COTERRA ENVIRONMENT

Native Vegetation Clearing Permit Application Supporting Information

Carey Baptist College, Forrestdale: Carpark Extension and Playground

Rev 0 November 2024

CALIBRE | COMMITMENT | COLLABORATION

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1 Introduction

1.1 Background

Carey Baptist College are progressing the development at the school located on Lot 2, Nicholson Road, Forrestdale (Lot 2 on Diagram 75868). Lot 2 is approximately 22 hectares (ha) in size and contains the Forrestdale campus catering for Kindergarten to Year 12 students, Carey Baptist College Church and childcare facilities.

Lot 2 is located approximately 24 kilometres (km) southeast of Perth, within the City of Armadale (Figure 1) and is zoned 'Rural' under the Metropolitan Region Scheme (MRS) and 'General Rural' under the City of Armadale's Town Planning Scheme 4 (TPS 4).

Historically, the site was used for agricultural (stock grazing) purposes. Consultation commenced with the City of Armadale, Department of Planning, (then) Department of Environment and Conservation, and other key stakeholders regarding development of a school on Lot 2 in 2011. A Masterplan for the school was prepared to outline the full development proposed for the site. A copy of the current Master Plan is provided in Appendix 1.

The Forrestdale school campus was approved for construction in 2014 by the City of Armadale. Following completion of initial construction works, the first areas of the school were opened in 2016. Since this time, construction and operation of Stages 1 to 3 have been progressed in accordance with the associated planning and environmental approvals.

1.2 Carpark Extension and Playground Development Area

The next stage of the school's development involves construction of:

- A new pick up/drop off parking facility, as an extension on the existing car parking in the east
- New staff parking and a bypass lane to allow staff access around the above pick up/drop off parking
- A playground area, consisting of grassed areas and play equipment as a temporary facility available for the students, prior to construction of the future football oval in the west of Lot 2. This area is ultimately proposed to be utilised for additional school buildings once the temporary use has concluded as shown on the Masterplan (Appendix 1)
- An interim playing field located within the previously cleared CPS 10881/1 area.

The location and extent of the development under this NVCP application is shown on Figure 2, with the total area required to be cleared being 1.245 ha within a 1.302 ha footprint.

1.3 Existing Clearing Permits

The Department of Water and Environmental Regulation (DWER) (and the former Department of Environment and Conservation) have granted several clearing permits historically to support the development of the school site. An overview of the permits granted for Lot 2 is provided in Table 1-1.

Table 1-1: Clearing Permits for Lot 2, Nicholson Road

Permit Number	Area	Date granted	Purpose of clearing	Conditions	Offsets
CPS 4860/1 and 4860/2	4.26 ha, amended	May 2014 (CPS 4860/1) and	Stage 1 of campus development	• Management of potential dieback spread and weed control	• 5.4 ha of revegetation within the

Permit Number	Area	Date granted	Purpose of clearing	Conditions	Offsets
	to 4.45 ha	December 2014 (CPS 4860/2)		• Implementation of a Revegetation Plan. Revision 1 of the Revegetation Plan, (Coterra Environment, 2014) was approved by DER, which outlined the ultimate revegetation scenario for both Stages 1 and 2 of the site) • Record keeping and reporting (Note: annual reporting was completed in 2020)	eastern end of the site
CPS 8786/1	1.21 ha	July 2020	Stage 2 of campus development (initial)	• Implementation of offset (revegetation and rehabilitation) works • Vegetation management through fencing • Application of a conservation covenant • Record keeping and reporting	• rehabilitation of 1.22 ha of Banksia Woodland • revegetation of 0.30 ha of Banksia Woodland • revegetation of 0.51 ha of mesic woodland
CPS 9928/1	0.03 ha	June 2023	Carpark extension	• Weed and dieback management • Rehabilitation offsets • A conservation covenant within the site • Record keeping and reporting	• revegetation of 0.073 ha
CPS 10281/1	2.015 ha	January 2024	Sports Hall and associated bushfire asset protection zone (APZ)	• Implementation of the *Revegetation Plan, Carey Baptist College, Forrestdale (Stage 4)* (Coterra, 2023), including rehabilitation and revegetation offsets • Application of a conservation covenant for part of Lot 2 • Record keeping and reporting	• Rehabilitation of 0.08 ha

1.4 *Environmental Protection and Biodiversity Conservation Act 1999* Referral

The complete masterplan was referred to the Federal Department of Sustainability, Environment, Water, Population and Communities (now the Department of Climate Change, Energy, the Environment and Water) under the *Environment Protection and Biodiversity Conservation Act* (1999) in 2012 (EPBC Ref: 2012/6561).

Following assessment of the proposal, including the proposed onsite revegetation works, the referral was issued a 'Not a Controlled Action' decision. The decision advised is provided in Appendix 2.

1.5 Purpose of Report

This report has been prepared to provide supporting information to the DWER on the Native Vegetation Clearing Permit (NVCP) application to clear native vegetation in order to progress the carpark extension and playground development at Lot 2, Nicholson Road.

This report includes the following:

- Size and location of the NVCP application area
- Description of site conditions
- Description of environmental values present within the NVCP application area
- Number and nature of any nearby environmentally sensitive receptors
- Assessment against the Clearing Principles listed in Schedule 5 of the EP Act
- Measures proposed to avoid, mitigate and/or offset environmental impacts
- Description of planning and other relevant matters.

2 Proposed Clearing

2.1 Schedule

Initial clearing works are proposed to begin in early 2025. Clearing and construction will be governed by the Development Application (DA) approval, which was lodged with the City of Armadale in October 2024. A copy of the approved DA will be provided to DWER once this is received.

2.2 Proposed Works

The proposed works to be undertaken in the NVCP application area will involve:

- Clearing of native vegetation (1.245 ha)
- Retention of mulched organic material onsite for use in landscaping and site stabilisation works
- Earthworks for creation of appropriate levels within the development footprint
- Building construction
- Service and access road installation (within the clearing footprint)
- Landscaping
- Management/revegetation of identified offset areas.

2.3 Alternatives Considered / Actions to avoid and minimise clearing impacts

Construction within the site is limited due to the Dampier to Bunbury Natural Gas Pipeline Easement, extending from the south west of the site through the northern boundary, and its associated restricted land uses (Figure 2).

Development of the school site has been considerate of the 50 m buffer to the Conservation Category Wetland (CCW) (UFI 7233), which borders the east of the Lot 2 and the CCW (UFI 14835) which borders the southwest corner of Lot 2.

Proposed development has targeted specific facilities required by the school as it continues to expand and provide community resources.

3 Site Characteristics

3.1 Topography

Topography within the proposed clearing area ranges from approximately 26 to 30 m Australian Height Datum (mAHD) (Figure 3) (Landgate, 2024). There are no outstanding landform features within Lot 2.

3.2 Geology and Soils

The clearing area contains the following geology and soil types, as described by Jordan (1986) (Figure 3):

- Bassendean Sand (S8): 'white to pale grey at surface, yellow at depth, fine to medium-grained, moderately sorted, subangular and sub-rounded, minor heavy minerals, of eolian origin'

Soils within the clearing area are mapped as having a moderate to low acid sulphate soil (ASS) risk occurring within 3 m of natural soils surface, but of high to moderate risk of ASS beyond 3 m of natural soil surface.

The Department of Primary Industries and Reginal Development (DPIRD) mapped soils within the proposed clearing area comprise the Bassendean B1 Phase (212Bs_B1) (Plate 3-1) and are described as (DPIRD, 2024):

- Extremely low to very low relief dunes, undulating sandplain and discrete sand rises with deep bleached grey sands sometimes with a pale-yellow B horizon or a weak iron-organic hardpan at depths generally greater than 2 m; banksia dominant

Land degradation risk categories for the Bassendean B1 Phase are listed in Table 3-1.

Plate 3-1: Soil Landscape Mapping Units

Source: MNG Access, 2024

Table 3-1: Land Degradation Risk Categories

Land Degradation Risk Category	Bassendean B1 Phase
Water Erosion	0% of map unit has a very high to extreme hazard
Wind Erosion	52% of map unit has a high to extreme hazard
Flood Hazard	0% of the map unit has a moderate to high hazard
Salinity Risk	0% of map unit has a moderate hazard
Waterlogging and Inundation	10% of the map unit has a moderate to very high risk

Source: DPIRD, 2024

3.3 Hydrology

3.3.1 Groundwater

The maximum groundwater level in this location is approximately 23 to 24 mAHD (DWER, 2024), which equates to 3 to 7 m below ground level within the proposed clearing area. Minimum groundwater levels are approximately 22 mAHD (DWER, 2024) (Figure 3).

Groundwater flow direction is easterly toward Forrestdale Lake (located approximately 1 km east of the proposed clearing area).

3.3.2 Surface water and Drainage

There are no regionally mapped surface water features or drainage lines within the development footprint.

3.3.3 Wetlands

The Department of Biodiversity, Conservation and Attractions (DBCA) geomorphic wetland dataset for the Swan Coastal Plain maps one Multiple Use Wetland (MUW) within the western portion of Lot 2 (UFI 7,088) and one Resource Enhancement Wetland (REW) in the eastern portion (UFI 15,820) (Landgate, 2024). The clearing area does not intercept either wetland and is outside of the 50 m buffer to the REW.

3.4 Flora and Vegetation

3.4.1 Pre-European Vegetation

Broad scale mapping of pre-European vegetation within the Perth region was undertaken by Beard (1976) which recorded major categories of plants. Shepherd et al. (2002) reassessed Beard's mapping and divided some of the larger vegetation units into smaller units, which then resulted in a total of 819 vegetation units being mapped across the state.

The site is mapped as containing the following broad vegetation type (Landgate 2024):

- Bassendean_1001: Jarrah, banksia or casuarina *Eucalyptus marginata, Banksia* spp., *Allocasuarina* spp. Low Forest, woodland or low woodland with scattered trees

The status of this vegetation system at the state, regional and local level is presented in Table 3-2. The remnant native vegetation of the Bassendean 1001 complex within the City of Armadale currently stands at 33.68%, and it is not expected that the minimal clearing to be undertaken in this application will alter this number significantly.

Table 3-2: Bassendean_1001 - Vegetation Statistics

Area	Pre-European extent	Current Extent	Current Extent managed in DBCA lands (proportion of Pre-European Extent)	Current Extent Protected for Conservation
Western Australia (1B)	53,283.54 ha	11,394.19 ha (21.38%)	1,790.74 ha (6.68%)	3.01%
Swan Coastal Plain (2B)	53,283.54 ha	11,394.19 ha (21.38%)	1,790.74 ha (6.68%)	3.01%
City of Armadale (4B)	3,332.90 ha	1.122.54 ha (33.68%)	87.41 ha (3.11%)	2.62%

Source: GoWA 2019a

3.4.2 Vegetation Complex

Vegetation at the site is identified to be part of the Southern River vegetation complex which is described as (Heddle, 1980):

- Open woodland of *Corymbia calophylla- Eucalyptus marginata- Banksia* spp. with fringing woodland of *E. rudis – Melaleuca rhaphiophylla* along creek beds'

Vegetation statistics for the Southern River Complex are outlined in Table 3-3.

Table 3-3: Southern River Vegetation Complex Vegetation Statistics

Area	Original extent	Current Extent	Proportion of Vegetation complex in LGA	Current Extent Protected for Conservation
Swan Coastal Plain	58,781	10,832 (18.4%)	-	692 ha (6.39%)
City of Armadale	4,108	1,027 (25%)	6.99%	

Source: GoWA, 2019b

3.4.3 Local Context

Spatial data review by DWER as part of the CPS 9928/1 assessment indicates the local area (as a 10-kilometre radius from the centre of the area proposed to be cleared during the CPS 9928/1 application) retains approximately 23.07% of the original native vegetation cover.

3.4.4 Flora and Vegetation Survey (2011)

A Level 2 Flora and Vegetation Survey was completed by Bennett Environmental Consulting (2011) for the entire Lot 2 in October 2011 in accordance with EPA Guidance Statement No. 51 (EPA, 2004). This report was submitted to DWER through the IBSA portal, with a reference number of IBSA-2023-0334.

This survey recorded a total of eight different vegetation types, including both wetland and upland vegetation (Table 3-4). The vegetation unit which extends over the proposed clearing extent is the Ba unit.

Table 3-4: Vegetation Units (BEC, 2011)

Vegetation Type	Vegetation Unit	Description
Upland Vegetation	Ba	Low Woodland A of *Banksia attenuata, Banksia menziesii, Nuytsia floribunda* and Eu*calyptus todtiana* over Heath B dominated by *Acacia pulchella* var. *glaberrima* over Tall Grass dominated by **Ehrharta calycina* in grey sand
	Bi	Low Forest A of *Banksia attenuata* and *Banksia ilicifolia* over Tall Grass dominated by **Ehrharta calycina* and **Ehrharta longiflora* in grey sand
	Et	Low Woodland A of *Eucalyptus todtiana* with occasional *Banksia ilicifolia* over Open Dense Tall Grass dominated by **Eragrostis curvula* over Herbs dominated by **Carpobrotus edulis, *Erodium botrys, *Lotus subbiflorus* and **Hypochaeris glabra* in pale grey sand
Wetland Vegetation	Mp	Open Low Woodland B of *Melaleuca preissiana* over Dense Thicket of *Kunzea glabrescens* over Open Herbs dominated by *Patersonia occidentalis* and *Drosera glanduligera* in damp dark grey sand
	Mr	Low Forest A of *Melaleuca rhaphiophylla* over Dense Herbs dominated by **Zantedeschia aethiopicum* and **Lotus subbiflorus* in very damp grey sand
	EM	Open Low Woodland A of *Eucalyptus todtiana* and *Melaleuca preissiana* over Low Scrub A or Scrub of *Kunzea glabrescens* and *Pultenaea reticulata* over Herbs dominated by **Carpobrotus edulis* and **Lotus subbiflorus* in grey sand
	Er	Low Forest A of *Eucalyptus species (possibly **Eucalyptus robusta*), *Melaleuca preissiana* and **Populus nigra* over Dense Tall Grass dominated by **Eragrostis curvula* in grey sandy loam
	Ec	Dense Tall Grass of **Eragrostis curvula*, **Paspalum urvillei,* and/or **Pennisetum clandestinum* or Tall Sedges of *Juncus pallidus* or Herbs dominated by **Lotus subbiflorus, *Moraea flaccida* and **Euphorbia terracina* in damp grey sand

3.4.5 Banksia Woodland Extent and Condition survey (2021)

A targeted flora and vegetation survey was undertaken by Focused Vision Consulting (FVC) in 2021 to verify and map the extent of the Banksia Woodland previously recorded by BEC (2011) across the southeastern portion of the site. The survey recorded a total of 1.29 ha of Banksia Woodland within the 1.55 ha study area, with the associated vegetation unit described as (FVC, 2021):

- Low Woodland A of *Banksia attenuata, Banksia menziesii, Nuytsia floribunda* and *Eucalyptus todtiana* over Heath B dominated by *Acacia pulchella* var. *glaberrima* over Tall Grass dominated by **Ehrharta calycina*

The survey was submitted to DWER with an IBSA reference number of IBSA-2022-0355. The survey encompassed part of the proposed clearing area within this application with the condition of this area assessed as ranging from 'Degraded-Good' to 'Completely Degraded-Degraded'.

3.4.6 Flora and Vegetation Survey (2023)

A detailed flora and vegetation survey was undertaken for portions of Lot 2 on 17 and 18 October 2023 and 28 March 2024 by Plantecology Consulting (Plantecology). A total of 47 native and 48 non-native taxa were recorded within the survey area, comprised of 36 families and 84 genera (Plantecology, 2024).

This survey has been submitted to DWER through the IBSA portal as part of this NVCP application (IBSA-2024-0460), with a copy also provided in Appendix 3.

3.4.6.1 Vegetation Units

Seven plant communities were recorded during the 2023/2024 survey. These are summarised on Table 3-5 and shown on Figure 5. The plant community within the proposed clearing area (1.261 ha) is *Banksia attenuata-Banksia menziesii* Open Woodland.

Table 3-5: Vegetation communities and Description

Vegetation community name	Description
Melaleuca preissiana – Kunzea glabrescens Open Woodland	Open woodland of *Melaleuca preissiana* over tall thicket of *Kunzea glabrescens* over an exotic understorey of **Vulpia bromoides, *Ehrharta longifolia* and **Hypochaeris glabra* on a closed depression of clayey sand.
Banksia attenuata – Kunzea glabrescens Open Woodland	Open Woodland of *Banksia attenuata* and *Banksia menziesii* over a tall thicket of *Kunzea glabrescens* and *Xanthorrhoea brunonis* over a herbland of **Hypochaeris glabra, *Vulpia bromoides* and **Briza maxima* on a flat of clayey sand.
Eucalyptus todtiana – Banksia attenuata – Banksia ilicifolia Open Woodland	Open woodland of *Eucalyptus todtiana* with *Banksia attenuata* or *Banksia ilicifolia* over tall shrubland of *Kunzea glabrescens, Xanthorrhoea brunonis* and *Acacia saligna* over tussock grassland of **Ehrharta longiflora, *Ehrharta calycina* and **Hypochaeris glabra* on flats of clayey sand.
Melaleuca rhaphiophylla Open Forest	Open Forest of *Melaleuca rhaphiophylla* over a mainly exotic herbland of **Zantedeschia aethiopica*, **Lolium rigidum* and **Cotula coronopifolia* on an open depression of clayey sand.
Melaleuca preissiana – Astartea scoparia Open Forest	Open Forest of *Melaleuca preissiana* over shrubland of *Astartea scoparia* over tussock grassland of **Ehrharta longiflora, Dielsia stenostachya* and **Vulpia bromoides* on an open depression of clayey sand.
Banksia attenuata – Banksia menziesii Open Woodland	Open woodland of *Banksia attenuata* and *Banksia menziesii* with *Eucalyptus todtiana* over open shrubland of *Adenanthos cygnorum* subsp. *cygnorum* over tussock grassland of **Ehrharta calycina, Conostylis aculeata* and **Hypochaeris glabra* on loamy to clayey sands on low rises.
**Eragrostis curvula* Tussock Grassland	Tussock grassland of **Eragrostis curvula* with **Vulpia bromoides, *Lotus subbiflorus, *Carpobrotus edulis* and **Lolium rigidum* with scattered emergent *Melaleuca lateritia* on flats of clayey sands to light clays.
Cleared areas	Cleared areas including firebreaks and track corridors.
Rehabilitation areas	Areas under rehabilitation under previous clearing permits (See Table 1-1)

3.4.6.2 Vegetation Condition

The condition of the vegetation within the proposed clearing extent ranged from 'Good' to 'Completely Degraded' (Figure 6).

Table 3-6: Vegetation condition within proposed clearing area

Condition	Area within clearing footprint
Good	0.955 ha
Degraded	0.290 ha

Condition	Area within clearing footprint
Completely Degraded (Firebreaks and Track Corridors)	0.057 ha
Total	1.302 ha

3.4.6.3 Declared Rare and Priority Flora

No Declared Rare Flora species were found during the BEC (2011) or Plantecology (2024) detailed surveys.

One priority 3 flora annual sedge species *Schoenus pennisetis* was identified at one location in the northwestern corner (CS01) of the site (not within the proposed clearing area) during the BEC (2011) survey. This location was revisited during the Plantecology (2024) survey, however the species was not observed to be present at this time.

Eight *Jacksonia gracillima* individuals were recorded during the Plantecology survey (2024) at five different locations. None of these individuals are within the proposed clearing area (Figure 5). As part of previous DWER approval requirements across the Lot 2 development, a conservation covenant is being progressed over part of Lot 2, and all *Jacksonia gracillima* species recorded during the survey are within the area protected by the covenant.

3.4.7 Weeds

Approximately 51% (total of 48) of all species recorded on site during the 2023 flora and vegetation survey were weed species. The common weeds which occurred at a density of 5% or greater in one or more plots were (Plantecology, 2024):

- **Ehrharta calycina*
- **Ehrharta longiflora*
- **Eragrostis curvula*
- **Hordeum leporinum*
- **Lolium rigidum*
- **Romulea rosea*
- **Vulpia bromoides*
- **Zantedeschia aethiopica*

Three Declared Pest weed species were recorded on the site, these being:

- **Asparagus asparagoides* (Bridal Creeper)
- **Moraea flaccida* (Cape Tulip)
- **Zantedeschia aethiopica* (Arum-lily)

Weed management is periodically undertaken within Lot 2 in line with the approved Revegetation Management Plans and permit conditions previously issued by the DWER. Active management of the Declared Pest weed species has not been identified as required at this time (Plantecology, 2024).

3.4.8 Dieback

In September 2014, NPC Consulting undertook a Dieback Assessment for the site which included (NPC, 2014):

- Site inspection to undertake dieback assessment
- Collection of 3 samples for soil and root testing of dieback

- Preparation of an interpretation map
- Preparation of a report outlining the findings of the assessment

Two of the three sample results returned positive, confirming field investigations which indicated that *Phytophthora cinnamomi* is present in the remnant Banksia Woodland area situated in the centre of the school site.

NPC Consulting (2014) discussed that there was a poor to average expression of the disease observed and grasses and weeds were present throughout the site. The impact of the disease was considered variable with significant changes in biomass and biodiversity and the greater presence of non-susceptible species particularly within the resource enhancement wetland (REW) area on the eastern site boundary and areas with little or no vegetation (i.e. paddocks/cleared areas).

3.5 Fauna and Habitat

3.5.1 Fauna Habitat

A fauna survey was undertaken on 10 August 2012 by Coterra Environment. The survey identified several waterbird and bushland bird species utilising and/or occurring within the site, though no conservation significant species were identified (Coterra, 2012).

Mammals identified at the site included the western grey kangaroo (*Macropus fuliginosus*) and the European rabbit (*Oryctolagus cuniculus*), which appears to have colonised many of the drier areas of the site. One reptile, a tiger snake (*Notechis ater*), was identified during the site visit (Coterra, 2012).

The site is largely degraded and therefore presents little opportunity for fauna habitat, especially when considering the better-quality bushland/habitat adjacent to Lot 2.

3.5.2 Black Cockatoo Habitat Assessment

A black cockatoo habitat assessment was undertaken as part of the Coterra fauna survey. Results are summarised as follows (Coterra, 2012):

- The Level 2 Flora and Vegetation Survey (BEC, 2011), identified four vegetation types (Ba, Bi, Et, EM) within the site containing plant species that provide potential black cockatoo foraging habitat
- Two black cockatoo species were identified through database searches as potentially occurring within the site, or having been previously recorded in the vicinity:
  - Carnaby's Black Cockatoo (*Zanda latirostris*)
  - Forest Red-tailed Black Cockatoo (*Calyptorhynchus banksii naso*)
- No potential breeding habitat trees were found within the site
- No potential roosting habitat trees were found within the site (no trees were considered sufficiently tall or structurally complex enough to provide core roosting habitat)
- Three types of foraging habitat were identified within the site as follows
  - Good quality *Eucalyptus todtiana* foraging habitat
  - Good quality *Banksia sp*. foraging habitat
  - Poor quality *Banksia sp*. foraging habitat
- A thorough search was undertaken for cockatoo feeding signs, though there was no evidence of cockatoos utilising the area for feeding across the entire site.

No signs of black cockatoos were noted during the field survey.

Rehabilitation under the DWER approved Revegetation Management Plans for historical NVCPs for Lot 2 include completion criteria that address loss of black cockatoo potential habitat associated with the development.

3.6 Conservation Areas

Bush Forever (BF) Site 344 'Denis De Young Reserve and Gibbs Road Swamp Bushland, Banjup/Forrestdale' is located to the immediate west and south of the site. This BF site extends over 289.8 ha (Landgate, 2024).

The site also contains a number of areas as noted in Section 1.3 that are being progressively rehabilitated and some of which form part of the conservation covenant lodged for the site:

- 5.4 ha of revegetation within the eastern end of the site as part of the CPS 4860/1 approval requirements
- 1.22 ha rehabilitation of Banksia woodland as part of the CPS 8768/1 approval requirements
- 0.30 ha revegetation of Banksia woodland as part of the CPS 8768/1 approval requirements
- 0.51 ha revegetation of mesic woodland vegetation as part of the CPS 8768/1 approval requirements
- 0.073 ha revegetation of Banksia woodland as part of the CPS 9928/1 approval requirements
- 2.866 ha revegetation of mesic woodland vegetation as part of the CPS 10281/1 approval requirements
- 0.08 ha of revegetation of Banksia woodland as part of the CPS 10281/1 approval requirements

The site is located within the Perth Regional Ecological Linkage (nr 52) mapped by WA Local Government Association's (WALGA) biodiversity project (WALGA, 2004).

The entirety of Lot 2 and its surrounds are mapped within an Environmentally Sensitive Area (ESA) (ID 1900) associated with surrounding wetlands (Landgate, 2024).

3.7 Heritage Areas

3.7.1 Indigenous Heritage

There are no known Aboriginal heritage places within the site or immediately surrounding the site (Landgate, 2024). The closest known Aboriginal heritage location is located over 500 m east from the boundary of Lot 2 (Place ID 4149 – NATGAS 128, Artefacts/Scatter). Forrestdale Lake is also a Registered Site, with significance as a Hunting Place, Camp or of Mythological value (Place ID 3713), however does not intersect the site.

3.7.2 Non-indigenous Heritage

A search of the Heritage Council InHerit database (State Heritage Council, 2024) and the City of Armadale's Heritage List (CoA, 2023) indicates the closest European heritage value to the site is Forrestdale Lake, over 1 km from the site.

4 Assessment Against Clearing Principles

An assessment of the proposed vegetation clearing against the ten native vegetation Clearing Principles contained in Schedule 5 of the EP Act is provided in Sections 4.1 to 4.10. Based on the assessment of the environmental values of the clearing area, it is deemed that the development is potentially at variance with two of the ten clearing principles.

4.1 Comprises high level of biological diversity

Principle (a): Native vegetation should not be cleared if it comprises a high level of biological diversity.

The botanical assessment undertaken by Plantecology (2024) over part of Lot 2, including the application area for this permit, recorded a total of 95 plant taxa, 47 (49%) of which were native species over the entire survey area. Plots associated with the banksia plant community which is the subject of this clearing application indicate the presence of 13 native and between five to seven weed species in these plot locations.

During the botanical assessment, no threatened or priority species were recorded within the proposed clearing extent.

Proposed clearing includes 0.955 ha of Banksia Woodland 'Good' condition, 0.209 ha of Banksia Woodland in 'Degraded' condition, as mapped by Plantecology (2024). Completely Degraded areas are also present associated with tracks and zones devoid of native vegetation. The targeted Banksia Woodland mapping produced by FVC in 2021 maps part of the clearing area as 'Degraded-Good', 'Degraded' and 'Completely-Degraded' condition.

The vegetation within the clearing area has been assessed to be part of FCT 21c, which is listed as a Priority 2 community under the EP Act. Vegetation mapped as 21c has been mapped as 'Good' condition, described as (Keighery, 1994):

- 'Vegetation structure significantly altered by very obvious signs of multiple disturbances. Retains basic vegetation structure or ability to regenerate it. Disturbance to vegetation structure caused by very frequent fires, the presence of very aggressive weeds, partial clearing, dieback and grazing'

As such, vegetation in 'Good' condition is often disturbed and given the high presence of weed taxa, high biological diversity is not considered a limiting factor on the development.

Given the above, the proposed clearing is potentially at variance with this Principle.

4.2 Potential impact to any significant habitat

Principle (b): Native vegetation should not be cleared if it comprises the whole or apart of, or is necessary for the maintenance of a significant habitat for fauna indigenous to Western Australia.

The proposed clearing area is mapped as containing 1.245 ha of native vegetation that may provide some foraging habitat opportunities for black cockatoos.

