jarrah) and *Corymbia calophylla* (Marri) woodlands on less leached soils (Beard 1990).

IBRA subregion

The proposed clearing area occurs within the Swan Coastal Plain 2 IBRA subregion which is dominated by *Banksia* or Tuart on sandy soils, *Casuarina obesa* on outwash plains and paperbark (*Melaleuca*) in swampy areas (Mitchell et al. 2002).

System 6 and vegetation association mapping

The proposed clearing area occurs within the Quindalup Complex which is described as:

Quindalup Complex: *Coastal dune complex consisting mainly of two alliances–the strand and fore dune alliance and the mobile and stable dune alliance. Local variations include the low closed forest of M. Lanceolata–Callitris preissii and the closed scrub of Acacia rostellifera.*

The proposed clearing area likely[1] falls within the Guilderton 1007 vegetation system association of the Quindalup Complex (i.e. Mosaic: Shrublands; *Acacia lasiocarpa* and *Melaleuca acerosa* heath / Shrublands; *Acacia rostellifera* and *Acacia cyclops* thicket) as defined in Government of Western Australia (2017).

Vegetation statistics for the Guilderton 1007 vegetation system association are displayed in Table 4.

Table 4: Pre-European and current extent of Guilderton 1007 vegetation system association

Vegetation system association	Pre-European extent (ha)	Current extent (ha)	% remaining	Amount proposed to be cleared (ha)	% Current Extent Protected for Conservation
1007	25,383.97	17,431.62	68.67	1.72	5.25

This vegetation association is very well represented locally and regionally, and currently extends over 68.67% of its pre-European area (Government of Western Australia 2015).

Native flora

A total of 176 native vascular plant taxa from 66 plant families (predominately *Asteraceae* and *Fabaceae* families) have the potential to occur within the broader survey area based on a desktop database search (Strategen 2016; Strategen 2017).

A total of 34 native vascular plant taxa from 28 plant genera and 15 plant families were recorded Capricorn Foreshore Reserve during the Level 2 flora and vegetation assessment (Strategen 2016; Strategen 2017). The majority of taxa were recorded within the *Myrtacea*e, *Chenopodiaceae* and *Fabaceae* families. The relatively low number of plant genera recorded reflects the disturbed nature of the survey area.

[1] The proposed clearing area falls outside of the extent mapped by Government of Western Australia (2017). This is likely attributable to a georeferencing error associated with the mapped dataset and as such, the system association within the proposed clearing area has been inferred through a comparison of vegetation descriptions and location in the landscape.

Threatened and Priority flora

One Threatened flora and three Priority flora species have been recorded in the regional area based on desktop database searches; of these, no Threatened flora species and two Priority flora species were considered to have the potential to occur within the survey area based on specific habitat requirements:

- *Leucopogon maritimus* (P1)
- *Leucopogon sp. Yanchep* (P3).

Table 3 shows the Threatened and Priority flora potentially occurring within the survey area.

Table 5: Threatened and Priority flora potentially occurring within the survey area

Species	Conservation status		Description	Potential to occur
	EPBC Act	WC Act		
Eucalyptus argutifolia (Wabling Hill Mallee)	**Threatened** – Vulnerable	Threatened	Mallee to 4 m tall with smooth bark. Flowers are white and visible March to April. Habitat for this species occurs within shallow soils over limestone, on slopes or gullies of limestone ridges and outcrops (Western Australian Herbarium 1998-).	**Unlikely –** Preferred soil type/habitat does not occur within the survey area.
Leucopogon maritimus (Coast Beard-heath)	Not listed	Priority 1	A low, spreading shrubs to 40 cm tall and 60 cm wide, often multi-stemmed close to the base but single-stemmed at ground level with a fire-sensitive rootstock. *Leucopogon maritimus* is restricted to near-coastal Quindalup dunes, from a small area of coastline about 40–70 km north of Perth. It occurs in deep, calcareous sands, on the mid to upper slopes of dunes or in shallow sand over limestone, but avoiding the thicker vegetation of the swales. It grows in low heathland communities often dominated by *Melaleuca systena, Acanthocarpus preissii, Acacia lasiocarpa and Olearia axillaris*, sometimes in close proximity to the common coastal epacrids *Leucopogon parviflorus* and *L. Insularis* (Strategen 2016).	**Possible** – Preferred habitat exists within the survey area.
Leucopogon sp. Yanchep	Not listed	Priority 3	An erect shrub, 0.15–1 m tall, to 0.6 m wide. Flowers are white/pink, occurring from April to June or September. This species occurs in light grey-yellow sand, brown loam, limestone, laterite or granite on coastal plain, breakaways, valley slopes or low hills (Western Australian Herbarium 1998-).	**Unlikely –** Preferred soil type/habitat does not occur within the survey area.
Stylidium maritimum	Not listed	Priority 3	Caespitose perennial herb to 70 cm tall. Leaves tufted, linear to narrowly oblanceolate. Flowers are white or purple and visible September to November. Habitat for this species is sandy soils over limestone on dune slopes and flats, typically growing within coastal heath and shrubland or open Banksia woodland (Western Australian Herbarium 1998-).	**Possible** – Preferred habitat exists within the survey area.

