



CLEARING PERMIT

Granted under section 51E of the Environmental Protection Act 1986

Purpose Permit number:	CPS 8794/1
Permit Holder:	Tamala Park Regional Council
Duration of Permit:	27 January 2021 to 27 January 2031

The permit holder is authorised to clear native vegetation subject to the following conditions of this permit.

PART I – CLEARING AUTHORISED

- 1. Clearing authorised (purpose)**
The permit holder is authorised to clear native vegetation for the purpose of construction of an access road and carpark
- 2. Land on which clearing is to be done**
Lot 9505 on Plan 52070, Tamala Park
Lot 3050 on Plan 47951, Mindarie (Reserve 35890)
Lot 15448 on Plan 40340, Mindarie (Reserve 20561)
- 3. Clearing authorised**
The permit holder must not clear more than 1.88 hectares of native vegetation within the area cross-hatched yellow in attached Plan 8794/1(a).
- 4. Period during which clearing is authorised**
The permit holder must not clear any native vegetation after 27 January 2026

PART II – MANAGEMENT CONDITIONS

- 5. Avoid, minimise, and reduce impacts and extent of clearing**
In determining the native vegetation authorised to be cleared under this permit, the permit holder must apply the following principles, set out in descending order of preference:
 - (a) avoid the clearing of native vegetation;
 - (b) minimise the amount of native vegetation to be cleared; and
 - (c) reduce the impact of clearing on any environmental value.
- 6. Weed and dieback management**
When undertaking any clearing authorised under this permit, the permit holder must take the following measures to minimise the risk of introduction and spread of *weeds* and *dieback*:

- (a) clean earth-moving machinery of soil and vegetation prior to entering and leaving the area to be cleared;
- (b) ensure that no known *dieback* or *weed*-affected soil, *mulch*, *fill*, or other material is brought into the area to be cleared; and
- (c) restrict the movement of machines and other vehicles to the limits of the areas to be cleared.

7. Directional clearing

The permit holder must conduct clearing activities in a slow, progressive manner from east to west to allow fauna to move into adjacent native vegetation ahead of the clearing activity.

8. Erosion management

The permit holder shall begin construction within two months of undertaking clearing authorised under this permit.

9. Revegetation requirements (Bush Forever mitigation)

Within 12 months of the commencement of clearing, the permit holder must implement and adhere to the 'Revegetation Management Plan – Earthworks Disturbance Area - Catalina Estate Coastal Access Infrastructure: Coterra Environment. Revision 0. December 2020' including but not limited to the following actions:

- (a) retain the vegetative material and topsoil removed by clearing authorised under this permit and stockpile the vegetative material and topsoil to be used in *revegetation* in an area that has already been cleared within the area cross-hatched red on the attached Plan 8794/1(b)
- (b) commence *revegetation* of the areas cross-hatched red on Plan 8794/1(b) by:
 - (i) laying the appropriate vegetative material and topsoil retained under condition 9(a);
 - (ii) deliberately *planting* tube stock and salvaged native vegetation and/or *direct seeding* native vegetation seeds; and
 - (iii) ensuring only *local provenance* seeds and propagating material are used to *revegetate* the areas.
- (c) implement hygiene protocols by cleaning earth-moving machinery of soil and vegetation prior to entering and leaving the *revegetation* sites;
- (d) establish at least eight 5 x 5 metre quadrat monitoring sites within *revegetated* areas;
- (e) monitor quadrats specified in condition 9(d) at least annually;
- (f) monitoring of quadrats specified in condition 9(d) is to be undertaken by an *environmental specialist*;
- (g) achieve the completion criteria specified in the attached Schedule 1 (Revegetation Completion Criteria) after the three year monitoring period for areas *revegetated* under this permit;
- (h) undertake *weed* control activities on an 'as needs' basis to maintain a minimum criteria in the attached Schedule 1 (Revegetation Completion Criteria)
- (i) undertake remedial actions for areas *revegetated* where monitoring indicates that *revegetation* has not met the completion criteria, outlined in the attached Schedule 1 (Revegetation Completion Criteria), including:
 - (i) revegetate the area by deliberately *planting* and/or *direct seeding* native vegetation seeds that will result in the minimum targets specified in the attached Schedule 1 (Revegetation Completion Criteria) ensuring only local provenance seeds and propagating material are used;
 - (ii) undertake further weed control activities;
 - (iii) undertake watering activities; and

- (iv) undertake annual monitoring of each revegetated site, until the completion criteria outlined in the attached Schedule 1 (Revegetation Completion Criteria) are met.

10. Vegetation management - fencing

- (a) Within 12 months of clearing, the permit holder shall construct a fence along the perimeters of the areas cross-hatched red on attached Plan 8794/1(c).
- (b) Fences should allow for the movement of wildlife by being raised 15 centimetres from the ground.
- (c) In at least two locations along the length of the fence specified in condition 10(a), gaps within the fence, or gates that accommodate for the movement of larger wildlife, shall be positioned.
- (d) Within one month of installing the above fences, the permit holder shall notify the CEO in writing that the fencing has been completed.

11. Offset - revegetation requirements

Within 12 months of the commencement of clearing, the permit holder must implement and adhere to the 'Revegetation Management Plan – Offset Site - Catalina Estate Coastal Access Infrastructure: Coterra Environment. Revision 0. December 2020' including but not limited to the following actions:

- (a) commence *revegetation* of at least 1.56 hectares of native vegetation in Completely Degraded to Degraded condition based upon the condition scale of Keighery (1994) within the areas cross-hatched red on Plan 8794/1(d) by;
 - (ii) deliberately *planting* tube stock and salvaged native vegetation and/or *direct seeding* native vegetation seeds; and
 - (iii) ensuring only *local provenance* seeds and propagating material are used to *Revegetate* the areas.
- (b) implement hygiene protocols by cleaning earth-moving machinery of soil and vegetation prior to entering and leaving the *revegetation* sites;
- (c) establish at least eight 5 x 5 metre quadrat monitoring sites within *revegetated* areas;
- (d) monitor quadrats specified condition in 11(d) at least annually;
- (e) monitoring of quadrats specified in condition 11(d) is to be undertaken by an *environmental specialist*;
- (f) achieve the completion criteria specified in the attached Schedule 1 (Revegetation Completion Criteria) after the three year monitoring period for areas *revegetated* under this permit;
- (g) undertake *weed* control activities on an 'as needs' basis to maintain a minimum criteria in the attached Schedule 1 (Revegetation Completion Criteria)
- (h) undertake remedial actions for areas *revegetated* where monitoring indicates that *revegetation* has not met the completion criteria, outlined in the attached Schedule 1 (Revegetation Completion Criteria), including:
 - (i) revegetate the area by deliberately *planting* and/or *direct seeding* native vegetation seeds that will result in the minimum targets specified in the attached Schedule 1 (Revegetation Completion Criteria) ensuring only local provenance seeds and propagating material are used;
 - (ii) undertake further weed control activities;
 - (iii) undertake watering activities; and
 - (iv) undertake annual monitoring of each revegetated site, until the completion criteria outlined in the attached Schedule 1 (Revegetation Completion Criteria) are met.

PART III - RECORD KEEPING AND REPORTING

12. Records that must be kept

The permit holder must maintain records relating to the listed relevant matters in accordance with the specifications detailed in Table 1.

Table 1: Records that must be kept

No.	Relevant matter	Specifications
1.	In relation to the authorised clearing activities generally	<ul style="list-style-type: none">(a) the species composition, structure, and density of the cleared area;(b) the location where the clearing occurred, recorded using a Global Positioning System (GPS) unit set to Geocentric Datum Australia 1994 (GDA94), expressing the geographical coordinates in Eastings and Northings;(c) the date that the area was cleared;(d) the size of the area cleared (in hectares); and(e) actions taken to avoid, minimise, and reduce the impacts and extent of clearing in accordance with condition 5 of this permit;(f) actions taken to minimise the risk of the introduction and spread of weeds and dieback in accordance with condition 6 of this permit; and(g) evidence supporting compliance with conditions 7, 8 and 10 of this permit.
2.	In relation to revegetation of areas pursuant to condition 9 of this permit:	<ul style="list-style-type: none">(a) the location of areas revegetated recorded using a Global Positioning System (GPS) unit set to Geocentric Datum Australia 1994 (GDA94), expressing the geographical coordinates in Eastings and Northings or decimal degrees;(b) description of the revegetation and rehabilitation activities undertaken;(c) the size of the area revegetated and rehabilitated (in hectares); and(d) evidence supporting compliance with conditions 9 of this permit.
3.	In relation to revegetation of offset areas pursuant to condition 11 of this permit:	<ul style="list-style-type: none">(a) the location of areas revegetated recorded using a Global Positioning System (GPS) unit set to Geocentric Datum Australia 1994 (GDA94), expressing the geographical coordinates in Eastings and Northings or decimal degrees;(b) description of the revegetation and rehabilitation activities undertaken;(c) the size of the area revegetated and rehabilitated (in hectares); and(d) evidence supporting compliance with condition 11 of this permit.

13. Reporting

- (a) The permit holder must provide to the *CEO* on or before 30 June of each calendar year, a written report containing:
- (i) the records required under condition 12 of this permit; and
 - (ii) records of activities done by the permit holder under this permit between 1 January and 31 December of the preceding calendar year.
- (b) If no clearing authorised under this permit has been undertaken, a written report confirming that no clearing under this permit has been carried out, must be provided to the *CEO* on or before 31 December of each calendar year.
- (c) The permit holder must provide to the *CEO*, no later than 90 calendar days prior to the expiry date of this permit, a written report of records required under condition 12, where these records have not already been provided under condition 13(a).

DEFINITIONS

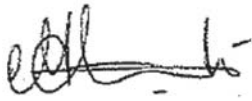
In this permit, the terms in Table have the meanings defined.

Table 2: Definitions

Term	Definition
<i>CEO</i>	Chief Executive Officer of the department responsible for the administration of the clearing provisions under the <i>Environmental Protection Act 1986</i> .
<i>clearing</i>	has the meaning given under section 3(1) of the EP Act.
<i>condition</i>	a condition to which this clearing permit is subject under section 51H of the EP Act.
<i>dieback</i>	means the effect of <i>Phytophthora</i> species on native vegetation.
<i>direct seeding</i>	means a method of re-establishing vegetation through establishment of a seed bed and the introduction of seeds of the desired plant species.
<i>environmental specialist</i>	means a person who holds a tertiary qualification in environmental science or equivalent, and has experience relevant to the type of environmental advice that an environmental specialist is required to provide under this permit;
<i>fill</i>	means material used to increase the ground level, or to fill a depression.
<i>local provenance</i>	means native vegetation seeds and propagating material from natural sources within 25 kilometres and the same Interim Biogeographic Regionalisation for Australia (IBRA) subregion of the area cleared.
<i>mulch</i>	means the use of organic matter, wood chips or rocks to slow the movement of water across the soil surface and to reduce evaporation.
<i>native vegetation</i>	has the meaning given under section 3(1) and section 51A of the EP Act.

Term	Definition
<i>planting</i>	means the re-establishment of vegetation by creating soil conditions and planting seedlings of the desired species;
<i>revegetate/ed/ion</i>	means the re-establishment of a cover of local provenance native vegetation in an area using methods such as natural regeneration, direct seeding and/or planting so that the species composition, structure and density is similar to pre-clearing vegetation types in that area;
<i>Weed/s</i>	means any plant – (a) that is a declared pest under section 22 of the <i>Biosecurity and Agriculture Management Act 2007</i> ; or (b) published in a Department of Biodiversity, Conservation and Attractions species-led ecological impact and invasiveness ranking summary, regardless of ranking; or (c) not indigenous to the area concerned.