The project was referred to the Federal Government under the *Environment Protection and Biodiversity Conservation Act 1999* in 2012 and was determined to be 'Not a Controlled Action' for impacts on Matters of National Environmental Significance (EPBC Ref: 2012/6561).

Given the above, the proposed clearing is potentially at variance with this Principle.

4.3 Potential impacts to any rare flora

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

No flora species listed as Threatened flora under the *Biodiversity Conservation Act (2016)* were recorded on site.

The proposed clearing is not considered to be at variance with this Principle.

4.4 Presence of any threatened ecological communities

Principle (d): Native vegetation should not be cleared if it comprises the whole or a part of, or is necessary for the maintenance of, a threatened ecological community.

The site contains the vegetation unit '*Banksia attenuata – Banksia menziesii* open woodland', which was determined to align with the Floristic Community Type (FCT) 21c 'Low lying *Banksia attenuata* woodlands or shrublands'.

FCT 21c is a Priority Ecological Community (PEC) under the State *Biodiversity Conservation Act (2016)* and is also considered to align with the 'Banksia woodlands of the Swan Coastal Plain IBRA Region Threatened Ecological Community' listed as 'Endangered' under the EPBC Act. However, the minimum threshold for inclusion as part of the TEC is for vegetation to be in 'Good' or better condition, with a patch size of at least 2 ha. The area of the patch within the survey area is 1.31 ha with an extension of an additional 0.6 ha outside of the Lot 2 boundary, totalling 1.91 ha. As such, the patch does not meet minimum thresholds for inclusion as the TEC.

Given the above, the proposed clearing will not be at variance with this Principle.

4.5 Significance of remnant native vegetation

Principle (e): Native vegetation should not be cleared if it is significant as a remnant of native vegetation in an area that has been extensively cleared.

DBCA 2018 vegetation complex statistics indicate that approximately 25% of the Southern River vegetation complex is remaining within the City of Armadale and approximately 18% is remaining within the Swan Coastal Plain (Government of Western Australia, 2019b). As part of the CPS 10281/1 NVCP assessment, DWER noted that vegetation at the site is inconsistent with the Southern River Complex.

The application area is classified as a constrained area on the Swan Coastal Plain, where the threshold for representation of the pre-clearing of native vegetation is 10%. The proposed clearing will not reduce the extent below this target.

The City of Armadale Local Biodiversity Strategy states that 76% of the original extent of remnant vegetation remains with the City of Armadale (CoA, 2009). As such, the vegetation onsite would not be considered an isolated remnant.

Given the above, the proposed clearing will not be at variance with this Principle.

4.6 Potential impact on watercourses and or/wetlands

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

No watercourses are present within or adjacent to Lot 2.

A MUW and a REW are mapped at the western and eastern extent of Lot 2 respectively. The proposed clearing does not overlap with either of these wetland areas.

As such, the proposed clearing is not considered to be at variance with this Principle.

4.7 Potential to cause appreciable land degradation

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

As noted in Table 3-1 , Wind Erosion is identified as having the highest land degradation risk associated with the regionally mapped soils on site (DPIRD, 2024).

Following clearing, soils onsite will be stabilised through construction of buildings, landscaping and playground equipment over the cleared area. It is also proposed to use mulched organic materials created onsite in the future landscape areas which will assist in soil erosion control and stabilisation.

Given the above, the proposed clearing is not considered to be at variance with this Principle.

4.8 Potential impact on adjacent or nearby conservation areas

Principle (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 areas.

Lot 2 is located immediately east of the Bush Forever Site 344, 'Denis De Young Reserve and Gibbs Road Swamp Bushland, Banjup/Forrestdale', located within the Jandakot Regional Park (Government of Western Australia, 2000). The Concept Plan was designed so that campus facilities to remain at least 50 m away from the Lot 2 boundary to provide a buffer to the BF sites. No clearing or development is proposed within this 50 m buffer. The western portion of Lot 2 has been allocated as revegetation/rehabilitation and will likely increase the ecological value of BF 344.

Given the above, the proposed clearing is not considered to be at variance with this Principle.

4.9 Potential deterioration in the quality of surface or underground water

Principle (i): Native vegetation should not be cleared if the clearing of the vegetation is likely to cause deterioration in the quality of the surface or underground water.

No *Rights in Water and Irrigation Act 1914* (RIWI Act) rivers, surface water areas or irrigation districts occur within the vicinity of the proposed clearing area. The site is located within the Jandakot Groundwater Area, but is not located within any Public Drinking Water Source Areas (Government of Western Australia, 2021).

Stormwater and drainage management form part of the approved development design and construction. The site is connected to the Water Corporation reticulated sewer network.

Given there is no significant surface water flow from the proposed application area, the proposed clearing is unlikely to impact surface water.

There are no wetland areas within the proposed clearing area. Given the size of the proposed clearing and the distance to the wetland areas in proximity to the site, it is not expected that any impacts will occur to groundwater and therefore no deterioration of surface or underground water quality.

As such, the proposed clearing is not considered to be at variance with this Principle.

4.10 Potential for clearing to cause or exacerbate the incidence of flooding

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

Soils on site are mapped within the Bassendean B1 Phase. These soils are regionally mapped as 10% of the unit having a moderate to very high risk of waterlogging (DPIRD, 2024). Waterlogging can be managed through appropriate design and the proposed clearing is not likely to cause or exacerbate the incidence of flooding.

Given the above, the proposed clearing is not considered to be at variance with this Principle.

5 Offsets

It is noted that historically the proponent has provided management plans and on-site offsets in consultation with DWER.

Given the limited remaining area within the Lot 2 boundary, and the extent of the land that is either managed for conservation under a previous NVCP, utilised for current school facilities or proposed for future school facilities, potential for further onsite offsets is now limited. Offset considerations are proposed to be discussed with the assessing DWER officer following review of this documentation.

6 References

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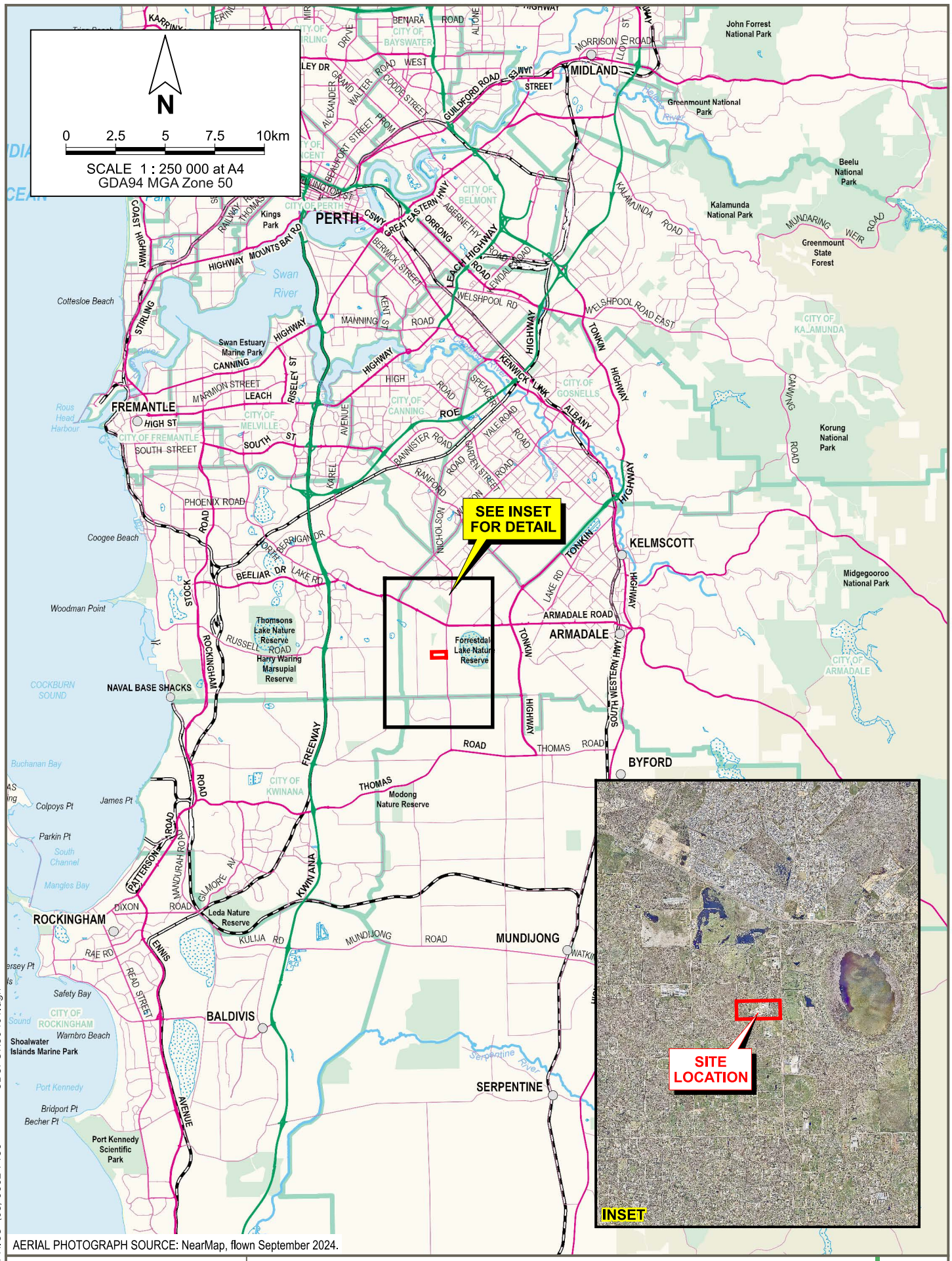
Figures



AERIAL PHOTOGRAPH SOURCE: NearMap, flown September 2024.

CBCFOR30-f01.dgn

PINPOINT CARTOGRAPHICS (08) 9562 7136

COTERRA ENVIRONMENT

Carey Baptist College Forrestdale
CARPARK EXTENSION AND PLAYGROUND NATIVE VEGETATION CLEARING
PERMIT APPLICATION - LOT 2 NICHOLSON ROAD, FORRESTDALE

Drawn: C. Norman	Date: 7 Nov 2024
Job: CBCFOR30	Revision: A

SITE LOCATION

Figure 1

Legend

- Site Boundary
- Cadastral Boundary
- Easement Boundary
- Existing Asset Protection Zone
- Existing Infrastructure
- Proposed Concept Plan
- Proposed Clearing Area

N

0 25 50 75 100m

SCALE 1 : 2 500 at A3
GDA94 MGA Zone 50

397 750mE
398 000mE
398 250mE
6 441 250mN
6 441 000mN

1
30
303
800
801
163
270
271
272

NICHOLSON ROAD

FUTURE FIRE TANKS & PUMPS
PLAYING COURTS
EXISTING STAFF CAR PARKING
EXISTING ACCESS ROAD
EXISTING LANDSCAPED PLAY AREA
EXIST. GRASSED AREA
EXIST. PLAYING FIELD
EXISTING K/PP
OSHC CENTRE
EXIST. PICK UP DROP OFF PARKING
EXIST. TRANSPORTABLES
EXISTING YEAR 1-2
DFES ROAD
FUTURE CHILD CARE
FUTURE ADMIN
TEACHING BLOCK
Lot 2
FUTURE SOCCER
FUTURE FOOTBALL OVAL
SPORTS HALL
FUTURE GLA's
EXISTING STEM CENTRE
FUTURE ARTS CENTRE FOR TECHNOLOGY & GLA's
FUTURE CENTRE FOR THE COMMUNITY
EXISTING SERVICE / FIRE SERVICE ACCESS ROAD
NEW CAR PARKING
FUTURE BYPASS
EXTENDED FIRE SERVICE ACCESS ROAD
FUTURE AUDITORIUM
FUTURE PICK UP DROP OFF PARKING
FUTURE PLAYING COURTS
FUTURE STAFF PARKING

CADASTRAL SOURCE: Landgate, March 2024.
AERIAL PHOTOGRAPH SOURCE: NearMap, flown September 2024.
CONCEPT PLAN SOURCE: Brad Quatermaine, Dwg No. 17.14 SK01-B, 19/09/24.

CBCFOR30-f02.dgn
PINPOINT CARTOGRAPHICS (08) 9562 7136

COTERRA ENVIRONMENT

Carey Baptist College
CARPARK EXTENSION AND PLAYGROUND NATIVE VEGETATION CLEARING
PERMIT APPLICATION - LOT 2 NICHOLSON ROAD, FORRESTDALE

Drawn: C. Norman	Date: 7 Nov 2024
Job: CBCFOR30	Revision: A

PROPOSED CLEARING AREA

Figure 2

Legend

- Site Boundary
- Cadastral Boundary
- Easement Boundary
- Topographic Contour
- Existing Asset Protection Zone
- Existing Infrastructure
- Proposed Concept Plan
- Proposed Clearing Area

Geology

- S8 — SAND - very light grey at surface, yellow at depth, fine to medium-grained, sub-rounded quartz, moderately well sorted of eolian origin
- S10 — SAND - as S8 as relatively thin veneer over strong, blocky, brown silts and clays
- SP1 — PEATY SAND - grey to black, fine to medium-grained, moderately sorted quartz sand, slightly peaty, of lacustrine origin

Acid Sulfate Soils Risk

- High to moderate risk of ASS occurring within 3m of natural soil surface
- Moderate to low risk of ASS occurring within 3m of natural soil surface but high to moderate risk of ASS beyond 3m of natural soil surface

N

0 25 50 75 100m

SCALE 1 : 2 500 at A3
GDA94 MGA Zone 50

398 000mE

398 250mE

6 441 250mN

6 441 000mN

Lot 2

NICHOLSON ROAD

ASS SOURCE: DWER, 2019.
CADASTRAL SOURCE: Landgate, March 2024.
AERIAL PHOTOGRAPH SOURCE: NearMap, flown September 2024.
GEOLOGY SOURCE: Geological Survey of WA, 1:50 000 Environmental Geology.
CONCEPT PLAN SOURCE: Brad Quatermaine, Dwg No. 17.14 SK01-B, 19/09/24.

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PINPOINT CARTOGRAPHICS (08) 9562 7136

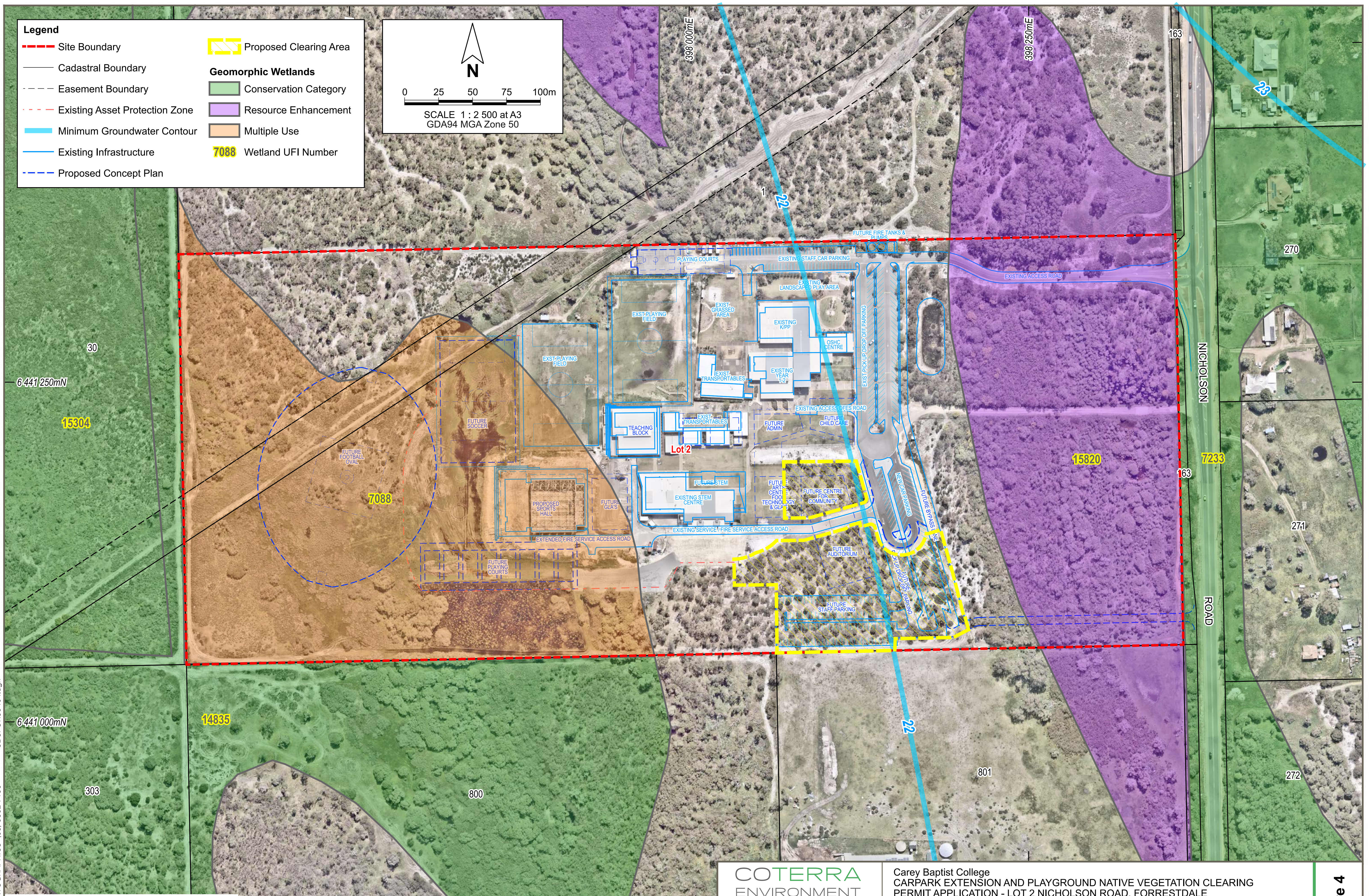
COTERRA ENVIRONMENT

Carey Baptist College
CARPARK EXTENSION AND PLAYGROUND NATIVE VEGETATION CLEARING
PERMIT APPLICATION - LOT 2 NICHOLSON ROAD, FORRESTDALE

Drawn: C. Norman | Date: 7 Nov 2024
Job: CBCFOR30 | Revision: A

TOPOGRAPHY AND SOILS

Figure 3


Legend
Site Boundary
Cadastral Boundary
Easement Boundary
Existing Asset Protection Zone
Minimum Groundwater Contour
Existing Infrastructure
Proposed Concept Plan
Proposed Clearing Area
Geomorphic Wetlands
Conservation Category
Resource Enhancement
Multiple Use
7088 Wetland UFI Number
N
0 25 50 75 100m
SCALE 1 : 2 500 at A3
GDA94 MGA Zone 50
398 000mE
398 250mE
6 441 250mN
6 441 000mN
15304
7088
14835
15820
7233
7090
22
23
30
303
800
801
163
270
271
272
1
Lot 2
NICHOLSON
ROAD
EXISTING STAFF CAR PARKING
EXISTING ACCESS ROAD
PLAYING COURTS
FUTURE FIRE TANKS & PUMPS
EXISTING LANDSCAPED PLAY AREA
EXIST. GRASSED AREA
EXISTING KPP
OSHC CENTRE
EXISTING YEAR 1-2
EXIST. TRANSPORTABLES
EXIST. PLAYING FIELD
TEACHING BLOCK
FUTURE SOCCER
FUTURE FOOTBALL OVAL
PROPOSED SPORTS HALL
FUTURE ADMIN
FUTURE CHILD CARE
EXISTING ACCESS DRIVE ROAD
FUTURE CENTRE FOR COMMUNITY
FUTURE STEM
EXISTING STEM CENTRE
EXISTING SERVICE / FIRE SERVICE ACCESS ROAD
EXTENDED FIRE SERVICE ACCESS ROAD
FUTURE PLAYING COURTS
FUTURE AUDITORIUM
FUTURE STAFF PARKING
FUTURE BYPASS LANE
EXIST. PICK UP DROP OFF PARKING
CBCFOR30-f04.dgn
PINPOINT CARTOGRAPHICS (08) 9562 7136

WETLANDS SOURCE: DWER, August 2022.
CADASTRAL SOURCE: Landgate, March 2024.
GROUNDWATER CONTOUR SOURCE: DWER, 2019 Minimum.
AERIAL PHOTOGRAPH SOURCE: NearMap, flown September 2024.
CONCEPT PLAN SOURCE: Brad Quatermaine, Dwg No. 17.14 SK01-B, 19/09/24.

COTERRA ENVIRONMENT

Carey Baptist College
CARPARK EXTENSION AND PLAYGROUND NATIVE VEGETATION CLEARING PERMIT APPLICATION - LOT 2 NICHOLSON ROAD, FORRESTDALE

Drawn: C. Norman	Date: 7 Nov 2024
Job: CBCFOR30	Revision: A

HYDROGEOLOGICAL FEATURES

Figure 4

Legend

- Site Boundary
- Cadastral Boundary
- Easement Boundary
- Existing Asset Protection Zone
- Existing Infrastructure
- Proposed Concept Plan
- Proposed Clearing Area
- *Jacksonia gracillima* Location

Vegetation Types

- *Banksia attenuata-Banksia menziesii* Open Woodland
- *Banksia attenuata-Kunzea glabrescens* Open Woodland
- *Eragrostis curvula* tussock grassland
- *Eucalyptus todtiana-Banksia attenuata-Banksia ilicifolia* Open Woodland
- *Melaleuca preissiana- Astartea scoparia* Open Forest
- *Melaleuca preissiana-Kunzea glabrescens* Open Woodland
- *Melaleuca rhaphiophylla* Open Forest
- Firebreaks and Track Corridors
- Under rehabilitation
- Dam

N

0 25 50 75 100m

SCALE 1 : 2 500 at A3
GDA94 MGA Zone 50

398 250mE

6 441 250mN

6 441 000mN

NICHOLSON ROAD

Lot 2

1

30

303

800

801

163

270

271

272

FUTURE FIRE TANKS & PUMPS
PLAYING COURTS
EXISTING STAFF CAR PARKING
EXISTING ACCESS ROAD
EXISTING LANDSCAPED PLAY AREA
EXIST. GRASSED AREA
EXIST. PLAYING FIELD
EXISTING K/PP
OSHC CENTRE
EXIST. PICK UP DROP OFF PARKING
EXIST. TRANSPORTABLES
EXISTING YEAR 1-2
TEACHING BLOCK
DFES ROAD
FUTURE CHILD CARE
FUTURE ADMIN
FUTURE SOCCER
FUTURE FOOTBALL OVAL
FUTURE GLA'S
EXISTING STEM CENTRE
FUTURE CENTRE FOR COMMUNITY
EXISTING SERVICE / FIRE SERVICE ACCESS ROAD
NEW CAR PARKING
FUTURE BYPASS
EXTENDED FIRE SERVICE ACCESS ROAD
FUTURE AUDITORIUM
FUTURE PLAYING COURTS
FUTURE STAFF PARKING
FUTURE DROP OFF PARKING

CADASTRAL SOURCE: Landgate, March 2024.
AERIAL PHOTOGRAPH SOURCE: NearMap, flown September 2024.
CONCEPT PLAN SOURCE: Brad Quatermaine, Dwg No. 17.14 SK01-B, 19/09/24.

COTERRA ENVIRONMENT		Carey Baptist College CARPARK EXTENSION AND PLAYGROUND NATIVE VEGETATION CLEARING PERMIT APPLICATION - LOT 2 NICHOLSON ROAD, FORRESTDALE	Figure 5
Drawn: C. Norman	Date: 7 Nov 2024	**VEGETATION UNITS AND *Jacksonia gracillima* LOCATIONS**	
Job: CBCFOR30	Revision: A		

CBCFOR30-f05.dgn
PINPOINT CARTOGRAPHICS (08) 9562 7136

Legend

- Site Boundary
- Cadastral Boundary
- Easement Boundary
- Existing Asset Protection Zone
- Existing Infrastructure
- Proposed Concept Plan
- Proposed Clearing Area

Vegetation Condition

- Good
- Degraded
- Completely Degraded

N

0 25 50 75 100m

SCALE 1 : 2 500 at A3
GDA94 MGA Zone 50

398 000mE

398 250mE

6 441 250mN

6 441 000mN

NICHOLSON ROAD

EXISTING ACCESS ROAD

FUTURE FIRE TANKS & PUMPS

PLAYING COURTS

EXISTING STAFF CAR PARKING

EXISTING LANDSCAPED PLAY AREA

EXIST. GRASSED AREA

EXIST. PLAYING FIELD

EXISTING K/PP

OSHC CENTRE

EXIST. TRANSPORTABLES

EXISTING YEAR 1-2

EXIST. PICK UP DROP OFF PARKING

DFES ROAD

FUTURE CHILD CARE

TEACHING BLOCK

FUTURE ADMIN

Lot 2

FUTURE SOCCER

FUTURE FOOTBALL OVAL

SPORTS HALL

FUTURE GLA'S

EXISTING STEM CENTRE

FUTURE CENTRE FOR COMMUNITY

NEW CAR PARKING

FUTURE BYPASS

EXISTING SERVICE / FIRE SERVICE ACCESS ROAD

EXTENDED FIRE SERVICE ACCESS ROAD

FUTURE PLAYING COURTS

FUTURE AUDITORIUM

FUTURE PICK UP DROP OFF PARKING

FUTURE STAFF PARKING

30

1

270

271

272

163

303

800

801

CADASTRAL SOURCE: Landgate, March 2024.
AERIAL PHOTOGRAPH SOURCE: NearMap, flown September 2024.
CONCEPT PLAN SOURCE: Brad Quatermaine, Dwg No. 17.14 SK01-B, 19/09/24.

COTERRA ENVIRONMENT		Carey Baptist College CARPARK EXTENSION AND PLAYGROUND NATIVE VEGETATION CLEARING PERMIT APPLICATION - LOT 2 NICHOLSON ROAD, FORRESTDALE	Figure 6
Drawn: C. Norman	Date: 7 Nov 2024	**VEGETATION CONDITION**	
Job: CBCFOR30	Revision: A		

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PINPOINT CARTOGRAPHICS (08) 9562 7136

Legend

- Site Boundary
- Cadastral Boundary
- Easement Boundary
- Existing Asset Protection Zone
- Existing Infrastructure
- Proposed Concept Plan
- Proposed Clearing Area
- Completed (Stage 1) Revegetation Zone
- Banksia Improvement (CPS 8768-1)
- Dryland Revegetation (CPS 8768-1)
- Mesic Revegetation (CPS 8768-1)
- Additional Dryland Vegetation (CPS 9928-1)
- Proposed 0.08ha Revegetation Area
- Weed Control Area 2023

N

0 25 50 75 100m

SCALE 1 : 2 500 at A3
GDA94 MGA Zone 50

398 000mE

398 250mE

6 441 250mN

6 441 000mN

0.073ha

0.74ha

0.30ha

0.06ha

0.08ha

0.51ha

0.48ha

Lot 2

NICHOLSON ROAD

EXISTING ACCESS ROAD

EXISTING STAFF CAR PARKING

FUTURE FIRE TANKS & PUMPS

PLAYING COURTS

EXISTING LANDSCAPED PLAY AREA

EXIST. PLAYING FIELD

EXIST. GRASSED AREA

EXISTING K/PP

OSHC CENTRE

EXIST. TRANSPORTABLES

EXISTING YEAR 1/2

EXIST. PICK UP/DROP OFF PARKING

EXISTING ACCESS DFES ROAD

FUTURE SOCCER

TEACHING BLOCK

FUTURE ADMIN

FUTURE CHILD CARE

FUTURE FOOTBALL OVAL

FUTURE STEM

EXISTING STEM CENTRE

FUTURE ARTS CENTRE FOR TECHNOLOGY & GLA'S

FUTURE CENTRE FOR THE COMMUNITY

PROPOSED SPORTS HALL

FUTURE GLA'S

EXISTING SERVICE / FIRE SERVICE ACCESS ROAD

EXTENDED FIRE SERVICE ACCESS ROAD

NEW CAR PARKING

FUTURE BYPASS

FUTURE PLAYING COURTS

FUTURE AUDITORIUM

FUTURE STAFF PARKING

SKILLED DROP OFF PARKING

1

30

303

800

801

163

270

271

272

CADASTRAL SOURCE: Landgate, March 2024.
AERIAL PHOTOGRAPH SOURCE: NearMap, flown September2024.
CONCEPT PLAN SOURCE: Brad Quatermaine, Dwg No. 17.14 SK01-B, 19/09/24.