No Threatened or priority flora species were recorded within the survey area at the time of Level 2 flora and vegetation assessment (Strategen 2016; Strategen 2017). The surveys were conducted during the prime flowering time for conservation significant species, which is the optimum time for correct identification Therefore, the combined survey effort is considered to adequately assess flora and vegetation values of the site.

Introduced (exotic) taxa

A total of 17 introduced (exotic) taxa were recorded within the survey area during the Level 2 flora and vegetation assessment (Strategen 2016; Strategen 2017), however, none of these species are Declared Plant species in Western Australia pursuant to s.22 of the *Biosecurity and Agriculture Management Act 2007* (BAM Act) (Strategen 2016).

Vegetation type and condition

Four native vegetation types (VT) were identified within the clearing footprint. Native vegetation types, description and areas are provided in Table 6.

Table 6: Vegetation type, description and area within the clearing footprint

Vegetation type	Description	Area (ha)	% clearing footprint
VT1	*Olearia axillaris, Atriplex isatidea, Spinifex hirsutus, *Cakile maritima* and **Thinopyrum distichum* low shrubland on sandy soils	0.10	4
VT2	*Olearia axillaris, Acacia rostellifera, Rhagodia baccata* and *Scaevola crassifolia* heath over *Spinifex longifolius, Acanthocarpus preissii, Cassytha flava*, **Pelargonium capitatum* and exotic grasses including on sandy soils	0.21	9
VT3	*Scaevola crassifolia, Olearia axillaris, Acacia rostellifera,* and *Spyridium globulosum* heath on dune crests and *Lepidosperma gladiatum* closed heath in dune swales over *Acanthocarpus preissii, *Pelargonium capitatum *Arctotis stoechadifolia* and exotic grasses on sandy soils	1.29	57
VT4	*Olearia axillaris, Scaevola crassifolia, Acacia rostellifera* and *Acacia truncata* heath with emergent *Agonis flexuosa* over *Acanthocarpus preissii, Spinifex hirsutus, *Pelargonium capitatum,* and exotic grasses on sandy soils	0.10	4
Planted	Planted palms (**Phoenix* sp.) and Japanese Pepper (**Schinus terebinthifolius)*	0.01	<1
Cleared	Cleared areas	0.55	24
TOTAL (native only)		1.70	74

The clearing footprint area shows signs of having been degraded for a long period of time due to the widespread extent of weeds and human disturbance (e.g. trampling dune vegetation for access to the beach). Vegetation condition within the clearing footprint area ranged from 'Completely Degraded' to 'Very Good' (Keighery 1994), with majority of the survey area mapped to be in 'Very Good' condition.

A summary of the vegetation condition within the clearing footprint area is provided in Table 7.

Table 7: Vegetation condition within the clearing footprint

Vegetation Condition	Area (ha)	Percentage of the site
Very Good	1.15	50
Good to Very Good	0.30	13
Good	0.27	12
Completely degraded	0.56	25
Total	**2.28**	**100**

Threatened and Priority Ecological Communities

Desktop database searches identified three TECs and one PEC within 5 km of the Capricorn Foreshore Reserve.

- *Banksia dominated woodlands of the Swan Coastal Plain Bioregion* (Endangered – EPBC Act[2]; Priority 3 PEC)

[2] This community was identified during the database search and is also recognised as the recently listed TEC – *Banksia woodlands of the Swan Coastal Plain* (Endangered – EPBC Act). There has not been sufficient time since the listing of the EPBC Act TEC to update State records to reflect the new community name and conservation status.

- SCP01: *Aquatic Root Mat Community Number 1 of Caves of the Swan Coastal Plain* (Endangered – EPBC Act, Critically Endangered – WC Act)
- Floristic community type (FCT) 26a: *Melaleuca huegelii - Melaleuca acerosa* (currently *M. systena*) shrublands on limestone ridges (Endangered – WC Act)
- FCT19b: Woodlands over sedgelands in Holocene dune swales of the southern Swan Coastal Plain (Endangered – EPBC Act, Critically Endangered – WC Act).