END OF CONDITIONS



Meenu Vitarana
A/SENIOR MANAGER
NATIVE VEGETATION REGULATION

*Officer delegated under Section 20
of the Environmental Protection Act 1986*

4 January 2021

SCHEDULE 1: Revegetation Completion Criteria

Characteristic	Measure	Baseline Flora Data	Completion Target	Completion Criteria
			Vegetation in Good condition as per Keighery (1994)	
A. Species Richness	i) Total Species Richness	42 native species	Minimum of 60% of native species returned, based on baseline data.	Minimum of 25 native species to be present in the revegetation areas
	ii) Quadrat Species Richness	20 native species (0.2 species/m ²)	Minimum of 60% of native species returned based on baseline data.	Minimum of 0.12 native species per m ² on average within the monitoring quadrats.
B. Species Density	i) Total	Information not previously recorded. An average plant density of 2 plants/m ² in dryland environments is used as a baseline measure.	Minimum of 60% of stems returned based on baseline data.	Minimum of 1.2 stems/m ² on average within the revegetation area.
C. Species diversity	i) Total	The following 10 species were recorded with >10% coverage in the monitoring quadrats: <ul style="list-style-type: none"> • <i>Acacia rostellifera</i> • <i>Cassyltha flava</i> • <i>Conostylis aculeata subsp. cygnorum</i> • <i>Desmocladius flexuosus</i> • <i>Lepidosperma gladiatum</i> • <i>Lomandra maritima</i> • <i>Melaleuca cardiophylla</i> • <i>Melaleuca systema</i> • <i>Spinifex longifolius</i> • <i>Spyridium globulosum</i> 	Minimum of 60% of dominant species returned, based on baseline data.	At least 6 of the following species are to be present in the revegetation areas: <ul style="list-style-type: none"> • <i>Acacia rostellifera</i> • <i>Cassyltha flava</i> • <i>Conostylis aculeata subsp. cygnorum</i> • <i>Desmocladius flexuosus</i> • <i>Lepidosperma gladiatum</i> • <i>Lomandra maritima</i> • <i>Melaleuca cardiophylla</i> • <i>Melaleuca systema</i> • <i>Spinifex longifolius</i> • <i>Spyridium globulosum</i>
D. Weed Cover	ii) General Weed Cover	Weeds observed in the clearing reference area were generally competitive species. The high weed cover recorded was: <ul style="list-style-type: none"> • <i>Ehrharta longiflora</i> – 20% • <i>Lysimachia arvensis</i> – 15% • <i>Petrorhagia dubia</i> – 15% • <i>Raphanus raphanistrum</i> – 20% • <i>Trachyandra divaricata</i> – 15% 	Weed cover no greater than 15%	Maximum of 15% weed cover
	iii) Declared Weeds	No declared weeds recorded in the vegetation survey	No declared weeds to be present within the revegetation areas	0% cover



Plan 8794/1(a)



Legend

 CPS 8794-1

base layers

 Road Centrelines
 Cadastre - LGATE 218

Local Government Authority (LGA) Boundaries (LGATE-233)

0 50 100 150 200 m



Meenu Vitarana

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Officer delegated under section 20 of the
Environmental Protection Act 1986




GOVERNMENT OF
WESTERN AUSTRALIA



Plan 8794/1(b)



Legend

 CPS 8794-1 Revegetation

base layers

 Road Centrelines
 Cadastre - LGATE 218

Local Government Authority (LGA) Boundaries (LGATE-233)

0 50 100 150 200 m



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Environmental Protection Act 1986




GOVERNMENT OF
WESTERN AUSTRALIA



Plan 8794/1(c)



Legend

 CPS 8794-1 Fencing

base layers

 Road Centrelines
 Cadastre - LGATE 218

Local Government Authority (LGA) Boundaries (LGATE-233)

0 50 100 150 200 m



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Environmental Protection Act 1986



GOVERNMENT OF
WESTERN AUSTRALIA

Plan 8794/1(d)

115°42'14.400"E

115°42'36.000"E

115°42'57.600"E

31°41'52.800"S

31°42'14.400"S

31°42'36.000"S

31°41'52.800"S

31°42'14.400"S




31°42'36.000"S

115°42'14.400"E

115°42'36.000"E

115°42'57.600"E

Legend

-  CPS 8794-1
-  Offset area north
-  Offset area south

base layers

Local Government Authority (LGA) Boundaries (LGATE-233)

0 150 300 450 600 750 m



Meenu Vitarana

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Environmental Protection Act 1986



GOVERNMENT OF
WESTERN AUSTRALIA



1. Application details

Permit application details

Permit application No.: 8794/1
Permit type: Purpose Permit

Applicant details

Applicant's name: Tamala Park Regional Council
Application received date: 29 January 2020

Property details

Property: Lot 9505 on Plan 52070, Tamala Park
Lot 3050 on Plan 47951, Mindarie (Reserve R 35890)
Lot 15448 on Plan 40340, Mindarie (Reserve R 20561)

Local Government Authority: City of Wanneroo

Localities: Mindarie
Latitude: -31.7037 Longitude: 115.7054; Latitude: -31.7051 Longitude: 115.7097; Latitude: -31.7058 Longitude: 115.7166

Application

Clearing Area (ha)	No. Trees	Method of Clearing	For the purpose of:
1.88		Mechanical Removal	Construction of an access road and carpark for public access to a swimming beach

Decision on application

Decision on Permit Application: Grant

Decision Date: 4 January 2021

Reasons for Decision:

This clearing permit application was submitted, accepted, assessed and determined in accordance with sections 51E and 51O of the *Environmental Protection Act 1986* (EP Act). The Department of Water and Environmental Regulation (DWER) advertised the application for 21 days and two submissions were received. Consideration of matters raised in the public submissions is summarised in Section 9.

In making this decision, the Delegated Officer had regard for the site characteristics, relevant datasets, the findings of flora surveys and site information, the clearing principles set out in Schedule 5 of the EP Act, the applicant's minimisation and mitigation measures (Section 3), relevant planning instruments, and any other matters considered relevant to the assessment (Section 5). The Delegated Officer also took into consideration the purpose of the clearing to provide public access to a safe beach location.

The assessment concluded that proposed clearing is at variance with principles (b) and (h) and may be at variance to principles (a) and (e), and that significant residual impact remains, that being the loss of:

- 0.60 hectares of Bush Forever Site 322 (Burns Beach Bushland), and a significant remnant of bushland, including:
 - 0.25 hectares of Priority 3 Ecological Communities:
 - 0.05 hectares of SCP29a (Vegetation unit Si)
 - 0.20 hectares of SCP29b (Vegetation unit Ar)
 - 0.33 hectares Priority 4 vertebrate fauna habitat (Vegetation units Ar and Lg)
 - 0.43 hectares Priority 4 invertebrate fauna habitat (Vegetation units Ar and Mc)

The delegated officer noted that the proposed clearing had the potential to introduce or spread dieback or weeds into adjacent vegetation associated with Bush Forever Site 322, which could impact on the quality of the adjacent vegetation and its habitat values. The delegated officer also noted that proposed clearing had the potential to contribute to land degradation in the form of wind erosion.

After consideration of the available information, as well as the applicant's minimisation and mitigation measures (Section 3), the Delegated Officer determined that proposed clearing can be minimised and managed to be unlikely to lead to an unacceptable risk to environmental values. The applicant has suitably demonstrated avoidance and

minimisation measures, and the offset provided appropriately counterbalances the impacts to 0.60 hectares of Bush Forever Site 322 (Section 7 and Section 8).

The Delegated Officer decided to grant a clearing permit subject to conditions to:

- avoid, minimise to reduce the impacts and extent of clearing;
- take hygiene steps to minimise the risk of the introduction and spread of dieback and weeds;
- undertake staged clearing to minimise wind erosion;
- undertake slow, progressive one directional clearing to allow terrestrial fauna to move into adjacent habitat ahead of the clearing activity;
- within 12 months of clearing revegetate and appropriately fence areas not required for the clearing purpose to ensure that 1.28 hectares of habitat is not permanently lost; and
- within 12 months implement an offset to revegetate at least 1.56 hectares of coastal native vegetation within Bush Forever Site 322.

2. Site Information

Clearing Description

The Catalina land development site (Catalina Estate) is located in the north-west corridor of the Perth Metropolitan Region. Catalina Estate located approximately 500 metres from the coastline and clearing of 1.88 hectares is required to construct an access road and carpark for public access to a safe swimming beach.

Vegetation Description

The application area is located within the Swan Coastal Plain (SWA02) bioregion as described by Thackway and Cresswell (1995).

Beard vegetation association:

- Spearwood 1007 Mosaic: Shrublands; *Acacia lasiocarpa* & *Melaleuca acerosa* heath / Shrublands; *Acacia rostellifera* & *Acacia cyclops* thicket.

Swan Coastal Plain vegetation complex:

Quindalup Complex of coastal dune complex consisting mainly of two alliances - the strand and fore-dune alliance and the mobile and stable dune alliance. Local variations include the low closed forest of *Melaleuca lanceolata* (Rottnest Teatree) - *Callitris preissii* (Rottnest Island Pine), the closed scrub of *Acacia rostellifera* (Summer-scented Wattle) and the low closed *Agonis flexuosa* (Peppermint) forest of Geographe Bay.

Local Descriptions

- A flora and vegetation survey by Bennett (2016) described and mapped four vegetation units over the application area. From east to west these consist of:
 - Mc: Open Heath of *Melaleuca cardiophylla* over Very Open Grassland dominated by **Ehrharta longiflora* over Herbland dominated by **Raphanus raphanistrum*, **Crassula glomerata* and **Petrorhagia dubia* over Sedgeland dominated by *Lomandra maritima* and *Desmocladius flexuosus*.
 - Ar: Tall Open Scrub of *Acacia rostellifera* and *Spyridium globulosum* over Low Shrubland of *Melaleuca systema* over Open Grassland dominated by **Ehrharta longiflora* over Open Herbland dominated by **Lysimachia arvensis* over Very Open Sedgeland of *Lomandra maritima* and *Desmocladius flexuosus*.
 - Lg: Shrubland of *Acacia rostellifera* over Low Shrubland dominated by *Rhagodia baccata* subsp. *dioica* and *Scaevola crassifolia* over Very Open Grassland dominated by **Ehrharta longiflora* over Open Herbland dominated by *Acanthocarpus preissii*, **Crassula glomerata* and **Trachyandra divaricata* over Sedgeland of *Lepidosperma gladiatum*.
 - Sl: Low Open Shrubland of *Olearia axillaris*, *Scaevola crassifolia*, **Pelargonium capitatum* and *Rhagodia baccata* subsp. *dioica* over Grassland dominated by *Spinifex longifolius* over Very Open Herbland dominated by **Trachyandra divaricata*.

Vegetation Condition

The vast majority of the vegetation is in Good to Very Good condition based on the condition scale of Keighery (1994). The only exception is a Degraded section along an off-road vehicle track.

Soil and Landform Type:

The application area is located entirely within the Quindalup Dune System (Quindalup South System), a coastal dune formation of unconsolidated Holocene aeolian sediments and Tamala limestone. The application area itself is steeply undulating, with topography

ranging from zero metres Australian Height Datum (AHD) in the west, to 32 to 34 metres AHD on the dune crests and ridgelines (Coterra 2019a). Five separate soil descriptions have been mapped over the application area (DPIRD 2017; Schoknecht *et al.* 2004). From east to west these are:

- Quindalup South - Oldest dune phase (211Qu_Q1)
 - Dunes or remnants with low relief. Calcareous sands have organic staining to about 30 centimetres, overlying pale brown sand with definite cementation below one metre.
- Quindalup South - Third dune phase (211Qu_Q3)
 - Irregular dunes with high relief and slopes up to 20 per cent. Loose calcareous sand with little surface organic staining and incipient cementation at depth.
- Quindalup South - Second dune phase (211Qu_Q2)
 - A complex pattern of dunes with moderate relief. Calcareous sands have organic staining to about 20 centimetres, passing into pale brown sand with some cementation below one metre.
- Quindalup South - Unstable sand phase (211Qu_Qu)
 - Presently unstable sands.
- Quindalup South - Water, beach phase (211QuU)
 - Beach.

Comments:

The applicant is the Tamala Park Regional Council, a corporate entity representing the interests of seven local governments which own the Tamala Park landholding. The local area referred to in the assessment of this application is defined as a 10 kilometre radius measured from the perimeter of the application area.



Quadrat caq3



Quadrat caq4



Quadrat caq2



Quadrat caq1

Figure 1: Representative photographs of the application area (Bennett 2016).

3. Avoidance and minimisation measures

Given the projected increase in the local population it has been determined by the applicant, in consultation with the City of Wanneroo, that a formal coastal access route is required to enable controlled access to this section of the coast in a controlled manner. At present, a number of informal bush tracks exist, used by people to gain 4WD access to the beach. Given the informal nature of these tracks, damage to vegetation and dune structures enhanced by wind erosion has occurred as a result of uncontrolled access. It is anticipated that the provision of formal coastal access infrastructure will deter residents from contributing to the environmental degradation caused by uncontrolled 4WD access and enable these areas to regenerate.

Prior to preparation of a Native Vegetation Clearing Application various options to address the need for, and the alignment of, a beach access path were considered.

The current formal beach access locations in the region are Claytons Beach (Mindarie), approximately 800 metres north of Catalina Estate, and Burns Beach approximately three kilometres to the south. The current Claytons Beach site has been identified by Surf Life Saving Western Australia (SLSWA) as dangerous and leads beach-goers to potentially hazardous areas, consisting of rock and reef platforms, steep dunes, rips, strong currents and submerged rocks (SLS 2020). Drownings at Claytons Beach have been attributed to the higher risk conditions of this site (Coterra 2019a; Coterra 2020a). The next closest beach access point is Burns Beach which also poses potential hazards to beach users.

In 2016, Tamala Park Regional Council commissioned a Coastal Aquatic Risk Assessment and Recommendations study which was undertaken by SLSWA. In the opinion of SLSWA, given the nature of the beach fronting the Catalina development, it represents the best opportunity to provide alternative beach access to a 'friendly' stretch of the coastline. This will permit a range of strategies and services to be implemented to mitigate aquatic risk and provide positive recreational outcomes (Coterra 2020a).