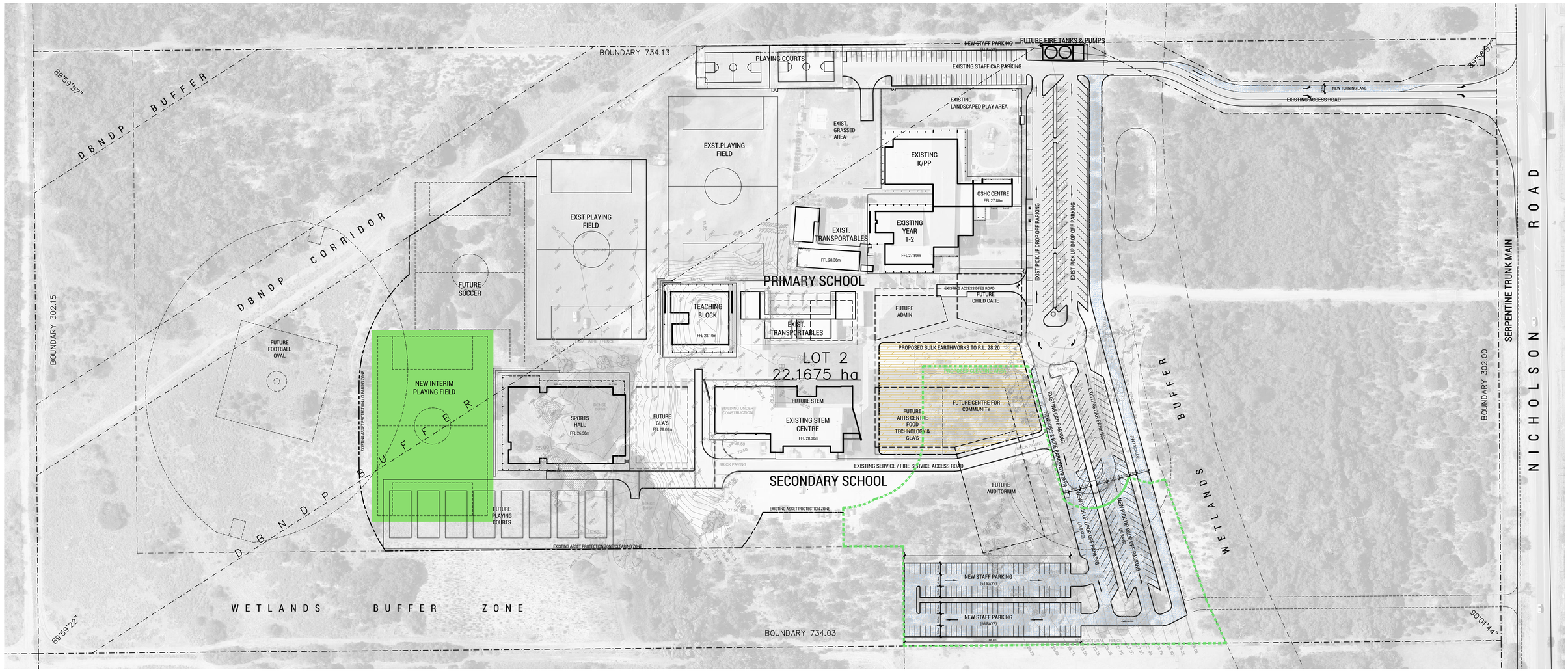
COTERRA ENVIRONMENT		Carey Baptist College CARPARK EXTENSION AND PLAYGROUND NATIVE VEGETATION CLEARING PERMIT APPLICATION - LOT 2 NICHOLSON ROAD, FORRESTDALE	Figure 7
Drawn: C. Norman	Date: 7 Nov 2024	**EXISTING VEGETATION AND WEED CONTROL AREAS**	
Job: CBCFOR30	Revision: A		

CBCFOR30-f07.dgn

PINPOINT CARTOGRAPHICS (08) 9562 7136

Appendix 1 Masterplan

0m 20m 40m 80m



SITE DETAILS ;
LOT 2 (540) NICHOLSON ROAD,
FORRESTDALE.
SITE AREA; 221,675m2
PROPOSED BUILDING AREA; -

brad quartermaine architect

M 0417 931 941 **E** brad@quartermaine.com.au
A 10 Caledonia Loop North Coogee WA 6163

CLIENT

Carey Baptist College

PROJECT

CAREY BAPTIST COLLEGE FORRESTDALE CARPARK

DRAWING:

SITE PLAN

SCALE:	1:1000 @ A1	DRAWING NO:	
DATE:	19 SEPTEMBER 2024		SK.01-B
STATUS:	DA		
PROJECT NO:	17.14		

Appendix 2 EPBC Decision

Australian Government

Department of Sustainability, Environment, Water, Population and Communities

Notification of

REFERRAL DECISION – not controlled action
Lot 2 Nicholson Road Forrestdale, WA (EPBC 2012/6561)

This decision is made under Section 75 of the *Environment Protection and Biodiversity Conservation Act 1999* (EPBC Act).

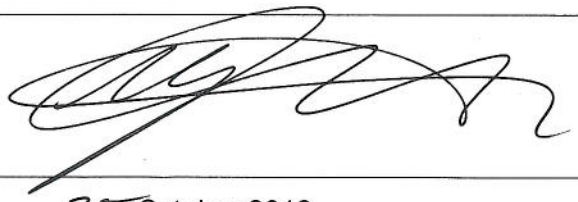
Proposed action

person named in the referral	Carey Baptist College Inc
proposed action	The construction of a school on portions of Lot 2 Nicholson Road, Forrestdale, WA [See EPBC Act referral 2012/6561].

Referral decision: Not a controlled action

status of proposed action	The proposed action is not a controlled action.

Person authorised to make decision

Name and position	Matthew Johnston Acting Assistant Secretary North, West & Offshore Assessment Branch
signature	
date of decision	25 October 2012

Appendix 3 Flora and Vegetation Survey (PlantEcology, 2023)

Carey Baptist College
Nicholson Rd, Forrestdale
Flora and Vegetation Survey

Prepared for CoTerra Environment

Plantecology CONSULTING

March 2024

Plantecology Consulting
ABN 18 849 210 133
50 New Cross Rd
Kingsley WA 6026
Telephone: 0429 061 094
shane@plantecology.com.au

Executive Summary

Plantecology Consulting was commissioned by Coterra Environment to undertake a detailed flora and vegetation survey within the grounds of Carey Baptist College, Nicholson Road, Forrestdale in the City of Armadale. The site is approximately 10 ha in area and currently supports a school, surrounded by a mixture of native and non-native vegetation, as well as cleared areas. .

A field survey of the site was undertaken by a botanist from Plantecology Consulting on the 17th and 18th October 2023. The site was traversed on foot and a detailed survey of the vegetation was undertaken at ten 100 m^2 sampling plots (10m x 10m quadrats), selected to adequately sample the flora within a stand. Plots were positioned to sample a representative and homogeneous area (i.e. not located in transitional areas between communities). The location of the NW corner of a plot was recorded with a hand-held GPS unit and a photograph of the plot taken looking inward to the quadrat. All vascular plant species were recorded and an estimate of the percentage cover was made for each species.

A total of 47 native and 48 non-native (exotic) taxa was recorded within the site, representing 36 families and 84 genera. The dominant families containing mostly native taxa were Proteaceae (5 native taxa), Myrtaceae (9 native taxa) and Fabaceae (8 native taxa, 6 exotic taxa). All but one of the taxa from the Poaceae family were exotics.

No Threatened Flora pursuant to either the Biodiversity Conservation Act (2016) (BC Act) or the Environment Protection and Biodiversity Conservation Act (1999) (EPBC Act) were recorded during the survey.

One species of Priority Flora was recorded. Eight individuals in total of *Jacksonia gracillima* (P3) were recorded at five locations, within the *Banksia attenuata – Kunzea glabrescens* Open Woodland and the *Eucalyptus todtiana* Open Woodland.

Six plant communities were identified within the survey area:

Melaleuca preissiana – Kunzea glabrescens Open Woodland

Open woodland of *Melaleuca preissiana* over tall thicket of *Kunzea glabrescens* over an exotic understorey of **Vulpia bromoides, *Ehrharta longifolia* and **Hypochaeris glabra* on a closed depression of clayey sand.

This community type occurs in the north western section of the survey area.

Banksia attenuata – Kunzea glabrescens Open Woodland

Open Woodland of *Banksia attenuata* and *Banksia menziesii* over a tall thicket of *Kunzea glabrescens* and *Xanthorrhoea brunonis* over a herbland of **Hypochaeris glabra, *Vulpia bromoides* and **Briza maxima* on a flat of clayey sand.

This community is adjacent to the *Melaleuca preissiana – Kunzea glabrescens* Open Woodland and the *Eucalyptus todtiana – Banksia attenuata – Banksia ilicifolia* Open Woodland described below.

Eucalyptus todtiana – Banksia attenuata – Banksia ilicifolia Open Woodland

Open woodland of *Eucalyptus todtiana* with *Banksia attenuata* or *Banksia ilicifolia* over tall shrubland of *Kunzea glabrescens, Xanthorrhoea brunonis* and *Acacia saligna* over tussock grassland of **Ehrharta longiflora, *Ehrharta calycina* and **Hypochaeris glabra* on flats of clayey sand.

This woodland occupies the central part of the site adjacent to the northern boundary.

Melaleuca rhaphiophylla Open Forest

Open Forest of *Melaleuca rhaphiophylla* over a mainly exotic herbland of **Zantedeschia aethiopica*, **Lolium rigidum* and **Cotula coronopifolia* on an open depression of clayey sand.

This community occurs along the drainage system in the central part of the survey area.

Melaleuca preissiana – Astartea scoparia Open Forest

Open Forest of *Melaleuca preissiana* over shrubland of *Astartea scoparia* over tussock grassland of **Ehrharta longiflora, Dielsia stenostachya* and **Vulpia bromoides* on an open depression of clayey sand.

Banksia attenuata – Banksia menziesii Open Woodland

Open woodland of *Banksia attenuata* and *Banksia menziesii* with *Eucalyptus todtiana* over open shrubland of *Adenanthos cygnorum* subsp. *cygnorum* over tussock grassland of **Ehrharta calycina, Conostylis aculeata* and **Hypochaeris glabra* on loamy to clayey sands on low rises.

**Eragrostis curvula* Tussock Grassland

Tussock grassland of **Eragrostis curvula* with **Vulpia bromoides, *Lotus subbiflorus, *Carpobrotus edulis* and **Lolium rigidum* with scattered emergent *Melaleuca lateritia* on flats of clayey sands to light clays.

This community is dominated by exotic taxa and covers the majority of the site.

No Threatened Flora pursuant to either the BC Act (2016) or the EPBC Act (1999) were recorded during the survey.

One species of Priority Flora was recorded. Eight individuals in total of *Jacksonia gracillima* (P3) were recorded at five locations, within the *Banksia attenuata – Kunzea glabrescens* Open Woodland and the *Eucalyptus todtiana* Open Woodland.

The vegetation condition of the of the majority of the site is rated as 'Completely Degraded', with only the *Eucalyptus todtiana – Banksia attenuata* woodland that may be considered 'Degraded', and the *Banksia attenuata – Banksia menziesii* Open Woodland rated as being in 'Good' condition. The native component in the *Eragrostis curvula* tussock grassland is almost wholly absent and this community, which is the majority of the survey area, is rated as 'Completely Degraded'.

The *Banksia attenuata – Banksia menziesii* open woodland was determined to be part of FCT 21c 'Low-lying *Banksia attenuata* woodlands or shrublands', a Priority 3 Ecological community. FCT 21c is often found fringing seasonally-wet habitats on the Bassendean Dune System between Gingin and Bunbury.

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1 Introduction

Plantecology Consulting was commissioned by Coterra Environment to undertake a detailed flora and vegetation survey within the grounds of Carey Baptist College in Nicholson Road, Forrestdale in the City of Armadale (Figure 1). The site is approximately 10 ha in area and currently supports a mixture of native vegetation and degraded wasteland.

1.1 Existing Environment

The site is located approximately 23 km SSE of the Perth CBD, and lies within the Bassendean Dune System of the Swan Coastal Plain. The site itself is only partially vegetated with native vegetation remnants, and has likely been open to grazing in the past. The site is dissected by the access track for the Dampier-Bunbury Natural Gas Pipeline (DBNGP). A drainage line separates the sandy flats in the western portion of the site from very low sandy rises in the eastern part of the site. The latter supports an open banksia woodland.

1.2 Previous Surveys

Prior to construction of Carey Baptist College, a flora and vegetation survey was undertaken over the entirety of Lot 2 Nicholson Rd, Forrestdale by Bennett Environmental Consulting Pty Ltd (BEC) (2011). The survey identified eight vegetation types including two *Banksia attenuata* woodlands and a *Eucalyptus todtiana* woodland in the uplands, as well as four wetland types dominated by either *Melaleuca preissiana* or *Melaleuca rhaphiophylla* and a disturbed **Eragrostis curvula* grassland. The vegetation condition ranged from 'Very Good to Good' in the banksia woodlands to 'Completely Degraded' and 'Degraded' in the lower lying areas.

BEC (2011) recorded a total of 148 taxa, 66 of which were weeds. Two of the taxa recorded were of conservation significance. Five *Jacksonia gracillima* individuals (P3)were recorded from one quadrat within a *Eucalyptus todtiana – Melaleuca preissiana* Woodland, with one other occurrence of about 10 plants. *Schoenus pennisetis* (P3) was recorded in the *Melaleuca preissiana* low woodland over dense thicket of *Kunzea glabrescens* in the north western section of the site.

1.3 Climate

The Forrestdale area experiences a dry Mediterranean climate of hot dry summers and cool wet winters. Long-term climatic averages indicate the site is located in an area of moderate to high rainfall, receiving 810 mm on average annually (data for Jandakot Aero, station number 9172, the nearest currently reporting station; Bureau of Meteorology 2023) with the majority of rainfall received between May and August. The area experiences rainfall on an average of 83 days per year. Mean maximum temperatures range from 18.1°C in July to 31.6 °C in February. Mean minimum temperatures range from 7.1 °C in July, to 17.2 °C in February (Bureau of Meteorology 2023).

1.4 Soils

The Atlas of Australian Soils maps the soils for the site as Map Unit Cb38, which is described as sandy dunes with intervening sandy and clayey swamp flats. The main soils are leached sands, sometimes over clay at depth (Natural Resource Information Centre 1991). On a finer scale, the western half of the survey area lies within the Bassendean B4 phase, which comprises broad, poorly drained sandplains with deep grey siliceous or bleached sands, and generally underlain by clay at depths greater than 1.5m (DPIRD 2022-). The eastern half of the site lies within the Bassendean B1 phase, which is comprised of very low relief dunes, undulating sandplain and discrete sand rises with deep bleached grey sands (DPIRD 2022-).

Either description is consistent with that observed within the survey area.

1.5 Conservation Significant Flora

Under the Biodiversity Conservation Act 2016 ('BC Act'), the Minister for the Environment produces a gazetted list of Threatened Flora under three categories: Critically Endangered, Endangered and Vulnerable. The Department of Biodiversity, Conservation and Attractions (DBCA) also produces a list of Priority Flora that have not been assigned statutory protection under the BC Act but may be under some degree of threat (DBCA 2023a). The DBCA recognises four Priority Flora levels. The definitions for each category of Threatened and Priority Flora are shown in Appendix E.

As well as protection under State legislation, selected flora are also afforded statutory protection at a Federal level pursuant to the Environment Protection and Biodiversity Conservation Act 1999 (EPBC Act). The EPBC Act provides for the protection of Threatened species, pursuant to Schedule 1 of the Act, and are defined as "Critically Endangered", "Endangered", "Vulnerable" or "Conservation Dependent" under Section 179. Definitions of these categories are shown in Appendix E. Any action likely to have a significant impact on a species listed under the EPBC Act requires approval from the Commonwealth Minister for the Environment.

Searches of the State databases (Reference Number: 53-1023) were undertaken to identify conservation significant taxa with the potential to occur within the site and an assessment of the likelihood of each taxon was made based on the criteria listed in Table 1. Fifty taxa of conservation significance were identified from the database searches (Table 2) and those records within approximately 10 km of the site are shown in Figure 2. Of the identified taxa, 14 are listed as Threatened under the BC Act, of which seven are orchids. *Caladenia huegelii* (Grand Spider Orchid) occurs in low-lying grey or brown sands and clayey loams. It flowers between September and October. *Diuris drummondii* (Drummond's Donkey Orchid) occurs in wet habitats and flowers between November and January. *Diuris purdiei* (Purdie's Donkey Orchid) is found in swamps and damp shrublands, flowering between September and October). *Drakaea elastica* (Glossy-leafed Hammer Orchid) occurs in damp *Kunzea glabrescens* or banksia woodland. It flowers between September and October. *Drakaea micrantha* (Dwarf Hammer Orchid) occurs in white-grey sand and flowers from September to October. *Thelymitra magnifica* (Crystal Brook Star Orchid) occurs in dense shrubland on clay soils near granite rocks and flowers between September and October. *Thelymitra variegata* (Queen of Sheba) occurs in banksia woodlands on sandy coastal plains and flowers between August and October.

Table 1: Criteria used to assess the likelihood of occurrence of significant taxa and communities.

Criterion	Definition
Recorded	The taxon has been recorded within the survey area previously or during the current survey.
Likely	The taxon is likely to occur within the survey area as suitable habitat is known to be present and there are existing records very close to the survey area (within c.a. 10km)
Possible	The taxon may occur within the survey area as there are existing records in the vicinity of the survey area, and suitable habitat is likely to be present; OR The taxon may occur within the survey area as there is insufficient information available to exclude the possibility of occurrence.
Unlikely	The taxon is unlikely to occur within the survey area as suitable habitat is not present or is not likely to be present; OR Suitable habitat is present within the survey area, but the taxon/community has not been recorded despite reasonable survey effort.

Table 2: Threatened and Priority Flora potentially occurring within the survey area based on database searches. (VU = Vulnerable; EN = Endangered; CR = Critically Endangered; T = Threatened; 1 – 4 = Priority Flora Category)

Taxon	DBCA Ranking	EPBC Act Category	Flowering Period	Habitat	Likelihood of Occurrence
Acacia benthamii	2		Aug-Sep	Limestone breakaways	Unlikely; habitat not observed within site
Acacia horridula	3		May-Aug	Gravelly soils over granite	Unlikely; habitat not observed within site
Acacia oncinophylla subsp. patulifolia	4		Aug-Dec	Granitic soils	Unlikely; habitat not observed within site
Amanita preissii	3		-	Sandy, lateritic soils	Possible
Aponogeton hexatepalus	4		Aug-Sep	Freshwater	Unlikely; habitat not observed within site
Austrostipa jacobsiana	T	CR	Oct-Nov	Grey, white sandy soil	Possible
Banksia kippistiana var. paenepeccata	3		Oct-Nov	Lateritic gravelly soils	Unlikely; habitat not observed within site
Byblis gigantea	3		Sep-Dec	Sandy peat swamps	Unlikely; habitat not observed within site
Caladenia huegelii	T	EN	Aug-Oct	Grey, brown sand or clay loam	Possible
Calectasia grandiflora	2		Jun-Nov	Swampy areas, outcrops, flats, slopes	Possible
Calytrix simplex subsp. simplex	1		Oct-Nov		
Cyathochaeta teretifolia	3		-	Swamps, creek edges	Unlikely; habitat not observed within site
Diuris drummondii	T	VU	Nov-Jan	Swamps; standing water	Unlikely; habitat not observed within site
Diuris purdiei	T	EN	Sep-Oct	Winter-wet swamps	Possible
Dodonaea hackettiana	4		Jul-Oct	Limestone	Possible
Drakaea elastica	T	EN	Oct-Nov	Low-lying near winter-wet swamps	Possible
Drakaea micrantha	T	VU	Sep-Oct	White, grey sand	Possible
Drosera occidentalis	4		Oct-Dec		Possible

Taxon	DBCA Ranking	EPBC Act Category	Flowering Period	Habitat	Likelihood of Occurrence
Drosera oreopodion	T		Sep-Oct	Clayey-sand, laterite	Unlikely; habitat not observed within site
Drosera patens	1		Dec, Feb	Swamp margins	Possible
Eucalyptus x balanites	T	EN	Oct-Feb	Sand over laterite	Unlikely; habitat not observed within site
Haloragis aculeolata	2		Dec	Winter-wet, clay over limestone	Unlikely; habitat not observed within site
Jacksonia gracillima	3		Oct-Nov	Sands	Recorded
Jacksonia sericea	4		Dec-Feb	Calcareous and sandy soils	Possible
Johnsonia pubescens subsp. cygnorum	2		Sep	Seasonally wet	Possible
Kennedia beckxiana	4		Sep-Dec	Granite outcrops	Unlikely; habitat not observed within site
Lasiopetalum glutinosum subsp. glutinosum	3		Sep-Dec	Banksia woodland	Possible
Lepidosperma rostratum	T	EN		Peaty sand, clay	Unlikely; habitat not observed within site
Levenhookia preissii	1		Sep-Dec	Swamps	Unlikely; habitat not observed within site
Meionectes tenuifolia	3		Nov-Dec	-	-
Microtis quadrata	4		Dec-Jan	Seasonally wet	Possible
Morelotia australiensis	T		Dec	Grey sand over clay, winter-wet depressions	Unlikely; habitat not observed within site
Ornduffia submersa	4		Sep-Oct	Wetlands	Unlikely; habitat not observed within site
Phlebocarya pilosissima subsp. pilosissima	3		Aug-Oct	White, grey sand, lateritic gravel	Unlikely; habitat not observed within site
Poranthera moorokatta	2		Sep-Nov	Banksia woodland	Possible
Ptilotus sericostachyus subsp. roseus	T		Sep-Oct	-	Unlikely
Schoenus benthamii	3		Oct-Nov	Winter-wet flats, swamps	Possible
Schoenus capillifolius	3		Sep-Nov	Brown mud	Unlikely; habitat not observed within site
Schoenus pennisetis	3		Aug-Sep	Peaty sand. Winter-wet	Recorded
Stenanthemum sublineare	2		Oct-Dec	Litterd white sand	Possible

Taxon	DBCA Ranking	EPBC Act Category	Flowering Period	Habitat	Likelihood of Occurrence
Stylidium aceratum	3		Oct-Nov	Sandy soils, swamp	Possible
Stylidium longitubum	4		Nov	Sandy clay. Wetlands	Possible
Stylidium paludicola	3		Oct-Dec	Peaty sand. Winter-wet.	Possible
Styphelia filifolia	3		Mar-May	Sandy soils. Banksia woodland	Possible
Synaphea sp. Serpentine (G.R. Brand 103)	T	CR	Aug-Nov	Sandy loams. Seasonally wet.	Possible
Thelymitra magnifica	T			Stony ridges	Unlikely; habitat not observed within site
Thelymitra variegata	T		Aug-Oct	Sandy clay. Laterite	Possible
Thysanotus glaucus	4		Nov-Feb	White, grey sand	Possible
Tripterococcus sp. Brachylobus (A.S. George 14234)	4		Feb		
Verticordia lindleyi subsp. lindleyi	4		Nov-Jan	Sandy clay. Winter-wet	Possible

1.6 Conservation Significant Communities

The DBCA defines an ecological community as "a naturally occurring assemblage that occurs in a particular type of habitat" (DBCA 2023b). A Threatened Ecological Community (TEC) is one that has declined in area or was originally limited in distribution. Uncommon ecological communities that do not strictly meet TEC defined criteria, or are inadequately defined, are listed by the DBCA as a Priority Ecological Community (PEC). Definitions of the categories of Threatened and Priority Ecological Communities are given in Appendix E.

As well as protection under State legislation, select ecological communities are also afforded statutory protection at a federal level pursuant to the EPBC Act. The EPBC Act provides for the protection of TECs, which are listed under section 181 of the Act, and are defined as "Critically Endangered", "Endangered" or "Vulnerable" under Section 182. Similar to flora listed under the EPBC Act, any action likely to have a significant impact on a TEC listed under the EPBC Act requires Commonwealth approval.

Eight terrestrial TECs endorsed under State legislation are recorded as occurring within 25 km of the site:

- SCP10a – 'Shrublands on dry clay flats', listed as Endangered under State legislation and as Critically Endangered pursuant to the EPBC Act;
- SCP 20b – '*Banksia attenuata* and/or *Eucalyptus marginata* woodlands of the eastern side of the Swan Coastal Plain', listed as Critically Endangered under State legislation and as Endangered pursuant to the EPBC Act;
- 'Communities of Tumulus Springs (Organic Mound Springs, Swan Coastal Plain)', listed as Critically Endangered under State legislation and as Endangered pursuant to the EPBC Act;
- SCP 3a – '*Corymbia calophylla – Kingia australis* woodlands on heavy soils', listed as Critically Endangered under State legislation and as Endangered pursuant to the EPBC Act;
- SCP 3b – '*Corymbia calophylla — Eucalyptus marginata* woodlands on sandy clay soils of the southern SCP', listed as Endangered under State legislation;
- SCP 3c – '*Corymbia calophylla – Xanthorrhoea preissii* woodlands and shrublands, Swan Coastal Plain', listed as Endangered under both State legislation and pursuant to the EPBC Act;
- SCP 8 – 'Herb rich shrublands in clay pans', listed as Endangered under State legislation and Critically Endangered pursuant to the EPBC Act (as part of 'Claypans of the Swan Coastal Plain'); and
- 'Shrublands and Woodlands on Muchea Limestone of the Swan Coastal Plain', listed as Endangered under State legislation and as Critically Endangered pursuant to the EPBC Act.

Seven other terrestrial FCTs listed as PECs are recorded as occurring within 25 km of the site:

- *Casuarina obesa* association (Priority 1);
- Claypans with mid dense shrublands of *Melaleuca lateritia* over herbs (Priority 1);
- SCP 22 '*Banksia ilicifolia* woodlands' (Priority 3);
- SCP 24 – Northern Spearwood shrublands and woodlands' (Priority 3);
- SCP 21c 'Low lying *Banksia attenuata* woodlands or shrublands' (Priority 3);
- 'Tuart (*Eucalyptus gomphocephala*) woodlands and forests of the Swan Coastal Plain' (Priority 3); and
- 'Banksia dominated woodlands of the Swan Coastal Plain IBRA Region' (Priority 3).

The 'Banksia-dominated woodlands of the Swan Coastal Plain IBRA Region', '*Banksia ilicifolia* woodlands' and 'Low-lying *Banksia attenuata* woodlands or shrublands' are listed as 'Endangered' by the Commonwealth under the EPBC Act, while both the 'Tuart woodlands' and the 'Claypans with mid dense shrublands' are listed as Critically Endangered by the Commonwealth.

All of the site lies within the buffer zone of occurrences of the 'Banksia-dominated woodlands of the Swan Coastal Plain IBRA Region' (Figure 3).

