Government of Western Australia
Department of Water and Environmental Regulation

Clearing Permit Decision Report

1 Application details and outcome

1.1. Permit application details

Permit number:	CPS 9553/1
Permit type:	Area permit
Applicant name:	Australian Islamic College (Perth) Inc
Application received:	4 January 2022
Application area:	1.70 hectares of native vegetation
Purpose of clearing:	Development of an education facility
Method of clearing:	Mechanical
Property:	Lot 15 on Diagram 226007
Location (LGA area):	City of Armadale
Localities (suburb):	Forrestdale

1.2. Description of clearing activities

The application is to clear native vegetation to facilitate future development of an educational facility. The educational facility will provide amenities for kindergarten, primary and high school student, along with ancillary services including a place of worship, head office, library, gym and supporting maintenance infrastructure. The development will include a best practice waterwise approach to irrigation, landscape areas and on-site sewage treatment and disposal system (Emerge Associates, 2022a).

1.3. Decision on application

Decision:	Granted
Decision date:	31 August 2022
Decision area:	1.70 hectares of native vegetation, as depicted in Section 1.5, below.

1.4. Reasons for decision

In undertaking the assessment, the Delegated Officer had regard for:

- actions taken by the applicant which resulted in the avoidance and minimisation of the extent of the clearing area and the mitigation of the impacts of clearing (see Section 3.1 of this report)
- a detailed assessment of the impacts of the clearing on environmental values (see Section 3.2 of this report)
- other matters considered relevant to the assessment (see Section 3.3 of this report). This included:
    - advice from City of Armadale on matters regulated under its jurisdiction
    - advice from the DWER's Swan-Avon Region branch on matters regulated under the *Rights in Water and Irrigation Act 1914* (RIWI Act)
- the application area site characteristics (see Appendix A)
- the 10 Clearing Principles set out in Schedule 5 of the *Environmental Protection Act 1986* (EP Act) (see Appendix B)
- the concerns raised in a public submission (see Appendix C)

- photographs of the vegetation within the application area (see Appendix D)
- a summary of a basic fauna and targeted black cockatoo habitat assessment of the application area conducted by Emerge Associates (see Appendix E)
- relevant datasets available at the time of the assessment (Appendix F).
- a summary of a detailed flora and vegetation assessment undertaken by Emerge Associates (see Appendix E)
- economic and social matters associated with the application (see Section 2.6 of this report)
- the detailed description of the vegetation types within the application area (Appendix A and E)
- an analysis of flora, fauna and ecological communities recorded/mapped within the local area (a 10-kilometre radius measured from the perimeter of the application area) (Appendix B)
- an assessment of the native vegetation within the application area against the key diagnostic criteria for the Low-lying *Banksia attenuata* woodlands and shrublands threatened ecological community (TEC), listed as 'Priority 3' priority ecological community (PEC) by the Department of Biodiversity, Conservation and Attractions (DBCA) and as an 'Endangered' TEC under the EPBC Act (hereafter referred to as the Banksia Woodland TEC) (Appendix C)
- relevant datasets available at the time of the assessment (Appendix I)
- other matters considered relevant to the assessment (see Section 2 of this report)
- advice from the Department of Biodiversity Conservation and Attractions (DBCA) (2022)

The clearing permit application was prepared, submitted, accepted, assessed and determined in accordance with section 51E and 51O of the EP Act. DWER advertised the application for 21 days. One public submission was received. Appendix A contains a summary of this submission and the DWER's advice on how these were considered during the assessment.

After consideration of the above information, the Delegated Officer determined that the proposed clearing:

- may increase the risk of spread of weeds and dieback into adjacent vegetation, which could impact on the quality of the adjacent native vegetation and fauna habitat values
- will impact on 1.33 hectares of native vegetation which provides habitat for conservation significant fauna, including 1.33 hectares of foraging habitat for Carnaby's cockatoo and 0.66 hectares of Baudin's cockatoo foraging habitat
- may lead to potential indirect impacts to conservation category wetlands as a result of changes to site hydrology that may increase runoff and loss of nutrients from the site
- will impact on 0.87 hectares of native vegetation that is consistent with the diagnostic criteria for the Banksia Woodland TEC.

The Delegated Officer also took into consideration the conditions imposed by the Joint Development Assessment Panel (JDAP) in determining to grant Development Approval for this project:

- fencing of adjacent Bush Forever site no. 345
- revegetation management to restore vegetation within, and within the buffer of, adjacent wetlands.

To ensure streamlined regulation of the proposed clearing, the Delegated Officer determined that the conditions imposed on the Development Approval should not be duplicated on the clearing permit.The Delegated Officer considers this is appropriate in this instance as the Development Approval conditions also relate to the management of impacts from the end land use of the site. The conditions imposed on the clearing permit are additional to those imposed on the Development Approval.

The Delegated Officer considered that the impacts of the proposed clearing, after consideration of the avoidance, mitigation and management measures, are not environmentally unacceptable and that in this instance offsets are appropriate.