Two locations were identified as preferred beach access fronting the Catalina Estate; Node A and Node B (**Figure 2**). Node A was identified by SLSWA as the preferred location as this section of beach is free of hazards noted in adjacent areas. Recommended infrastructure to support safe aquatic recreation includes defined access tracks, designated emergency vehicle access points, a system of safety signage, and consideration of a lifesaving facility for future service provision (Coterra 2020a).

In addition to the safety aspects, the environmental aspects of each node were also investigated. It was determined that Node A was also preferable as less disturbance of the coastal vegetation and landform would be required for this option.

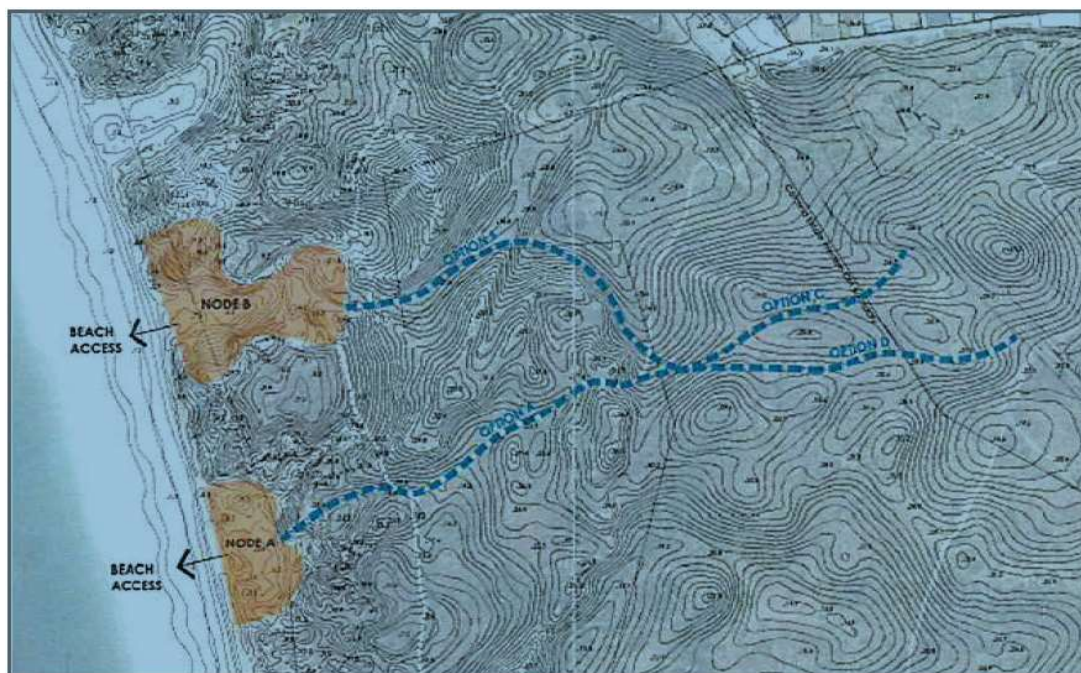


Figure 2: Alternative locations considered (Coterra 2020a)

The access path alignment to Node A was then considered to determine the preferred alignment from an environmental perspective. **Figure 3** shows the two alignments investigated. The northern alignment was selected on the basis of being able to utilise more of the existing tracks and creating a shorter overall length with less clearing. The location of the proposed access route and the carpark area have been selected to follow existing informal tracks where vegetation condition is lowest and weeds are more prevalent, or areas of damaged vegetation to minimise impacts on existing native vegetation and habitat values (Coterra 2020a).

Note that the preferred access track does not follow the existing track alignment to the north-east as, due to the topography in this location (**Figure 2**), the disturbance required for construction would be greater than the location shown in **Figure 3** (Coterra 2020a).

The road has therefore been aligned as far as possible (subject to engineering considerations) to overlap existing informal tracks. The carpark has been located within a degraded dune blowout supporting very little vegetation to further minimise the clearing required.



Figure 3: Two alignments investigated (Coterra 2020a)

The initial application considered a required clearing area of 3.0 hectares. During the assessment, and in consideration of revised engineering specifications, the clearing area required was revised down to 1.88 hectares. The application area assessed therefore is based on a Purpose Permit application whereby an area of 1.88 hectares is proposed to be cleared within a 3.78 hectare application area (**Figure 4**). The 3.78 hectare application area includes allowances to accommodate any final adjustments. The applicant has committed to revegetating all areas disturbed during construction, resulting in the permanent removal of native vegetation over approximately 0.60 hectares (**Figure 4**) as below:

- Application area: 3.78 hectares
- Construction area: 1.88 hectares
- Revegetation area: 1.28 hectares
- Area remaining not vegetated: 0.60 hectares

A Foreshore Management Plan (Catalina Estate Coastal Infrastructure) has been prepared by the applicant (Coterra 2019b), and has been approved by the City of Wanneroo and the Department of Planning, Lands and Heritage (DPLH). The Foreshore Management Plan provides context, and includes management actions including rehabilitation strategies.

Seed and plant cuttings will be collected from the clearing footprint area and surrounding foreshore reserve by a suitably qualified person, remaining as close as possible to areas to be rehabilitated to ensure that all species used in rehabilitation are endemic to that particular vegetation type. Weed control will be undertaken within a two metre buffer directly adjacent to proposed rehabilitation areas prior to planting being undertaken. Brushing and/or hydro-mulching will be incorporated as required in erosion prone areas. Contingency actions and rehabilitation completion criteria have been identified in the Foreshore Management Plan (Coterra 2019b).

Coterra (2020d) have provided the specific revegetation strategies, species lists, and detailed completion criteria to be utilised for the 1.28 hectares of revegetation considered for clearing application CPS 8794/1 (**Figure 4**). Species selection and completion criteria area are based upon quadrat data obtained from baseline flora and vegetation data (Bennett 2016; AECOM 2018).

The coastal access road and associated infrastructure will remain under the ownership of both City of Wanneroo and the Western Australian Planning Commission, in accordance with the existing reserve boundaries. This is in keeping with the City of Wanneroo agreement to continue managing (wholly or in part) the reserves between Burns Beach and Mindarie (WAPC 2012).

It is important that fauna movements between the northern and southern sections of the foreshore reserve adjacent to Catalina Estate be maintained. To facilitate this several strategies will be implemented by the applicant:

- Rural 'conservation-style' fencing will be installed that incorporates a 200 millimetre gap between the bottom wire and the ground to allow the movement of small to medium-sized ground fauna.
- To facilitate the movement of kangaroos and wallabies pedestrian 'kissing' gates will be installed, through which these species can pass.
- The speed limit along the beach access road will be limited to 30 kilometres per hour to protect fauna that may cross the road.
- Wildlife crossing signage will be installed at entrance points to the beach access road.

Additional generic strategies will include:

- Implementation of dieback hygiene strategies.
- Implementation of erosion and dust management strategies.

- Storm water management.
- Fire management.
- The engagement of a fauna relocation specialist during construction to monitor and assist with the clearing program. Vegetation will be observed for any fauna that may be trapped, injured or occupying an unseen nest or shelter. If feasible, felled vegetation will be left *in situ* overnight to allow the escape of any resident fauna species before removal.

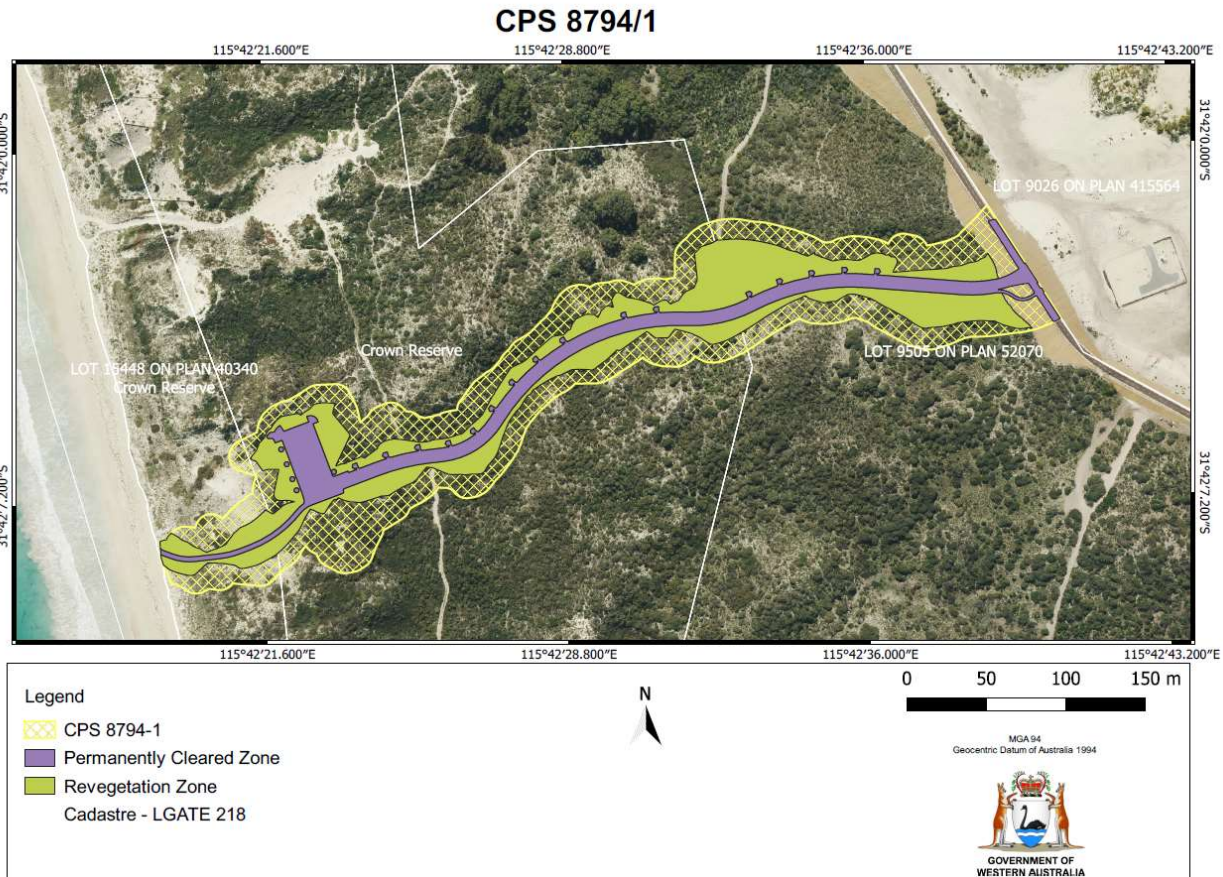


Figure 4: CPS 8794/1 Application Area

4. Assessment of application against clearing principles

(a) Native vegetation should not be cleared if it comprises a high level of biodiversity.

Proposed clearing may be at variance with this Principle

The entire application area is located wholly within Bush Forever Site 322 ('Burns Beach Bushland') (Government of Western Australia 2000b) that forms a part of the Gnaragar Sustainability Strategy (GSS) Ecological Linkages (ID 88) (Brown *et al.* 2009; Sonneman and Brown 2008), and the Tamala Conservation Park (WAPC 2012).

The application area is located entirely within the Quindalup Dune System, and four Vegetation Units have been mapped over the application area (Bennett 2016), from east to west consisting of (abbreviated):

- Mc: Open Heath of *Melaleuca cardiophylla* over Very Open Grassland.
- Ar: Tall Open Scrub of *Acacia rostellifera* and *Spyridium globulosum* over Low Shrubland of *Melaleuca systema* over Open Grassland.
- Lg: Shrubland of *Acacia rostellifera* over Low Shrubland dominated by *Rhagodia baccata* subsp. *dioica* and *Scaevola crassifolia* over Very Open Grassland.
- Sl: Low Open Shrubland of *Olearia axillaris*, *Scaevola crassifolia*, **Pelargonium capitatum* and *Rhagodia baccata* subsp. *dioica* over Grassland dominated by *Spinifex longifolius* over Very Open Herbland dominated by **Trachyandra divaricata*.

Most of the vegetation is in Good to Very Good condition based on Keighery (1994), however weeds or introduced taxa comprised 38 per cent of the species present and were common throughout the remnant bushland, but most dense along the edges of a 4WD access track (Bennett 2016). Vegetation change from east to west was gradual with an overlap of four species recorded across all vegetation units (*Acacia cyclops*, *Acanthocarpus preissii*, *Olearia axillaris* and *Spyridium globulosum*).

The flora survey over the application area (Bennett 2016) recorded a total of 68 taxa from 58 genera, and 31 families of which 26 taxa were weeds. None of the weeds were listed as Declared Plants, however, thirteen of the weeds recorded have a high impact

on the environment (Bennett 2016). A survey over an adjacent area in the Tamala Park Reserve to the south recorded 86 taxa, representing 71 genera and 38 families (AECOM 2018). Species richness within the overall Bush Forever Site 322 itself is 168 native taxa (Government of Western Australia 2000b).

According to available databases, three Threatened flora taxa and 20 Priority flora taxa have been recorded within the local area of a 10 kilometre radius of the application area. No flora taxa of significance have been recorded over the application area (Bennett 2016), or the adjacent area to the south by AECOM (2018).