1.7 Vegetation Complexes

Vegetation complexes are a series of plant communities forming a regularly repeating pattern associated with a particular soil unit (Government of Western Australia 2000). There are two vegetation complexes mapped as occurring within the site (Figure 4). Bassendean Complex – Central and South is mapped as occurring over in the western part of the site and is described as ranging from *Eucalyptus marginata – Allocasuarina fraseriana – Banksia* spp. woodlands to Melaleuca woodlands over sedges in the moister sites (Government of Western Australia 2017). This complex has approximately 25.7% of its original 87 500 ha pre-European extent remaining, and 1.86% of its original extent occurs on lands with some level of protection (Government of Western Australia 2017).

The Southern River Complex consists of *Corymbia calophylla – Eucalyptus marginata – Banksia* spp. woodlands with *Eucalyptus rudis* and *Melaleuca rhaphiophylla* along creek beds. This complex is mapped as occurring over the eastern portion of the site and has approximately 18.4% of its original 58 800 ha extent remaining, 1.18% of which is afforded some level of protection (Government of Western Australia 2017).

In the defined constrained area of the Perth Metropolitan Area, a vegetation complex with less than 10% of its original extent remaining is considered a 'Critical Asset' (DER 2014). Both vegetation complexes mapped over the site currently retain over 10% of their original extent.

1.8 Geomorphic Wetlands

Hill et al. (1996) has mapped all wetlands of the Swan Coastal Plain using the classification system of Semeniuk (1987). This classification system is based on the geomorphic setting and hydrological processes associated with a wetland. The classification allocates individual wetlands with shared characteristics to wetland suites. According to the geomorphic classification system of Semeniuk (1987), the wetland within the site is classified as a palusplain, which is an ephemeral or seasonally waterlogged wetland on flats. Table 3 below indicates the wetland types and their geomorphic setting.

Table 3: Geomorphic Wetland Classification, adapted from Semeniuk (1987)

	Basin	Flat	Channel	Slope
Permanently inundated	Lake	River		
Seasonally inundated	Sumpland	Floodplain	Creek	
Seasonally waterlogged	Dampland	Palusplain		Paluslope

The Hill et al. (1996) wetland mapping was digitised by the Department of Biodiversity, Conservation and Attractions (DBCA) to create the Geomorphic Wetland Swan Coastal Plain dataset (the dataset), which is managed and maintained by the DBCA. Each classified wetland listed in the dataset has a Unique Feature Identifier (UFI), however in the case of many large wetlands that have sustained a degree of disturbance, a separate management category may be assigned to parts of the wetland in order to reflect the current values. The description and management objectives of each management category are listed in Table 4. The wetland management category is important as it categorises wetlands on their significance, based on hydrological, biological and human use features. This

dynamic dataset is continually updated with site-specific wetland surveys providing new and relevant information.

Table 4: Wetland Management Categories and Objectives (Western Australian Planning Commission 2005)

Management Category	Description of Wetland	Management Objectives
Conservation Category Wetland (CCW)	Wetlands that support high levels of attributes and functions.	To preserve wetland attributes and functions through reservation in national parks, crown reserves, state owned land and protection under environmental protection policies.
Resource Enhancement Wetland (REW)	Wetlands that have been partly modified but still support substantial functions and attributes.	To restore wetlands through maintenance and enhancement of wetland functions and attributes by protection in crown reserves, state or local government owned land and by environmental protection policies, or in private property by sustainable management.
Multiple Use Wetland (MUW)	Wetlands with few attributes, which still provide important wetland functions.	Use, development and management should be considered in the context of water, town and environmental planning through landcare.

The Geomorphic Wetlands of the Swan Coastal Plain (GWSCP) dataset indicates that there is one wetland wholly or partially within the site (Figure 5). The Dampland UFI 7088 is categorised as a Multiple Use Wetland (MUW), which is a wetland with few natural attributes but may still provide important functions.

1.9 Purpose

The purpose of the survey was to assess the botanical values within the site by:

- Undertaking a detailed flora and vegetation survey in accordance with the Environmental Protection Authority's (EPA) Technical Guidance: Flora and Vegetation Survey for Environmental Impact Assessment (2016).
- Identifying the presence of any Threatened Ecological Communities (TECs) and Priority Ecological Communities (PECs);
- Undertaking a systematic search for all vascular plant taxa present; and
- Recording the locations and numbers present of any Threatened Flora and Priority Flora identified at the time of the field survey.

2 Methods

2.1 Field Survey

A field survey of the site was undertaken by a botanist from Plantecology Consulting on the 17th and 18th October 2023. The site was traversed on foot and a detailed survey of the vegetation was undertaken at ten 100 m² sampling plots (10m x 10m quadrats), selected to adequately sample the flora within a stand (Figure 5). Plots were positioned to sample a representative and homogeneous area (i.e. not located in transitional areas between communities). The location of the NW corner of a plot was recorded with a hand-held GPS unit and a photograph of the plot taken looking inward to the quadrat. All vascular plant species were recorded and an estimate of the percentage cover was made for each species.

Environmental data recorded included topographic position, aspect, slope, soil colour and texture class, rock outcropping, litter cover as well as the degree of disturbance and an estimate of the time since the last fire event. The condition of the vegetation of the site was assessed to assist in determining the conservation values of the site. The vegetation condition was rated according to Keighery (1994), a vegetation condition scale commonly used in the metropolitan and southwest regions. The categories are listed and defined in Table 5. Data on the vegetation structure was also recorded and included the height of the three main strata and the dominant species within each stratum. The vegetation structural description follows that of Thackway et al. (2006).

Table 5: Vegetation Condition Scale (Keighery 1994)

Vegetation Condition	Definition
Pristine (1)	Pristine or nearly so, no obvious signs of disturbance.
Excellent (2)	Vegetation structure intact, disturbance affecting individual species and weeds are non-aggressive species.
Very Good	Vegetation structure altered, obvious signs of disturbance. For example, disturbance to vegetation structure caused by repeated fires, the presence of some more aggressive weeds, dieback, logging and grazing.
Good	Vegetation structure significantly altered by very obvious signs of multiple disturbances. Retains basic vegetation structure or ability to regenerate it. For example, disturbance to vegetation structure caused by very frequent fires, the presence of some very aggressive weeds at high density, partial clearing, dieback and grazing.
Degraded	Basic vegetation structure severely impacted by disturbance. Scope for regeneration but not to a state approaching good condition without intensive management. For example, disturbance to vegetation structure caused by very frequent fires, the presence of very aggressive weeds, partial clearing, dieback and grazing.
Completely Degraded	The structure of the vegetation is no longer intact and the area is completely or almost completely without native species. These areas are often described as 'parkland cleared' with the flora comprising weed or crop species with isolated native trees or shrubs.

All plant specimens collected during the field survey were dried, pressed and then sorted in accordance with requirements of the Western Australian Herbarium. Identification of specimens occurred through comparison with named material and through the use of taxonomic keys. Taxonomic determinations were made using reference material at the Western Australian State Herbarium. Taxa names utilise the current terminologies from the Western Australian Herbarium (1998-). Family names utilise the revised phylogeny of the Angiosperm Phylogeny Group - APGIII Western Australian Herbarium (1998-).

2.2 Data Analysis

2.2.1 Hierarchical Clustering

To place the vegetation of the site in a regional context and determine its conservation significance, the Carey Baptist College data was analysed against the data from the Swan Coastal Plain survey (Gibson et al. 1994). All analyses were undertaken using R packages cluster (Maechler et al. 2022), labdsv (Roberts 2019), optpart (Roberts 2020), fossil (Vavrek 2011) and Vegan (Oksanen et al. 2020).

For the comparison of the site data and that of the Swan Coastal Plain, the floristic data from this survey was transformed to presence/absence and the two datasets were merged into one. The transformed dataset was added to the Swan Coastal Plain dataset and the combined dataset was then analysed calculating the Bray-Curtis distance coefficient (or resemblance measure) and the flexible beta linkage method (beta = -0.1). Assignment of the Carey Baptist College plots was to the nearest distinct group by inspection of the resulting dendrogram. To remove any effect of spatial correlation between the new plots, data was added to the matrix one plot a time and the analysis re-run.

2.3 Survey Limitations

Various factors can limit the effectiveness of a vegetation survey. Pursuant to EPA Technical Guidance: Flora and Vegetation Survey for Environmental Impact Assessment (EPA 2016), these factors have been identified and their potential impact on the effectiveness of the survey has been assessed (Table 6).

The survey was undertaken in October 2023 and would likely have intercepted the flowering period of most taxa of conservation concern with the potential to occur within the site, in particular the Threatened annual and geophytic taxa. The minimum and maximum temperatures from July through October were approximately 1-2°C above average for the region. Rainfall during the period was considerably below average, with August (59.6 mm compared to an average of 127.4 mm) and October (6.8 mm against 46.1 mm) particularly dry. It is expected that the range of climatic conditions in the months prior to the survey may have affected the local species' phenology, in particular the annual taxa.

Table 6: Potential limitations affecting the vegetation survey

Potential limitations	Constraint	Comment
Availability of contextual information	No	Sufficient regional and local information was available to place the survey site in its environmental context.
Competency and experience of the botanists	No	The survey was undertaken by botanists with a comprehensive knowledge of South West vegetation, with at least 20 years' experience in vegetation surveys in Western Australia.
Seasonality	Moderate	The rainfall in the period prior was below average, particularly August and October. Maximum and minimum temperatures were above and below average, respectively, in the 3 months prior to the survey.
Adequate coverage and intensity of survey	No	The survey area was traversed on foot. It is considered the survey quadrats and mapping points provided adequate coverage of the site.
Proportion of Flora identified	No	It is estimated that 76% of taxa present within the site at the time of the survey were recorded (Chao2 estimator).
Disturbance	No	The vegetation was mostly intact, with past disturbance apparent from the presence of weeds.
Resources	No	Adequate resources were available to conduct the survey.
Access restrictions	No	All parts of the site were accessible.

3 Results

3.1 Flora

3.1.1 Floristic Summary

A total of 47 native and 48 non-native (exotic) taxa was recorded within the site, representing 36 families and 84 genera. The dominant families containing mostly native taxa were Proteaceae (5 native taxa), Myrtaceae (9 native taxa) and Fabaceae (8 native taxa, 6 exotic taxa). All but one of the taxa from the Poaceae family were exotics. For a complete species list and the individual site data refer to Appendix A and Appendix B, respectively.

3.1.2 Conservation Significant Flora

No Threatened Flora pursuant to either the Biodiversity Conservation Act (2016) or the EPBC Act (1999) were recorded during the survey.

One species of Priority Flora was recorded. Eight individuals in total of *Jacksonia gracillima* (P3) were recorded at five locations, within the *Banksia attenuata – Kunzea glabrescens* Open Woodland and the *Eucalyptus todtiana* Open Woodland (Table 7; Figure 6). Four plants were recorded within Plot 2 and one within Plot 3, with one individual each recorded at three other locations.

Table 7: Location of Priority flora within the survey area at Carey Baptist College, Forrestdale

Taxon	DBCA Ranking	Population Count	Latitude	Longitude
Jacksonia gracillima	P3	1	-32.16004983	115.9153297
Jacksonia gracillima	P3	1	-32.16021082	115.9155088
Jacksonia gracillima	P3	1	-32.1597537	115.9150520
Jacksonia gracillima	P3	4	-32.160224	115.914962
Jacksonia gracillima	P3	1	-32.159803	115.91517

3.2 Vegetation

3.2.1 Plant Associations

Six plant communities were identified within the survey area (Figure 6):

Melaleuca preissiana – Kunzea glabrescens Open Woodland (Plate 1)

Open woodland of *Melaleuca preissiana* over tall thicket of *Kunzea glabrescens* over an exotic understorey of **Vulpia bromoides, *Ehrharta longifolia* and **Hypochaeris glabra* on a closed depression of clayey sand.

This community type occurs in the north western section of the survey area and is part of the *Melaleuca preissiana* Woodland described by BEC (2011).

Banksia attenuata – Kunzea glabrescens Open Woodland (Plate 2)

Open Woodland of *Banksia attenuata* and *Banksia menziesii* over a tall thicket of *Kunzea glabrescens* and *Xanthorrhoea brunonis* over a herbland of **Hypochaeris glabra, *Vulpia bromoides* and **Briza maxima* on a flat of clayey sand.

This community is adjacent to the *Melaleuca preissiana – Kunzea glabrescens* Open Woodland and the *Eucalyptus todtiana – Banksia attenuata – Banksia ilicifolia* Open Woodland described below. It was previously mapped as part of the *Melaleuca preissiana* Woodland by BEC (2011) but has been separated due to the presence of *Banksia attenuata* and *Banksia menziesii* in the overstorey.

Eucalyptus todtiana – Banksia attenuata – Banksia ilicifolia Open Woodland (Plates 3 & 4)

Open woodland of *Eucalyptus todtiana* with *Banksia attenuata* or *Banksia ilicifolia* over tall shrubland of *Kunzea glabrescens, Xanthorrhoea brunonis* and *Acacia saligna* over tussock grassland of **Ehrharta longiflora, *Ehrharta calycina* and *Hypochaeris glabra* on flats of clayey sand.

This woodland occupies the central part of the site adjacent to the northern boundary and is approximately equivalent to the *Banksia attenuata* and *Banksia ilicifolia* Low Forest described by BEC (2011).

Melaleuca rhaphiophylla Open Forest (Plate 5)

Open Forest of *Melaleuca rhaphiophylla* over a mainly exotic herbland of **Zantedeschia aethiopica*, **Lolium rigidum* and **Cotula coronopifolia* on an open depression of clayey sand.

This community occurs along the drainage system in the central part of the survey area and is equivalent to the *Melaleuca rhaphiophylla* Low forest described by BEC (2011).

Melaleuca preissiana – Astartea scoparia Open Forest (Plate 6)

Open Forest of *Melaleuca preissiana* over shrubland of *Astartea scoparia* over tussock grassland of **Ehrharta longiflora, Dielsia stenostachya* and **Vulpia bromoides* on an open depression of clayey sand.

This community was considered part of the *Melaleuca rhaphiophylla* Low Forest by BEC (2011) but has been separated due to the dominance of *Melaleuca preissiana* in this area.

Banksia attenuata – Banksia menziesii Open Woodland (Plates 7 & 8)

Open woodland of *Banksia attenuata* and *Banksia menziesii* with *Eucalyptus todtiana* over open shrubland of *Adenanthos cygnorum* subsp. *cygnorum* over tussock grassland of **Ehrharta calycina, Conostylis aculeata* and **Hypochaeris glabra* on loamy to clayey sands on low rises.

This community occupies the south eastern part of the survey area and is part of the *Banksia attenuata – Banksia menziesii* Low Woodland described by BEC (2011).

**Eragrostis curvula* Tussock Grassland (Plates 9 & 10)

Tussock grassland of **Eragrostis curvula* with **Vulpia bromoides, *Lotus subbiflorus, *Carpobrotus edulis* and **Lolium rigidum* with scattered emergent *Melaleuca lateritia* on flats of clayey sands to light clays.

This community is dominated by exotic taxa and covers the majority of the site.

3.2.2 Vegetation Condition

The vegetation condition of the of the majority of the site is in 'Completely Degraded' condition, with only the *Eucalyptus todtiana – Banksia attenuata* woodland considered 'Degraded', and the *Banksia attenuata – Banksia menziesii* Open Woodland in 'Good' condition. The native component in the *Eragrostis curvula* tussock grassland is almost wholly absent and this community, which is the majority of the survey area, is 'Completely Degraded'.

The *Melaleuca preissiana* open woodland in the north western part of the site retains a native overstorey, with the shrub layer dominated by *Kunzea glabrescens* with low native shrub diversity. The ground layer consists mainly of weed taxa with only a sporadic occurrence of native taxa. Past disturbance has severely altered the structure and native diversity of these woodlands and they are in 'Completely Degraded' condition.

Similarly, the ground layer within the *Melaleuca rhaphiophylla* and *Melaleuca preissiana* open forests associated with the drainage line consists almost entirely of weed taxa such as **Zantedeschia aethiopica*, with only small patches of native taxa such as *Dielsia stenostachya.* The shrub layer is also diminished and consists of either *Kunzea glabrescens* or *Astartea scoparia.* The open forests are also 'Completely Degraded'.

While past disturbance has reduced the density of native taxa in the ground and shrub layers within the *Eucalyptus todtiana -Banksia attenuata* and *Banksia attenuata – Kunzea glabrescens* open woodlands, some native diversity has been retained and these communities are in 'Degraded' condition.

Only the *Banksia attenuata – Banksia menziesii* open woodland is in 'Good' condition. Some patches of this community have dense infestations of weeds such as **Ehrharta calycina* and the tree and shrub density is lower than would be expected in undisturbed vegetation, but enough native taxa remain in the ground layer for the stand to be considered 'Good' condition.

3.2.3 Conservation Significant Communities

No TECs are inferred to occur within the site. The results of the hierarchical clustering analysis showed that most plots were assigned either FCT 6 'Weed-dominated wetlands on heavy soils' or FCT 11 'Wet forests and woodlands'. These FCTs contain a high proportion of weeds and such results are often seen when the vegetation is in poor condition. The only assignments with some reliability were for Plots 8 and 9 in the *Banksia attenuata – Banksia menziesii* open woodland. Plot 8 was assigned to FCT 21c 'Low-lying *Banksia attenuata* woodlands or shrublands', while Plot 9 was assigned to FCT 22 '*Banksia ilicifolia* woodlands'. The assignment to FCT 21c is reasonable given the landscape position and composition of the overstorey, but the assignment to FCT 22 is unlikely and may be due to the higher weed presence in Plot 9. While *Adenanthos cygnorum, Banksia menziesii* and *Banksia attenuata* occur in both FCTs, *Banksia ilicifolia* is usually found in FCT 22 yet is absent from Plots 8 and 9. Therefore, assignment to FCT 21c is considered the more robust result.

FCT 21c is listed as a Priority 3 community under State policy, and also forms part of the 'Banksia-woodlands of the Swan Coastal Plain IBRA Region', which is listed as an 'Endangered' TEC pursuant to the EPBC Act. However, to meet the criteria for inclusion as part of the Banksia woodlands TEC, a vegetation stand must be in 'Good' or better condition according to the definitions in Table 2. Also, for a patch in 'Good' condition, the area of the patch must be at least 2 ha. The area of the *Banksia attenuata – Banksia menziesii* open woodland within the survey area is 1.79 ha, of which 1.50 ha is in 'Good' condition and 0.29 ha is 'Degraded'. Therefore, this vegetation type does not meet the criteria for inclusion as part of the 'Banksia-dominated woodlands of the Swan Coastal Plain IBRA Region' TEC.

3.3 Weeds

Forty-eight of the taxa recorded during the survey are exotics (weeds), which demonstrates the overall degraded condition of the vegetation within the site. The **Eragrostis curvula* tussock grassland consists mostly of exotic grasses and herbs, with only occasional emergent native shrubs.

Three taxa are Declared Pests under the *Biosecurity and Agriculture Management Act 2007*, with restrictions on their sale and movement. **Zantedeschia aethiopica* (Arum Lily) occurs in dense infestations within the *Melaleuca rhaphiophylla* and *Melaleuca preissiana* open forests, while **Asparagus asparagoides* (Bridal Creeper) also occurs in the *Melaleuca preissiana* open woodland. **Moraea flaccida* (Cape Tulip) was recorded from the **Eragrostis curvula* tussock grassland.

4 Discussion

The condition of the vegetation within the site is mostly poor and in 'Completely Degraded' condition, with around half of the taxa recorded being introduced (weeds). Three of the weeds are Declared Pests - **Zantedeschia aethiopica, *Asparagus asparagoides* and **Moraea flaccida.*

Most of the site is covered by the **Eragrostis curvula* tussock grassland and reflects the previous agricultural land use of the property. In the wetter habitats that support a *Melaleuca* spp. overstorey, and the native ground layer has almost entirely been replaced by weeds such as **Zantedeschia aethiopica*, **Ehrharta longiflora* and **Vulpia bromoides.* In the slightly drier habitats that support a banksia overstorey, the native component of the ground layer is more evident but is still dominated by weeds. These areas are rated as 'Degraded', or 'Good' where a basic native diversity is still evident. The condition ratings are mainly lower than that reported by BEC (2011) and this may in part reflect variances between observers, but is also likely to be a reflection of a continued drying in the intervening years.

Eight plants of one species of Priority Flora were recorded at five locations within the site. *Jacksonia gracillima* (P3) is a prostrate shrub to approximately 1.5 m high that is often found in damp, sandy soils on the Swan Coastal Plain. The species was recorded in the previous survey of the Carey Baptist College site by BEC (2011) although not all previously recorded plants were within the current survey area.

Also recorded by BEC (2011) was *Schoenus pennisetis* (P3) in the *Melaleuca preissiana – Kunzea glabrescens* Open Woodland in the north western part of the site. This species was not observed in this survey. Precise coordinates were not given by BEC (2011) and so a location could not re-checked but, as stated by BEC (2011), the species is difficult to observe when its normally damp habitat dries out. The weeks prior to the survey were unusually dry and may have affected observability, and the general decline in rainfall in the south west region may mean the taxon is no longer present.

Much of the dryland habitat within the site would originally have supported stands of the Commonwealth-listed TEC 'Banksia-dominated woodlands of the Swan Coastal Plain IBRA Region'. To be considered a part this community, a vegetation patch must be in 'Good' or better condition and, for patches in 'Good' condition, must be 2 ha or more in size. The *Eucalyptus todtiana – Banksia attenuata – Banksia ilicifolia* open woodland is in 'Degraded' condition and therefore does not meet the criteria for inclusion. The *Banksia attenuata – Banksia menziesii* open woodland is mostly in 'Good' condition, but is below the 2 ha threshold. Therefore, this patch does not meet the size criterion for inclusion as part of the 'Banksia-dominated woodlands of the Swan Coastal Plain IBRA Region'.

The *Banksia attenuata – Banksia menziesii* open woodland was determined to be part of FCT 21c 'Low-lying *Banksia attenuata* woodlands or shrublands', a Priority 3 Ecological community. FCT 21c is often found fringing seasonally-wet habitats on the Bassendean Dune System between Gingin and Bunbury.

A dampland (UFI 7088) with a management category of Multiple Use (MUW) has been mapped over the south west corner of the site. The vegetation within this area is part of the **Eragrostis curvula* tussock grassland community and the condition is 'Completely Degraded'. The MUW category remains appropriate for this dampland.

5 Summary

The main ecological values of the vegetation within the site at Carey Baptist College, Forrestdale is the presence of the conservation significant species *Jacksonia gracillima* (P3) and the Priority 3 community FCT 21c 'Low-lying *Banksia attenuata* woodlands or shrublands. The vegetation of the site is mostly in a 'Degraded' to 'Completely Degraded' condition and has lost much of its botanical value from past land uses in those areas. Approximately half of the taxa recorded within the site were weeds, with three Declared Pests, **Zantedeschia aethiopica*, **Asparagus asparagoides* and **Moraea flaccida* present.

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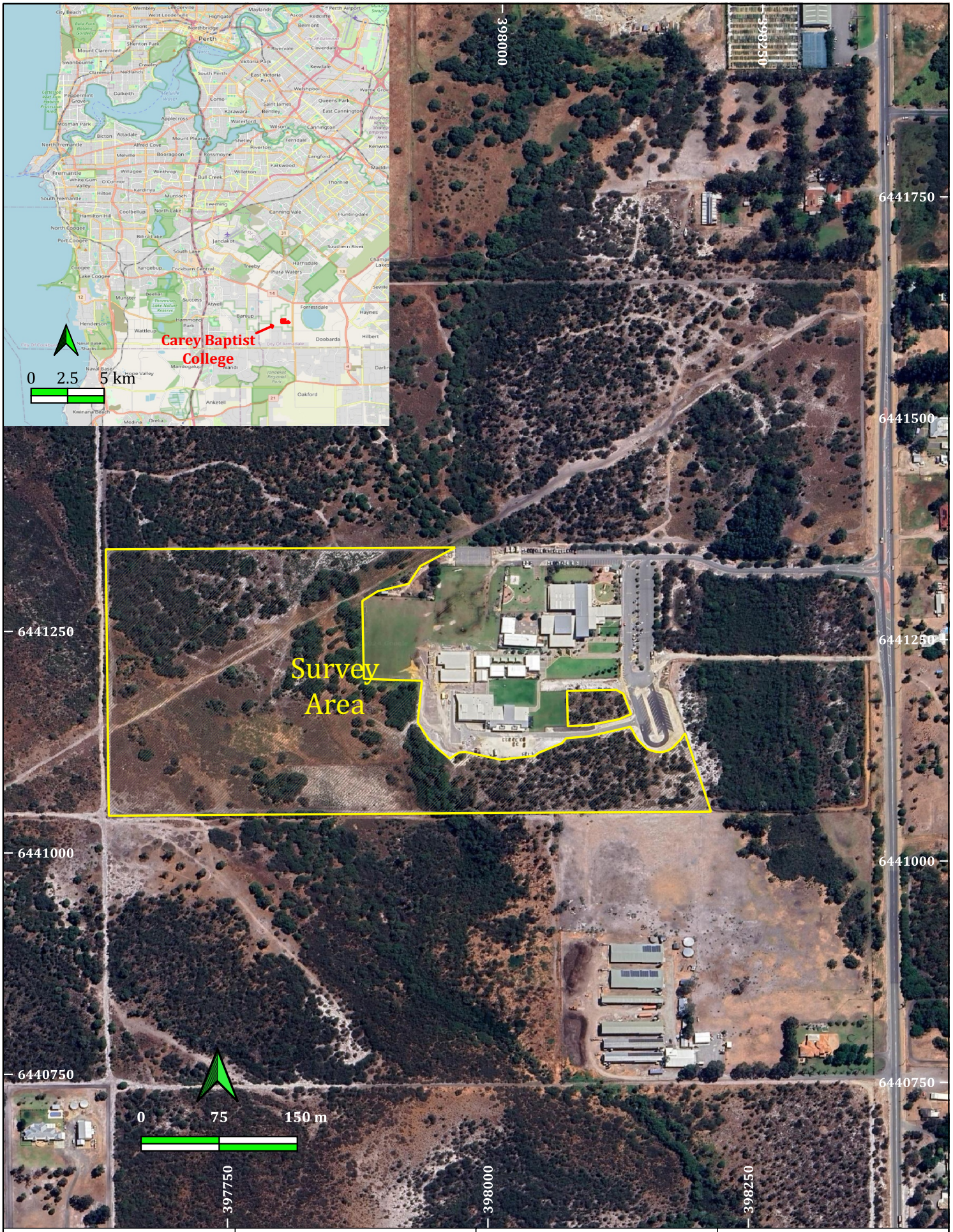
Figures