The closest known occurrences of TECs are the following:

- SCP01 - *Aquatic Root Mat Community Number 1 of Caves of the Swan Coastal Plain* (Critically Endangered under the EPBC Act and WC Act) located approximately 1 km from the survey area
- *Banksia dominated woodlands of the Swan Coastal Plain Bioregion* (Priority 3; now EPBC Act listed TEC), located approximately 3 km from the survey area.

The vegetation within the survey area did not resemble a known TEC; however, the vegetation within VT 2 and VT 3 may resemble two Priority 3 PECs:

- FCT 29a (Coastal Shrublands on shallow sands)
- FCT 29b (*Acacia* Shrublands on taller dunes).

These FCTs were recorded in the previous vegetation surveys within the region (ATA 2007). FCT 29 is largely restricted to the Quindalup System and contains two distinct subgroups. FCT 29a comprises mostly heaths on shallow sands over limestone close to the coast and occurs between Seabird and Garden Island. FCT 29a does not have a single dominant species but important species include *Spyridium globulosum, Rhagodia baccata* and *Olearia axillaris*. FCT 29b is dominated by *Acacia* Shrublands or mixed heaths of the larger dunes and ranges from Seabird to south of Mandurah. There is no consistent dominant species in FCT 29b, however species such as *Acacia rostellifera, Acacia lasiocarpa* and *Melaleuca systena* are important.

FCT 29a is inferred to potentially occur within VT 2 based on the dominant species recorded during the survey (e.g. *Rhagodia baccata* and *Olearia axillaris*) while VT 3 may represent FCT 29b as it comprises *Acacia rostellifera* and *Melaleuca systena*. These FCTs are also restricted to the Quindalup complex within which the survey area occurs (GoWA 2000).

Therefore, it is expected that FCT 29a and FCT 29b occur within the survey area based on previous survey results (ATA 2007), the known vegetation complex within the survey area and dominant taxa recorded. Whilst the PECs may occur in the survey area, these FCTs are very well represented within surrounding Bush Forever Site 397: *Coastal Strip from Wilbinga to Mindarie* which is under existing protection. Furthermore, these VTs will be retained within the larger foreshore reserve, subject to protection and management measures detailed in the Capricorn Yanchep Foreshore Management Plan (Strategen 2016; Strategen 2017).