The data of Bennett (2016) has been revised by Coterra Environmental in association with Dr Eleanor Bennett (Coterra 2020b). A 'likelihood of occurrence' assessment was undertaken that included an assessment of the 'reliability to locate' 23 conservation significant species during the Spring (November) survey of Bennett (2016), including *Conostylis pauciflora* subsp. *euryrhipis* (P4) and *Stylidium maritimum* (P3). The closest Priority flora taxa was recorded approximately 580 metres east of the application area (*Fabronia hampeana*) (P2) (Syrinx 2009). *Fabronia hampeana* is a moss found commonly on *Macrozamia riedlei* trunks (Bennett 2016); a species not recorded in the application area and *Fabronia hampeana* is unlikely to occur.

The vast majority of taxa assessed by the likelihood of occurrence of Coterra (2020b) had a 'High' likelihood of reliability to locate during the November survey and assessed as unlikely to occur. Of note, *Poranthera moorokatta* (P2) would have completed flowering, and possibly fruiting, by November so had the possibility of being overlooked. *Poranthera moorokatta* has been recorded 8.3 kilometres to the east, with records predominantly in Banksia Woodland and areas further away from the coast (Coterra 2020b) and is unlikely to occur. *Conostylis bracteata* (P3) has the potential to occur in the more eastern areas surveyed. This taxon is readily distinguished by its leaves and has been recorded approximately 2.8 kilometres to the north, but was not recorded by Bennett (2016) over the application area. Similarly, *Conostylis pauciflora* subsp. *euryrhipis* (P4) was assessed as having a 'High' likelihood of reliability to locate during the November survey. This taxa has been recorded from Alkimos and Two Rocks but not in the vicinity of the survey site (Coterra 2020b). *Sarcozona bicarinata* (P3) was assessed as having a Moderate only likelihood of reliability to locate during the November survey as it flowers in August, however, it is very distinctive (related to 'pig face') and not recorded by Bennett (2016).

No flora taxa of significance have been recorded over the application area (Bennett 2016), or the adjacent area to the south by AECOM (2018), however, if survey intensity was increased it is possible that priority species may occur.

No Threatened Ecological Communities (TECs) listed under the *Environment Protection and Biodiversity Conservation Act 1999*, or endorsed by the Western Australian Minister for Environment have been mapped or identified over the application area. The closest to the application area is the Endangered SCP26a; *Melaleuca huegelii* - *Melaleuca systema* shrublands on limestone ridges (floristic community type 26a as originally described in Gibson *et al.* (1994)). Vegetation units mapped over the application area do not align with any TECs (Bennett 2016; Coterra 2020b).

Three Priority Ecological Communities (PECs) listed by the Department of Biodiversity, Conservation and Attractions (DBCA) have been mapped in the vicinity of the application area (AECOM 2018; Ecoscape 2004).

- SCP29b Acacia shrublands on taller dunes (P3);
- SCP29a Coastal shrublands on shallow sand (P3); and
- SCP24 Northern Spearwood shrublands and woodlands (P3).

Two of the four Vegetation Units mapped over the application area by Bennett (2016) represent PECs (Coterra 2020b). That is:

- 'Ar': Tall Open Scrub of *Acacia rostelifera* and *Spyridium globulosum* over Low Shrubland of *Melaleuca systema* over Open Grassland, is representative of: PEC ID 28, SCP29b, Acacia shrublands on taller dunes (P3).
- SI: Low Open Shrubland of *Olearia axillaris*, *Scaevola crassifolia*, **Pelargonium capitatum* and *Rhagodia baccata* subsp. *dioica* over Grassland dominated by *Spinifex longifolius* over Very Open Herbland dominated by **Trachyandra divaricata* is representative of: PEC ID 21, SCP29a, Coastal shrublands on shallow sand (P3).

Approximately 1.78 hectares, or 47 per cent of the application area is represented by Priority 3 (i) PECs incorporating:

- ID 28, SCP29b, Acacia shrublands on taller dunes (1.2 hectares or 32 per cent of the application area).
- ID 21, SCP29a, Coastal shrublands of shallow sand (0.58 hectares or 15 per cent of the application area).

Priority 3 (i) PECs are poorly known ecological communities that are known from several to many occurrences, a significant number or area of which are not under threat of habitat destruction or degradation.

PEC ID 28, SCP29b, is described as a community dominated by Acacia shrublands or mixed heaths on the larger dunes. This community stretches from Seabird to south of Mandurah. There is no consistent dominant, but species such as *Acacia rostelifera*, *Acacia lasiocarpa*, and *Melaleuca acerosa* are important. PEC ID 21, SCP29a is described as mostly heaths on shallow sands over limestone close to the coast. There is no single dominant, but important species include *Spyridium globulosum*, *Rhagodia baccata*, and *Olearia axillaris*.

Vegetation present represents Priority Ecological Communities and provides habitat for priority fauna species including the Quenda (*Isodon fusciventer*), Western Brush Wallaby (*Notamacropus Irma*), Black-striped Burrowing Snake (*Neelaps calonotos*) and Graceful Sunmoth (*Synemon gratiosa*). Proposed clearing is located within a large and diverse urban remnant of regional significance and given the importance of the application area to PECs, fauna diversity, and the ecological linkage value of the vegetation, proposed clearing may be at variance with Principle (a).

(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.

Proposed clearing is at variance with this Principle

According to available databases 29 vertebrate fauna species of conservation significance have been recorded within the local area of a 10 kilometre radius of the application area. However, due to the proximity of the ocean many of these are marine species including whales and marine turtles not relevant to the application area.

Discounting marine species 15 birds, two mammals, one reptile and three invertebrates of conservation significance have been recorded within the local area. Of the birds, four are wetland inhabiting species not likely to occur due to a lack of habitat. Five species are migratory shorebirds. Although regional soils mapping includes the Quindalup South (Water, beach phase - 211QuU), the littoral zone will not be impacted by proposed clearing and habitat for these species will not be impacted by the proposed clearing of native vegetation.

The Eastern Osprey (*Pandion cristatus*), protected under International Agreements, is a well-known species from the Mindarie area. The Eastern Osprey forages over oceans, estuaries and river and perches and nests on headlands or towering trees. No large trees are present over the application area for this species to utilise. Similarly, the Peregrine Falcon (*Falco peregrinus*) (other specially protected fauna) and the migratory Fork-tailed Swift (*Apus pacificus*) may overfly the application area without utilising any of the habitats present.

The remaining birds of conservation significance known from the local area are the three species of black cockatoo known from the Perth metropolitan area that could potentially utilise habitats present: the Endangered Carnaby's cockatoo (*Calyptorhynchus latirostris*), Endangered Baudin's cockatoo (*Calyptorhynchus baudinii*), and the Vulnerable forest red-tailed black cockatoo (*Calyptorhynchus banksii naso*). Baudin's cockatoo is typically associated with jarrah-marri forest of the Jarrah Forest bioregion to the east. Just three 'moderately certain' records from 2009 have been made in the local area at Lake Joondalup, and the species is unlikely to occur over the application area. Although the forest red-tailed black cockatoo is known the coastal plain its diet and habitat requirements are typically eucalypts and casuarina. Just four records have been made in the local area, and none within five kilometres, and habitats present are not suitable.

The Endangered Carnaby's cockatoo (*Calyptorhynchus latirostris*) is known from the coastal plain, particularly from late summer to winter during the non-breeding season. The species is semi-migratory with migrations to the Wheatbelt regions to breed from July to January (DPaW 2013). Carnaby's Cockatoo is well known from the local area with over 430 records in the local area.

Black cockatoo habitat can be considered in terms of breeding habitat, night roosting habitat, and foraging habitat. Carnaby's Cockatoo will generally forage up to 12 kilometres from an active breeding site (DSEWPaC 2012) (DoEE 2017) (DPaW 2013). Following breeding, they will flock in search of food, usually within six kilometres of a night roost (DSEWPaC 2012; DoEE 2017; DPaW 2013), but may range up to 20 kilometres (Commonwealth of Australia 2017). Food resources within the range of breeding sites and roost sites are important to sustain populations, and foraging resources are therefore viewed in the context of known breeding and night roosting sites, particularly within 12 kilometres of an impact area (Commonwealth of Australia 2017).

Black cockatoo night roosts are usually located in the tallest trees of an area, and in close proximity to both a food supply and surface water (DAWE 2020a; Le Roux 2017). Several Carnaby's cockatoo confirmed night roosts are located within the local area with the closest approximately three kilometres to the east, with a known breeding area focused at Edith Cowan University Joondalup campus located approximately eight kilometres to the south-east (BirdLife Australia 2017). Food resources within the local area are therefore important to sustain these populations and clearing of foraging habitat on the Swan Coastal Plain poses a significant threat to the long term survival of the species (EPA 2019).

No Carnaby's cockatoo roosting sites or breeding sites occur over the application area. Foraging habitat for Carnaby's cockatoo typically consists of the native plant genera: *Banksia* (ser *Dryandra*), *Hakea*, *Grevillea*, *Allocasuarina*, and *Eucalyptus* sp. (including *Corymbia*) (DEC 2011; Valentine and Stock 2008). These genera were not recorded in the application area by Bennett (2016) and Carnaby's cockatoo habitat was not mapped over the application area during a study by EcoLogical (2010). Vegetation over the application area is not likely to provide foraging habitat for black cockatoos.

Three mammal species of conservation significance have been recorded in the local area; the P4 Quenda (*Isoodon fusciventer*), and the P4 Western Brush Wallaby (*Notamacropus Irma*). Several relatively recent records (2012 to 2015) of the Quenda (*Isoodon fusciventer*) (P4) occur within 400 metres of the application area (DBCA 2007-). This species is associated with dense vegetation (van Dyck and Strahan 2008) and is likely to occur over the application area, particularly in vegetation units 'Ar' and 'Lg'.

The Western Brush Wallaby is much less commonly recorded, however, AECOM (2018) recorded evidence of this species (fresh scats) in woodland and mallee habitat approximately 1.5 kilometres south of the application area, and other records have been made within four kilometres of the application area. Woodland and mallee habitat is not present over the application area, however, the Western Brush Wallaby is also found in flats of low grasses and open scrubby thickets and may disperse through the application area particularly utilising the 1.74 hectares of vegetation units 'Ar' and 'Lg'.

One record of the P4 Water Rat (*Hydromys chrysogaster*) was made at Lake Joondalup in 2008. This species is unlikely to occur over the application area due to a lack of habitat.

The P3 Black-striped Burrowing Snake (*Neelaps calonotos*) was recorded approximately 380 metres east of the application area in 2015. The Black-striped Burrowing Snake has a limited distribution on the Swan Coastal Plain inhabiting areas with sandy soils that support heathlands and/or *Banksia* and *Eucalypt* Woodlands (Storr *et al.* 1999). Due to its cryptic burrowing habit this species is rarely observed and due to the proximity of records, and the sandy habitat present, the Black-striped Burrowing Snake possibly occurs over the application area.

Four invertebrates of conservation significance have been recorded within ten kilometres of the application area. The P3 Shield-backed Trapdoor Spider (*Idiosoma nigrum*) occurs in woodland habitat not present over the application area and is unlikely to occur. The P3 native bee *Hylaeus globuliferus* is known to be associated with *Adenanthos cygnorum* and *Banksia* species (Houston 2018), and *Hylaeus globuliferus* has been recorded in the locality of Neerabup. However, given the lack of *Adenanthos* or *Banksia* in the application area the species is unlikely to occur. The P2 cricket *Austrosaga spinifer* is known from dense heathland habitats from Perth to Cervantes. Just two records have been made within ten kilometres of the application area, at

Neerabup National Park approximately 4.2 kilometres to the east in 1982. Little is known of this species but due to the paucity of records, distance to known locations, and the duration since recorded this species is unlikely to occur.

The P4 Graceful Sunmoth (*Synemon gratiosa*) is a diurnal flying sunmoth that occurs in open herbland, heathland and shrubland on sand and limestone close to the coast where it is known to breed on *Lomandra maritima*, and which may prove also to be the foodplant. Adults are active only in autumn, and predominantly in March. The Graceful Sunmoth is known from numerous records in the local area with several recent records within 300 metres of the application area. *Lomandra maritima* is present over the application area, particularly within vegetation units 'Mc' and 'Ar' and EcoLogical (2010) mapped a component of the application area as high quality Graceful Sun Moth habitat. The Graceful Sunmoth (*Synemon gratiosa*) is likely to occur over the application area and 2.66 hectares, or 70 percent of the application area (vegetation units 'Mc' and 'Ar') is considered Graceful Sunmoth habitat.