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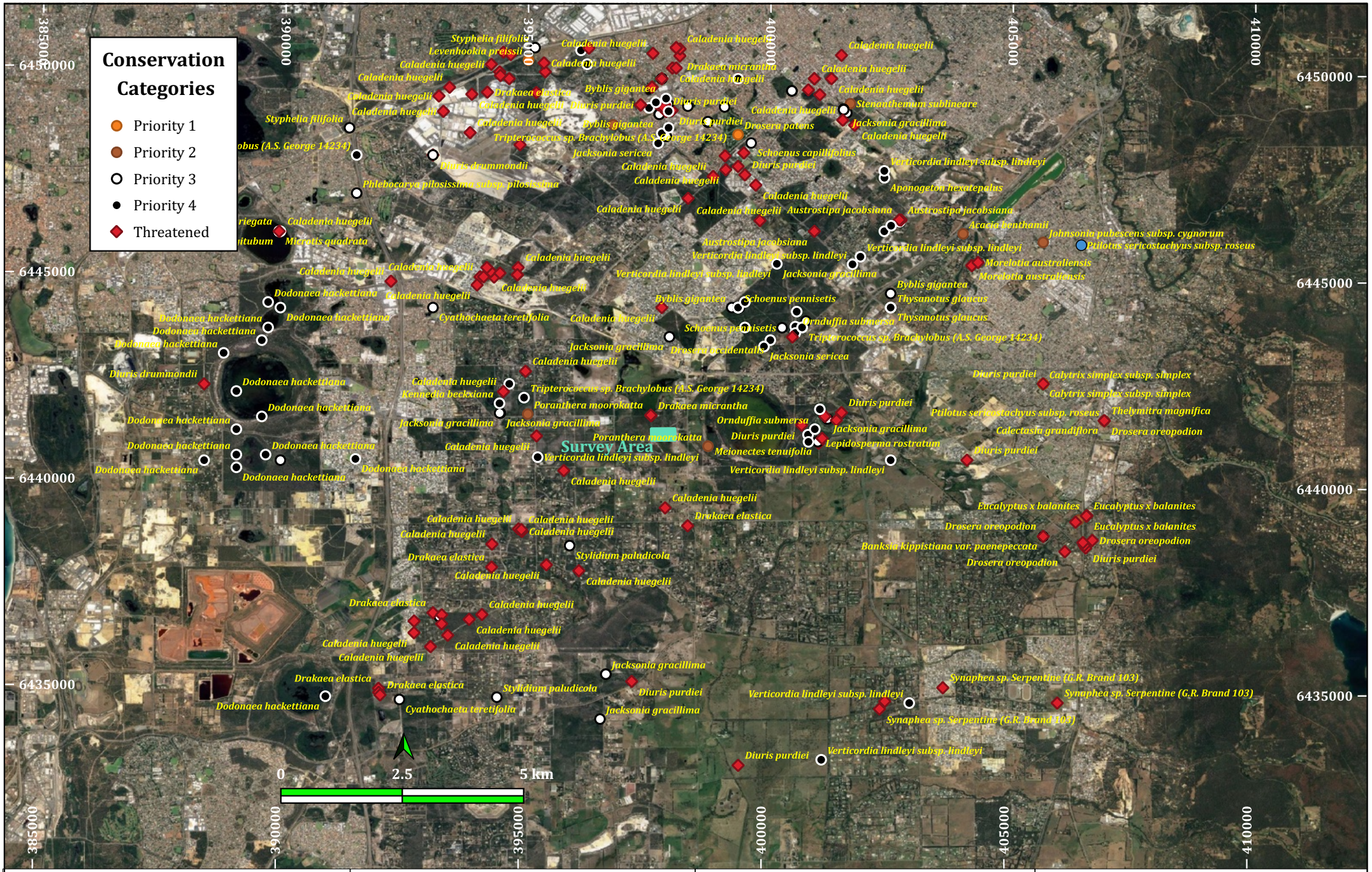
Projection: EPSG 7844

Client: CoTerra Environment
Project: Carey Baptist College Flora Survey
Location: Nicholson Rd, Forrestdale
Author: S.T.S. Chalwell
Drawn: S.T.S. Chalwell

Figure 1: Locality Plan



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Projection: EPSG 7844

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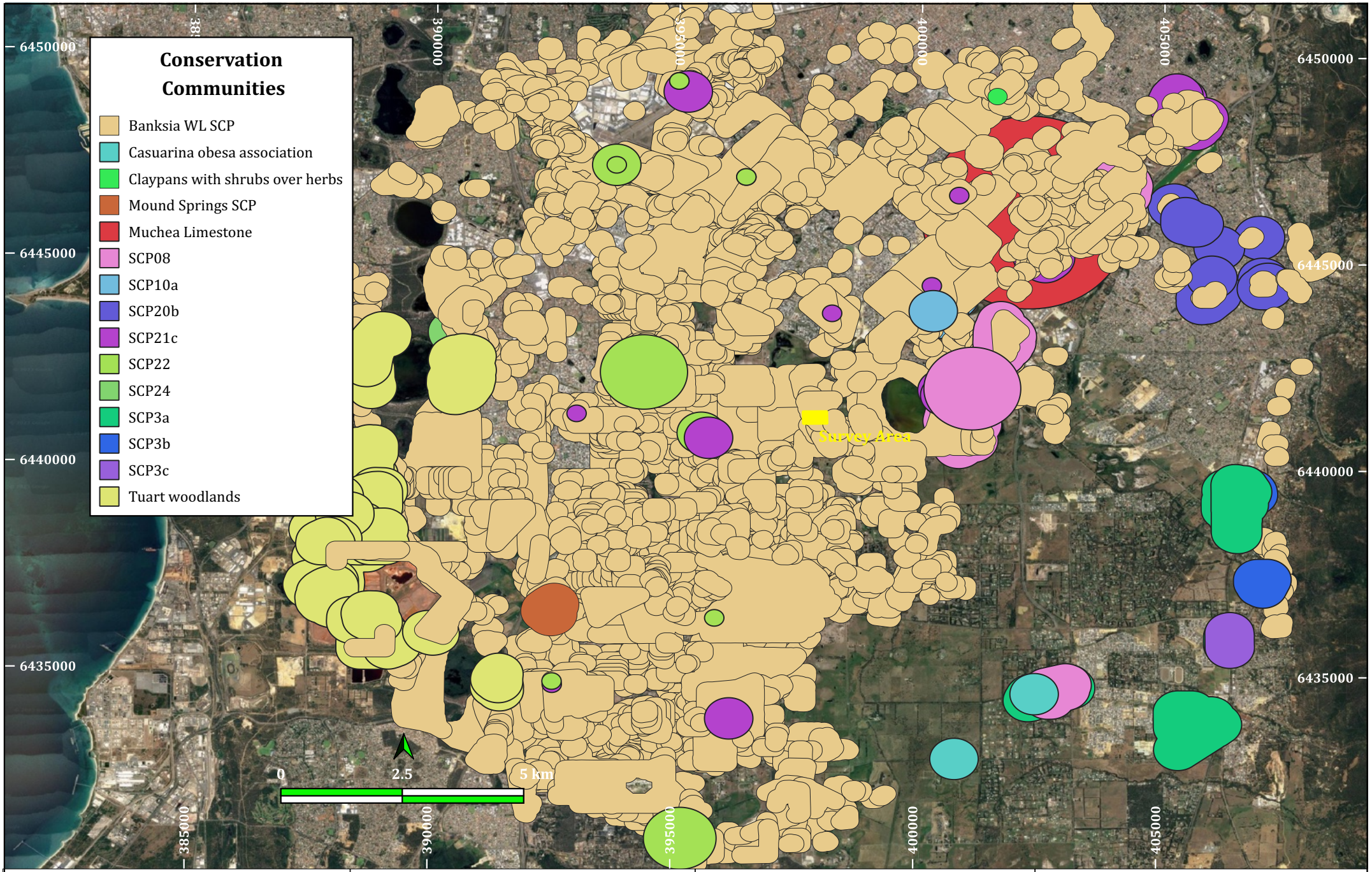
Project: Carey Baptist College Flora Survey
Location: Nicholson Rd, Forrestdale
Author: S.T.S. Chalwell
Drawn: S.T.S. Chalwell

Figure 2: Conservation Significant Flora



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Projection: EPSG 7844

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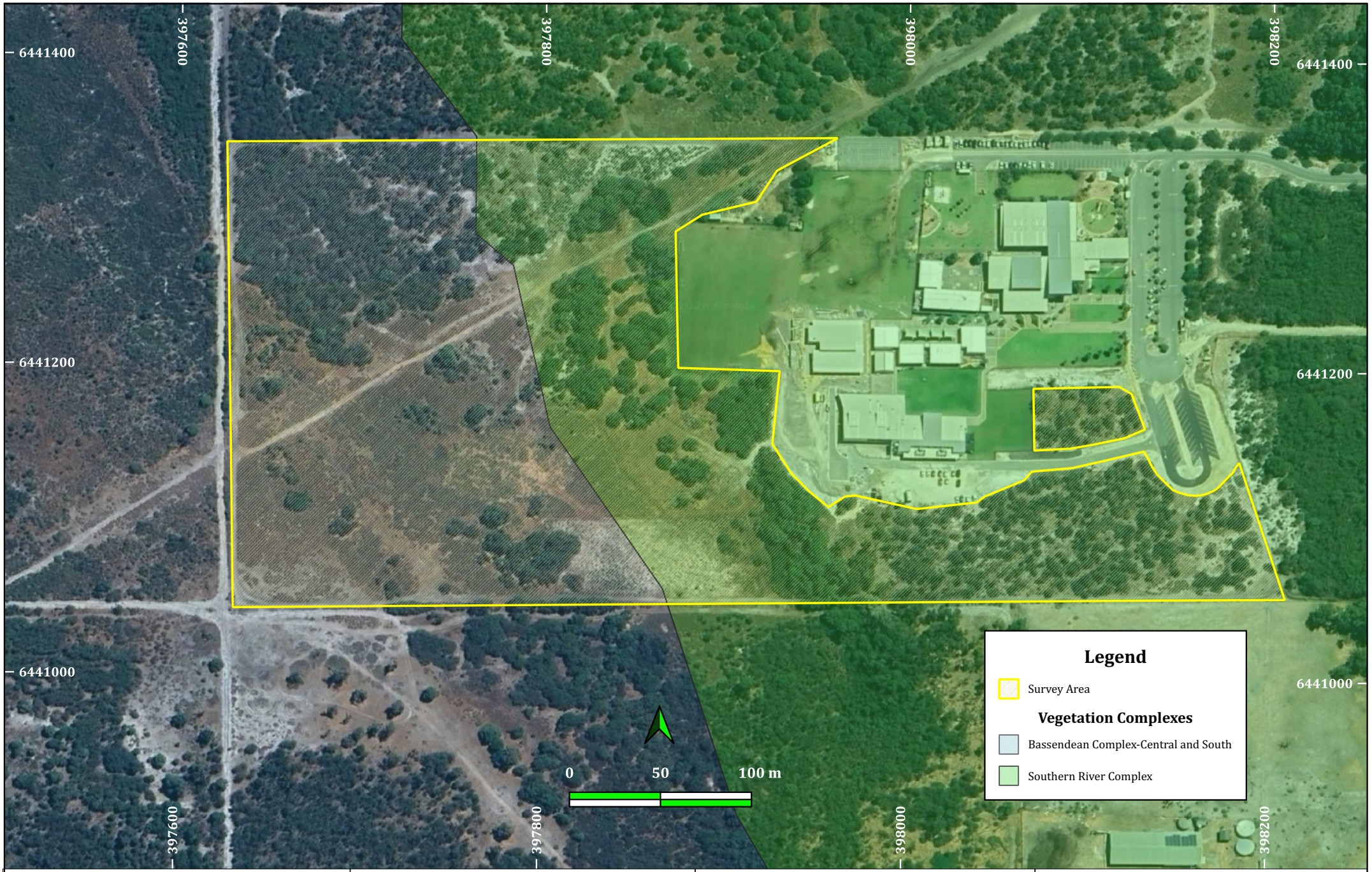
Location: Nicholson Rd, Forrestdale
Author: S.T.S. Chalwell
Drawn: S.T.S. Chalwell

Figure 3: Conservation Significant Communities



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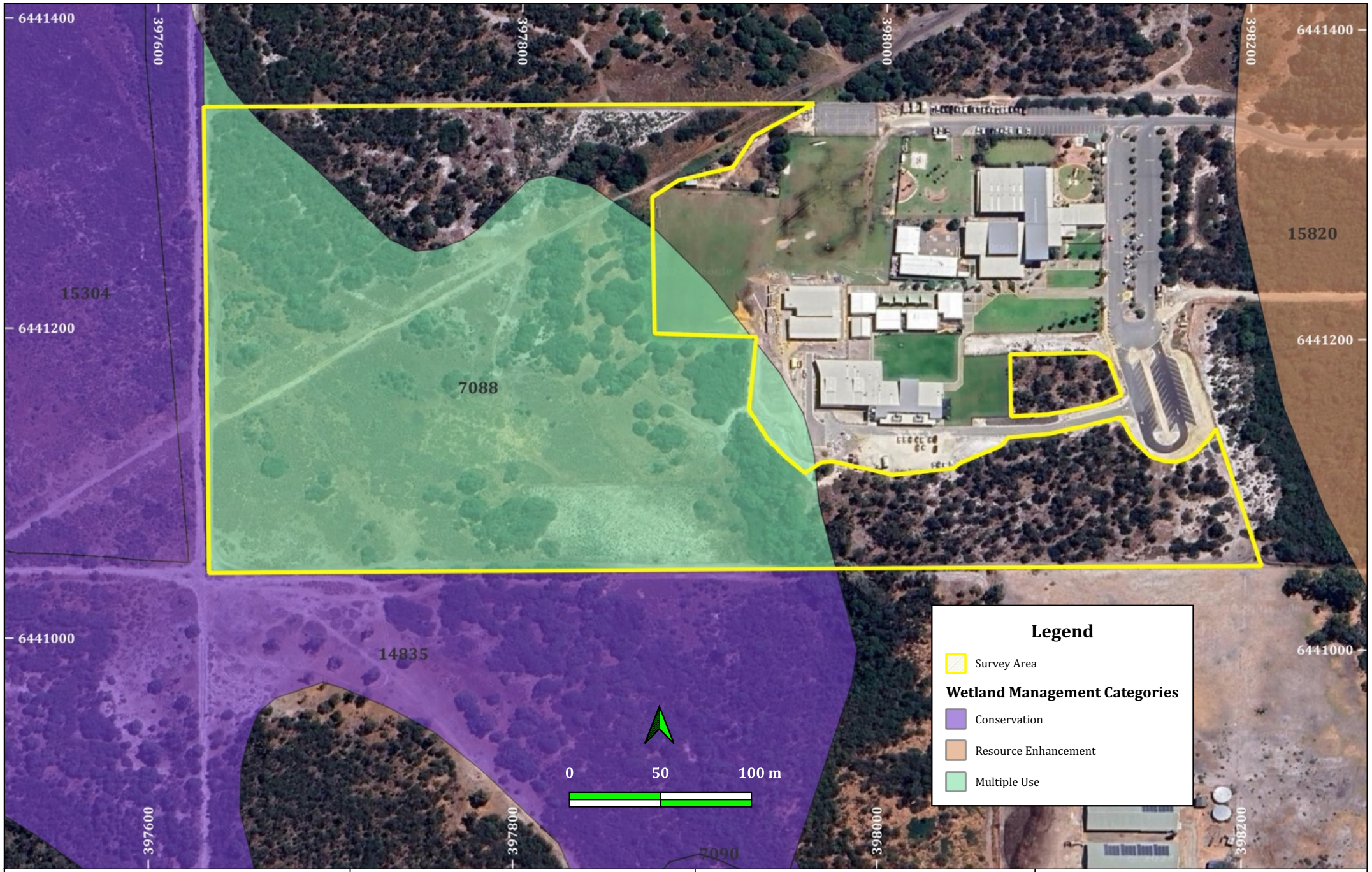
Projection: EPSG 7844

Client: CoTerra Environment
Project: Carey Baptist College Flora Survey
Location: Nicholson Rd, Forrestdale
Author: S.T.S. Chalwell
Drawn: S.T.S. Chalwell

Figure 4:
Vegetation Complexes



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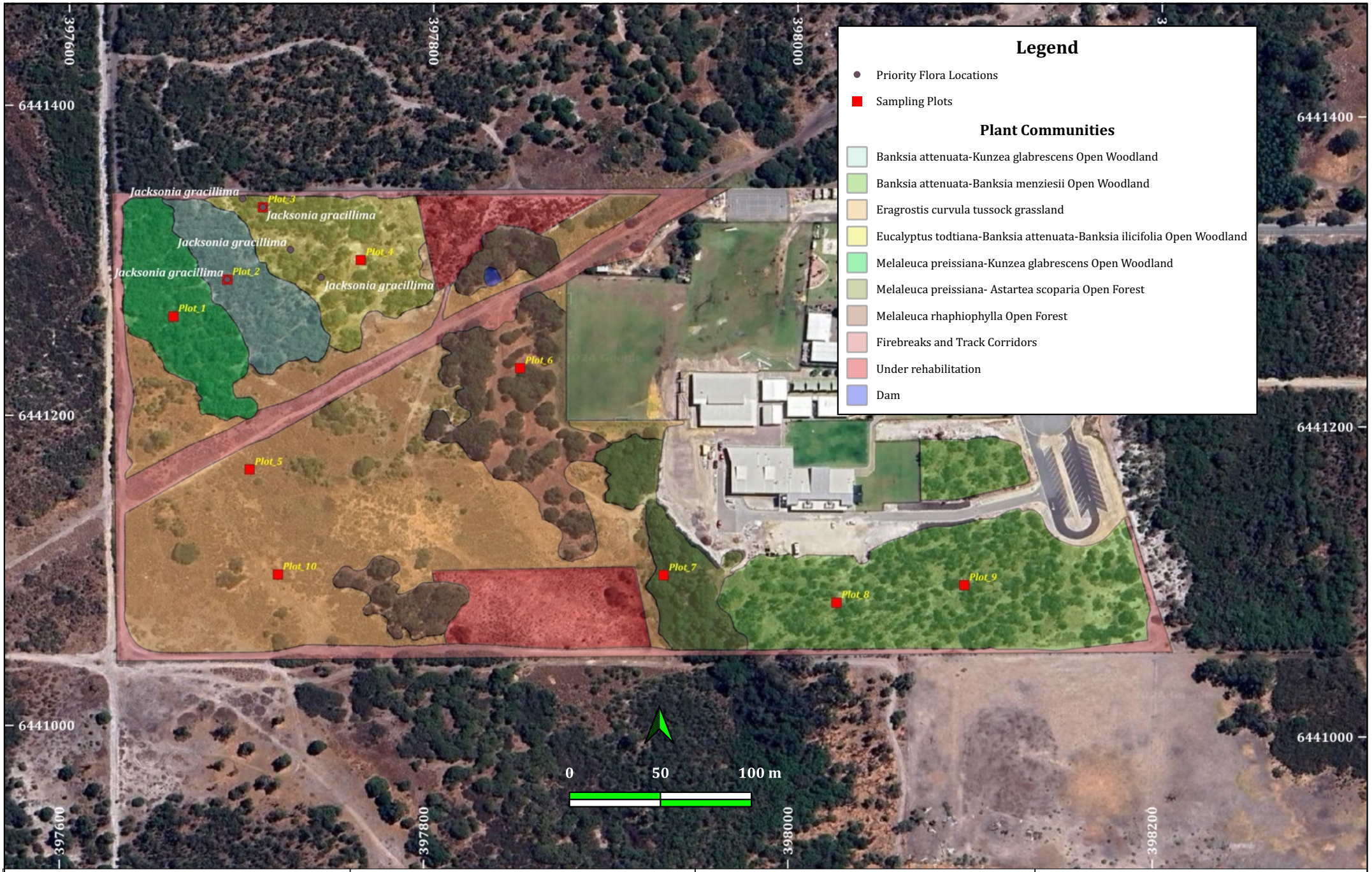
Location: Nicholson Rd, Forrestdale
Author: S.T.S. Chalwell
Drawn: S.T.S. Chalwell

Figure 5:
SCP Geomorphic Wetlands



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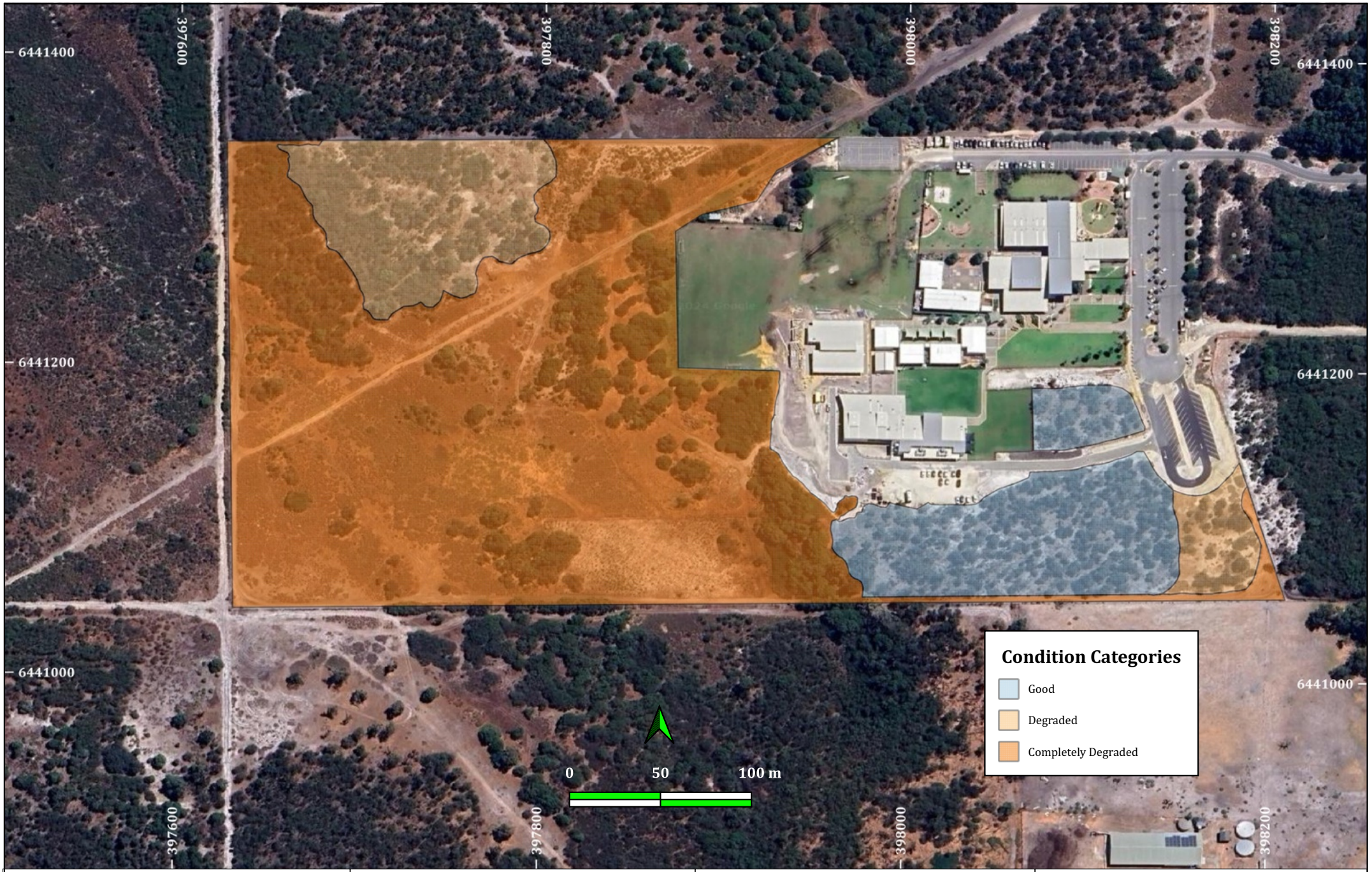
Project: Carey Baptist College Flora Survey
Location: Nicholson Rd, Forrestdale
Author: S.T.S. Chalwell
Drawn: S.T.S. Chalwell

Figure 6: Plant Communities



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Project: Carey Baptist College Flora Survey
Location: Nicholson Rd, Forrestdale
Author: S.T.S. Chalwell
Drawn: S.T.S. Chalwell

Figure 7:
Vegetation Condition

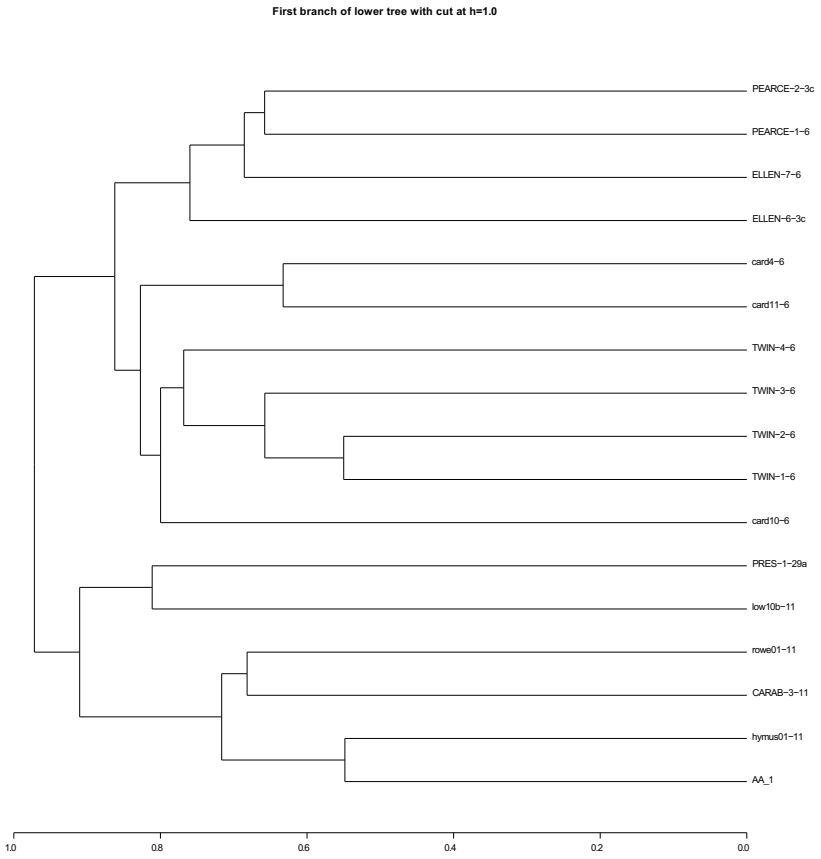

Figure 8: Partial dendrogram of Plot 1 assignment to the Swan Coastal Plain dataset.

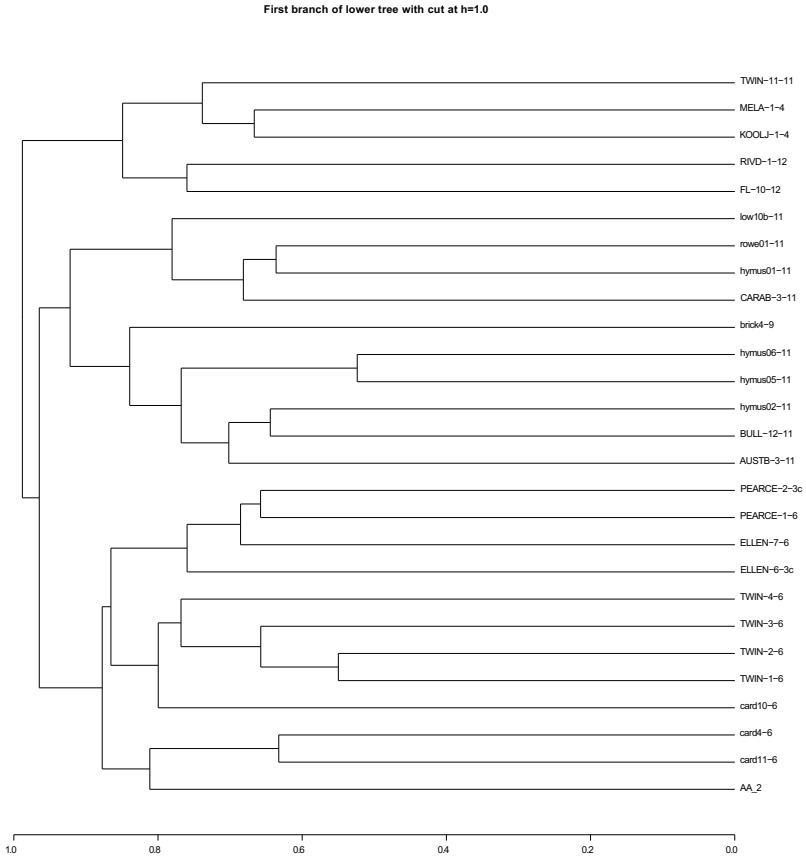

Figure 9: Partial dendrogram of Plot 2 assignment to the Swan Coastal Plain dataset.