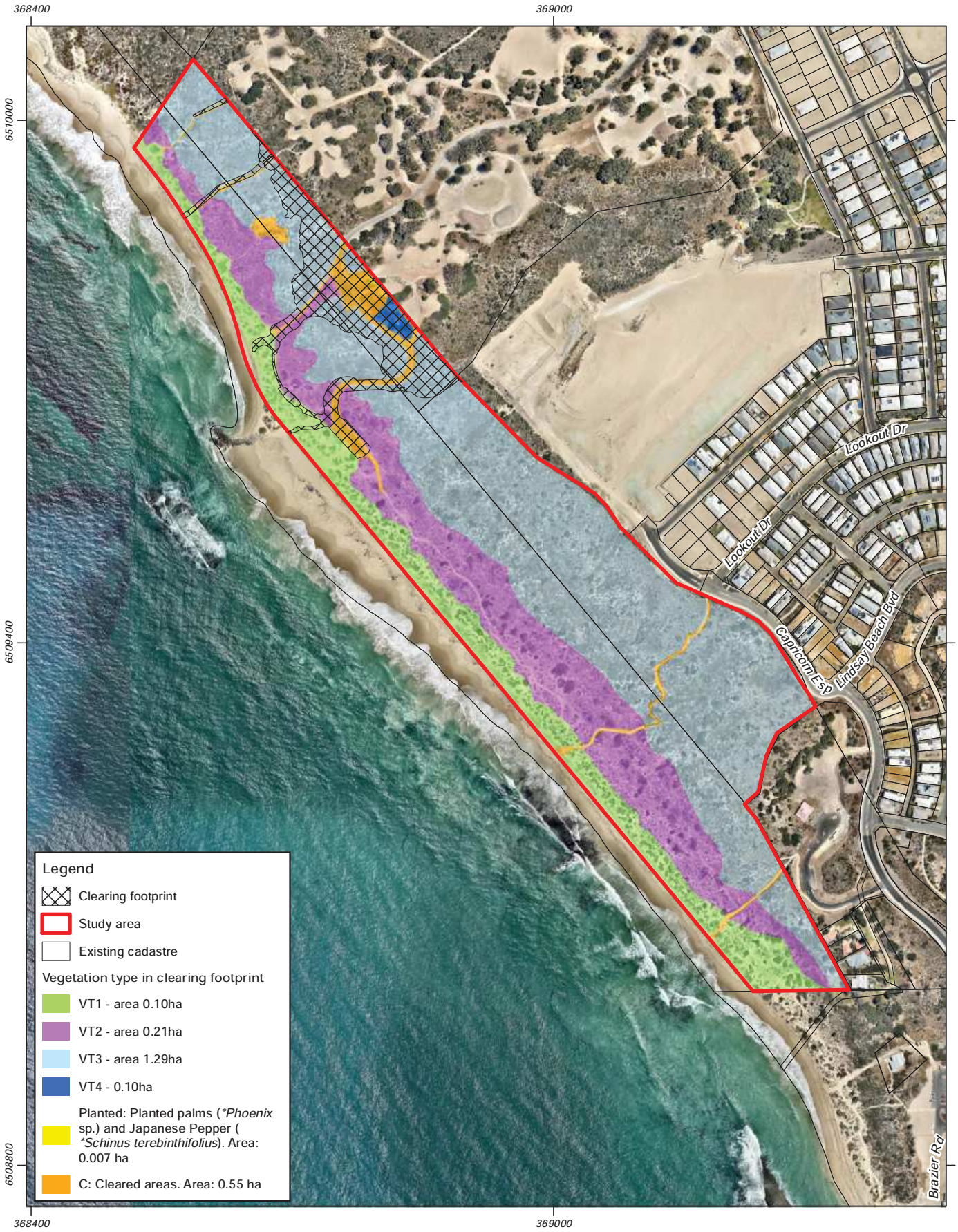

Figure 2: Vegetation types mapped within the survey area

Scale 1:6,000 at A4

0 50 100 150 200 m

N

Coordinate System: GDA 1994 MGA Zone 50
Note that positional errors may occur in some areas
Date: 2/10/2017
Author: JCrute
Source: Aerial image: Nearmap, flown 01/2017. Existing cadastre: SLIP, Landgate 2017. Master plan: Client 03/2017.

Path: Q:\Consult\2016\ADS\ADS16184\ArcMap_documents\ADS16184_G002_RevB.mxd

Vegetation type	Area in hectare
VT1	0.1
VT2	0.21
VT3	1.29
VT4	0.1
Planted	0.007
Cleared	0.55

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Figure 3: Vegetation condition mapped within the survey area

Scale 1:5,500 at A4

0 50 100 150 200 m

N

Coordinate System: GDA 1994 MGA Zone 50
Note that positional errors may occur in some areas
Date: 2/10/2017
Author: JCrute
Source: Aerial image: Nearmap, flown 01/2017. Existing cadastre: SLIP, Landgate 2017. Master plan: Client 03/2017.

Path: Q:\Consult\2016\ADS\ADS16184\ArcMap_documents\ADS16184_G003_RevB.mxd

Vegetation condition	Area in hectare
Very Good	1.15
Good to Very Good	0.30
Good	0.27
Completely Degraded	0.56

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2.4 Terrestrial fauna

Bamford Consulting Ecologists (Bamford) was commissioned to undertake a Level 1 fauna survey of the Study area in accordance with EPA *Guidance Statement No. 56 Terrestrial Fauna Surveys for Environmental Impact Assessment in Western Australia* (EPA 2004b; Appendix 4). The field component of the survey was undertaken in December 2016 and focussed on a 'values and impacts' approach to impact assessment with respect to fauna (Bamford 2017).

2.4.1 Desktop assessment

The desktop study identified 166 vertebrate fauna species as potentially occurring in the site: four frogs, 53 reptiles, 92 birds, 12 native and five introduced mammals (Bamford 2017).

The vertebrate assemblage includes up to 38 species of conservation significance (CS). Some species have been excluded from the assemblage as they are almost certainly locally extinct. A further three CS invertebrate species were identified from the desktop assessment (Bamford 2017).

Overall, the fauna assemblage may consist of up to 166 vertebrate species, but all these are unlikely to occur due to the limited range of environments present in the site (Bamford 2017).

Conservation significant fauna species

Based on the likely fauna assemblage of the site, a total of 38 species of conservation significance were considered to potentially occur in the Capricorn Foreshore Reserve. Species of conservation significance have been divided into three categories including:

1. Conservation significance (CS) 1 - listed under legislation (EPBC Act; WC Act).
2. Conservation significance (CS) 2 - listed as Priority by Department of Biodiversity, conservation and Attractions.
3. Conservation significance (CS) 3 - locally significant or otherwise of note in the area.