The application area provides habitat for the P4 Quenda (*Isoodon fusciventer*), the P4 Western Brush Wallaby (*Notamacropus Irma*), the P3 Black-striped Burrowing Snake (*Neelaps calonotos*) and the P4 Graceful Sunmoth (*Synemon gratiosa*). Proposed clearing of 1.88 hectares will reduce available habitat for fauna species and bisect Bush Forever Site 322 leading to the fragmentation of a large patch of remnant vegetation resulting in the isolation of approximately 32 hectares of Bush Forever Site 322 to the north. This has the potential to hinder ecological connectivity and faunal movements and impact dispersal and genetic vigour due to a combination of increased random genetic drift, inbreeding, and reduced gene flow (Schlaepfer *et al.* 2018).

Management and mitigation actions detailed in the Foreshore Management Plan of Coterra (2019b) ensure that the access road is constructed and used in an environmentally acceptable manner (Coterra 2019a). The design of the infrastructure and measures proposed by applicant will mitigate impacts to fauna dispersal. The coastal access road has been designed with a six metre wide asphalt pavement leading to a carpark. From the carpark to the beach, a distance of approximately 80 metres, a three metre wide stabilised limestone walking path will be constructed (Coterra 2020b). This narrower pedestrian access, with a lack of vehicular traffic, will assist the north to south movement of fauna. Rural 'conservation-style' fencing will be installed along the access road edge and car park edge to restrict uncontrolled off-road vehicle access (Coterra 2019b). Fencing will incorporate a 200 millimetre gap between the bottom wire and the ground to allow the movement of small to medium-sized ground fauna. To facilitate the movement of kangaroos and wallabies gaps in fencing will be provided, or pedestrian 'kissing' gates installed, through which these species can pass Coterra (2019b).

Nevertheless the loss of 1.88 hectares of habitat from Bush Forever Site 322 will reduce available habitat for fauna species and bisect a significant urban faunal refuge. Proposed clearing may also increase the spread of weeds and dieback into adjacent vegetation associated with Bush Forever Site 322 thereby degrading habitats. Increased traffic and intensive use of the area has the potential to disrupt fauna movements and proposed clearing is at variance to Principle (b).

(c) Native vegetation should not be cleared if it includes, or is necessary for the continued existence of, Threatened flora.

Proposed clearing is not likely to be at variance with this Principle

According to available databases three Threatened flora taxa have been recorded within the local area of a 10 kilometre radius of the application area. The closest Threatened flora (*Eucalyptus argutifolia*) (Vulnerable) has been recorded approximately 350 metres to the north of the application area. *Eucalyptus argutifolia* is a mallee associated with shallow soils on slopes or gullies close to summits of limestone ridges and outcrops. This eucalypt is distinctive, due to its form. *Eucalyptus argutifolia* was not recorded by Bennett (2016), nor any other eucalypt, and habitat is not present over the application area.

The survey of Bennett (2016) was undertaken during the flowering period of the Endangered *Melaleuca* sp. Wanneroo (G.J. Keighery 16705). Both *Melaleuca cardiophylla* and *Melaleuca systema* were recorded by Bennett (2016). *Melaleuca* sp. Wanneroo (G.J. Keighery 16705) is taller and has a yellow flower when compared to the more common *Melaleuca systema* which, has a white or cream flower. *Melaleuca systema* Low Open Shrubland was recorded, but all the shrubs were up to 80 centimetres tall. Known occurrences *Melaleuca* sp. Wanneroo (G.J. Keighery 16705) occur in Nowergup approximately 5.6 kilometres to the north-east of the application area. Soils in Nowergup are predominantly Spearwood Dunes, with the western edge only within Quindalup Dunes, and the species is unlikely to occur over the application area (Bennett 2016).

The Endangered *Marianthus paralius* is a distinctive, almost prostrate woody shrub with a climbing habit that flowers between September and November and occurs on white sands over limestone and low coastal cliffs. This distinctive species was not recorded by Bennett (2016) during its flowering period, and is unlikely to occur. Proposed clearing is not likely to be at variance with Principle (c).

(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.

Proposed clearing is not likely to be at variance with this Principle

No Threatened Ecological Communities (TECs) endorsed by the Western Australian Minister for Environment have been identified or mapped over the application area (Bennett 2016).

Two TECs endorsed by the Western Australian Minister for Environment have been identified and mapped within ten kilometres of the application area:

- The Endangered SCP26a: *Melaleuca huegelii* - *Melaleuca systema* shrublands on limestone ridges (floristic community type 26a as originally described in Gibson *et al.* (1994)); and
- The Endangered SCP20a: *Banksia attenuata* woodlands over species rich dense shrublands (floristic community type 20a as originally described in Gibson *et al.* (1994))

Nineteen records of the Endangered SCP26a totalling 23.75 hectares have been identified and mapped within ten kilometres of the application area, and three records of the Endangered SCP20a have been identified and mapped within ten kilometres of the application area. The closest record is of SCP26a, which occurs approximately five kilometres north of the application area.

Vegetation descriptions over the application area are not analogous with these communities (Bennett 2016), and given the vegetation occurring, and the distance to the nearest known TEC, it is unlikely that the vegetation under application will be necessary for the maintenance of any of these communities. Proposed clearing is not at likely to be variance with Principle (d).

(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.

Proposed clearing may be at variance with this Principle

The national objectives and targets for biodiversity conservation in Australia has a target to prevent clearance of ecological communities with an extent below 30 per cent of that present prior to the year 1750, below which species loss appears to accelerate exponentially at an ecosystem level (Commonwealth of Australia 2001).

The application area is located within the Swan Coastal Plain bioregion as described by Thackway and Cresswell (1995). The Swan Coastal Plain (IBRA) bioregion retains approximately 38.6 per cent of its pre-European vegetation extent (Government of Western Australia 2019a).

The Beard vegetation association 1007 (Shepherd *et al.* 2001) has been mapped over the application area. Beard vegetation association 1007 consists of a mosaic of *Acacia lasiocarpa* and *Melaleuca acerosa* heath/shrublands and *Acacia rostellifera* and *Acacia cyclops* thickets. The Ar and Lg vegetation units described and mapped by Bennett (2016) over the application area are analogous with this association. Beard vegetation association 1007 has 68.68 per cent of its pre-European vegetation extent remaining (Government of Western Australia 2019a). Within the Spearwood System the Beard vegetation association 1007 retains 34.73 per cent of its pre-European vegetation extent.

Hedde *et al.* (1980) (as updated by Webb *et al.* 2016) described and mapped the Quindalup vegetation complex over the application area. The Quindalup vegetation complex is a coastal dune complex consisting of mainly of two alliances; the strand and fore-dune alliance, and the mobile and stable dune alliance and variations include the closed scrub of *Acacia rostellifera* (Summer-scented Wattle). The Ar and Lg vegetation units described and mapped by Bennett (2016) over the application area are analogous with this complex. The Quindalup vegetation complex has 60.49 per cent of its pre-European vegetation extent remaining (Government of Western Australia 2019b).

In assessing the risk of further loss and subsequent cumulative effects, consideration has been given to the extent of native currently managed for conservation purposes. The Environmental Protection Authority (EPA) recognises the Perth Metropolitan Region as a constrained area, which provides for the reduction of vegetation complexes to a minimum of 10 per cent of their pre-European extent (EPA 2008). Bush Forever is a strategic plan that proposes to protect at least 10 per cent of each of the original 26 vegetation complexes of the Swan Coastal Plain within the Perth Metropolitan Region, with a target of 20 per cent for the Quindalup vegetation complex (Government of Western Australia 2000a).

At the local scale approximately 33.2 per cent of native vegetation has been retained within a ten kilometre radius of the application area, with 44.8 per cent retained within the City of Wanneroo (Government of Western Australia 2019b). The majority of the areas of remnant vegetation exist as small fragments, with six areas over 200 hectares within the local area of ten kilometre radius of the application area.

Bush Forever Site 322 forms a significant component of the local vegetation retained within the local area, with the application area is situated within over 340 hectares of coastal vegetation.

Although native vegetation retention rates within the local area are above Government targets (EPA 2008; Commonwealth of Australia 2001) the application area is located in an area of vegetation that is considered a significant remnant. Large patches of remnant vegetation, such as that the proposed clearing is located in, are important for providing core habitat areas necessary to support species that cannot persist in smaller areas, and act as refugia (Davis 2009; Hopper 1979; Hopper *et al.* 1996; Main 1996; Reside *et al.* 2013). The application area forms part of approximately 14 kilometres of largely contiguous native vegetation along the foreshore from Hillarys to Mindarie. This forms a component of the Gnarara Mound Ecological Linkage (Brown *et al.* 2009), a conceptual linkage of areas of remnant vegetation throughout the Gnarara groundwater system, with vegetation along the coastline forming an essential component (Brown *et al.* 2009; Sonneman and Brown 2008).

The retention rate for the Quindalup vegetation complex on Swan Coastal Plain is greater than targets advocated by government agencies (EPA 2008; Commonwealth of Australia 2001), however, only 10.98 per cent of the Quindalup vegetation complex is protected within lands secured for conservation purposes, with just 4.6 per cent protected within the Perth Metropolitan Region (Government of Western Australia 2019b) that has a target of 20 per cent (Government of Western Australia 2000a).

Proposed clearing of 1.88 hectares will bisect a regionally significant ecological corridor and lead to the fragmentation of a large patch of coastal remnant vegetation resulting in the isolation of approximately 33.5 hectares of native vegetation to the north and proposed clearing may be at variance with Principle (e).

(f) Native vegetation should not be cleared if it is growing in, or in association with, an environment associated with a watercourse or wetland.

Proposed clearing is not at variance with this Principle

The application area is located within the Coastal Catchment (UFI 236) of the Swan Coastal Basin (ID 616). The coastal waterline is 37 metres to the west of the application area, with drainage from the application area discharging to the Indian Ocean.

The application area is located within the wetlands of the Swan Coastal Plain consanguineous wetlands suite (not assessed). However, no watercourses or wetlands occur within the application area. The closest Geomorphic Wetland is the Neerabup Lake resource enhancement sumpland located approximately 4.4 kilometres to the east, and Lake Joondalup, approximately 6.1 kilometres south-east, is listed within the Directory of Important Wetlands (WA081). There are no recognised natural watercourses occurring within the local area with the closest being minor tributaries entering Lake Pinjar over 10 kilometres to the east.

The native vegetation occurring within the application area is not growing in, or in association with, an environment associated with a watercourse or wetland and proposed clearing is not at variance with Principle (f).

(g) Native vegetation should not be cleared if the clearing of the vegetation is likely to cause appreciable land degradation.

Proposed clearing is not likely to be at variance with this Principle

The area for the proposed clearing is located within the Quindalup Dune System, a coastal dune formation of unconsolidated Holocene aeolian sediments and Tamala limestone. The application area itself is steeply undulating, with topography ranging from 0 metres Australian Height Datum (AHD) in the west, to 32 to 34 metres AHD on the dune crests and ridgelines (Coterra 2020a). The major formations are moderately inclined to steep sided, complex parabolic dunes. Active foredune ridges also occur adjacent to the coast. Five separate soil descriptions have been mapped over the application area (DPIRD 2017; Schoknecht *et al.* 2004). From east to west these are:

- Quindalup South - Oldest dune phase (211Qu_Q1)
 - Dunes or remnants with low relief. Calcareous sands have organic staining to about 30 centimetres, overlying pale brown sand with definite cementation below one metre.
- Quindalup South - Third dune phase (211Qu_Q3)
 - Irregular dunes with high relief and slopes up to 20 per cent. Loose calcareous sand with little surface organic staining and incipient cementation at depth.
- Quindalup South - Second dune phase (211Qu_Q2)
 - A complex pattern of dunes with moderate relief. Calcareous sands have organic staining to about 20 centimetres, passing into pale brown sand with some cementation below one metre.
- Quindalup South - Unstable sand phase (211Qu_Qu)
 - Presently unstable sands.
- Quindalup South - Water, beach phase (211QuU)
 - Beach.

Soils are rapidly drained calcareous sands and the acid sulfate soil and sub-surface acidification risk over the application area has been assessed at a low risk, as has the risk of salinity. Similarly, due to the rapidly draining sands, water-logging risk is assessed as low (DPIRD 2017). Conversely, the phosphorus export risk is moderate in the dunal systems to the east and high in the foredune beach phase and unstable sand phase (211QuU and 211Qu_Qu) (DPIRD 2017).

Water erosion risk is assessed as high in the unstable sand phase (211Qu_Qu), and moderate in the third dune phase and oldest dune phase. Soils are unconsolidated and there is a high risk of wind erosion in all the mapped soils units, except for the oldest dune phase furthest to the east, which is ranked at a moderate risk.

Standard design features and construction management strategies will mitigate potential land degradation risks. Management of the construction and use of the access infrastructure has been documented within the Catalina Estate Coastal Access Infrastructure Foreshore Management Plan (Coterra 2019b). The foreshore management plan provides detail on construction and operational management actions, including water erosion and wind erosion and dust management actions during construction. Cleared areas will be progressively replaced with a hard road surface, drainage controls, and landscaping. Engineering measures will stabilise the road and carpark structures, and include stormwater management and rock pitching within table drains adjacent to the asphalt road that comply with relevant standards. With construction to commence within two months of clearing to mitigate the effects of wind erosion, and standard operational controls in place, proposed clearing is not likely to be at variance with Principle (g).