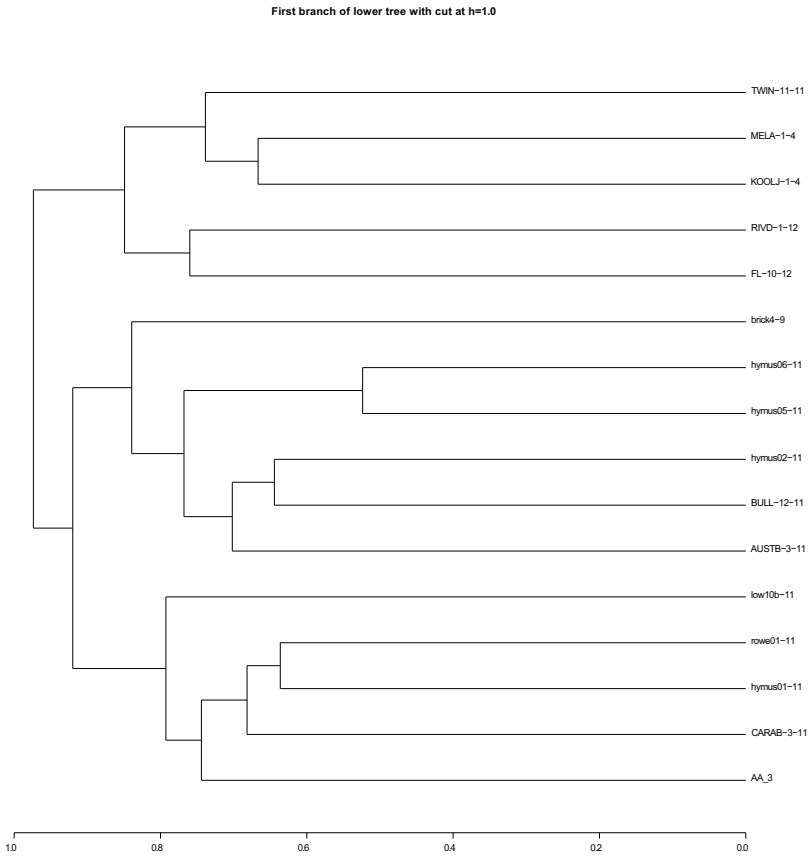

Figure 10: Partial dendrogram of Plot 3 assignment to the Swan Coastal Plain dataset.

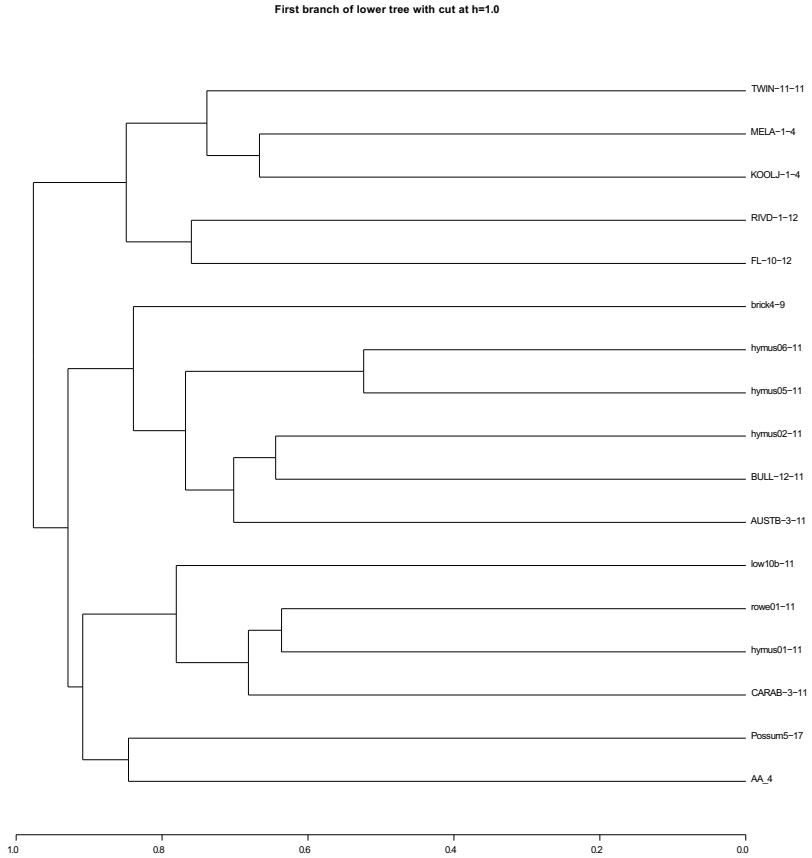

Figure 11: Partial dendrogram of Plot 4 assignment to the Swan Coastal Plain dataset.

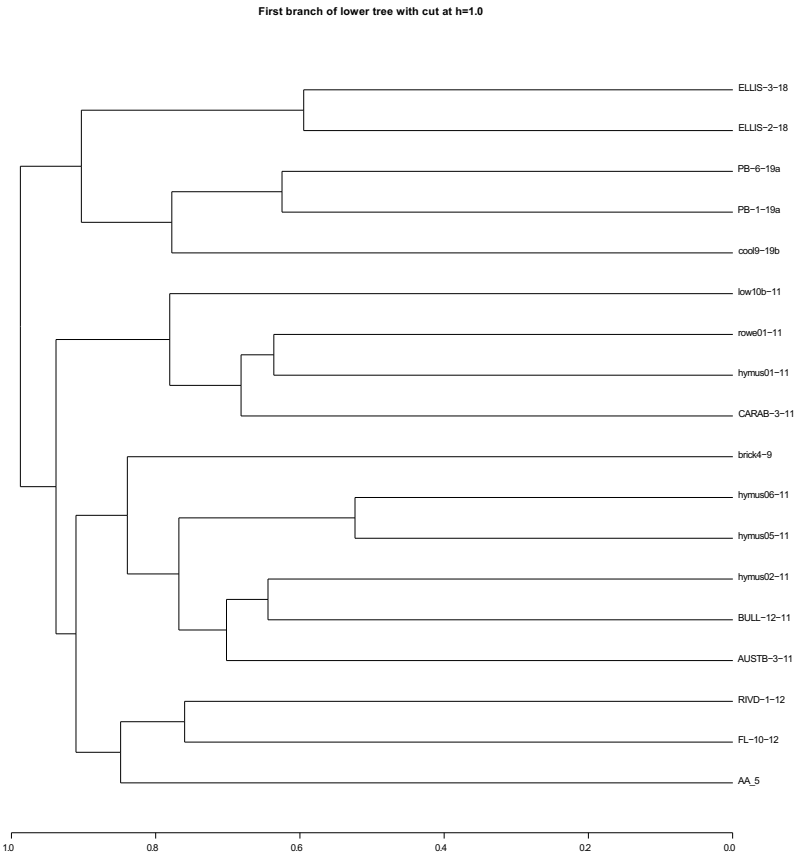

Figure 12: Partial dendrogram of Plot 5 assignment to the Swan Coastal Plain dataset.

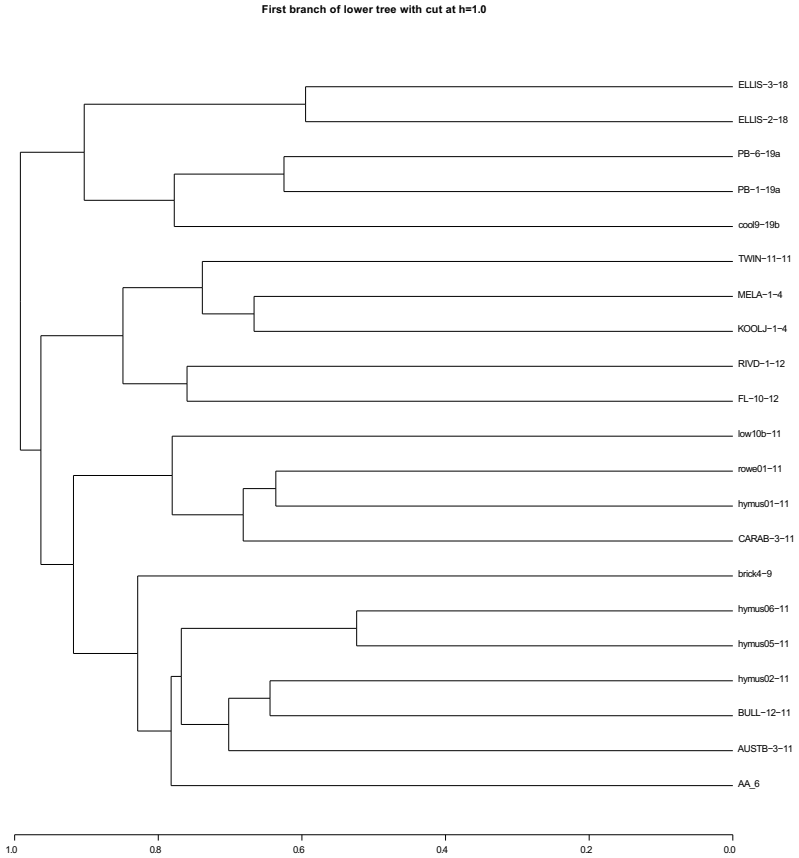

Figure 13: Partial dendrogram of Plot 6 assignment to the Swan Coastal Plain dataset.

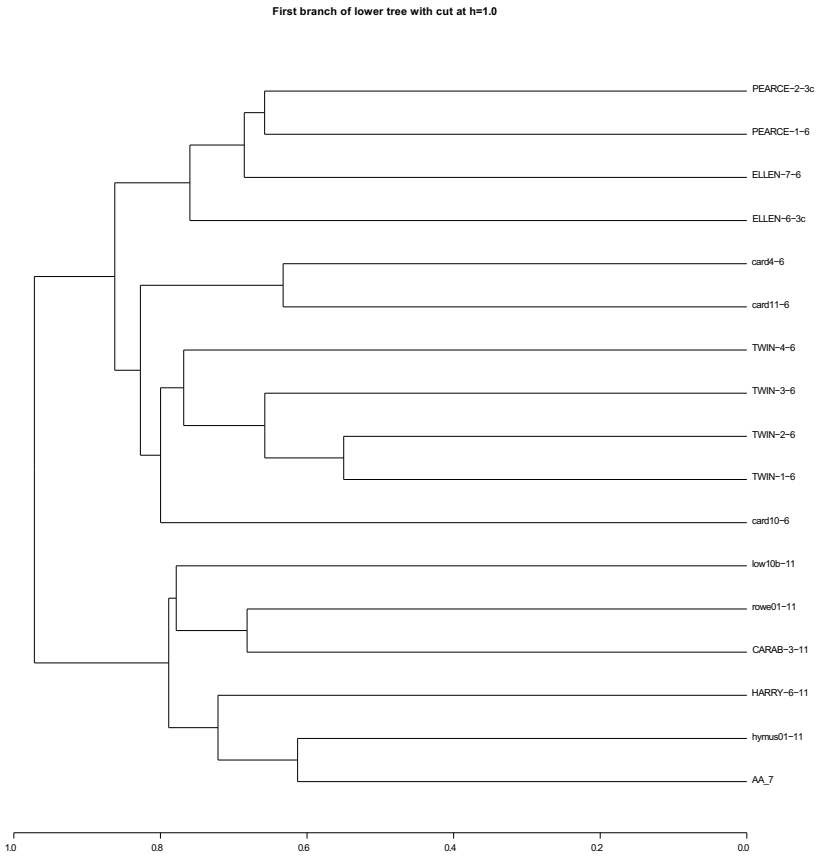

Figure 14: Partial dendrogram of Plot 7 assignment to the Swan Coastal Plain dataset.

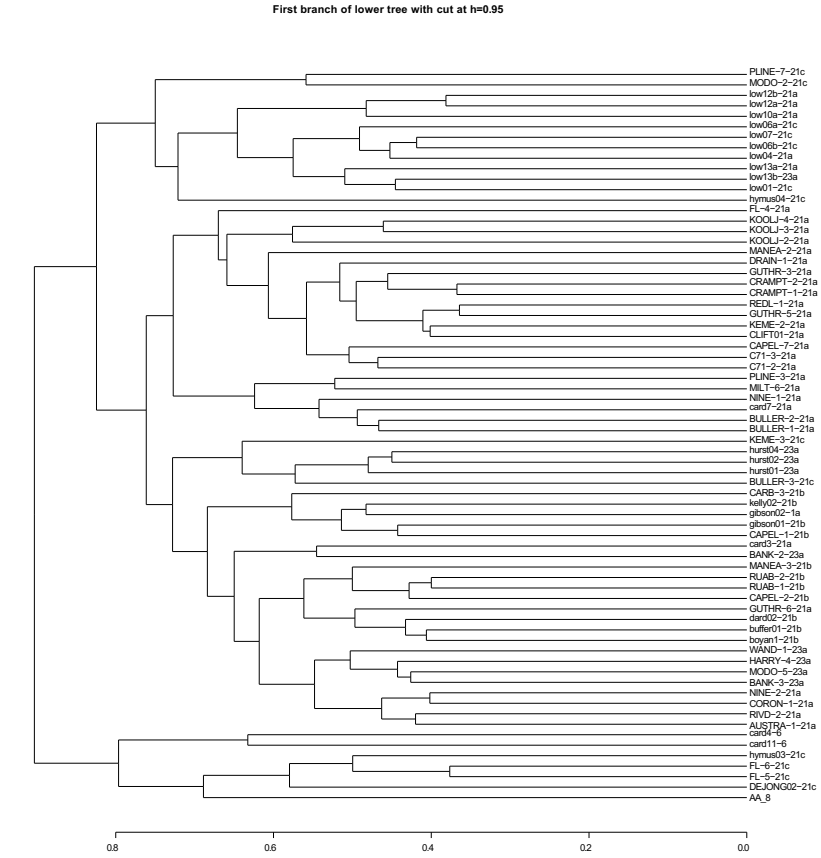

Figure 15: Partial dendrogram of Plot 8 assignment to the Swan Coastal Plain dataset.

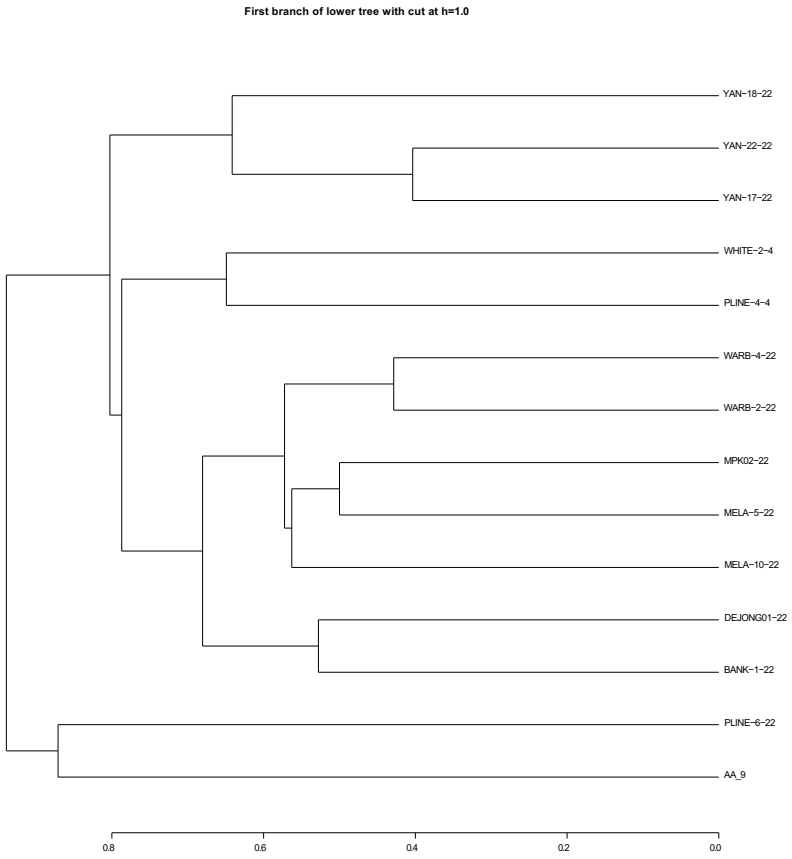

Figure 16: Partial dendrogram of Plot 9 assignment to the Swan Coastal Plain dataset.

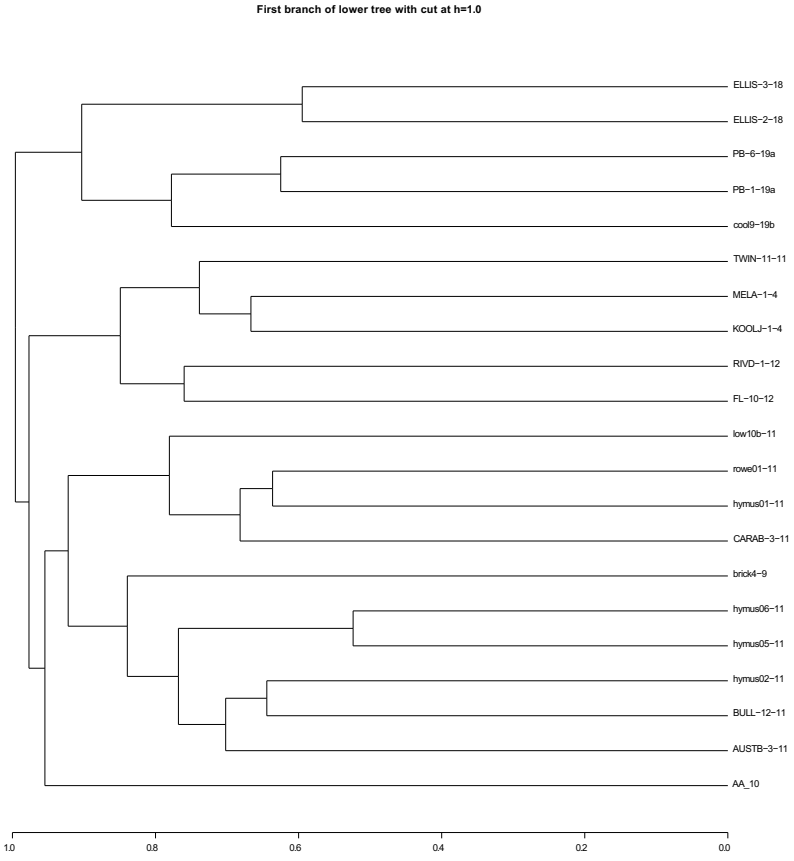

Figure 17: Partial dendrogram of Plot 10 assignment to the Swan Coastal Plain dataset.

Plates

Plate 1: View of sampling Plot 1: *Melaleuca preissiana – Kunzea glabrescens* Open Woodland in 'Completely Degraded' condition.

Plate 2: View of sampling Plot 2: *Banksia attenuata – Kunzea glabrescens* Open Woodland in 'Completely Degraded' condition.

Plate 3: View of sampling Plot 3: *Eucalyptus todtiana - Banksia attenuata – Banksia ilicifolia* Open Woodland in 'Degraded' condition.

Plate 4: View of sampling Plot 4: *Eucalyptus todtiana - Banksia attenuata – Banksia ilicifolia* Open Woodland in 'Degraded' condition.

Plate 5: View of sampling Plot 6: *Melaleuca rhaphiophylla* Open Forest in 'Completely Degraded' condition.

Plate 6: View of sampling Plot 7: *Melaleuca preissiana – Astartea scoparia* Open Forest in 'Completely Degraded' condition.

Plate 7: View of sampling Plot 8: *Banksia attenuata – Banksia ilicifolia* Open Woodland in 'Good' condition.

Plate 8: View of sampling Plot 9: *Banksia attenuata – Banksia ilicifolia* Open Woodland in 'Good' condition.

Plate 9: View of sampling Plot 5: *Eragrostis curvula* Tussock Grassland in 'Completely Degraded' condition.

Plate 10: View of sampling Plot 10: *Eragrostis curvula* Tussock Grassland in 'Completely Degraded' condition.

Appendix A

List of flora recorded within the survey area, including opportunistically observed taxa.

NB: * indicates introduced flora

Family	Taxon
Araceae	* *Zantedeschia aethiopica*
Orchidaceae	* *Disa bracteata* *Thelymitra mucida*
Iridaceae	* *Gladiolus caryophyllaceous* * *Moraea flaccida* *Patersonia occidentalis* * *Romulea rosea*
Xanthorrhoeaceae	*Xanthorrhoea brunonis*
Asparagaceae	* *Asparagus asparagoides* *Lomandra micrantha*
Haemodoraceae	*Conostylis aculeata* subsp. *aculeata*
Dasypogonaceae	*Dasypogon bromeliifolius*
Juncaceae	* *Juncus bufonius* *Juncus pallidus*
Cyperaceae	*Chaetospora curvifolia* *Eleocharis acuta* *Gahnia trifida* * *Ficinia marginata* *Lepidosperma longitudinale*
Anarthriaceae	*Lyginia barbata*
Centrolepidaceae	*Aphelia cyperoides*
Restionaceae	*Desmocladus flexuosus* *Dielsia stenostachya* *Hypolaena exsulca*
Poaceae	*Austrostipa flavescens* * *Avena barbata* * *Briza maxima* * *Briza minor* * *Bromus diandrus* * *Cynodon dactylon* * *Ehrharta calycina* * *Ehrharta longiflora* * *Eragrostis curvula* * *Holcus setiger* * *Hordeum leporinum* * *Lanatus ovatus* * *Lolium rigidum* * *Pennisetum clandestinum*

Family	Taxon
Poaceae	* *Phalaris aquatica*
	* *Poa annua*
	* *Vulpia bromoides*
Proteaceae	*Adenanthos cygnorum* subsp. *cygnorum*
	Banksia attenuata
	Banksia ilicifolia
	Banksia menziesii
	Stirlingia latifolia
Dilleniaceae	*Hibbertia subvaginata*
Crassulaceae	*Crassula colorata*
Fabaceae	*Acacia huegelii*
	* *Acacia longifolia* subsp. *longifolia*
	Acacia pulchella
	Acacia saligna
	Aotus gracillima
	Euchilopsis linearis
	Gompholobium tomentosum
	Jacksonia furcellata
	Jacksonia gracillima
	* *Lotus subbiflorus*
	* *Lupinus cosentinii*
	* *Medicago polymorpha*
	* *Ornithopus compressus*
	* *Trifolium campestre*
Moraceae	* *Ficus carica*
Casuarinaceae	*Allocasuarina fraseriana*
Geraniaceae	* *Erodium botrys*
	* *Pelargonium capitatum*
Lythraceae	* *Lythrum hyssopifolia*
Myrtaceae	*Astartea scoparia*
	Calytrix sp.
	Eucalyptus marginata
	Eucalyptus todtiana
	Hypocalymma angustifolium
	Kunzea glabrescens
	Melaleuca preissiana
	Melaleuca rhaphiophylla
	Scholtzia involucrata
Anacardiaceae	* *Schinus terebinthifolia*

Family	Taxon
Polygonaceae	* *Rumex crispus*
Aizoaceae	* *Carpobrotus edulis*
Primulaceae	* *Lysimachia arvensis*
Ericaceae	*Styphelia conostephioides*
Loganiaceae	*Phyllangium paradoxum*
Apocynaceae	* *Gomphocarpus fruticosus*
Boraginaceae	* *Echium plantagineum*
Solanaceae	* *Solanum nigrum*
Campanulaceae	* *Monopsis debilis* var. *depressa* * *Wahlenbergia capensis*
Stylidiaceae	*Stylidium repens*
Asteraceae	* *Arctotheca calendula* * *Cotula coronopifolia* * *Hypochaeris glabra* *Podotheca gnaphalioides* * *Sonchus oleraceus* * *Ursinia anthemoides*
Araliaceae	*Trachymene pilosa*

Appendix B

Site x species matrix of flora recorded within plots in the survey area.