After consideration of the above information, as well as the avoidance, minimisation and mitigation actions taken by the applicant and the mitigation actions conditioned on the Development Approval, DWER determined that the proposed clearing will result in the following significant residual impacts (SRI):

- loss of 0.67 hectares of native vegetation which provides low quality foraging habitat for Carnaby's cockatoo
- loss of 0.66 hectares of native vegetation which provides moderate quality foraging habitat for Carnaby's cockatoo

The Delegated Officer determined that the following impacts are not likely to have a significant residual impact and therefore do not require offsetting:

- loss of 0.66 hectares of native vegetation which provides low quality foraging habitat for Baudin's cockatoo
- loss of 0.87 hectares of native vegetation which represents the Banksia Woodland TEC
- loss of 0.036 hectares of native vegetation growing in a mapped wetland and a further 0.409 hectares of native vegetation growing in association with a mapped wetland.

To address the above SRIs and applying the WA Offsets assessment guide (WA Offsets Metric), the Delegated Officer determined that the following offset is required:

- contribution of funds for establishment and maintenance of 6.72 hectares of native vegetation which supports Carnaby's cockatoo foraging habitat.

In this instance, the Delegated Officer considered that a financial contribution to the Part V Offset Fund is suitable and would facilitate the acquisition of self-sustaining vegetation supporting Carnaby's cockatoo populations in the local area. The financial contribution will allow the pooling of resources for the purchase of larger vegetated land parcels, with less edge effects and more effective options for on-ground management.

A financial contribution of $22,057.50 per hectare was determined using unimproved land valuations for nearby potential offset sites within the Shire of Serpentine-Jarrahdale.
The above offset strategy will therefore address:

- 100 per cent of SRIs of the proposed clearing on Carnaby's cockatoo foraging habitat.

Given the above, the Delegated Officer has decided to grant a clearing permit subject to the following conditions:

- avoid, minimise to reduce the impact and extent of clearing
- weed and dieback management to minimise the risk of introduction and spread of weeds
- fauna management to allow fauna a reasonable time to move to adjacent native vegetation ahead of the clearing activity
- provision of $148,226.40 to DWER's Part V Offset Fund to offset the significant residual impacts of the proposed clearing on Carnaby's cockatoo foraging habitat.