(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.

Proposed clearing is at variance with this Principle

The entire application area is located wholly within an Environmentally Sensitive Area (ESA ID 20902), and Bush Forever Site 322 (Burns Beach Bushland) that is also associated with the Gngangara Mound Ecological Linkages (Brown *et al.* 2009; Sonneman and Brown 2008). The closest lands managed by DBCA are Marmion Marine Park located approximately 2.5 to the and Neerabup National Park located approximately 2.5 kilometres to the The Yellagonga Regional Park is located approximately 5.9 kilometres to the south-east.

The application area consists of three lots all of which are included in their entirety within Bush Forever Site 322. The Western Australian Planning Commission (WAPC) is the registered proprietor of the eastern freehold portion (Lot 9505 on Plan 52070). This eastern lot was previously owned by the Tamala Park Regional Council (TPRC) and was ceded to the Crown for reservation as Bush Forever after a 'Negotiated Planning Solution' between TPRC and WAPC in 2006 (Coterra 2019b) to secure an appropriate conservation outcome. The central lot (Lot 3050 on Plan 47951 / Reserve 35890) and the western lot (Lot 15448 on Plan 40340 / Reserve 20561) are both reserves managed the City of Wanneroo for the purpose of 'public recreation' and 'recreation and purposes incidental thereto' respectively.

Bush Forever aims to fulfil the Government of Western Australia's commitment to plan for the conservation of bushland on the Swan Coastal Plain portion of the Perth Metropolitan Region. Bush Forever Site 322 comprises approximately four kilometres of

coastal native vegetation from Mindarie to Burns Beach. South of Burns Beach, Bush Forever Site 325 comprises approximately ten kilometres of semi-continuous coastal vegetation to Hillarys. This strip of coastal vegetation forms an important component of the Gnaragara Mound Ecological Linkages and a priority for nature conservation (Brown *et al.* 2009).

Linear strips of native vegetation retained as traditional ecological corridors, however, have a number of negative aspects (Davis 2009). For example, rates of bird nest predation are higher in linear remnants as opposed to large remnants, and the abundance and density of birds is often also higher in large, non-linear remnants as opposed to narrow corridors (Major *et al.* 1999b; Major *et al.* 1999a). Large patches of remnant vegetation, such as Bush Forever Site 322 within which the proposed clearing is located in, are important for providing core habitat areas necessary to support species that cannot persist in smaller areas, and may act as refugia (Davis 2009; Hopper *et al.* 1996; Reside *et al.* 2013). In the landscape context Bush Forever Site 322 contains the west to east Quindalup - Spearwood dune interface, and forms part of a north to south semi-contiguous vegetated coastal strip (Government of Western Australia 2000b). The application is situated within the Quindalup dune complex and the proposed clearing will isolate approximately 32 hectares of Bush Forever Site 322 to the north from extensive areas of reserved coastal bushland to the south. Proposed clearing will also bisect the proposed Tamala Conservation Park (WAPC 2012).

Only 10.98 per cent of the Quindalup vegetation complex is protected within lands secured for conservation purposes, with just 4.6 per cent protected within the Perth Metropolitan Region (Government of Western Australia 2019b), with a target of 20 per cent (Government of Western Australia 2000a).

The application area is located within a Bush Forever site with a zoning of Regional Parks and Recreation under the City of Wanneroo District Planning Scheme 2. Proposed clearing of 1.88 hectares will bisect Bush Forever Site 322, a regionally significant ecological corridor, and lead to the fragmentation of a large patch of remnant vegetation resulting in the isolation of approximately 32 hectares of Bush Forever Site 322 to the north. Proposed clearing will decrease the area to perimeter ratio of adjacent conservation areas (Helzer and Jelinski, 1999; Stenhouse, 2004) and increase their susceptibility to ecological edge effects such as increased predation rates (Major *et al.* 1999a; Major *et al.* 1999b), and increases in weed abundance and diversity with consequent changes to adjacent vegetation composition (Davis 2009). Habitat fragmentation also leads to increasingly smaller and isolated remnant plant and animal populations. The combination of increased random genetic drift, inbreeding, and reduced gene flow has the potential to substantially reduce the genetic variation of remnant populations (Schlaepfer *et al.* 2018).

The coastal access road has been designed with a six metre wide asphalt pavement leading to the carpark. From the carpark to the beach, a distance of approximately 80 metres, a narrower three metre wide stabilised limestone walking path will be constructed (Coterra 2020a). The proposed clearing for an access route has been aligned as far as possible with an existing track, and the carpark has been sited within an existing dune blowout to reduce the amount of clearing required.

Nevertheless, proposed clearing of 1.88 hectares bisecting Bush Forever Site 322 is likely to have an irreversible negative impact on the environmental values of adjacent conservation areas and is at variance with Principle (h).

(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.

Proposed clearing is not likely to be at variance with this Principle

The application area is located within the Coastal Catchment (UFI 236) of the Swan Coastal Basin (ID 616). The application area is within the Perth Groundwater Area proclaimed under the *Rights in Water and Irrigation Act 1914* (RIWI Act), however, is located well outside of any RIWI Act surface water and irrigation districts, or any *Country Areas Water Supply Act* (CAWS Act) control catchments or reserves, or any Public Drinking Water Source Areas.

No watercourses or wetlands occur over the application area, or within the vicinity of the application area, with the closest wetland (Neerabup Lake) approximately 4.4 kilometres to the east and no recognised natural watercourses occurring within the local area. The coastal waterline is 37 metres to the west of the application area, with drainage from the application area discharging to the Indian Ocean.

Groundwater is mapped at 500 to 1,000 Total Dissolved Solids (TDS) milligrams per litre (mg/L), that is, 'fresh'. Regional groundwater contours (DWER 2020) indicate that groundwater levels vary between 32 metres Australian Height Datum (AHD) in the east of the application area, to eight metres AHD in the west, with flows in a westerly direction discharging to the Indian Ocean.

The soils over the application area are unconsolidated, highly permeable, and conducive to infiltration. Management of the construction and use of the access infrastructure is documented in the Catalina Estate Coastal Access Infrastructure Foreshore Management Plan (Coterra 2019b). Stormwater will be generated from the handstand road, carpark and beach access path surfaces and drainage design will adhere to Water Sensitive Urban Design principles as advocated by DoW (2008). Given the nature and relatively small scale of the proposed clearing, and the design, and standard construction methodologies employed, the proposed clearing is unlikely to cause deterioration in the quality of surface or underground water and is not likely to be at variance with Principle (i).

(j) Native vegetation should not be cleared if clearing the vegetation is likely to cause, or exacerbate, the incidence or intensity of flooding.

Proposed clearing is not at variance with this Principle

The application area experiences an annual average rainfall of approximately 866 millimetres, with the majority received during the winter months, with the wettest being June and July (BOM 2020). The application area is located within the Coastal Catchment (UFI 236) of the Swan Coastal Basin (ID 616) with surface water and groundwater discharging to the Indian Ocean.

The majority of the application area is mapped as a low flood risk, with less than three per cent of the mapped L1 unit having a moderate to high flood risk. The western foreshore section, that is the beach phase (211QuU), is mapped as a high flood risk

due to the risk of coastal inundation. The Catalina Estate Coastal Access Infrastructure Foreshore Management Plan (Coterra 2019b) addresses coastal erosion and inundation. However, given the relatively limited scale of clearing, location of infrastructure behind the fore dune, and the unconsolidated and permeable nature of the soils, proposed clearing is not likely to cause, or exacerbate, the incidence or intensity of flooding and is not at variance with Principle (j).

5. Planning and other relevant matters

Tenure

The application area consists of three lots all of which are included in their entirety within Bush Forever Site 322. The Western Australian Planning Commission (WAPC) is the registered proprietor of the eastern freehold portion (Lot 9505 on Plan 52070). This eastern lot was previously owned by the Tamala Park Regional Council (TPRC) and was ceded to the Crown for reservation as Bush Forever after a 'Negotiated Planning Solution' between TPRC and WAPC in 2006 (Coterra 2019b) to secure an appropriate conservation outcome. The central lot (Lot 3050 on Plan 47951 / Reserve 35890) and western lot (Lot 15448 on Plan 40340 / Reserve 20561) are both reserves managed by the City of Wanneroo for 'public recreation' and 'recreation and purposes incidental thereto' respectively. The coastal access road and associated infrastructure will remain under the ownership of both City of Wanneroo and the Western Australian Planning Commission, in accordance with the existing reserve boundaries. This is in keeping with the City of Wanneroo agreement to continue managing (wholly or in part) the reserves between Burns Beach and Mindarie (WAPC 2012) (Coterra 2019b).

Negotiated Planning Solution

The original Tamala Park Regional Council (TPRC) landholdings west of the now-established Marmion Avenue totalled 121.5 hectares. As a result of a Negotiated Planning Solution process the TPRC ceded 89 hectares of land originally part of the Tamala Park landholdings to the Government for reservation as Bush Forever (becoming Bush Forever Site No. 323). With this area excised from the Tamala Park landholding, 32.5 hectares remained within the Catalina Beach precinct for urban development purposes.

Tamala Conservation Park

The application area is within the boundaries of the Tamala Conservation Park. The Tamala Conservation Park Establishment Plan was prepared by the Western Australian Planning Commission (WAPC 2012) to guide the coordinated long-term management of the coastal bushland between Burns Beach and Mindarie. It described the relevant conservation and recreation values and identified proposed boundaries. The plan outlined management objectives, park management options and tenure. A Community Advisory Committee was created to develop the establishment of the Park. The Park has three primary usages; Conservation and protection, natural environment uses, and recreation. The former Department of Environment and Conservation (DEC) (now Department of Biodiversity, Conservation and Attractions [DBCA]) provided its support to the protection of the Park as a Class A Nature reserve. However, it was recognised that whilst containing high conservation value, the Park permits an element of suitable managed passive recreation (Coterra 2019b). A recommendation of WAPC (2012) includes consideration of community access to safe swimming areas adjacent to Mindarie and Tamala Park, with the identification of a public recreational swimming area off Long Beach Promenade with public road access, and appropriately located facilities (WAPC 2012).

Development Approval

Approval to commence development was obtained from the Western Australian Planning Commission (WAPC) on the 29 April 2020 (WAPC Ref: 30-50409-1). Approval was conditional and included the development of a revegetation management plan, fencing, and dust and sand drift management (WAPC 2020).

Catalina Estate Coastal Access Infrastructure Foreshore Management Plan

The Catalina Estate Coastal Access Infrastructure Foreshore Management Plan (Coterra 2019b) has been prepared by the Tamala Park Regional Council (TPRC) in the interest of the community to facilitate the opening of a swimming beach, and for the benefit of the City of Wanneroo who are responsible for the area. The Foreshore Management Plan specifically addresses the impacts of the provision of beach access infrastructure. The objective of the Foreshore Management Plan is to provide measures to ensure controlled public access to a safe swimming and aquatic activity beach, providing commitments for the protection, and where possible, enhancement of the conservation value of the adjacent foreshore area. Management measures to minimise the environmental impact of the proposed coastal access infrastructure are provided, and the Foreshore Management Plan supports applications for Development Approval, as well as a Native Vegetation Clearing Permit (Coterra 2019a).

City of Wanneroo Coastal Management Plan (Part 1)

The City of Wanneroo Coastal Management Plan (CoW 2012) community consultation was undertaken to take into account recommendations for future coastal uses. Potential future uses of the South Mindarie-Tamala Park beach area included a possible horse exercise area (recommendation 3 of the report), a proposed dual use path to connect Burns Beach with Tamala Park, potential change room and toilet at the access way from Longbeach Promenade, and a dune blow-out proposed for revegetation (CoW 2012).

State Planning Policy 2.8 – Bushland Policy for the Perth Metropolitan Region (SPP 2.8)

Department of Planning, Lands and Heritage (DPLH) advised DWER on 20-03-2020 (DPLH 2020) that the application area is reserved as Parks and Recreation in the Metropolitan Region Scheme (MRS) and has the Bush Forever implementation category of Bush Forever Reserves (existing or proposed). DPLH advised that an offset package should be prepared and approved by DWER in accordance with the WA Environmental Offsets Policy (2011) and Appendix 4 of State Planning Policy (SPP) 2.8. DPLH recommended that offset measures be provided onsite at Bush Forever area 322 to provide an environmental gain to what is being lost. DPLH recommended (based upon the initial clearing proposal of three hectares) an offset area of at least six hectares (that is, two-to-one) within Bush Forever area 322 should be rehabilitated for the clearing (DPLH 2020). DPLH (2020)

also recommend that construction adhere to the Foreshore Management Plan of Coterra (2019b), and that no other disturbance or clearing of any other native vegetation within Bush Forever area 322 is to occur.