Taxon	Plot 1	Plot 2	Plot 3	Plot 4	Plot 5	Plot 6	Plot 7	Plot 8	Plot 9	Plot 10
Acacia huegelii			0.2							
Acacia pulchella								0.3	0.2	
Acacia saligna				12						
Adenanthos cygnorum subsp. *cygnorum*								12	3	
Arctotheca calendula				0.1						
Asparagus asparagoides	0.3						0.2			
Astartea scoparia							35			
Austrostipa flavescens								0.1		
Banksia attenuata		10	30					20	8	
Banksia ilicifolia				5						
Banksia menziesii		4						10	5	
Briza maxima	0.2	1	1				0.2	1	0.1	
Briza minor		0.1	0.1							0.2
Calytrix sp.								1		
Carpobrotus edulis	0.1		0.1	0.1				0.1		0.2
Chaetospora curvifolia									0.1	
Conostylis aculeata subsp. *aculeata*								1	0.3	
Cotula coronopifolia						3				
Crassula colorata		0.1	0.1	0.1						
Desmocladus flexuosus								0.1		
Dielsia stenostachya							7			
Echium plantagineum										0.1
Ehrharta calycina		0.1	0.2	0.2				5	35	
Ehrharta longiflora	5		1	3			20			
Eragrostis curvula						0.1				40
Eucalyptus todtiana			4	20					15	
Gahnia trifida										1
Gladiolus caryophyllaceous	0.1									
Gomphocarpus fruticosus										
Gomphocarpus fruticosus										0.3
Gompholobium tomentosum									0.2	
Hibbertia subvaginata								0.3	0.1	
Hordeum leporinum						5				3
Hypochaeris glabra	3	4	2	0.5				0.5		
Hypolaena exsulca									0.3	
Isolepis marginata						1				
Jacksonia gracillima		1	0.3							
Kunzea glabrescens	30	30	8							
Lepidosperma longitudinale						0.1				
Lolium rigidum						10	1			0.1
Lomandra micrantha		0.2	0.2						0.1	
Lotus subbiflorus	0.3	0.1	1			3				1
Lyginia barbata		1								
Lysimachia arvensis							0.5			
Medicago polymorpha						0.1				
Melaleuca preissiana	10						40			
Melaleuca rhaphiophylla						50				
Moraea flaccida										0.3
Patersonia occidentalis	0.3		0.3							
Phyllangium paradoxum		0.1								
Poa annua								0.1	0.1	
Podotheca gnaphalioides								1		
Romulea rosea										5
Rumex crispus						0.1				
Schinus terebinthifolia							0.2			
Scholtzia involucrata									0.3	
Sonchus oleraceus			0.1	0.1		0.1	0.1	0.1		
Stirlingia latifolia								0.2		
Stylidium repens								0.2		
Styphelia conostephioides								0.3	0.3	
Trifolium campestre			0.1							
Ursinia anthemoides								1		
Vulpia bromoides	25	3					5			20
Wahlenbergia capensis									0.1	
Xanthorrhoea brunonis		2	3	1						
Zantedeschia aethiopica	0.3		0.1			50	1		0.3	

Appendix C

Sampling plot environmental data

Site Name	Latitude	Longitude	SiteType	Date	Plot Shape	Plot size ($m^{2)}$	Topography
Plot 1	-32.160438	115.914648	Quadrat	17/10/2023	Square	100	Closed Depression
Plot 2	-32.160224	115.914962	Quadrat	17/10/2023	Square	100	Flat
Plot 3	-32.159803	115.91517	Quadrat	17/10/2023	Square	100	Flat
Plot 4	-32.16011	115.915739	Quadrat	17/10/2023	Square	100	Flat
Plot 5	-32.161328	115.915092	Quadrat	17/10/2023	Square	100	Closed Depression
Plot 6	-32.160739	115.916667	Quadrat	18/10/2023	Square	100	Open Depression
Plot 7	-32.161945	115.917503	Quadrat	18/10/2023	Square	100	Open Depression
Plot 8	-32.162105	115.91851	Quadrat	18/10/2023	Square	100	Simple Slope
Plot 9	-32.162002	115.919254	Quadrat	18/10/2023	Square	100	Simple Slope
Plot 10	-32.161941	115.915257	Quadrat	18/10/2023	Square	100	Flat

Site Name	Relief	Slope (^{o})	Aspect	Soil Colour	Soil Depth (cm)	Texture	Fire Interval (yrs)
Plot 1	LP	0-5		Grey	0-50cm	CS	>10 years
Plot 2	LP	0-5		Grey	0-50cm	CS	>3 years
Plot 3	LP	0-5		Grey	0-50cm	CS	>10 years
Plot 4	LP	0-5		Grey	0-50cm	CS	>3 years
Plot 5	LP	0-5		Grey	0-50cm	CS	>3 years
Plot 6	LP	0-5		Grey	0-50cm	CS	>3 years
Plot 7	LP	0-5		Grey	0-50cm	CS	>3 years
Plot 8	LP	0-5	SW	Grey	0-50cm	CS	>3 years
Plot 9	LP	0-5	S	Grey	0-50cm	LS	>3 years
Plot 10	LP	0-5		Grey	0-50cm	LC	>3 years

Site Name	Gravel Cover (%)	Gravel Size (mm)	Outcrop %	Rock Type	Disturbance Level	Vegetation Condition
Plot 1	0				High	CD
Plot 2	0				High	CD
Plot 3	0				High	D
Plot 4	0				High	D
Plot 5	0				High	CD
Plot 6	0				High	CD
Plot 7	0				High	CD
Plot 8	0				Moderate	G
Plot 9	0				Moderate	G
Plot 10	0				High	CD

Site Name	Strata 1 Cover (%)	Strata 2 Cover (%)	Strata 3 Cover (%)	Strata 1 Structure	Strata 2 Structure	Strata 3 Structure	Strata 1 Dominants	Strata 2 Dominants	Strata 3 Dominants
Plot 1	30-70%	2-10%	30-70%	Trees <10m	Tussock grass	Tussock grass	*Melaleuca preissiana, Kunzea glabrescens*	*Ehrharta longiflora, Zantedeschia aethiopica, Gladiolus caryophyllaceous*	*Vulpia myuros, Lotus subbiflorus, Briza maxima*
Plot 2	70-100%	2-10%	2-10%	Trees <10m	Sedges	Tussock grass	*Banksia attenuata, Banksia menziesii, Kunzea glabrescens*	*Lyginia barbata, Xanthorrhoea preissii*	*Vulpia myuros, Hypochaeris glabra, Briza maxima*
Plot 3	30-70%	10-30%	10-30%	Trees <10m	Shrubs <1m	Tussock grass	*Banksia attenuata, Kunzea glabrescens, Eucalyptus todtiana*	*Xanthorrhoea brunonis, Acacia huegelii*	*Briza maxima, Ehrharta longiflora, Lotus subbiflorus*
Plot 4	30-70%	2-10%	2-10%	Trees <10m	Shrubs <1m	Tussock grass	*Eucalyptus todtiana, Banksia ilicifolia, Acacia saligna*	*Xanthorrhoea brunonis*	*Ehrharta longiflora*
Plot 5		2-10%	70-100%		Shrubs 1-2m	Tussock grass		*Melaleuca lateritia*	*Eragrostis curvula, Carpobrotus edulis, Lotus subbiflorus*
Plot 6	30-70%	30-70%	30-70%	Trees <10m	Herbs	Tussock grass	*Melaleuca rhaphiophylla*	*Zantedeschia aethiopica*	*Hordeum leporinum, Cotula coronopifolia, Lotus subbiflorus*
Plot 7	30-70%	30-70%	30-70%	Trees <10m	Shrubs 1-2m	Tussock grass	*Melaleuca preissiana*	*Astartea scoparia*	*Ehrharta longiflora, Vulpia bromoides*
Plot 8	10-30%	2-10%	10-30%	Trees <10m	Shrubs >2m	Herbs	*Banksia menziesii, Banksia attenuata*	*Adenanthos cygnorum*	*Podolepis gnaphaloides, Acacia pulchella, Conostylis aculeata*
Plot 9	30-70%	2-10%	10-30%	Trees <10m	Shrubs 1-2m	Tussock grass	*Banksia menziesii, Banksia attenuata, Eucalyptus todtiana*	*Adenanthos cygnorum, Styphelia tenuiflora*	*Ehrharta calycina, Conostylis aculeata,*
Plot 10		30-70%	30-70%		Tussock grass	Bunch grass		*Eragrostis curvula, Gahnia trifida*	*Vulpia bromoides, Hordeum leporinum, Lotus subbiflorus*

Appendix D

EPBC Protected Matters Search Results

Australian Government

Department of Climate Change, Energy, the Environment and Water

EPBC Act Protected Matters Report

This report provides general guidance on matters of national environmental significance and other matters protected by the EPBC Act in the area you have selected. Please see the caveat for interpretation of information provided here.

Report created: 29-Dec-2023

Summary

Matters of National Environment Significance

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

World Heritage Properties:	None
National Heritage Places:	None
Wetlands of International Importance (Ramsar	2
Great Barrier Reef Marine Park:	None
Commonwealth Marine Area:	None
Listed Threatened Ecological Communities:	7
Listed Threatened Species:	42
Listed Migratory Species:	22

Other Matters Protected by the EPBC Act

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

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

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

Commonwealth Lands:	52
Commonwealth Heritage Places:	None
Listed Marine Species:	29
Whales and Other Cetaceans:	None
Critical Habitats:	None
Commonwealth Reserves Terrestrial:	None
Australian Marine Parks:	None
Habitat Critical to the Survival of Marine Turtles:	None

Extra Information

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

State and Territory Reserves:	15
Regional Forest Agreements:	None
Nationally Important Wetlands:	4
EPBC Act Referrals:	106
Key Ecological Features (Marine):	None
Biologically Important Areas:	None
Bioregional Assessments:	None
Geological and Bioregional Assessments:	None

Details

Matters of National Environmental Significance

Wetlands of International Importance (Ramsar Wetlands) [Resource Information]

Ramsar Site Name	Proximity	Buffer Status
Forrestdale and thomsons lakes	Within Ramsar site	In feature area
Peel-yalgorup system	30 - 40km upstream from Ramsar site	In buffer area only

Listed Threatened Ecological Communities [Resource Information]

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

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

Community Name	Threatened Category	Presence Text	Buffer Status
Banksia Woodlands of the Swan Coastal Plain ecological community	Endangered	Community likely to occur within area	In feature area
Clay Pans of the Swan Coastal Plain	Critically Endangered	Community likely to occur within area	In buffer area only
Corymbia calophylla - Kingia australis woodlands on heavy soils of the Swan Coastal Plain	Endangered	Community known to occur within area	In buffer area only
Corymbia calophylla - Xanthorrhoea preissii woodlands and shrublands of the Swan Coastal Plain	Endangered	Community known to occur within area	In buffer area only
Empodisma peatlands of southwestern Australia	Endangered	Community may occur within area	In buffer area only
Honeymyrtle shrubland on limestone ridges of the Swan Coastal Plain Bioregion	Critically Endangered	Community may occur within area	In buffer area only
Tuart (Eucalyptus gomphocephala) Woodlands and Forests of the Swan Coastal Plain ecological community	Critically Endangered	Community likely to occur within area	In feature area

Listed Threatened Species [Resource Information]

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

Scientific Name	Threatened Category	Presence Text	Buffer Status
BIRD			

Scientific Name	Threatened Category	Presence Text	Buffer Status
Botaurus poiciloptilus Australasian Bittern [1001]	Endangered	Species or species habitat known to occur within area	In feature area
Calidris canutus Red Knot, Knot [855]	Endangered	Species or species habitat known to occur within area	In buffer area only
Calidris ferruginea Curlew Sandpiper [856]	Critically Endangered	Species or species habitat known to occur within area	In feature area
Calyptorhynchus banksii naso Forest Red-tailed Black-Cockatoo, Karrak [67034]	Vulnerable	Species or species habitat known to occur within area	In feature area
Charadrius leschenaultii Greater Sand Plover, Large Sand Plover [877]	Vulnerable	Species or species habitat known to occur within area	In feature area
Leipoa ocellata Malleefowl [934]	Vulnerable	Species or species habitat likely to occur within area	In feature area
Numenius madagascariensis Eastern Curlew, Far Eastern Curlew [847]	Critically Endangered	Species or species habitat likely to occur within area	In feature area
Rostratula australis Australian Painted Snipe [77037]	Endangered	Species or species habitat known to occur within area	In feature area
Sternula nereis nereis Australian Fairy Tern [82950]	Vulnerable	Species or species habitat known to occur within area	In buffer area only
Zanda baudinii listed as Calyptorhynchus baudinii Baudin's Cockatoo, Baudin's Black-Cockatoo, Long-billed Black-cockatoo [87736]	Endangered	Roosting known to occur within area	In feature area
Zanda latirostris listed as Calyptorhynchus latirostris Carnaby's Black Cockatoo, Short-billed Black-cockatoo [87737]	Endangered	Breeding known to occur within area	In feature area
INSECT			

Scientific Name	Threatened Category	Presence Text	Buffer Status
Leioproctus douglasiellus a short-tongued bee [66756]	Critically Endangered	Species or species habitat known to occur within area	In feature area
Neopasiphae simplicior A native bee [66821]	Critically Endangered	Species or species habitat known to occur within area	In feature area
MAMMAL			
Bettongia penicillata ogilbyi Woylie [66844]	Endangered	Species or species habitat likely to occur within area	In buffer area only
Dasyurus geoffroii Chuditch, Western Quoll [330]	Vulnerable	Species or species habitat known to occur within area	In feature area
Pseudocheirus occidentalis Western Ringtail Possum, Ngwayir, Womp, Woder, Ngoor, Ngoolangit [25911]	Critically Endangered	Species or species habitat likely to occur within area	In feature area
Setonix brachyurus Quokka [229]	Vulnerable	Species or species habitat likely to occur within area	In buffer area only
OTHER			
Westralunio carteri Carter's Freshwater Mussel, Freshwater Mussel [86266]	Vulnerable	Species or species habitat known to occur within area	In buffer area only
PLANT			
Andersonia gracilis Slender Andersonia [14470]	Endangered	Species or species habitat likely to occur within area	In feature area
Anthocercis gracilis Slender Tailflower [11103]	Vulnerable	Species or species habitat may occur within area	In buffer area only
Austrostipa jacobsiana [87809]	Critically Endangered	Species or species habitat known to occur within area	In buffer area only
Banksia mimica Summer Honeypot [82765]	Endangered	Species or species habitat may occur within area	In feature area

Scientific Name	Threatened Category	Presence Text	Buffer Status
Caladenia huegelii King Spider-orchid, Grand Spider-orchid, Rusty Spider-orchid [7309]	Endangered	Species or species habitat known to occur within area	In feature area
Calytrix breviseta subsp. breviseta Swamp Starflower [23879]	Endangered	Species or species habitat may occur within area	In buffer area only
Conospermum undulatum Wavy-leaved Smokebush [24435]	Vulnerable	Species or species habitat may occur within area	In buffer area only
Diuris drummondii Tall Donkey Orchid [4365]	Vulnerable	Species or species habitat known to occur within area	In feature area
Diuris micrantha Dwarf Bee-orchid [55082]	Vulnerable	Species or species habitat known to occur within area	In feature area
Diuris purdiei Purdie's Donkey-orchid [12950]	Endangered	Species or species habitat known to occur within area	In feature area
Drakaea elastica Glossy-leafed Hammer Orchid, Glossy-leaved Hammer Orchid, Warty Hammer Orchid [16753]	Endangered	Species or species habitat known to occur within area	In feature area
Drakaea micrantha Dwarf Hammer-orchid [56755]	Vulnerable	Species or species habitat known to occur within area	In feature area
Eleocharis keigheryi Keighery's Eleocharis [64893]	Vulnerable	Species or species habitat may occur within area	In buffer area only
Eremophila glabra subsp. chlorella [84927]	Endangered	Species or species habitat likely to occur within area	In buffer area only
Eucalyptus x balanites Cadda Road Mallee, Cadda Mallee [87816]	Endangered	Species or species habitat known to occur within area	In buffer area only

Scientific Name	Threatened Category	Presence Text	Buffer Status
Goodenia arthrotricha [12448]	Endangered	Species or species habitat likely to occur within area	In buffer area only
Grevillea curviloba subsp. incurva Narrow curved-leaf Grevillea [64909]	Endangered	Species or species habitat may occur within area	In buffer area only
Lepidosperma rostratum Beaked Lepidosperma [14152]	Endangered	Species or species habitat known to occur within area	In feature area
Macarthuria keigheryi Keighery's Macarthuria [64930]	Endangered	Species or species habitat may occur within area	In buffer area only
Synaphea sp. Fairbridge Farm (D.Papenfus 696) Selena's Synaphea [82881]	Critically Endangered	Species or species habitat likely to occur within area	In feature area
Synaphea sp. Pinjarra Plain (A.S.George 17182) [86878]	Endangered	Species or species habitat likely to occur within area	In buffer area only
Synaphea sp. Serpentine (G.R.Brand 103) [86879]	Critically Endangered	Species or species habitat known to occur within area	In feature area
Thelymitra stellata Star Sun-orchid [7060]	Endangered	Species or species habitat likely to occur within area	In buffer area only
SHARK			
Pristis pristis Freshwater Sawfish, Largetooth Sawfish, River Sawfish, Leichhardt's Sawfish, Northern Sawfish [60756]	Vulnerable	Species or species habitat may occur within area	In buffer area only

Listed Migratory Species [Resource Information]

Scientific Name	Threatened Category	Presence Text	Buffer Status
Migratory Marine Birds			
Apus pacificus Fork-tailed Swift [678]		Species or species habitat likely to occur within area	In feature area
Migratory Marine Species			

Scientific Name	Threatened Category	Presence Text	Buffer Status
Pristis pristis Freshwater Sawfish, Largetooth Sawfish, River Sawfish, Leichhardt's Sawfish, Northern Sawfish [60756]	Vulnerable	Species or species habitat may occur within area	In buffer area only
Migratory Terrestrial Species			
Motacilla cinerea Grey Wagtail [642]		Species or species habitat may occur within area	In feature area
Migratory Wetlands Species			
Actitis hypoleucos Common Sandpiper [59309]		Species or species habitat known to occur within area	In feature area
Calidris acuminata Sharp-tailed Sandpiper [874]		Roosting known to occur within area	In feature area
Calidris canutus Red Knot, Knot [855]	Endangered	Species or species habitat known to occur within area	In buffer area only
Calidris ferruginea Curlew Sandpiper [856]	Critically Endangered	Species or species habitat known to occur within area	In feature area
Calidris melanotos Pectoral Sandpiper [858]		Species or species habitat known to occur within area	In feature area
Calidris ruficollis Red-necked Stint [860]		Roosting known to occur within area	In buffer area only
Calidris subminuta Long-toed Stint [861]		Roosting known to occur within area	In buffer area only
Charadrius dubius Little Ringed Plover [896]		Roosting known to occur within area	In buffer area only
Charadrius leschenaultii Greater Sand Plover, Large Sand Plover [877]	Vulnerable	Species or species habitat known to occur within area	In feature area
Gallinago megala Swinhoe's Snipe [864]		Roosting likely to occur within area	In buffer area only

Scientific Name	Threatened Category	Presence Text	Buffer Status
Gallinago stenura Pin-tailed Snipe [841]		Roosting likely to occur within area	In buffer area only
Limosa limosa Black-tailed Godwit [845]		Roosting known to occur within area	In buffer area only
Numenius madagascariensis Eastern Curlew, Far Eastern Curlew [847]	Critically Endangered	Species or species habitat likely to occur within area	In feature area
Numenius minutus Little Curlew, Little Whimbrel [848]		Roosting likely to occur within area	In buffer area only
Pandion haliaetus Osprey [952]		Species or species habitat known to occur within area	In feature area
Philomachus pugnax Ruff (Reeve) [850]		Roosting known to occur within area	In buffer area only
Tringa glareola Wood Sandpiper [829]		Roosting known to occur within area	In buffer area only
Tringa nebularia Common Greenshank, Greenshank [832]		Species or species habitat known to occur within area	In feature area
Tringa stagnatilis Marsh Sandpiper, Little Greenshank [833]		Roosting known to occur within area	In buffer area only

Other Matters Protected by the EPBC Act

Commonwealth Lands [Resource Information]

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

Commonwealth Land Name	State	Buffer Status
Unknown		
Commonwealth Land - [50751]	WA	In buffer area only
Commonwealth Land - [50790]	WA	In buffer area only
Commonwealth Land - [50736]	WA	In buffer area only

Commonwealth Land Name	State	Buffer Status
Commonwealth Land - [51899]	WA	In buffer area only
Commonwealth Land - [51514]	WA	In buffer area only
Commonwealth Land - [50796]	WA	In buffer area only
Commonwealth Land - [50745]	WA	In buffer area only
Commonwealth Land - [50749]	WA	In buffer area only
Commonwealth Land - [50833]	WA	In buffer area only
Commonwealth Land - [50876]	WA	In buffer area only
Commonwealth Land - [51144]	WA	In buffer area only
Commonwealth Land - [50755]	WA	In buffer area only
Commonwealth Land - [50731]	WA	In buffer area only
Commonwealth Land - [51382]	WA	In buffer area only
Commonwealth Land - [50865]	WA	In buffer area only
Commonwealth Land - [50793]	WA	In buffer area only
Commonwealth Land - [50792]	WA	In buffer area only
Commonwealth Land - [50883]	WA	In buffer area only
Commonwealth Land - [50882]	WA	In buffer area only
Commonwealth Land - [50864]	WA	In buffer area only
Commonwealth Land - [50881]	WA	In buffer area only
Commonwealth Land - [50848]	WA	In buffer area only
Commonwealth Land - [50762]	WA	In buffer area only
Commonwealth Land - [51150]	WA	In buffer area only
Commonwealth Land - [51151]	WA	In buffer area only
Commonwealth Land - [51152]	WA	In buffer area only
Commonwealth Land - [51975]	WA	In buffer area only
Commonwealth Land - [50795]	WA	In buffer area only
Commonwealth Land - [50794]	WA	In buffer area only
Commonwealth Land - [50779]	WA	In buffer area only

Commonwealth Land Name	State	Buffer Status
Commonwealth Land - [50832]	WA	In buffer area only
Commonwealth Land - [51900]	WA	In buffer area only
Commonwealth Land - [51901]	WA	In buffer area only
Commonwealth Land - [51148]	WA	In buffer area only
Commonwealth Land - [51149]	WA	In buffer area only
Commonwealth Land - [50787]	WA	In buffer area only
Commonwealth Land - [50786]	WA	In buffer area only
Commonwealth Land - [50785]	WA	In buffer area only
Commonwealth Land - [50781]	WA	In buffer area only
Commonwealth Land - [50780]	WA	In buffer area only
Commonwealth Land - [50782]	WA	In buffer area only
Commonwealth Land - [50740]	WA	In buffer area only
Commonwealth Land - [51143]	WA	In buffer area only
Commonwealth Land - [50789]	WA	In buffer area only
Commonwealth Land - [50788]	WA	In buffer area only
Commonwealth Land - [51146]	WA	In buffer area only
Commonwealth Land - [51147]	WA	In buffer area only
Commonwealth Land - [50784]	WA	In buffer area only
Commonwealth Land - [51376]	WA	In buffer area only
Commonwealth Land - [50725]	WA	In buffer area only
Commonwealth Land - [51153]	WA	In buffer area only
Commonwealth Land - [50272]	WA	In buffer area only

Listed Marine Species			[Resource Information]
Scientific Name	Threatened Category	Presence Text	Buffer Status
Bird			
Actitis hypoleucos Common Sandpiper [59309]		Species or species habitat known to occur within area	In feature area

Scientific Name	Threatened Category	Presence Text	Buffer Status
Apus pacificus Fork-tailed Swift [678]		Species or species habitat likely to occur within area overfly marine area	In feature area
Bubulcus ibis as Ardea ibis Cattle Egret [66521]		Species or species habitat may occur within area overfly marine area	In feature area
Calidris acuminata Sharp-tailed Sandpiper [874]		Roosting known to occur within area	In feature area
Calidris canutus Red Knot, Knot [855]	Endangered	Species or species habitat known to occur within area overfly marine area	In buffer area only
Calidris ferruginea Curlew Sandpiper [856]	Critically Endangered	Species or species habitat known to occur within area overfly marine area	In feature area
Calidris melanotos Pectoral Sandpiper [858]		Species or species habitat known to occur within area overfly marine area	In feature area
Calidris ruficollis Red-necked Stint [860]		Roosting known to occur within area overfly marine area	In buffer area only
Calidris subminuta Long-toed Stint [861]		Roosting known to occur within area overfly marine area	In buffer area only
Charadrius dubius Little Ringed Plover [896]		Roosting known to occur within area overfly marine area	In buffer area only
Charadrius leschenaultii Greater Sand Plover, Large Sand Plover [877]	Vulnerable	Species or species habitat known to occur within area	In feature area

Scientific Name	Threatened Category	Presence Text	Buffer Status
Charadrius ruficapillus Red-capped Plover [881]		Roosting known to occur within area overfly marine area	In buffer area only
Gallinago megala Swinhoe's Snipe [864]		Roosting likely to occur within area overfly marine area	In buffer area only
Gallinago stenura Pin-tailed Snipe [841]		Roosting likely to occur within area overfly marine area	In buffer area only
Haliaeetus leucogaster White-bellied Sea-Eagle [943]		Species or species habitat known to occur within area overfly marine area	In feature area
Himantopus himantopus Pied Stilt, Black-winged Stilt [870]		Roosting known to occur within area overfly marine area	In buffer area only
Limosa limosa Black-tailed Godwit [845]		Roosting known to occur within area overfly marine area	In buffer area only
Merops ornatus Rainbow Bee-eater [670]		Species or species habitat may occur within area overfly marine area	In feature area
Motacilla cinerea Grey Wagtail [642]		Species or species habitat may occur within area overfly marine area	In feature area
Numenius madagascariensis Eastern Curlew, Far Eastern Curlew [847]	Critically Endangered	Species or species habitat likely to occur within area	In feature area
Numenius minutus Little Curlew, Little Whimbrel [848]		Roosting likely to occur within area overfly marine area	In buffer area only
Pandion haliaetus Osprey [952]		Species or species habitat known to occur within area	In feature area

Scientific Name	Threatened Category	Presence Text	Buffer Status
Philomachus pugnax Ruff (Reeve) [850]		Roosting known to occur within area overfly marine area	In buffer area only
Recurvirostra novaehollandiae Red-necked Avocet [871]		Roosting known to occur within area overfly marine area	In buffer area only
Rostratula australis as Rostratula benghalensis (sensu lato) Australian Painted Snipe [77037]	Endangered	Species or species habitat known to occur within area overfly marine area	In feature area
Thinornis cucullatus as Thinornis rubricollis Hooded Plover, Hooded Dotterel [87735]		Species or species habitat known to occur within area overfly marine area	In buffer area only
Tringa glareola Wood Sandpiper [829]		Roosting known to occur within area overfly marine area	In buffer area only
Tringa nebularia Common Greenshank, Greenshank [832]		Species or species habitat known to occur within area overfly marine area	In feature area
Tringa stagnatilis Marsh Sandpiper, Little Greenshank [833]		Roosting known to occur within area overfly marine area	In buffer area only

Extra Information

State and Territory Reserves			[Resource Information]
Protected Area Name	Reserve Type	State	Buffer Status
Balannup Lake	Nature Reserve	WA	In buffer area only
Banksia	Nature Reserve	WA	In buffer area only
Forrestdale Lake	Nature Reserve	WA	In buffer area only
Gibbs Road	Nature Reserve	WA	In feature area
Harry Waring Marsupial Reserve	Nature Reserve	WA	In buffer area only
Modong	Nature Reserve	WA	In buffer area only

Protected Area Name	Reserve Type	State	Buffer Status
Piara	Nature Reserve	WA	In buffer area only
Thomsons Lake	Nature Reserve	WA	In buffer area only
Unnamed WA42044	Nature Reserve	WA	In buffer area only
Unnamed WA48291	Conservation Park	WA	In buffer area only
Unnamed WA49299	Nature Reserve	WA	In buffer area only
Unnamed WA49561	Conservation Park	WA	In buffer area only
Unnamed WA53313	Conservation Park	WA	In buffer area only
Unnamed WA53649	Nature Reserve	WA	In buffer area only
Wandi	Nature Reserve	WA	In buffer area only

Nationally Important Wetlands [Resource Information]

Wetland Name	State	Buffer Status
Forrestdale Lake	WA	In buffer area only
Gibbs Road Swamp System	WA	In feature area
Spectacles Swamp	WA	In buffer area only
Thomsons Lake	WA	In buffer area only

EPBC Act Referrals [Resource Information]

Title of referral	Reference	Referral Outcome	Assessment Status	Buffer Status
119 Hammond Road Residential Development	2023/09541		Completed	In buffer area only
Cockburn Surf Park	2022/09267		Completed	In buffer area only
Jandakot Airport Expansion, Commercial Development and Clearing of Vegetation	2009/4796		Approval	In buffer area only
JANDAKOT EASTERN LINK ROAD	2022/09401		Completed	In buffer area only
Jandakot Horse Agistment	2022/09280		Assessment	In buffer area only
Kwinana Alumina Refinery ? Future Residue Storage Area	2023/09454		Referral Decision	In buffer area only
Lot 16 Barfield Road: Residential Development	2023/09450		Assessment	In buffer area only

Title of referral	Reference	Referral Outcome	Assessment Status	Buffer Status
Residential Development, Wattleup Road, Hammond Park, WA	2021/8933		Post-Approval	In buffer area only
Tree removal for road widening - Eighth Road, Armadale, WA	2023/09563		Completed	In buffer area only
Controlled action				
Alcoa Bauxite Residue Storage Area Extension	2011/5878	Controlled Action	Further Information Request	In buffer area only
Byford Rail Extension, Byford, WA	2020/8764	Controlled Action	Post-Approval	In buffer area only
Clearing of Lots 2 and 10 Rowley Road, Mandogalup WA	2018/8182	Controlled Action	Assessment Approach	In buffer area only
Development of Kwinana Quay port facility	2008/4387	Controlled Action	Completed	In buffer area only
Develop three sites into residential housing and mixed use developments, Western Australia	2013/6916	Controlled Action	Post-Approval	In buffer area only
Garden Street road extension, Huntingdale, city of Gosnells, WA	2016/7735	Controlled Action	Post-Approval	In buffer area only
Hammond Park Secondary School development, WA	2016/7741	Controlled Action	Post-Approval	In buffer area only
Honeywood Estate Development	2010/5476	Controlled Action	Post-Approval	In buffer area only
Keane Road Strategic Link, proposed construction central portion of Keane Road	2009/5035	Controlled Action	Completed	In buffer area only
Latitude 32-industrial development of various lots, Ashley and Sayer Roads, Hope Valley, WA	2016/7695	Controlled Action	Post-Approval	In buffer area only
Lots 13, 14 & 18 Barfield Rd & Lots 48-51 Rowley Rd, Hammond Park	2012/6524	Controlled Action	Post-Approval	In buffer area only
Mandogalup Urban Development, Mandogalup, WA	2014/7308	Controlled Action	Post-Approval	In buffer area only
Natural Gas Pipeline Expansion	2006/2813	Controlled Action	Post-Approval	In feature area
Ranford Road Residential Development	2002/549	Controlled Action	Post-Approval	In buffer area only
Residential development, Bertram, WA	2017/7887	Controlled Action	Further Information	In buffer area only