1.5. Site map

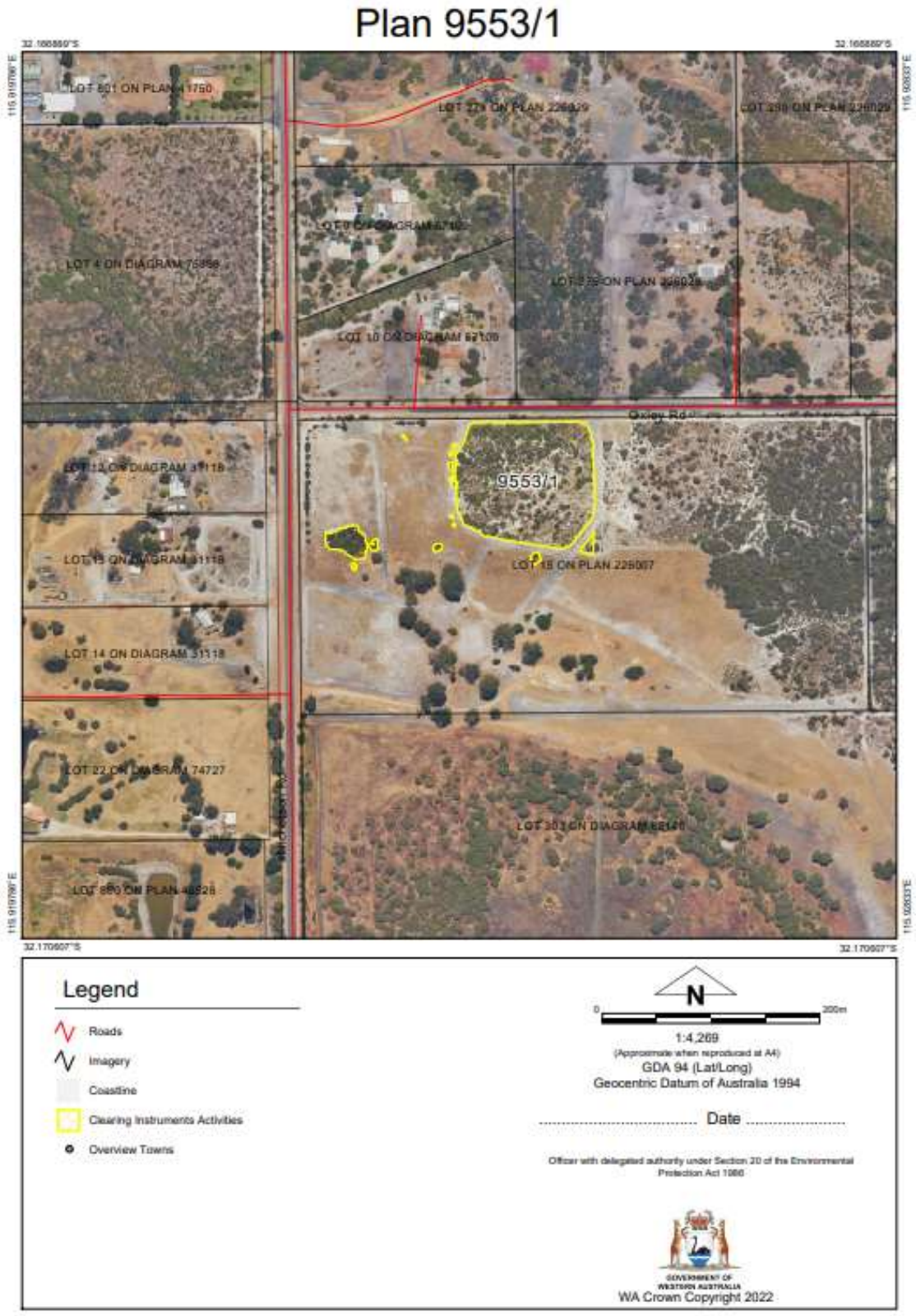

Figure 1 Map of the application area

The area cross-hatched yellow indicates the area authorised to be cleared under the granted clearing permit.

2 Legislative context

The clearing of native vegetation in Western Australia is regulated under the EP Act and the *Environmental Protection (Clearing of Native Vegetation) Regulations 2004* (Clearing Regulations).

In addition to the matters considered in accordance with section 51O of the EP Act (see Section 1.4), the Delegated Officer has also had regard to the objects and principles under section 4A of the EP Act, particularly:

- the precautionary principle
- the principle of intergenerational equity
- the principle of the conservation of biological diversity and ecological integrity.

Other legislation of relevance for this assessment include:

- *Aboriginal Heritage Act 1972*
- *Biodiversity Conservation Act 2016* (WA) (BC Act)
- *Conservation and Land Management Act 1984* (WA) (CALM Act)
- EPBC Act
- *Planning and Development Act 2005* (WA) (P&D Act)
- *Rights in Water and Irrigation Act 1914* (RIWI Act)

Relevant policies considered during the assessment include:

- *Environmental Offsets Policy* (2011)

The key guidance documents which inform this assessment are:

- *A guide to the assessment of applications to clear native vegetation* (December 2013)
- *Procedure: Native vegetation clearing permits* (DWER, October 2019)
- *Environmental Offsets Guidelines* (August 2014)
- *Draft Environmental Offsets Metric Procedure (2022)*
- Technical guidance – *Flora and Vegetation Surveys for Environmental Impact Assessment* (EPA, 2016)
- Technical guidance – *Terrestrial Fauna Surveys for Environmental Impact Assessment* (EPA, 2016).

3 Detailed assessment of application

3.1. Avoidance and mitigation measures

In relation to any actions which have been considered to avoid or minimise the need for clearing, the applicant advised that the native vegetation proposed to be cleared within Lot 15 is considered an appropriate location for an educational facility, owing to the high historical disturbance of the land and limited environmental values. Further, the applicant advised that the project has been designed to limit the extent of disturbance by utilising, where possible, existing impacted areas with more degraded environmental values (Emerge Associates, 2021a).

A key feature of the site is an existing power transmission easement that runs in a south-north direction and approximately bisects the site. The overarching development layout of the site has been prepared such that there has been no requirement to move this infrastructure. Due to this, development has been located on the western half of the site.

The applicant's consultant, Emerge Associates, prepared an Environmental Assessment and Management Plan (EAMP) which was submitted as supporting information for this application (Emerge Associates, 2021). The EAMP identified that the development layout and landscaping plan responded to site-specific environmental considerations, including the retention of higher-quality vegetation within the eastern portion of the site (see Figure 2). This includes the largest area of fauna habitat within the site, which is also contiguous with broader areas of better condition vegetation outside of the site (see Figure 3 and Figure 4).