The overall list of significant species includes six CS1 species, three CS2 species and 29 CS3 species. Numbers and classes of significant species broken down by major taxonomic group and still expected to be present are listed in Table 8.

Table 8: Conservation significant vertebrate species expected in the survey area.

Taxon	CS1	CS2	CS3	Total
Frogs	-	-	-	-
Reptiles	-	1	1	2
Birds	6	-	26	32
Mammals*	-	2	2	4
Total	**6**	**3**	**29**	**38**

Key species of conservation significance (CS 1 and CS 2) with the potential to occur in the survey area are discussed further in Table 9.

Table 9: Conservation significant fauna species with the potential to occur on site

Common Name	Conservation Status		Expected status in Study area	Fauna assessment
	CS1	**CS2**		
Reptiles				
Black-striped Snake *Neelaps calonotos*		P3	Resident	The Black-striped Snake is restricted to the west coast from just north of Lancelin to Mandurah and, although locally common in some environments on the Swan Coastal Plain, its persistence is threatened by continuing loss of habitat due to urban development throughout its range. The species may be locally extinct at Capricorn and Yanchep due to habitat fragmentation. It was not recorded during the Level 1 fauna assessment (Bamford 2017).
Birds				
Eastern Osprey *Pandion cristatus*	Mar S5		Irregular visitor	Several other species listed as Migratory until recently have also been removed from the EPBC list, including the Eastern Osprey and White-bellied Sea-Eagle. These are likely to be infrequent visitors to the area. Both Ospreys and White-bellied Sea-Eagles are known to nest in Tuart trees around the Peel Inlet. They nest on the ground or on the tops of high dunes on islands, but are unlikely to nest on the mainland (Bamford 2017).
Peregrine Falcon *Falco peregrinus*	S7		Irregular visitor	This species is known to occur over a wide range of environments across Australia. Preferred nesting locations include a range of elevated locations with steep topography such as rocky hills, breakaways, cliffs and high artificial structures. It will also nest in very large, horizontally-aligned tree hollows, and in old Raven nests in tall trees (Bamford 2017). The Peregrine Falcon may be a regular foraging visitor to the site, but the area would represent a very small proportion of a pair's range.
Carnaby's Black-Cockatoo (CBC) *Calyptorhynchus latirostris*	E S2		Visitor	The species is likely to be an irregular non-breeding visitor to the Capricorn area; it is common and with some pairs breeding slightly inland around Yanchep National Park. It is known to feed on seeding Banksia and Eucalyptus as well as proteaceous heaths, which does not occur in the site (Bamford 2017). The coastal heathland present at the site provides minimal foraging value for the species, with only five of the 51 species recorded in the broader survey area considered habitat for Carnaby's Black-Cockatoo in accordance with *Plants Used by Carnaby's Black Cockatoo* (Groom 2011). Of the five species recorded which are utilised by CBC, all are foraging species only, with the exception of *Eucalyptus gomphocelphala* which potentially provides roosting and breeding habitat. No evidence of roosting or nesting was recorded during the Level 1 fauna assessment (Bamford 2017), and based on the lack of suitable habitat is unlikely to occur. Several known roosting sites occur to the east of the site at Yanchep National Park (approximately 5 km from the site), Carabooda and Nowergup (Department of Planning Western Australia 2011). Data from Birdlife Australia's Great Cocky Count survey indicate that a single roost site located east of Yanchep had a count of 4,897 Carnaby's Black-Cockatoos and accounted for 45% of all of the Carnaby's recorded on the Perth-Peel Coastal Plain (Bamford 2017). Breeding is known to occur further inland, east of the site (Bamford 2017). There are several small resident populations on the northern Swan Coastal Plain at Yanchep National Park, Boonanarring and Mooliabeenee. Birds at these sites are known to forage in remnant bushland and in adjacent pine plantations (Bamford 2017). Carnaby's Black-Cockatoo was recorded foraging at Burns Beach by and flying over the site at South Yanchep in previous fauna investigations (Bamford 2017).