State Planning Policy 2.6 – Coastal Planning (SPP 2.6)

Revision 6 of the Catalina Estate Coastal Access Infrastructure Foreshore Management Plan (Coterra 2019b) has been reviewed by both the City of Wanneroo and DPLH. DPLH has advised the applicant that the Foreshore Management Plan is consistent with the Tamala Conservation Park Establishment Plan (March 2012). The Foreshore Management Plan satisfies the requirements of SPP 2.6, and should any Development Applications be submitted with the access infrastructure in accordance with the Foreshore Management Plan, there should be no impediment from an SPP 2.6 perspective to issuing approval (Coterra 2019a).

Water

The application area is within the Perth Groundwater Area proclaimed under the *Rights in Water and Irrigation Act 1914* (RIWI Act), however, is located well outside of any RIWI Act surface water and irrigation districts, or any *Country Areas Water Supply Act* (CAWS Act) control catchments or reserves, or any Public Drinking Water Source Areas.

Aboriginal Heritage

The application area is located within the boundaries of the Single Noongar Claim (WAD6006/2003) and the Whadjuk People Indigenous Land Use Agreement (WI2017/015). No Aboriginal sites of significance have been recorded within the application area. One aboriginal heritage place, Mindarie Waugal (ID 3567), is located within 30 metres east of the application area. It is the applicant’s responsibility to ensure compliance with any obligations under the *Native Title Act (1993)* or *Aboriginal Heritage Act 1972*.

6. Information provided by the applicant

Summary	Reference
Supporting information providing background, summary of environmental investigations, site characteristics, assessment against clearing principles, proposed foreshore management and conclusions.	Coterra (2019a)
Foreshore Management Plan. Catalina Estate Coastal Access Infrastructure. (Revision 6, February 2019). Approved by the City of Wanneroo.	Coterra (2019b)
Botanical assessment of proposed access roads from Catalina to the beach.	Bennett (2016)
Information regarding alternatives considered and avoidance, minimisation, and mitigation options.	Coterra (2020a)
Updated information and assessment of fauna, priority ecological communities and priority flora. Attachment 3: Threatened and Priority Flora Summary Table	Coterra (2020b)
Revised clearing areas and detailed revegetation strategies with species selection and completion criteria.	Coterra (2020c)
Western Australian Planning Commission (WAPC) Approval to Commence Development.	WAPC (2020)
Detailed revegetation plan for construction areas (Final)	Coterra (2020d)
Offset Proposal (Final)	Coterra (2020e)
Detailed revegetation plan for offset proposal (Final)	Coterra (2020f)
In principle support from the City of Wanneroo to Tamala Park Regional Council for revegetation offsets in relation to CPS 8794-1 to be undertaken within coastal reserves located with Bush Forever Site 322	(CoW 2020)

7. Residual impact and offset

In preparing the clearing permit application, the applicant has appropriately applied the impact mitigation sequence through avoidance, minimisation and mitigation to reduce the impacts of the proposed development (Section 3 and supporting documents).

The alignment has been selected on the basis of being able to utilise more of the existing tracks and creating a shorter overall length with less clearing. The location of the proposed access route and the carpark area have been selected to follow existing informal tracks where vegetation condition is lowest and weeds are more prevalent, or areas of damaged vegetation to minimise impacts on existing native vegetation and habitat values. The road has therefore been aligned as far as possible (subject to engineering considerations) to overlap existing informal tracks. The carpark has been located within a degraded dune blowout supporting very little vegetation to further minimise the clearing required.

The initial application considered a clearing area of 3.0 hectares. During the assessment, and in consideration of revised engineering specifications, the clearing area required was revised down to 1.88 hectares. The applicant has committed to revegetating all areas disturbed during construction, resulting in the permanent removal of native vegetation over approximately 0.60 hectares.

Through the assessment against the ten clearing principles the Delegated Officer has determined that the proposed clearing is at variance with principles (b) and (h) and may be at variance to principles (a) and (e) and that significant residual impact remains, that being the loss of:

- 0.60 hectares of Bush Forever Site 322 (Burns Beach Bushland) and a significant remnant of bushland.
- 0.25 hectares of Priority 3 Ecological Communities:
 - 0.05 hectares of SCP29a (Vegetation unit Si)
 - 0.20 hectares of SCP29b (Vegetation unit Ar)
- 0.33 hectares Priority 4 vertebrate fauna habitat (Vegetation units Ar and Lg)
- 0.43 hectares Priority 4 invertebrate fauna habitat (Vegetation units Ar and Mc)

The DPLH have also advised that an offset package should be prepared and approved by DWER in accordance with the WA Environmental Offsets Policy (2011), and Appendix 4 of State Planning Policy 2.8 (Section 5) (DPLH 2020). That is, an environmental gain to what is being lost with a recommended offset ratio two-to-one.

To counter-balance the significant residual impacts, the applicant has submitted an offset proposal (Coterra 2020e) that involves the revegetation, protection, and ongoing management of 1.56 hectares of coastal native vegetation within Bush Forever Site 322. That is, within Lot 3050 on Plan 47951 (Reserve R 35890) and/or Lot 15448 on Plan 40340, Mindarie (Reserve R 20561). The proposed offset site(s) are proposed to be located within reserves that are managed by the City of Wanneroo for 'public recreation' and 'recreation and purposes incidental thereto' respectively.

The City of Wanneroo has advised that there are opportunities for revegetation works to be undertaken within these coastal reserves, which would improve the quality of the existing degraded areas. To this end the City of Wanneroo has provided *in principle* support for the Tamala Park Regional Council (TPRC) to undertake revegetation and/or rehabilitation works within a portion of these reserves (CoW 2020). The *in principle* support is contingent upon conditions, including that TPRC be responsible for the works, and all cost associated with the rehabilitation and/or revegetation plan and implementation to meet the requirements of DWER's clearing permit conditions associated with CPS 8794-1.

Coterra Environment provided the specific revegetation strategies, species lists, and detailed completion criteria to be utilised for the 1.28 hectares of revegetation to be revegetated as part of post-construction rehabilitation of the application area (Coterra, 2020d) and for the proposed 1.56 offset area (Coterra, 2020f). Species selection and completion criteria area are based upon quadrat data obtained from baseline flora and vegetation data (Bennett 2016; AECOM 2018).

The proposed offset has been developed in accordance with the WA State Government's Environmental Offsets Policy and Environmental Offsets Guidelines, and informed by the application of the *Environment Protection and Biodiversity Conservation Act 1999* (EPBC Act) Offset Assessment Guide and calculator. The proposed offset also conforms with DPLH advice and State Planning Policy 2.8 (Section 5).

The Delegated Officer concluded that the offset provided adequately counterbalances the significant residual impacts identified. The justification for the values used in the offset calculation is provided in Table 1 below.

8. Offset justification

The justification for the values used in the offset calculation is provided below in the table below.

Field Name	Description	Justification for value used (Revegetation)
<i>IUCN Criteria</i>	The IUCN criteria for the value being impacted	(Other) value assigned based on residual impact to Bush Forever Site 322 (Burns Beach Bushland) reserved as Parks and Recreation in the Metropolitan Region Scheme (MRS) with the Bush Forever implementation category of Bush Forever Reserves (existing or proposed).
<i>Area of impact (habitat / community) or Quantum of impact (features/individuals)</i>	The area of habitat/community impacted or number of features / individuals impacted	(0.60) hectares has been assigned based on the proposed clearing resulting in the permanent loss of 0.60 hectares of Bush Forever Site 322 that includes 0.25 hectares of PECs and 0.56 hectares of priority fauna habitat.
<i>Quality of impacted area (habitat/community)</i>	The quality score for area of habitat / community being impacted - a measure of how well a particular site supports a particular threatened species or ecological community and contributes to its ongoing viability.	A quality score of (5) has been assigned based on the vegetation within Bush Forever Site 322 being in predominantly Good to Very Good condition based upon the vegetation condition scale of Keighery (1994) as presented within the report of Bennett (2016) that is a significant conservation area.
<i>Time over which loss is averted (habitat / community)</i>	This describes the timeframe over which changes in the level of risk to the proposed offset site can be considered and quantified	(20) years has been assigned based on the offset site being revegetated managed and protected. Twenty years is the maximum value associated with this field.
<i>Time until ecological benefit (habitat / community) or Time horizon (features / individuals)</i>	This describes the estimated time (in years) that it will take for the main benefit of the quality (habitat/ community) or value (features / individuals) improvement of the proposed offset to be realised	(10) years has been assigned being the timeframe for the revegetation of coastal vegetation to provide the anticipated ecological benefits. However, the permit has been conditioned for 5 years to meet the specified completion criteria, as the proposed revegetation is considered to achieve success within shorter time periods.
<i>Start area (habitat/community) or Start value (features / individuals)</i>	The area of habitat/community or number of features/individuals proposed to offset the impacts	(1.56) hectares has been assigned based on the revegetation offset providing 100% of the offset requirement.

Field Name	Description	Justification for value used (Revegetation)
<i>Start quality (habitat / community)</i>	The quality score for the area of habitat/community proposed as an offset - a measure of how well a particular site supports a particular threatened species or ecological community and contributes to its ongoing viability	A start quality score of (1) has been assigned based on the offset vegetation condition being in Degraded to Completely Degraded condition based upon the condition scale of Keighery (1994).
<i>Future quality without offset (habitat/community) or Future value without offset (features / individuals)</i>	The predicted future quality score (habitat/community) or value (features/individuals) of the proposed offset site without the offset	A future quality without offset score of (1) has been assigned based on the relevant offset area retaining a Degraded to Completely Degraded condition ranking based upon the condition scale of Keighery (1994) without active management intervention.
<i>Future quality with offset (habitat/community) or Future value with offset (features/individuals)</i>	The predicted future quality score (habitat/community) or value (features/individuals) of the proposed offset site with the offset	A future quality with offset score of (4) has been assigned based on the likelihood of the revegetated offset area attaining a vegetation condition ranking of Good or better based upon the condition scale of Keighery (1994).
<i>Risk of loss (%) without offset (habitat/community)</i>	This describes the chance that the habitat/community on the proposed offset site will be completely lost (i.e. no longer hold any value for the protected matter of concern) over the foreseeable future without an offset	A risk of loss percentage without offset of (20%) has been assigned due to the relevant Lots currently being reserved as Parks and Recreation in the Metropolitan Region Scheme (MRS) with the Bush Forever implementation category of Bush Forever Reserves (existing or proposed).
<i>Risk of loss (%) with offset (habitat/community)</i>	This describes the chance that the habitat/community on the proposed offset site will be completely lost (i.e. no longer hold any value for the protected matter of concern) over the foreseeable future with an offset	A risk of loss percentage with offset of (20%) has been assigned due to the relevant Lots remaining as reserved as Parks and Recreation in the Metropolitan Region Scheme (MRS) with the Bush Forever implementation category of Bush Forever Reserves (existing or proposed).
<i>Confidence in result (%) – risk of loss (habitat/community)</i>	The capacity of measures to mitigate risk of loss of the proposed offset site	A confidence in result percentage of (90%) for the risk of loss has been assigned as there is a high level of confidence that Lots will remain as reserved as Parks and Recreation in the Metropolitan Region Scheme (MRS)
<i>Confidence in result (%) – Change in quality (habitat / community) or Change in value (features / individuals)</i>	The level of certainty about the successful achievement of the proposed change in quality (habitat/community) or value (features/individuals)	A confidence in result percentage of (80%) for the change in quality has been assigned as there is a high level of confidence that the proven revegetation strategies will result in providing coastal native vegetation at a condition of Good or better within 10 years (based upon the condition score of Keighery 1994), based upon the species selected for revegetation.
<i>% of impact offset</i>	% of the significant residual impact that would be offset by the proposed offset (note: the offset calculations combined should equate to 100% for each residual impact)	A percentage of impact offset of (100%) has been assigned based upon the revegetation of 1.56 hectares of coastal vegetation from Completely Degraded to Good (based upon the condition scale of Keighery 1994) over ten years will appropriately offset the loss of 0.60 hectares of Bush Forever Site 322 (Burns Beach Bushland) consistent with the State Government's Environmental Offsets Policy and State Planning Policy 2.8 (Appendix 4).

9. Public submissions

The application was advertised on the DWER website for a 21 day public comment period on 21 February 2020. Two public submissions were received in relation to this application. Summaries are provided in the table below.