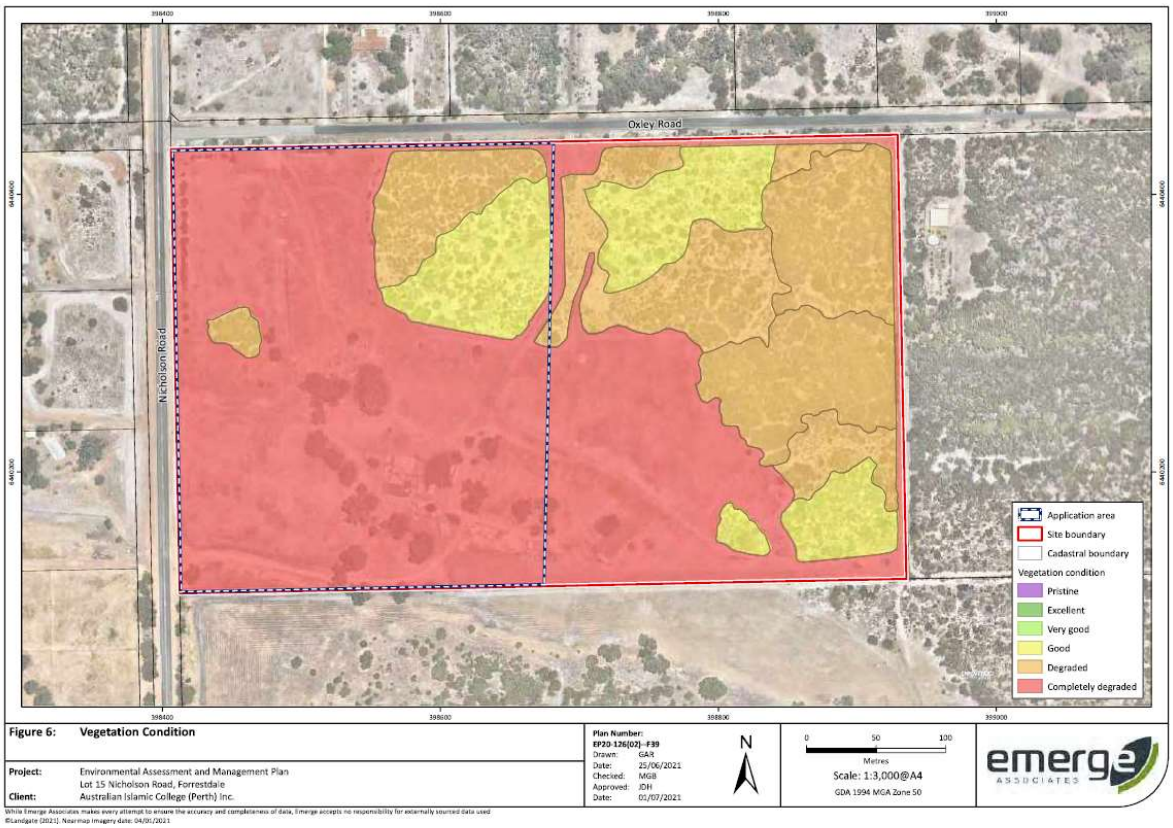

Figure 2: Vegetation condition map of Lot 15 showing more degraded areas to the western side of the application area (Emerge Associates, 2021).

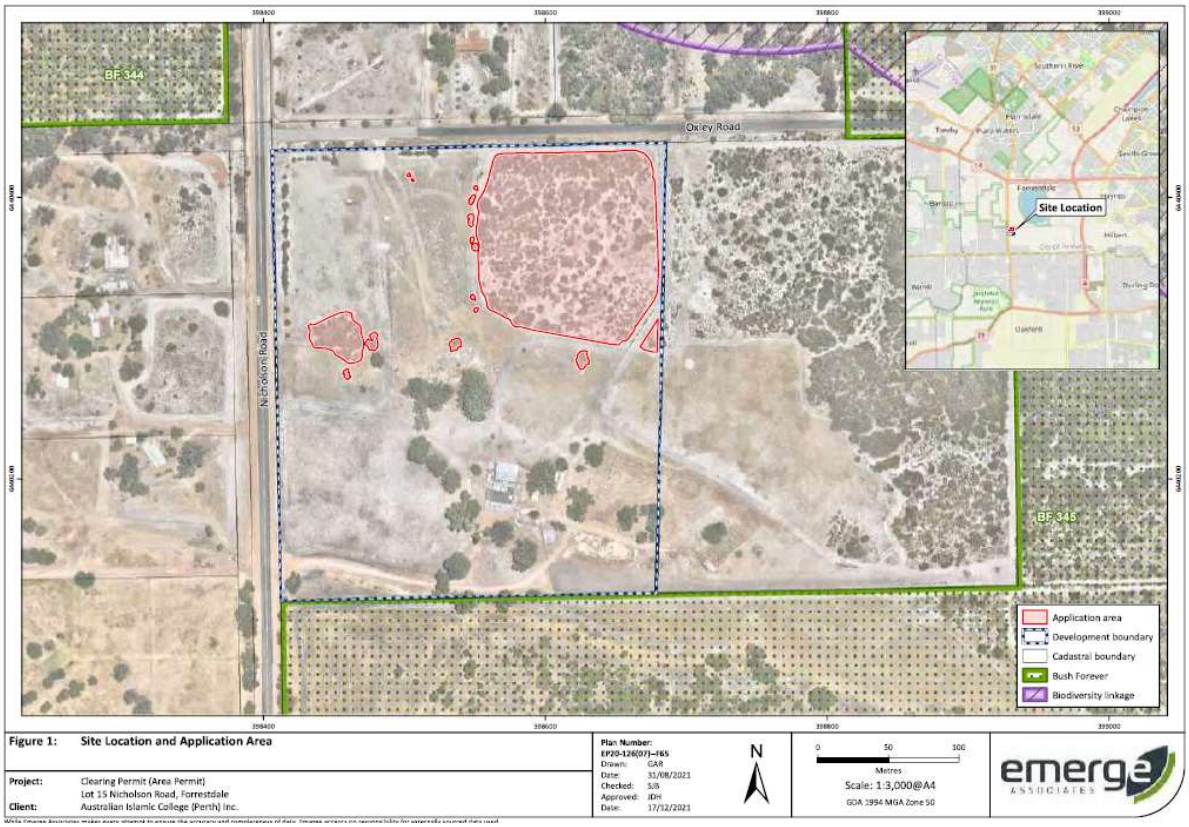

Figure 3: Lot 15 situation in relation to adjacent Bush Forever sites (Emerge Associates, 2021)