Common Name	Conservation Status		Expected status in Study area	Fauna assessment
Fork-tailed Swift *Apus pacificus*	Mig S5		Migrant, occasional visitor	This species occurs is a spring to autumn, non-breeding migrant to Australia, and is widespread but infrequently observed in coastal and subcoastal areas between Augusta and Carnarvon, including nearshore and offshore islands (DoEE 2017b). This species was not recorded during the survey but may occur occasionally on site, although it is a largely aerial species mostly independent of terrestrial ecosystems.
Rainbow Bee-eater *Merops ornatus*	Mar S5		Migrant, occasional visitor	Rainbow Bee-eater was not recorded during the Level 1 fauna assessment in December 2016, but is likely to nest in the area during spring and was recorded at Burns Beach in previous investigations (Bamford 2017). The species will often construct its burrows on slopes that are sparsely vegetated, including slopes around construction sites.
Mammals				
Quenda, Southern Brown Bandicoot *Isoodon obesculus fusciventer*		P5	Resident	This species is commonly associated with dense, low vegetation, so may be present in heathland habitats within the site. No evidence (diggings or tracks) of the species was recorded, during the Level 1 fauna assessment however the species has been recorded at South Yanchep, approximately 3 km to the south in previous investigations (Bamford 2017).
Brush Wallaby *Notamacropus irma*		P4	Resident	The Brush Wallaby occurs in a range of shrublands and woodlands across much of the south-west of Western Australia. This species has been recorded previously in the Neerabup National Park however was not recorded during the Level 1 fauna assessment in the site (Bamford 2017).

EPBC Act listed species: V = Vulnerable, E = Endangered, C = Critically Endangered, Mig = Migratory, Mar = Marine.
WC Act listed species: S1 – S7 = Schedule 1 - 7; DPaW Priority Species: P1 - P5 = Priority 1 - 5.

2.4.2 Fauna values present within the site

Fauna assemblage

The assemblage is typical of heathland on coastal dunes, located throughout the Swan Coastal Plain Bioregion. The likely composition of the major taxonomic groups is described in Table 10.

Table 10: Fauna assemblage

Taxonomic group	Anticipated species numbers
Frogs	Four species of frog may occur in the Study area. Frog species are likely to be locally common, regionally widespread and can be expected to breed in seasonal wetlands in the region.
Reptiles	53 species of reptile are known from the general area. The majority of reptile species that may occur in the area are common and regionally widespread on the coastal plain north of Perth.
Birds	92 species of bird may occur in the Study area, however species that may occur include species that fly over the Study area occasionally and therefore do not strictly use the survey area.
Mammals	17 mammal species could be present in the Study area, including five introduced species and several species are considered to be locally extinct. Approximately half of the native species potentially occurring in the Study area are bats, known from the general region north of Perth.
Invertebrates	Some species of conservation significance are known from the region.

Vegetation and Substrate Associations (VSAs)

The coastal heath on calcareous sand can be considered a single VSA that is well-represented to the north and south. It also tends to be the coastal strip of native vegetation that is retained during urban development. Vegetation includes a mix of low shrubs comprising, *Acacia rostellifera*, *Olearia axillaris* and *Scaevola* sp. over coastal sand dunes.

Sedgelands of *Lepidosperma gladiatum* sometimes form a distinct VSA in some locations (i.e. in deep swales) but are also mixed with other vegetation types across the site. The lack of variety in VSAs with the separation of the coastal heaths from more inland VSAs such as shrublands and woodlands will slightly reduce the number of species present. This is because some species will move between vegetation types seasonally but this opportunity has been lost with development nearby. This VSA type is widespread in the local area, particularly to the north of the site (Bamford 2017).

Summary of fauna values

Overall, the fauna assemblage is constrained by the limited range of environments present in the survey area and the adjacent development areas (Bamford 2017). Few species of conservation significance are anticipated to be present, however locally significant birds and mammals may utilise the site. The fauna assemblage is affected by the long, narrow shape of the survey area and its relationship to areas of protected native vegetation to the north and south.

3. Assessment against the ten clearing principles

An assessment of the proposed clearing against the ten clearing principles is provided in Table 11. The ten clearing principles are outlined in Schedule 5 of the EP Act and assessment is in accordance with Department of Water and Environmental Regulation, formerly Department of Environment Regulation guidelines (DER 2014).

This assessment demonstrates that the proposed removal of 1.72 ha of native vegetation is not at variance with the any of the clearing principles. On this basis, CVJV anticipates that the proposed clearing of 1.72 ha of native vegetation can be permitted to occur.