Title of referral	Reference	Referral Outcome	Assessment Status	Buffer Status
Controlled action				
			Request	
Residential Development, Lot 123 Mortimer Road, Casuarina, WA	2018/8379	Controlled Action	Assessment Approach	In buffer area only
Residential development and bushfire protection within part Lot 9006 Reilly Road, Harrisdale, WA	2016/7846	Controlled Action	Post-Approval	In buffer area only
Residential Development Lot 131 Jandakot Road, Treeby WA	2018/8205	Controlled Action	Further Information Request	In buffer area only
Residential development of various lots	2019/8500	Controlled Action	Proposed Decision	In buffer area only
Residential developmnt, Lots 11 and 74 Beenyup Road, Banjup, WA	2017/7923	Controlled Action	Post-Approval	In buffer area only
Residential Estate at Lot 1580 Warton Road, Southern River	2004/1471	Controlled Action	Post-Approval	In buffer area only
Residential Estate Development, Lot 682 Rowley Road, Mandogalup, Western Australia	2014/7126	Controlled Action	Post-Approval	In buffer area only
Roe Highway extension, Kwinana Freeway to Stock Road, WA	2009/5031	Controlled Action	Post-Approval	In buffer area only
Roe Hwy Extension	2003/972	Controlled Action	Post-Approval	In buffer area only
Thornlie-Cockburn Link Project, WA	2018/8188	Controlled Action	Post-Approval	In buffer area only
Tonkin Highway Extension ??? Thomas Road to South Western Highway	2019/8608	Controlled Action	Post-Approval	In buffer area only
Vegetation clearing (Cwlth land), Jandakot Airport, Cockburn, WA	2013/7032	Controlled Action	Post-Approval	In buffer area only
Not controlled action				
'Looping 10' gas transmission pipeline from Kwinana to Hopelands	2005/2212	Not Controlled Action	Completed	In buffer area only
Abernethy Road upgrade (Kardan, Tourmaline & Soldiers) Byford, WA	2015/7441	Not Controlled Action	Completed	In buffer area only
Armadale Road Duplication - Tapper to Anstey Road	2017/7972	Not Controlled Action	Completed	In buffer area only
Armadale Road to North Lake Road Bridge development, Jandakot, WA	2018/8284	Not Controlled Action	Completed	In buffer area only

Title of referral	Reference	Referral Outcome	Assessment Status	Buffer Status
Not controlled action				
Bushfire hazard reduction, Lot 37 Barfield Road, Hammond Park, WA	2018/8204	Not Controlled Action	Completed	In buffer area only
Calleya Residential Development, Banjup, WA	2016/7708	Not Controlled Action	Completed	In buffer area only
Clearing and development of 220 and 234 Wattleup Rd, Wattleup, WA	2016/7738	Not Controlled Action	Completed	In buffer area only
Clearing of Native Vegetation, Hammond Park, WA	2011/6041	Not Controlled Action	Completed	In buffer area only
Commercial development of Lot 106 Wright Road, Forrestdale WA	2003/1255	Not Controlled Action	Completed	In buffer area only
Construction of Hammond Road Primary School, Hammond Park, WA	2012/6619	Not Controlled Action	Completed	In buffer area only
Construction of international rowing course and commercial/residential areas	2003/1034	Not Controlled Action	Completed	In feature area
Denny Avenue Level Crossing Removal, Kelmscott WA	2018/8377	Not Controlled Action	Completed	In buffer area only
Development of Lots 100-101 Sayer Road, Hope Valley, WA	2019/8399	Not Controlled Action	Completed	In buffer area only
Eighth Road and Forrest Road Upgrade, Armadale, WA	2019/8538	Not Controlled Action	Completed	In buffer area only
Eradication of the European House Borer, Perth metropolitan area, WA	2009/5027	Not Controlled Action	Completed	In buffer area only
Frankland Parks Oval project, Hammond Park, WA	2018/8369	Not Controlled Action	Completed	In buffer area only
Gas-fired Power Station	2005/2213	Not Controlled Action	Completed	In buffer area only
Grazing of stock and associated works on Lot 1790 Passmore Street, Southern River Western Australia	2018/8176	Not Controlled Action	Completed	In buffer area only
Hammond West Urban Development, Hammond Park, WA	2017/7917	Not Controlled Action	Completed	In buffer area only
Hazard reduction and site access, Lot 682 Rowley Road, Mandogalup, WA	2018/8186	Not Controlled Action	Completed	In buffer area only
Hope Valley-Wattleup Redevelopment Project	2020/8644	Not Controlled Action	Completed	In buffer area only

Title of referral	Reference	Referral Outcome	Assessment Status	Buffer Status
Not controlled action				
Improving rabbit biocontrol: releasing another strain of RHDV, sthrn two thirds of Australia	2015/7522	Not Controlled Action	Completed	In feature area
INDIGO Central Submarine Telecommunications Cable	2017/8127	Not Controlled Action	Completed	In feature area
Industrial development 105 Sayer Road, Hope Valley, WA	2014/7261	Not Controlled Action	Completed	In buffer area only
Industrial Development Lot 64 Ashley Road, Hope Valley, WA	2014/7238	Not Controlled Action	Completed	In buffer area only
Jandakot Road Widening, Solomon Road to Berrigan Drive, Jandakot, WA	2020/8728	Not Controlled Action	Completed	In buffer area only
Kwinana Fwy southbound widening Roe Hwy to Armadale Rd and construction of farrington Rd off-ramp	2013/7062	Not Controlled Action	Completed	In buffer area only
Kwinana Gas-Fired Power Station	2005/2101	Not Controlled Action	Completed	In buffer area only
Lot 28 157 Barfield Road, Hammond Park - Proposed Residential Development	2021/9063	Not Controlled Action	Completed	In buffer area only
Lot 29 Barfield Road, Hammond Park	2017/7948	Not Controlled Action	Completed	In buffer area only
Lot 2 Nicholson Road, Forrestdale	2012/6561	Not Controlled Action	Completed	In feature area
Lots 12, 13 and 18 Hammond Road, Lot 80 Beeliar Drive and Lot 500 Hird Road	2012/6576	Not Controlled Action	Completed	In buffer area only
Oakford Village development, Shire of Serpentine-Jarrahdale, WA	2018/8157	Not Controlled Action	Completed	In buffer area only
Perth Seawater Desalination Project: Thomsons Lake to Kogolup Pipeline	2005/1971	Not Controlled Action	Completed	In feature area
Residential Development, Hilbert	2020/8675	Not Controlled Action	Completed	In buffer area only
Residential Development, Lot 12 Lyon Road, Aubin Grove, WA	2013/6852	Not Controlled Action	Completed	In buffer area only
Residential development, Lot 13 Lyon Road, Aubin Grove, WA	2014/7151	Not Controlled Action	Completed	In buffer area only
Residential development, Lot 33 Barfield Road, Hammond Park, WA	2015/7548	Not Controlled Action	Completed	In buffer area only

Title of referral	Reference	Referral Outcome	Assessment Status	Buffer Status
Not controlled action				
Residential development, Lot 74 Wattleup Road, Hammond Park, WA	2018/8273	Not Controlled Action	Completed	In buffer area only
Residential development, Lots 124 and 125, Wattleup Road, Hammond Park, WA	2015/7519	Not Controlled Action	Completed	In buffer area only
Residential development, Lots 1 and 7-11 Lyon Rd and Lot 88 De Haer Rd, Wandi, WA	2017/7908	Not Controlled Action	Completed	In buffer area only
Residential development of Lot 7 Anketell Rd, Anketell, WA	2018/8281	Not Controlled Action	Completed	In buffer area only
Residential Development of Lots 76 and 107 Wattleup Road, Hamond Park	2020/8865	Not Controlled Action	Completed	In buffer area only
Residential Development Various Lots Doley Road, Orton Road and Lawrence Way, Beenyup Grove Byford,	2020/8779	Not Controlled Action	Completed	In buffer area only
Residential estate, multiple lots, Mandogalup, WA	2018/8264	Not Controlled Action	Completed	In buffer area only
Road widening - Eighth Road Armadale between Gribble Avenue and Armadale Road	2021/8964	Not Controlled Action	Completed	In buffer area only
Roe Highway - Karel Avenue to Hope Road Bridge Project	2005/2061	Not Controlled Action	Completed	In buffer area only
Sand extraction operation, Lot 1 Thomas Road, Oakford, WA	2017/8136	Not Controlled Action	Completed	In buffer area only
Southern River Mixed Business Precinct F, City of Gosnells, WA	2013/6813	Not Controlled Action	Completed	In buffer area only
Southern River Precinct 3E	2017/7900	Not Controlled Action	Completed	In buffer area only
Stages 2-5 of primary school and assoc facilities development, Hammond Park, WA	2015/7407	Not Controlled Action	Completed	In buffer area only
Subdivision, Lot 4 Anketell Road, Anketell, WA	2018/8145	Not Controlled Action	Completed	In buffer area only
Tonkin Highway Extension	2001/470	Not Controlled Action	Completed	In buffer area only
Translocation of orchids (Caladenia huegelii) from Roe Hway Reserve	2002/781	Not Controlled Action	Completed	In buffer area only

Title of referral	Reference	Referral Outcome	Assessment Status	Buffer Status
Not controlled action				
Undertake a Controlled Fuel Reduction Burn	2008/4262	Not Controlled Action	Completed	In buffer area only
Urban development, Lot 109 Wattleup Road, Hammond Park, WA	2015/7425	Not Controlled Action	Completed	In buffer area only
Urban development Lots 3, 1199 and 650 Thomas Road, Casuarina, WA	2016/7659	Not Controlled Action	Completed	In buffer area only
Urban development of Lot 107 Wattleup Road, Hammond Park, WA	2017/7890	Not Controlled Action	Completed	In buffer area only
Urban development of Lots 9049 and 9063, The Glades, Byford, WA	2015/7607	Not Controlled Action	Completed	In buffer area only
Urban developmnet & associated infrastructure, Lot 4 Armadale Road, Banjup WA	2013/7049	Not Controlled Action	Completed	In buffer area only
Wandi South residential development Kenby Close & Lyon Rd, Wandi, WA	2014/7198	Not Controlled Action	Completed	In buffer area only
Wentworth West residential development, Bartram Road, Success, WA	2014/7245	Not Controlled Action	Completed	In buffer area only
Wungong Transfer Mains Project	2007/3532	Not Controlled Action	Completed	In buffer area only
Not controlled action (particular manner)				
City of Cockburn Sporting Facilties	2005/2139	Not Controlled Action (Particular Manner)	Post-Approval	In feature area
INDIGO Marine Cable Route Survey (INDIGO)	2017/7996	Not Controlled Action (Particular Manner)	Post-Approval	In feature area
Residential Subdivision on Abernethy Road, Byford	2009/4767	Not Controlled Action (Particular Manner)	Post-Approval	In buffer area only
South West Metropolitan Railway Project	2003/1175	Not Controlled Action (Particular Manner)	Post-Approval	In buffer area only
Referral decision				
AIC Forrestdale Campus, Educational Establishment	2021/9134	Referral Decision	Referral Publication	In buffer area only

Title of referral	Reference	Referral Outcome	Assessment Status	Buffer Status
Referral decision				
Residential Development Doley Road, Orton Road and Lawrence Way	2020/8679	Referral Decision	Completed	In buffer area only
Rezoning of Crown Reserve 39181 to facilitate future residential development	2005/2096	Referral Decision	Completed	In buffer area only

Caveat

1 PURPOSE

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

The report contains the mapped locations of:

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

2 DISCLAIMER

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

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

3 DATA SOURCES

Threatened ecological communities

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

Threatened, migratory and marine species

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

Where little information is available for a species or large number of maps are required in a short time-frame, maps are derived either from 0.04 or 0.02 decimal degree cells; by an automated process using polygon capture techniques (static two kilometre grid cells, alpha-hull and convex hull); or captured manually or by using topographic features (national park boundaries, islands, etc.).

In the early stages of the distribution mapping process (1999-early 2000s) distributions were defined by degree blocks, 100K or 250K map sheets to rapidly create distribution maps. More detailed distribution mapping methods are used to update these distributions

4 LIMITATIONS

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

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

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

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

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

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

Acknowledgements

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

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

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

Please feel free to provide feedback via the Contact us page.

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Appendix E

Definitions of Threatened and Priority Flora and Communities

Conservation Codes for Western Australian Flora and Fauna

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

T Threatened species – Schedules 1-4

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

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

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

CR Critically endangered species

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

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

EN Endangered species

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

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

VU Vulnerable species

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

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

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

EX Presumed extinct species

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

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

EW Extinct in the wild species

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

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

Specially protected species

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

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

MI Migratory species

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

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

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

CD Species of special conservation interest (conservation dependent fauna)

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

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

OS Other specially protected species

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

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

P Priority species

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

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

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

Priority 1: Poorly-known species

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

Priority 2: Poorly-known species

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

Priority 3: Poorly-known species

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

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

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

(b) Near Threatened. Species that are considered to have been adequately surveyed and that are close to qualifying for vulnerable but are not listed as Conservation Dependent.

(c) Species that have been removed from the list of threatened species during the past five years for reasons other than taxonomy.

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

Western Australian Ecological Communities

Threatened Ecological Communities

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

Presumed Totally Destroyed (PD)

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

Critically Endangered (CR)

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

Endangered (EN)

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

Vulnerable (VU)

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

Priority Ecological Communities

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

Priority One: Poorly-known ecological communities

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

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

Priority Two: Poorly-known ecological communities

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

Priority Three: Poorly known ecological communities

(i) Communities that are known from several to many occurrences, a significant number or area of which are not under threat of habitat destruction or degradation or:

(ii) communities known from a few widespread occurrences, which are either large or with significant remaining areas of habitat in which other occurrences may occur, much of it not under imminent threat (within approximately 10 years), or;

(iii) munities made up of large, and/or widespread occurrences, that may or may not be represented in the reserve system, but are under threat of modification across much of their range from processes such as grazing by domestic and/or feral stock, inappropriate fire regimes, clearing, hydrological change etc.

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

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

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

(ii) Near Threatened. Ecological communities that are considered to have been adequately surveyed and that do not qualify for Conservation Dependent, but that are close to qualifying for a higher threat category.

(iii) Ecological communities that have been removed from the list of threatened communities during the past five years.

Priority Five: Conservation Dependent ecological communities

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

Commonwealth of Australia Conservation Codes

Threatened Flora and Fauna

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

Extinct

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

Extinct in the wild

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

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

Critically endangered

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

Endangered

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

Vulnerable

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

Conservation dependent

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

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

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

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

Threatened Ecological Communities

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

Critically endangered

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

Endangered

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

Vulnerable

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

Categories of Threatened Species pursuant to the Environment Protection and Biodiversity Conservation Act 1999

EPBC Act Category	Department of Environment and Energy Definition
Extinct	A native species is eligible to be included in the extinct category at a particular time if, at that time, there is no reasonable doubt that the last member of the species has died.
Extinct in the wild	A native species is eligible to be included in the extinct in the wild category at a particular time if, at that time: (a) it is known only to survive in cultivation, in captivity or as a naturalised population well outside its past range; or (b) it has not been recorded in its known and/or expected habitat, at appropriate seasons, anywhere in its past range, despite exhaustive surveys over a time frame appropriate to its life cycle and form.
Critically endangered	A native species is eligible to be included in the critically endangered category at a particular time if, at that time, it is facing an extremely high risk of extinction in the wild in the immediate future, as determined in accordance with the prescribed criteria.
Endangered	A native species is eligible to be included in the endangered category at a particular time if, at that time (a) it is not critically endangered; and (b) it is facing a very high risk of extinction in the wild in the near future, as determined in accordance with the prescribed criteria.
Vulnerable	A native species is eligible to be included in the vulnerable category at a particular time if, at that time: (a) it is not critically endangered or endangered; and (b) it is facing a high risk of extinction in the wild in the medium term future, as determined in accordance with the prescribed criteria.
Conservation dependent	A native species is eligible to be included in the conservation dependent category at a particular time if, at that time: (a) the species is the focus of a specific conservation program the cessation of which would result in the species becoming vulnerable, endangered or critically endangered; or (b) the following subparagraphs are satisfied: (i) the species is a species of fish; (ii) the species is the focus of a plan of management that provides for management actions necessary to stop the decline of, and support the recovery of, the species so that its chances of long term survival in nature are maximised; (iii) the plan of management is in force under a law of the Commonwealth or of a State or Territory; (iv) cessation of the plan of management would adversely affect the conservation status of the species.

CONSERVATION CATEGORY DEFINITIONS

for Western Australian Ecological Communities

GENERAL DEFINITIONS

An **ecological community** is a naturally occurring assemblage of organisms that occurs in a particular habitat, as defined in the *Biodiversity Conservation Act 2016* (BC Act). Ecological communities may comprise various life forms including plants, animals and microorganisms.

Note: The scale at which ecological communities are defined will often depend on the level of detail in the information source, therefore no particular scale is specified.

A **threatened ecological community** (TEC) means an ecological community that is listed under section 27(1) of the BC Act as a critically endangered, endangered or vulnerable ecological community, or is a rediscovered ecological community to be regarded as a threatened ecological community under section 33 of the BC Act.

An **assemblage** is a defined group of biological entities.

Habitat, as defined in the BC Act, means the biophysical medium or media —

a) occupied (continuously, periodically or occasionally) by an organism or group of organisms, or
b) once occupied (continuously, periodically or occasionally) by an organism, or group of organisms, and into which organisms of that kind have the potential to be reintroduced.

An **occurrence** is a discrete example of an ecological community, separated from other examples of the same community by more than 20 metres with, for example: a different ecological community, a sealed road, a building, a water body (for terrestrial communities), or a terrestrial body (for aquatic communities). There is no minimum size of an occurrence of a threatened or priority ecological community. By ensuring that every discrete occurrence is recognised and recorded, future changes in status can be readily monitored.

Adequately surveyed is defined as an ecological community that has been searched for thoroughly in most likely habitats, by relevant experts.

Community structure is defined as the spatial organisation, construction and arrangement of the biological elements comprising a biological assemblage. For example, the vegetation structure (e.g., *Eucalyptus salmonophloia* woodland over scattered small shrubs over dense herbs) or the trophic structure in a faunal assemblage (e.g., dominance by feeders on detritus as distinct from feeders on live plants).

To **modify** an occurrence of an ecological community, as defined in section 44 of the BC Act, means to take action that results in —

(a) the modification of the occurrence of the threatened ecological community to such an extent that the occurrence is unlikely to recover —
    (i) its species composition or structure; or
    (ii) its species composition and structure; or
(b) the destruction of the occurrence of the threatened ecological community.

Destruction of an occurrence of an ecological community means modification such that reestablishment of ecological processes, species composition or community structure within the range of variability exhibited by the original community is unlikely within the foreseeable future even with positive human intervention.

Modification and destruction are difficult concepts to quantify, and their application will be determined by scientific judgement. Refer to the document Guidance note – Modification of an occurrence of a threatened ecological community for more information on what constitutes modification and how to determine whether an action is likely to modify an occurrence of a threatened ecological community.

Threatening process means a process that threatens, or may threaten, the survival, abundance or evolutionary development of a native species or ecological community, as defined under the BC Act. Examples of some of the continuing threatening processes in Western Australia include: vegetation clearance; competition and land degradation by introduced fauna; dieback caused by the root-rot fungus (*Phytophthora cinnamomi*); competition and displacement of native plants by introduced flora; hydrological changes (declining groundwater levels); drying climate, fire regimes that cause declines in biodiversity; direct human exploitation and disturbance of ecological communities.

Restoration is defined as returning an ecological community to its pre-disturbance or natural state in terms of abiotic conditions, community structure and species composition.

Rehabilitation is defined as the re-establishment of ecological attributes in a damaged ecological community although the community will remain modified.

LISTED ECOLOGICAL COMMUNITIES

Assessment of the conservation status of ecological communities is carried out in accordance with the BC Act listing criteria and the requirements of Ministerial Guideline Number 1 and Ministerial Guideline Number 4 that adopt the use of the International Union for Conservation of Nature (IUCN) Red List of Ecosystems Categories and Criteria.

CO Collapsed ecological communities

An ecological community listed by order of the Minister as collapsed under section 31(1) of the BC Act. As determined by criteria set out in section 32 of the BC Act, an ecological community is eligible for listing as a collapsed ecological community at a particular time if, at that time —

(a) there is no reasonable doubt that the last occurrence of the ecological community has collapsed; or
(b) the ecological community has been so extensively modified throughout its range that no occurrence of it is likely to recover —
    (i) its species composition or structure; or
    (ii) its species composition and structure.

CR Critically endangered ecological communities

A threatened ecological community listed in the category of critically endangered under section 27(1)(a) of the BC Act, as determined by criteria set out in section 28 of the BC Act and the ministerial guidelines. A critically endangered ecological community faces an extremely high risk of becoming eligible for listing as a collapsed ecological community in the immediate future, as determined in accordance with criteria set out in the ministerial guidelines.

Examples of use:

- 'Assemblages of the organic springs and mound springs of the Mandora Marsh area' is listed as a critically endangered threatened ecological community under the *Biodiversity Conservation Act 2016.*
- 'Assemblages of the organic springs and mound springs of the Mandora Marsh area' is listed as critically endangered under the *Biodiversity Conservation Act 2016.*
- Listing reference in a table – column heading: BC Act; row text: CR.

EN Endangered ecological communities

A threatened ecological community listed in the category of endangered ecological community under section 27(1)(b) of the BC Act, as determined by criteria set out in section 29 of the BC Act and the ministerial guidelines. A threatened ecological community faces a very high risk of becoming eligible for listing as a collapsed ecological community in the near future, as determined in accordance with criteria set out in the ministerial guidelines.

Examples of use:

- 'Herb rich shrublands in clay pans (floristic community type 8 as originally described in Gibson *et al*. (1994))' is listed as an endangered threatened ecological community under the *Biodiversity Conservation Act 2016.*
- 'Herb rich shrublands in clay pans (floristic community type 8 as originally described in Gibson et al. (1994))' is listed as endangered under the *Biodiversity Conservation Act 2016.*
- Listing reference in a table – column heading: BC Act; row text: EN.

VU Vulnerable ecological communities

A threatened ecological community listed in the category of vulnerable ecological community under section 27(1)(c) of the BC Act, as determined by criteria set out in section 30 of the BC Act and the ministerial guidelines. A vulnerable ecological community faces a high risk of becoming eligible for listing as a collapsed ecological community in the medium-term future, as determined in accordance with criteria set out in the ministerial guidelines.

Examples of use:

- '*Calothamnus graniticus* subsp. *graniticus* heaths on south west coastal granites' is listed as a vulnerable threatened ecological community under the *Biodiversity Conservation Act 2016.*
- '*Calothamnus graniticus* subsp. *graniticus* heaths on south west coastal granites' is listed as vulnerable under the *Biodiversity Conservation Act 2016.*
- Listing reference in a table – column heading: BC Act; row text: VU.

PRIORITY ECOLOGICAL COMMUNITIES

Priority is not a listing category under the BC Act. The Priority Ecological Communities list is maintained by the department and is published on the department's website.

All fauna and flora that may be present in an ecological community are protected in WA following the provisions in Part 10 of the BC Act. The protection applies even when these species occur in an ecological community that is not listed as threatened, and regardless of land tenure (State managed land (Crown land), private land, or Commonwealth land).

Possible threatened ecological communities that do not meet survey criteria or are not adequately defined to enable listing are added to the department's Priority Ecological Communities for Western Australia list under priority 1, 2 or 3. Ecological communities that are adequately known and not threatened but rare, near threatened, or have recently been removed from the threatened list are placed in priority 4. Conservation dependent ecological communities are placed in priority 5.

P1 Priority 1: Poorly known ecological communities – very few occurrences, very restricted distribution

Ecological communities that are known from very few occurrences with a very restricted distribution (generally ≤5 occurrences or a total area of ≤100ha). Occurrences are believed to be under threat either due to limited extent, or being on lands under immediate threat (e.g., within agricultural or pastoral lands, urban areas, active mineral leases) or for which current threats exist. May include communities with occurrences on protected lands. Communities may be included if they are comparatively well-known from one or more localities but do not meet adequacy of survey requirements, and/or are not well defined, and appear to be under immediate threat from known threatening processes across their range.

Examples of use:

- 'Banded Ironstone Hills with *Dryandra arborea*' is listed as a Priority 1 ecological community by the Department of Biodiversity, Conservation and Attractions.
- 'Banded Ironstone Hills with *Dryandra arborea*' is listed as Priority 1 on the DBCA Priority Ecological Communities List.
- Listing reference in a table – column heading: DBCA; row text: P1.

P2 Priority 2: Poorly known ecological communities – few occurrences, restricted distribution

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

Examples of use:

- 'Aquatic invertebrate communities of peat swamps' is listed as a Priority 2 ecological community by the Department of Biodiversity, Conservation and Attractions.
- 'Aquatic invertebrate communities of peat swamps' is listed as Priority 2 on the DBCA Priority Ecological Communities List.
- Listing reference in a table – column heading: DBCA; row text: P2.

P3 Priority 3: Poorly known ecological communities – inadequately surveyed or not well defined

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

(i) Communities that are known from several to many occurrences, a significant number or area of which are not under threat of habitat destruction or degradation.

(ii) Communities known from a few widespread occurrences, which are either large or with significant remaining areas of habitat in which other occurrences may occur, much of it not under imminent threat (within approximately 10 years).

(iii) Communities made up of large, and/or widespread occurrences, that may or may not be represented in the reserve system, but are under threat of modification across much of their range from processes such as grazing by domestic and/or feral stock, inappropriate fire regimes, clearing, hydrological change, etc.

Examples of use:

- 'Assemblages of gypsum dunes of the central and southern wheatbelt' is listed as a Priority 3(iii) ecological community by the Department of Biodiversity, Conservation and Attractions.
- 'Assemblages of gypsum dunes of the central and southern wheatbelt' is listed as Priority 3(iii) on the DBCA Priority Ecological Communities List.
- Listing reference in a table – column heading: DBCA; row text: P3(iii).

P4 Priority 4: Adequately known ecological communities – rare, near threatened, or recently removed from the threatened list

Ecological communities that are adequately known and either rare but not threatened, near threatened, or have recently been removed from the threatened list. These communities require regular monitoring.

(i) Rare: ecological communities known from few occurrences that are considered to have been adequately surveyed, or for which sufficient knowledge is available, and that are considered not currently threatened or in need of special protection, but could be if present circumstances change. These communities are usually represented on conservation lands.

(ii) Near threatened: ecological communities that are considered to have been adequately surveyed and that do not qualify as conservation dependent, but that are close to qualifying for a higher threat category.

(iii) Ecological communities that have been removed from the list of threatened communities during the past five years.

Examples of use:

- 'Nimalaica (Nimalarragun) claypan and associated wetland assemblages' is listed as a Priority 4(ii) ecological community by the Department of Biodiversity, Conservation and Attractions.
- 'Nimalaica (Nimalarragun) claypan and associated wetland assemblages' is listed as Priority 4(ii) on the DBCA Priority Ecological Communities List.
- Listing reference in a table: column heading: DBCA, row text: P4(ii).

P5 Priority 5: Conservation dependent ecological communities

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

Categories of Threatened Communities pursuant to the Environment Protection and Biodiversity Conservation Act 1999

Category	Definition
Critically Endangered	(1) An ecological community is eligible to be included in the ***critically endangered*** category at a particular time if, at that time, it is facing an extremely high risk of extinction in the wild in the immediate future, as determined in accordance with the prescribed criteria.
Endangered	(2) An ecological community is eligible to be included in the ***endangered*** category at a particular time if, at that time: (a) it is not critically endangered; and (b) it is facing a very high risk of extinction in the wild in the near future, as determined in accordance with the prescribed criteria.
Vulnerable	(3) An ecological community is eligible to be included in the ***vulnerable*** category at a particular time if, at that time: (a) it is not critically endangered nor endangered; and (b) it is facing a high risk of extinction in the wild in the medium-term future, as determined in accordance with the prescribed criteria.

COTERRA
ENVIRONMENT

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