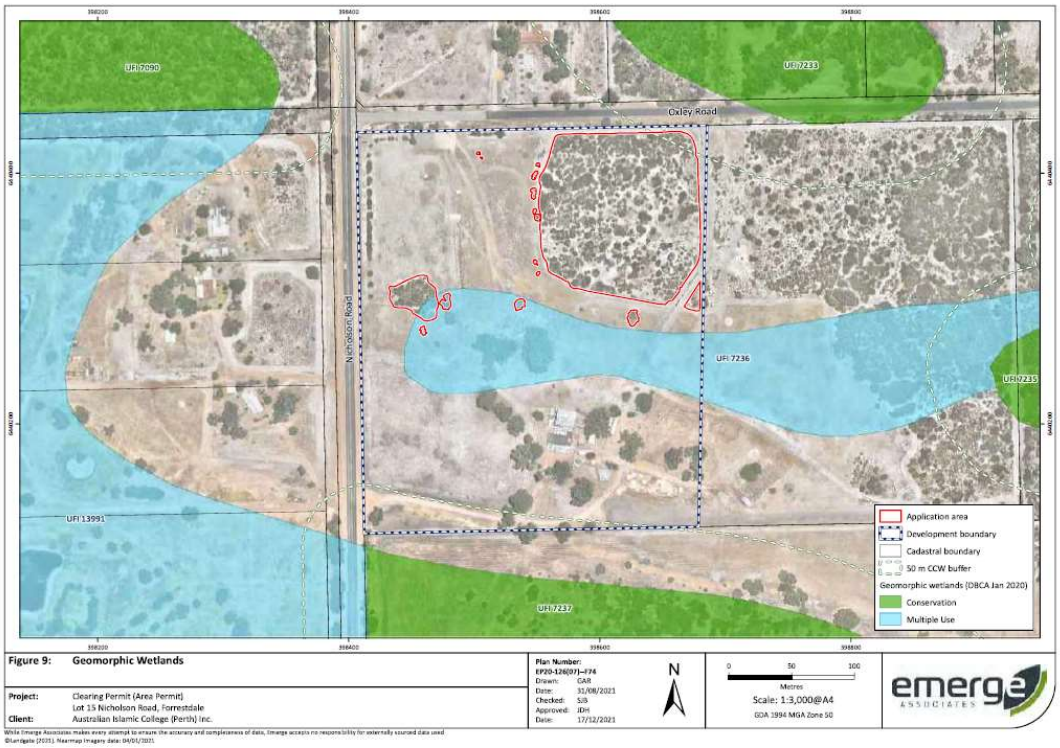

Figure 4: Juxtaposition of application area and mapped wetland habitats (Emerge Associates, 2021)

The following mitigation measures have been considered for this project, several of which are required under conditions of the Development Approval:

- Acid sulfate soils: Completion of an ASS self-assessment form and if necessary (based on the outcomes of the ASS self-assessment), the preparation of an Acid Sulfate Soil and Dewatering Management Plan (ASSDMP).
- Native fauna: Where clearing of potential black cockatoo habitat is proposed, the potential requirement for an EPBC Act referral will need to be considered. Fauna management protocols and actions will also need to be implemented prior to and during clearing activities.
- Construction management: A Construction Management Plan will be prepared and include measures to ensure the protection of retained vegetation within the site including consideration of aspects such as physical protection of vegetation and management of dust and weed encroachment.
- Sewage disposal: should be designed and implemented consistent with the requirements of the Site and Soil Evaluation (SSE) prepared for the site (Emerge Associates, 2022a) and other relevant guidelines and policy.
- Drainage strategy: The drainage strategy for the site should be documented within a drainage plan, water management plan or similar which will demonstrate how the hydrological regime will be maintained and that sewage disposal systems will not be subject to flooding or inundation in a 10% annual exceedance probability (AEP) event.
- Irrigation and fertilisation: An Irrigation and Nutrient Management Plan will be prepared to outline the establishment and ongoing maintenance requirements of the playing fields. The approach will minimise any irrigation and fertiliser requirements through water-sensitive design and sensitive fertilising.
- Non-potable water: Non-potable water requirements should be provided by groundwater if possible (and through scheme water if not). A groundwater operating strategy may be required should a groundwater allocation be acquired.
- Wetlands: Wetland values will be maintained and protected through maintenance of the hydrological regime (on-site treatment and retention), managing public access to the CCW UFI 7235, sensitive and transitional landscaping, benign land uses within transitional boundary areas, locating any on-site sewage systems at least 100 m from the outer edge of any conservation category wetlands (CCWs), appropriate design of sewage treatment units and disposal areas, appropriate consideration of functional buffer requirements and the sensitive use of fertilisation in sporting and landscaped areas.
- Bushfire: Bushfire risk can be safely managed within the application area without the clearing of vegetation not located within the application area. Landscaping within the application area will be sensitively designed and managed by the proponent such that a low bushfire risk will be maintained.

The Delegated Officer considered that the applicant adequately demonstrated all reasonable efforts have been taken to avoid and minimise potential impacts on the environmental values. In particular, the Delegated Officer noted that the applicant considered the values of native vegetation within the application area and adjacent native vegetation, in order to select the area within Lot 15 which has the least environmental impact.

After consideration of avoidance and mitigation measures, it was determined that an offset to counterbalance the significant residual impacts to fauna is necessary. In accordance with the Government of Western Australia's *Environmental Offsets Policy* and *Environmental Offsets Guidelines*, these significant residual impacts have been addressed through the conditioning of environmental offset requirements on the permit. The nature and suitability of the offset provided are summarised in Section 4.