Table 11: Assessment of native vegetation clearing in accordance with the ten clearing principles

Clearing principle	Assessment	Outcome
(a) Native vegetation should not be cleared if it comprises a high level of biological diversity.	The clearing is to occur with the site covers an area of approximately 1.72 ha. A total of 34 native flora species were identified in the Level 2 flora assessment (Strategen 2016; Strategen 2017). The species recorded is likely to be representative of the true diversity of the site given that the survey was conducted in November (i.e. spring) the optimal survey timing for the Swan Coastal Plain, with an additional survey completed in autumn. Vegetation within VT 2 and VT 3 may resemble two Priority 3 PECs; FCT 29a and FCT29b, of which 0.21 ha and 1.29 ha will be cleared. These FCTs however are well represented within surrounding Bush Forever Site 397 which is under existing protection, as well as within the Capricorn Foreshore Reserve area. These VTs will be retained within the larger foreshore reserve, subject to protection and management measures detailed in the Capricorn Yanchep Foreshore Management Plan. The clearing footprint shows signs of degradation over a long period of time due to the widespread extent of weeds and human disturbance (e.g. trampling dune vegetation for access to the beach). As such, vegetation condition within the survey area ranged from 'Completely Degraded' to 'Very Good'. Vegetation is also uniform in nature. Results indicate a relatively low floristic diversity for the proposed clearing area; therefore, biological diversity within the proposed clearing area is not expected to be significantly affected, due to the proportionally small area of clearing proposed. In addition, the proposed clearing area encompasses previously disturbed areas, further reducing impacts on native vegetation. Clearing is not expected to be at variance to this principle.	Not at variance.
b) Native vegetation should not be cleared if it comprises the whole or a part of, or is necessary for the maintenance of, a significant habitat for fauna indigenous to Western Australia.	The proposed clearing area shows signs of being degraded by clearing, human disturbance and invasive weeds, reducing the value of the site for significant fauna. The proposed clearing area is located within the larger foreshore reserve, representing 7.45% of the foreshore reserve. Furthermore, the fauna habitat within the foreshore reserve is consistent with extensive areas of foreshore reserve spanning the coastline. The proposed clearing area is not considered to represent habitat critical for fauna species, therefore the nature and scale of vegetation to be cleared is not considered to be significant at a local or regional scale in regard to indigenous fauna habitat.	Not at variance.
c) Native vegetation should not be cleared if it includes, or is necessary for the continued existence of, rare flora.	No rare flora was recorded in the proposed clearing area during the flora and vegetation assessments (Strategen 2016, 2017). No Threatened flora species as listed under s 178 of the EPBC Act or pursuant to Schedule 1 of the WC Act and as listed by Parks and Wildlife (2015) or Priority flora species as listed by Western Australian Herbarium (1998-) were recorded within the site. Given that the site was conducted during the prime flowering time for majority of the conservation significant species potentially occurring within the site, it is not expected that occurrences of conservation significant species are present within the site. Therefore, the Project is not at a variance with this principal.	Not at variance.

Clearing principle	Assessment	Outcome
d) Native vegetation should not be cleared if it comprises the whole or a part of, or is necessary for the maintenance of, a threatened ecological community.	The vegetation identified within the Strategen (2016) survey area did not resemble a known TEC. As a result the proposed clearing will be at variance with this principle.	Not at variance.
e) Native vegetation should not be cleared if it is significant as a remnant of native vegetation in an area that has been extensively cleared.	A total 1.72 ha of vegetation, representing 7.45% of the foreshore reserve is proposed to be cleared. Vegetation to be cleared has been historically disturbed by human trampling, invasive weeds and clearing, and is surrounded by residential areas and roads. Notwithstanding this, the vegetation of the foreshore reserve is not considered to be a significant remnant. The proposed clearing is not expected to result in a significant impact at the local or regional scale due to the small scale of clearing, and highly degraded and uniform nature of vegetation. Furthermore, the proposed clearing area encompasses previously disturbed areas, further reducing impacts on native vegetation. The balance of the foreshore reserve, comprising 20.74 ha (92.55% of the foreshore reserve) will be retained and protected.	Not at variance.
f) Native vegetation should not be cleared if it is growing in, or in association with, an environment associated with a watercourse or wetland.	The proposed clearing will not occur near a watercourse or wetland. The closest wetland is located approximately 2 km east of the proposed clearing area (Wetland UFI: 8010; Conservation Category Wetland) therefore the proposed clearing is not at variance to this principle.	Not at variance.
g) Native vegetation should not be cleared if the clearing of the vegetation is likely to cause appreciable land degradation.	The proposed clearing will affect a small amount of vegetation (1.72 ha; 7.45%) within the foreshore reserve. In consideration of the above, the clearing is not likely to cause appreciable land degradation due to: • the small area of total proposed clearing • the large extent of vegetation that would remain within the local and regional areas.	Not at variance.