Comment (summarised)	Area	Response
One design option only for the access road which will introduce a 9m wide sealed surface.	Avoidance / Minimisation	Avoidance and minimisation measures have provided by Coterra (2019a; 2019b; 2020a; 2020c), and summarised in the decision report (Section 3). Two options were considered. The clearing area has been reduced from 3.0 hectares to 1.88 hectares of which 1.28 hectares will be revegetated.
The plan shows a cut option into the dune system with no evidence of better utilising the existing tracks to run a one way access (the major tracks are 3 m wide and used by unauthorised 4WDs).	Avoidance / Minimisation	Avoidance and minimisation measures have provided by Coterra (2019a; 2019b; 2020a; 2020c), and summarised in the decision report (Section 3). Two options were considered. The clearing area has been reduced from 3.0 hectares to 1.88 hectares of which 1.28 hectares will be revegetated. The location of the proposed access route

		<p>and the carpark area have been selected to follow existing informal tracks where vegetation condition is lowest and weeds are more prevalent, or areas of damaged vegetation to minimise impacts on existing native vegetation and habitat values (Coterra 2020a).</p> <p>Note that the preferred access track does not follow the existing track alignment to the north-east as, due to the topography in this location (Figure 2), the disturbance required for construction would be greater than the location shown in Figure 3 (Coterra 2020a).</p> <p>The road has therefore been aligned as far as possible (subject to engineering considerations) to overlap existing informal tracks. The carpark has been located within a degraded dune blowout supporting very little vegetation to further minimise the clearing required.</p>
Should consider forming small bridges along some sections to reduce the amount of clearing along the presented 'preferred' route.	Avoidance / Minimisation	<p>Avoidance and minimisation measures have provided by Coterra (2019a; 2019b; 2020a; 2020c), and summarised in the decision report (Section 3). Two options were considered. The clearing area has been reduced from 3.0 hectares to 1.88 hectares of which 1.28 hectares will be revegetated.</p> <p>The alignment has been selected on the basis of being able to utilise more of the existing tracks and creating a shorter overall length with less clearing.</p>
Design does not reflect the sensitive nature of the environment and local fauna requirements.	Avoidance / Minimisation	<p>Avoidance and minimisation measures have provided by Coterra (2019a; 2019b; 2020a; 2020c), and summarised in the decision report (Section 3). Two options were considered, where, in addition to the safety aspects, the environmental aspects of each option were also investigated. The clearing area has been reduced from 3.0 hectares to 1.88 hectares of which 1.28 hectares will be revegetated.</p>
The proposal is likely to have several adverse impacts and the impact assessment process appears not to have considered all reasonable steps to avoid, minimise or offset these impacts.	Avoidance / Minimisation	<p>Avoidance and minimisation measures have provided by Coterra (2019a; 2019b; 2020a; 2020c), and summarised in the decision report (Section 3). Two options were considered. The clearing area has been reduced from 3.0 hectares to 1.88 hectares of which 1.28 hectares will be revegetated.</p> <p>To counter-balance the significant residual impacts, the applicant has submitted an offset proposal (Coterra 2020e) that involves the revegetation, protection, and ongoing management of 1.56 hectares of coastal native vegetation within Bush Forever Site 322. That is, within Lot 3050 on Plan 47951 (Reserve R 35890) and/or Lot 15448 on Plan 40340, Mindarie (Reserve R 20561). Refer Section 7 for further details.</p>
Clearing envelopes of the proposed roads and car park are extremely wide. The road is up to 75 metres wide and up to 115 metres wide for the car park.	Avoidance / Minimisation	<p>Avoidance and minimisation measures have provided by Coterra (2019a; 2019b; 2020a; 2020c), and summarised in the decision report (Section 3). Two options were considered. The clearing area has been reduced from 3.0 hectares to 1.88 hectares of which 1.28 hectares will be revegetated. The final road is 8.5 metres wide.</p> <p>The beach carpark providing 30 car parking bays including one ACROD bay) is proposed to be constructed in line with the City's specifications for recreation area carparks. The carpark has been located within a degraded dune blowout supporting very little vegetation to further minimise the clearing required. Detailed carpark design has been included in the Development Application.</p>
Why clear a Bush Forever Site for a road and car park, when bike or walk trails could allow access (without the need for either the road or car park). Such a trail could follow the pre-existing tracks.	Avoidance / Minimisation	<p>Avoidance and minimisation measures have provided by Coterra (2019a; 2019b; 2020a; 2020c), and summarised in the decision report (Section 3). Two options were considered. The clearing area has been reduced from 3.0 hectares to 1.88 hectares of which 1.28 hectares will be revegetated.</p> <p>It is anticipated that the provision of formal coastal access infrastructure will deter residents from contributing to the environmental degradation caused by uncontrolled 4WD access and enable these areas to regenerate.</p>

		Rural 'conservation-style' fencing will be installed along the access road edge and car park edge to restrict uncontrolled off-road vehicle access (Coterra 2019b). Fencing will incorporate a 200 millimetre gap between the bottom wire and the ground to allow the movement of small to medium-sized ground fauna. To facilitate the movement of kangaroos and wallabies gaps in fencing will be provided, or pedestrian 'kissing' gates installed, through which these species can pass Coterra (2019b).
The consultant recommends using the northern most track for the proposed road, however it appears that the road could potentially follow the entire pre-existing track to the northeast at the east end rather than bisecting the intact vegetation.	Avoidance / Minimisation	Avoidance and minimisation measures have provided by Coterra (2019a; 2019b; 2020a; 2020c), and summarised in the decision report (Section 3). Two options were considered. The clearing area has been reduced from 3.0 hectares to 1.88 hectares of which 1.28 hectares will be revegetated. The northern alignment was selected on the basis of being able to utilise more of the existing tracks and creating a shorter overall length with less clearing. The location of the proposed access route and the carpark area have been selected to follow existing informal tracks where vegetation condition is lowest and weeds are more prevalent, or areas of damaged vegetation to minimise impacts on existing native vegetation and habitat values (Coterra 2020a).
Proposal needs to consider impacts of climate change on the Perth's coastline and the coastal habitats.	Principle (a)	Impact to vegetation is addressed in the decision report. Supporting information (Coterra 2019b) addresses climate change (Section 5.2 p 18) Appendix B provides a Catalina Estate Coastal Hazard Risk Management and Adaptation Plan.
Impact on vegetation communities that are poorly protected and threatened by further development and by climate change.	Principle (a)	Impact to vegetation is addressed in the decision report. Supporting information (Coterra 2019b) addresses climate change with Section 5.2 p 18 and Appendix B of that plan providing a Catalina Estate Coastal Hazard Risk Management and Adaptation Plan.
Missing information on PECS: FCT29a (P3) and FCT29b (P3).	Principle (a) Survey results	Coterra (2020b) provides information on PECs that is summarised in the decision report (Section 4a).
Missing information on P3 flora: <i>Stylidium maritimum</i> , <i>Astroloma microcalyx</i> , <i>Lasiopetalum membranaceum</i> , and P4 flora <i>Conostylis pauciflora</i> subsp. <i>Euryrhipis</i> .	Principle (a) Survey results	Coterra (2020b) provides additional information on significant flora taxa, including those listed, and is summarised in the decision report (Section 4a).
Potentially missing information on conservation significant vegetation and flora.	Principles (a), (c), and (d) Survey results	Coterra (2020a) and Coterra (2020b) provides information on significant flora taxa and vegetation that is summarised in the decision report (Section 4a).
It is not clear that the entire project envelope was surveyed by Bennett (2016).	Principles (a), (c), and (d), (e) and (f) Survey results	The application area has been surveyed by Bennett (2016) (Coterra 2019b; Coterra 2020b). Refer 'Botanical Assessment of Proposed Access Roads from Catalina to the Beach' available for public view on DWER's FTP site ftp://ftp.dwer.wa.gov.au/permit/ under 8794.
Large stands of habitat for the Graceful Sunmoth are present	Principle (b)	The Graceful Sun Moth is now listed as Priority 4 after extensive survey efforts identifying significant areas of suitable habitat and areas containing the species. Habitat for the Graceful Sunmoth is addressed in the decision report (Section 4b).
Gap between the fence and the ground will not facilitate the free movement of larger fauna. Fencing with regular openings to allow kangaroo's and wallabies to move freely seems to work at the recently completed bike/walk trail from Burns Beach to Mindarie.	Principle (b)	To facilitate the movement of kangaroos and wallabies pedestrian 'kissing' gates will be installed, through which these species can pass (Coterra 2019b).
Appropriate fauna culverts should be considered to accommodate a variety of local fauna as a condition.	Principle (b)	The applicant has advised that 'Conservation-style' fencing will be installed with a 200mm gap between the bottom wire and the ground to allow the movement of small to medium-sized ground fauna. To facilitate the movement of kangaroos and wallabies pedestrian 'kissing' gates will be installed (Coterra 2019a). Faunal movement and dispersal has been addressed in the decision report Section 3).
The survey is not up to date as large areas of the Quindalup Complex cleared in the past twenty years. This patch of Quindalup bushland is regionally important, as it is the last remaining large remnant in an increasingly cleared area.	Principle (e) Survey results	Addressed in the decision report (Section 4e)
The vegetation complex is under-represented. Bush Forever has sought to protect about 20% of vegetation representative of Quindalup vegetation complex in the Perth Metropolitan Region. 9.8% of the pre-European extent of Quindalup vegetation complex is reserved on the Swan Coastal Plain, and 4.6% of the pre-European extent	Principle (e)	Addressed in the decision report (Section 4e)

of Quindalup vegetation complex in the Perth Metropolitan Region.		
Significant impact on the local dune system.	Geomorphology	Not within the Department's scope of this assessment.
Bush Forever (EPA 2000a and 2000b) states that the area "represents the most well defined remaining cusped foreland and its associated range of medium to small scale (Quindalup) dune landforms...with a number of coastal blowouts with small Q4 dunes surrounding".	Geomorphology	Not within the Department's scope of this assessment.
Proportion of application area within land used as an EPBC Act offset site (Graceful Sunmoth Habitat) by the Tamala Park Regional Council.	Land status	The application area is not located in land used as an EPBC Act offset site (Coterra 2020a). The relevant Tamala Park Regional Council offset for EPBC 2010/5785 required contribution to a fund to provide for foraging and breeding habitat for Carnaby's cockatoo.
The subject area is set aside under Bush Forever Negotiated Planning Solution.	Land status	Addressed in the decision report (Planning and Other Matters).
Area is entirely within Bush Forever Site 322, and the Tamala Conservation Park proposed by the WA Planning Commission in 2012.	Land status	Addressed in the decision report (Planning and Other Matters).
There is no management plan covering the bushland which includes areas subject to Negotiated Solutions under Bush Forever, and an offset under the EPBC Act.	Management Planning	The applicant has provided the Foreshore Management Plan (Rev 6) (Coterra 2019b) approved by the City of Wanneroo that identifies actions to minimise impacts. The application area is not located in land used as an EPBC Act offset site (Coterra 2020a).
There is no management plan that covers the management of the area subject to clearing application CPS 8794/1.	Management Planning	The Foreshore Management Plan (Rev 6) (Coterra 2019b) approved by the City of Wanneroo covers management of the area subject to clearing application CPS 8794/1.
A formal agreement is required between all management authorities over the Tamala Park Conservation Park.	Management Planning	Not within the scope of this assessment.
A management plan needs to address known management issues, and issues that will arise as a result of the road and carpark	Management Planning	The Foreshore Management Plan (Rev 6) (Coterra 2019b) approved by the City of Wanneroo covers the management of the area subject to clearing application CPS 8794/1.
If the proposal is approved, strict conditions must be imposed to protect the surrounding vegetation including weed management, fencing, restriction of public access and fire protection.	Management Planning	If granted, relevant permit conditions will be included with CPS 8794/1.
The justification for the project is the current unauthorised access by vehicles - but this has not been addressed.	Management Planning	The Foreshore Management Plan (Rev 6) (Coterra 2019b) approved by the City of Wanneroo covers the management of the area subject to clearing application CPS 8794/1. Access management is covered in 7.3.3 of that plan.
There will be a high risk of increased vandalism and rubbish dumping.	Management Planning	The Foreshore Management Plan (Rev 6) (Coterra 2019b) approved by the City of Wanneroo covers the management of the area subject to clearing application CPS 8794/1.
Revegetation plan needs to source local plant material.	Revegetation	The applicant has provided specific revegetation strategies, species lists, and detailed completion criteria (Coterra 2020d; Coterra 2020f) that specifies that locally provenanced plant material will be utilised wherever possible.
<i>Spinifex longifolius</i> is now propagated more from seed rather than cuttings.	Revegetation	The applicant has provided specific revegetation strategies, species lists, and detailed completion criteria (Coterra 2020d; Coterra 2020f). Revegetation species lists include <i>Spinifex longifolius</i> . Completion criteria include the presence of <i>Spinifex longifolius</i> .

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10. GIS Datasets

Publicly available GIS Databases used (sourced from www.data.wa.gov.au):

- Contours (DPIRD-073)
- DBCA – Lands of Interest (DBCA-012)
- DBCA Legislated Lands and Waters (DBCA-011)
- Directory of Important Wetlands in Australia – Western Australia (DBCA-045)
- Environmentally Sensitive Areas (DWER-046)
- Flood Risk (DPIRD-007)
- Groundwater Salinity Statewide (DWER-026)
- IBRA Vegetation Statistics
- Local Planning Scheme – Zones and Reserves (DPLH-071)
- Regional Parks (DBCA-026)
- Soil and Landscape Mapping – Best Available

Restricted GIS Databases used:

- ICMS (Incident Complaints Management System) – Points and Polygons
- Threatened Flora (TPFL)
- Threatened Flora (WAHerb)
- Threatened Fauna
- Threatened Ecological Communities and Priority Ecological Communities
- Threatened Ecological Communities and Priority Ecological Communities (Buffers)