3.2. Assessment of impacts on environmental values

The assessment against the clearing principles (see Appendix C**Error! Reference source not found.**) identified that the impacts of the proposed clearing present a risk to biological values (fauna and ecological communities) and water resources. The consideration of these impacts, and the extent to which they can be managed through conditions applied in line with sections 51H and 51I of the EP Act, is set out below.

3.2.1. Environmental value: biological values (fauna, ecological communities) – Clearing Principles (a) and (d)

Outcome:
The proposed clearing will increase the risk of impacts to adjacent native vegetation through an increase of weeds and *Phytophthora* dieback spread.

Noting that the application area comprises vegetation representative of Banksia Woodland TEC, the Delegated Officer determined that the proposed clearing will impact on native vegetation comprising a high level of biodiversity. Taking into account the applicant's avoidance, minimisation and mitigation measures and advice provided by the Department of Biodiversity, Conservation and Attractions (DBCA), the Delegated Officer determined that the loss of 0.87 of Banksia Woodland TEC is not considered significant.

Adhering to weed and dieback management measures (as conditioned on the clearing permit) will minimise the risk of weeds and dieback being spread to nearby areas of native vegetation.

Conditions:
The Delegated Officer imposed a weed and dieback management condition on the clearing permit to minimise the risk of introduction and spread of weeds and dieback and fauna management conditions to minimise the risk of harm to individual fauna within the application area at the time of clearing.

Assessment:
According to the Department of Biodiversity, Conservation and Attractions (DBCA) datasets, 10 threatened and 45 Priority flora species are known to occur within the local area. Based on the similarities shared between the soil and vegetation types in habitats for these flora taxa and within the application area, two threatened and 12 Priority flora had a potential to occur within the application area:

- *Babingtonia urbana* (P3)
- *Calectasia grandiflora* (P2)
- *Cyathochaeta teretifolia* (P3)
- *Diuris drummondii* (T)
- *Drakaea micrantha* (T)
- *Drosera occidentalis* (P4)
- *Jacksonia gracillima* (P3)
- *Johnsonia pubescens* subsp. *Cygnorum* (P2)
- *Phlebocarya pilosissima* subsp. *Pilosissima* (P3)
- *Schoenus benthamii* (P3)
- *Schoenus pennisetis* (P3)
- *Stenanthemum sublineare* (P2)
- *Stylidium aceratum* (P3); and
- *Stylidium longitubum* (P4)

To confirm the presence of these species within the application area, the applicant commissioned Emerge to undertake a detailed assessment to provide information on the flora and vegetation values within Lot 15 Nicholson Road (the survey area) which encompass the entire application area.

Emerge (2021a) undertook the survey in March, October and November, and thus, both, within and outside the main flowering season. Moderate rainfall was recorded from May to October 2020 and high rainfall was recorded over the same period in 2021 preceding the site visits. Therefore, it was considered likely that many plant species would have been in flower and visible at the time of the survey.

The survey identified a total of 48 native and 40 non-native species within the survey area. The dominant families containing native taxa were Myrtaceae, Fabaceae, Orchidaceae and Asparagaceas. The most common genera were *Eucalyptus, Acacia, Banksia* and *Lomandra.* No occurrences of threatened or priority flora species were recorded within the site. The majority of the threatened and priority flora species identified in the desktop assessment are not considered likely to occur within the application area due to lack of suitable habitat or because there were not recorded during the fields survey (Emerge, 2021a).

The survey was unable to confirm the presence or absence of the priority flora species *Schoenus pennisetis* as this is an annual species that flowers outside the survey period (August and September).

S. pennisetis is a tufted annual, grass-like or herb plant, up to 15 centimetres high which flowers between August to September and tends to occupy grey or peaty sand, sandy clay within swamps and winter-wet depressions (WA Herbarium, 1998-). Emerge (2021a) surveyed the application in March, October and November which is not the typical flowering period of *S. pennisetis.* Noting this, had the individuals of this species occurred within the application area at the time of the survey, Emerge may have overlooked them due to the lack of material for detection.

In the absence of an adequate survey for *S. pennisetis,* a detailed risk-based assessment has been conducted to determine the potential impacts of the proposed clearing on this species. The assessment has concluded that the clearing is unlikely to cause significant impacts on *S. pennisetis.* The likelihood of occurrence of *S. pennisetis* within the application area was considered low and the severity of the potential impacts minor.

The assessment of the likelihood of occurrence has identified that *S. pennisetis* is unlikely to occur within the application area. The application area provides limited habitat for this species in a degraded to completely degraded (Keighery, 1994) condition. The majority of application area is located within the northern portion of the property on sandy hills which is unlikely to provide habitat for *S. pennisetis* as it typically occurs within swamps and winter-wet depressions (WA Herbarium, 1998-). The central portion of the property is mapped within a seasonal wetland which may provide habitat for this species. Approximately 0.04 hectares of the application area scattered across four separate areas is mapped within this wetland. Emerge (2021a) described the vegetation condition in these areas as degraded to completely degraded (Keighery, 1994).