Clearing principle	Assessment	Outcome
h) Native vegetation should not be cleared if the clearing of the vegetation is likely to have an impact on the environmental values of any adjacent or nearby conservation area.	The proposed clearing area occurs within the mapped extent of Bush Forever Site 397: *Coastal Strip from Wilbinga to Mindarie*. Bush Forever Site 397 corresponds to the existing coastal foreshore reserve between Mindarie and Wilbinga and is therefore identified in Bush Forever as a 'Site with some Existing Protection'. Bush Forever Site 397 comprises part of the Yanchep foreshore reserve. The foreshore reserve boundary was determined in 1996 as part of MRS Amendment 975/33 and is based on the Coastal Planning Strategy prepared for the Yanchep-Two Rocks area (Alan Tingay & Associates, 1993). As outlined in State Planning Policy 2.8 *Bushland Policy for the Perth Metropolitan Region* (SPP 2.8) mitigation and offset measures are required for direct impacts to Bush Forever sites. Appendix 4 of SPP2.8 requires (for areas of low conservation significance) a net outcome of at least 1 x the calculated loss in habitat hectares with the possibility of reducing with consideration of gains achieved in vegetation/habitat of a higher significance than the vegetation lost. Given that 25% of the clearing footprint is 'completely degraded' and no conservation significant flora or threatened communities have been identified within the clearing footprint, the vegetation to be cleared has been considered 'low conservation significance' In addition, Bush Forever Site 397 is widespread, and only 1.72 ha of the Bush Forever Site is proposed to be cleared with the balance retained, ensuring ecological connectivity to the Bush Forever Site to the north and south is maintained. Selective revegetation will be undertaken within the foreshore reserve in accordance with any requirements of the Foreshore Management Plan (to be endorsed by CoW and WAPC). In addition, the proposed development will include formalising access-ways and the construction of conservation fencing which will provide additional protection to foreshore vegetation. The draft FMP also proposes a targeted weed control programme for the broader foreshore reserve thus enhancing the existing vegetation within the surrounding Bush Forever area. Weed control will be informed by the high level weed mapping within the FMP. The indicative revegetation areas are shown in Figure 9 of the FMP (Appendix 2) totalling 1.05 ha. Given the above information, including the management and revegetation provisions in the FMP, the proposal is not considered to be at variance to principle h.	Not at variance.
i) Native vegetation should not be cleared if the clearing of the vegetation is likely to cause deterioration in the quality of surface or underground water.	The amount of vegetation proposed to be cleared is minimal and is not expected to affect surface or underground water quality.	Not at variance.
j) Native vegetation should not be cleared if clearing the vegetation is likely to cause, or exacerbate, the incidence of flooding.	The proposed clearing will affect a small amount of vegetation and is not part of, or associated with, a flood management zone, a drainage basin or creek line, therefore the proposed clearing is not at variance with this principle.	Not at variance.

4. Environmental approval and management

4.1 Environmental approvals

The key approvals identified as being required and/or potentially required to support the proposed clearing include the following:

- Native Vegetation Clearing Permit (NVCP) under s 51 E of the EP Act
- Development Application in accordance with City of Wanneroo requirements, including an associated Foreshore Management Plan and Bushfire Management Plan.

The assessment against the 10 clearing principles concluded that the proposed clearing, whilst resulting in some reduction in vegetation within Bush Forever Site 397 and two Priority 3 PECs (FCT 29a and FCT 29b) will not result in a significant impact to any flora or fauna species, or threatened ecological communities particularly with consideration of the proposed mitigation and management measures outlined below and detailed in the Foreshore Management Plan (currently under review by CoW and DoPLH).

4.2 Environmental mitigation and management

The location of the proposed clearing area has been selected with consideration of the existing environment and quality of native vegetation. As such, the development has been located in a degraded area (Figure 3), particularly in comparison to the large areas of 'very good quality' vegetation within the foreshore reserve.

In order to manage potential impacts associated with the proposed clearing on Bush Forever, CVJV will implement a range of environmental management measures detailed in the Capricorn Yanchep Foreshore Management Plan (Appendix 2), focussing on key aspects and potential impacts, including the following:

- selective rehabilitation of degraded areas (as shown indicatively in Figure 9 of Appendix 2)
- measures to avoid the spread of weeds and pathogens, including:
  - site inductions
  - establishing clearing boundaries through use of GPS and on-ground demarcation
  - ensure vehicles are clean of entry
  - targeted weed control within the foreshore reserve based on weed mapping
  - weed monitoring
- measures to minimise vegetation clearing and avoid significant vegetation where required:
  - site inductions
  - establishing clearing boundaries through use of GPs and on-ground demarcation
  - ensure vehicles are clean of entry

  provision of signage in areas of know wildlife activity
- measures to protect fauna and fauna habitat:
  - site inductions
  - establishing clearing boundaries through use of GPs and flagging
  - fauna inspections, trapping and translocation program
  - Feral animals control

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