Noting the spatial distribution of the known populations of *S. pennisetis* and the number of recorded live individuals, DWER considered that should *S. pennisetis* occur within the application area, the impacts on it would likely be minor. *S. pennisetis* is Priority 3 flora which means that the species is known 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 (DBCA, 2019). *S. pennisetis* is known from a total of nine and 43 populations from the WA Herbarium and TPFL databases, respectively. The spatial distribution of these populations is approximately 650 kilometres north-south and 185 kilometres east-west in Avon Wheatbelt, Geraldton Sandplains, Jarrah Forest and Swan Coastal Plain Interim Biogeographic Regionalisation for Australia (IBRA) bioregions. The quantitative data about the known populations indicates that there is approximately 1,710 live plants of *S. pennisetis.* at a number of locations, the species was very common or abundant.

Advice from the Department of Biodiversity, Conservation and Attractions (DBCA) concurred with the above assessment and noted that "*Whilst it is considered possible that this species may occur, if present the potential impacts are unlikely to be considered significant to the conservation of the species*" (DBCA, 2022).

Noting the survey efforts, survey timing and flowering periods of the species considered as potentially occurring within the application area, DWER considered that the application area is unlikely to provide habitat for other conservation significant flora known to occur within the local area.

<u>TECs and PECs</u>
Emerge (2021a) identified three vegetation communities within the application area:

- BaBmSi - Low sparse to open woodland of *Banksia menziesii, B. attenuata, B. ilicifolia, Eucalyptus todtiana* and *Nuytsia floribunda* (approximately 0.87 hectares of the application area)
- KgSi - Tall shrubland to closed tall shrubland of *Kunzea glabrescens* (approximately 0.79 hectares of the application area); and
- Heavily disturbed areas comprising weeds with occasional native shrubs and forbs and planted vegetation (approximately 0.04 hectares of the application area).

Plant communities BaBmSi and KgSi in good condition were considered to represent floristic community type (FCT) 21c 'Low lying *Banksia attenuata* woodlands and shrublands'.

The following TECs and PECs were identified within the application area:
- Banksia woodlands of the Swan Coastal Plain TEC; and
- Low lying *Banksia attenuata* woodlands and shrublands PEC.

The Banksia Woodland ecological community is a low woodland dominated (or co-dominated) by *Banksia* (Proteaceae) trees, most commonly *B. attenuata* and *B. menziesii*, sometimes with scattered eucalyptus and other tree species present within or above the *Banksia* canopy (Ritchie et al., 2021). The understorey is rich in plant species, including sclerophyllous shrubs, sedges, rushes and geophytes. Many understorey species are locally endemic and most do not occur across the full range of the ecological community. Banksia woodlands are highly variable in composition across their range and, as such, the community provides habitat for many native flora, fungi and fauna, with remaining patches providing important wildlife corridors and refuges in a mostly fragmented landscape (Ritchie et al., 2021).

A flora and vegetation survey of the vegetation within the application area noted that;
- *The BaBmSi vegetation in 'good' condition within the site comprises four areas ranging in size from 0.09 ha to 0.87 ha and none of these areas independently meet this criterion.*
- *The northern two areas of the BaBmSi vegetation are separated by over 30 m from each other and any other banksia woodland and thus were assessed independently and do not meet the minimum size threshold.*
- *The south-eastern patches of plant community BaBmSi are separated by less than 30 m and combine to form 0.6 ha. These are further connected by under 30 m to banksia woodland vegetation in the adjacent Lot 13 and Lot 303 (as shown on Figure 6).*

(Emerge Associates, 2021c)

Expert advice provided by DBCA noted that: *"There is uncertainty as to whether the two patches (R2 and R3), as mapped in Emerge (2021) as FCT21c, meet the key diagnostic characteristics to be considered a single patch of the Banksia Woodlands of the Swan Coastal Plain community, as outlined in the EPBC conservation advice. The distance at the northern end between the two patches is <30m, and 30m is the threshold distance to be considered a single patch. In addition, the prolific presence of Kunzea glabrescens occurring in between the two northern patches may indicate the area is recovering from past disturbance. This area may regenerate and then be meet the criteria. Vegetation linkages also occur to the east of Lot 15 where current mapping indicates the majority of the vegetation is potentially Banksia Woodlands, in which case the patch on Lot 15 may meet the key diagnostic characteristics to be deemed the TEC."* (DBCA, 2022)

Based on the above, the Delegated Officer has adopted a conservative approach to consider that the application area contains approximately 0.87 hectares of native vegetation which represents the 'Low lying *Banksia attenuata* woodlands and shrublands' TEC. The 0.87-hectare area of plant community BaBmSi, which contains dominant species of both Banksia Woodland TEC and Low lying *B. attenuata* woodlands or shrublands, does not meet the patch size criteria to be considered as part of the Banksia woodland TEC as a standalone patch, however, when considered in the context of the potential patch noted by DBCA (2022), it may meet this criteria. This area is in good condition. To be considered as the Banksia Woodland TEC, a vegetation patch in good condition must be at least of two hectares in size (TSSC, 2016). There is no conservation advice for the State listed 'Low lying *Banksia attenuata* woodlands and shrublands'. Therefore, all vegetation in good condition has been considered, for the purpose of the assessment to represent this TEC (EPBC Act) and PEC (BC Act).

Low lying *Banksia attenuata* woodlands and shrublands is a subcommunity of Banksia Woodland TEC which is largely restricted to the uploads on the Bassendean system, consisting of low dunes and interwoven wetlands and extends from Gingin to Bunbury. In 2016, approximately 317.5 hectares of this subcommunities were mapped from Chittering to Gelorup (TSSC, 2016). Currently, the community is known from an approximately 317.68-hectare extent. The findings of the flora survey (Emerge, 2021a) increase the known extent to approximately 319.34 hectares, of which approximately 0.87 hectares occur within the application area. Noting that the clearing will

impact approximately 0.27 per cent of the known extent of the Low laying *Banksia attenuata* woodlands and shrublands, the proposed clearing is unlikely to have significant impacts on this TEC/PEC (DBCA, 2022).

Weed and dieback
Land clearing can adversely affect adjacent native species diversity and promote weed invasion because of increasing areas of disturbance and fragmentation of habitat. Increased presence of weed species decreases the likelihood of persistence of many native species (Ritchie et al., 2021). *Phytophthora cinnamomi* disease centres are more commonly found in deeper soils where they can alter the root system to provide refugia for persistence. Many common plant families in banksia woodlands are susceptible to *P. cinnamomi*, including Proteaceae, Fabaceae, Ericaceae, Xanthorrhoeaceae, and Zamiaceae, causing mortality by hydraulic failure, leading to changes in plant species abundance and community structure. The change in plant community composition and structure, and potential localised loss of key species can have flow- on effects for fauna dependent on specific habitat and food sources (Ritchie et al., 2021).

Considerable research has been undertaken on plant diseases in Banksia Woodlands over the last 30 years. Although other pathogens, such as *Armillaria luteobubalina* (Australian honey fungus), have been recorded in Banksia Woodlands of the Spearwood dune system, the most prolific and serious pathogen is *Phytophthora cinnamomi* (Ritchie et al., 2021).

The increased risk of adverse impacts to nearby native vegetation as a result of clearing increasing the mobilisation of weeds and dieback may indirectly impact the biodiversity of nearby native vegetation. Management conditions to manage the spread of weeds and dieback as a result of clearing will mitigate the potential risk to nearby native vegetation biodiversity values.

3.2.2. Environmental value: biological values (fauna) – Clearing Principle (b)

Outcome:
The Delegated Officer has determined that the proposed clearing is likely to cause significant adverse impacts on this environmental value.

Noting the findings of Emerge Associates (2021b) targeted black cockatoo habitat assessment, the proposed clearing will result in the loss of

- 0.67 hectares of low quality Carnaby's cockatoo foraging habitat
- 0.66 hectares of moderate quality Carnaby's cockatoo foraging habitat
- 0.66 hectares of low-quality Baudin's cockatoo foraging habitat.

Although the application area is unlikely to provide significant habitat for black-striped snake, black-striped burrowing snake (*Neelaps calonotos*), Perth slider, lined skink (*Lerista lineata*), Quenda, southwestern brown bandicoot (*Isoodon fusciventer*), southern death adder (*Acanthophis antarcticus*), tammar wallaby (*Notamacropus eugenii derbianus*) and western brush wallaby (*Notamacropus irma*) it may be used for fauna dispersal.

The application area provides foraging habitat for black cockatoos. Noting the presence of 14 roost sites within 6 kilometers of the application area (see Figure 5), the foraging habitat observed is considered significant to the persistence of Carnaby's black cockatoo populations at this location.

Conditions:
The Delegated Officer determined that the following management conditions on the clearing permit will adequately mitigate the potential impacts of the proposed clearing on the above environmental values:

- fauna management condition to provide fauna an opportunity to move into adjacent native vegetation ahead of the clearing activity
- weed and dieback hygiene measures to mitigate the risk of impacts to adjacent fauna habitat
- offset condition to counterbalance the significant residual impacts of the proposed clearing on black cockatoo foraging habitat.

The Delegated Officer has determined that weed and dieback hygiene measures to mitigate the risk of impacts to adjacent native vegetation will adequately mitigate the potential impacts of the proposed clearing on the biodiversity values within the adjacent native vegetation. These requirements have been conditioned on the clearing permit.

The Delegated Officer determined that whilst not considered significant habitat for Quenda, Perth Slider, western brush wallaby tammar wallaby, black-striped snake and southern death adder, impacts to individuals of these species may occur at the time of clearing. To minimise the potential impacts, the applicant will be required to undertake slow, progressive, one-directional clearing to allow terrestrial fauna to disperse ahead of the clearing activity should they occur on site at the time of clearing.

The offset condition will counterbalance the significant residual impacts of the clearing on Carnaby's black cockatoo. In considering the applicant's avoidance and mitigation measures, no other significant residual environmental impacts were considered likely. Section 4 of this report provides further information on the offset provided to counterbalance the significant residual impacts of the clearing on Carnaby's black cockatoo.

Based on the above assessment, the Delegated Officer has determined that potential impacts on the abovementioned fauna species can be addressed through fauna management conditions and offsetting the significant residual impacts on foraging habitat for Carnaby's black cockatoo.

Assessment:
According to available databases, a total of 55 conservation significant fauna species have been recorded within the local area (DBCA, 2021b). Noting the habitat requirements, distribution of the recorded species, the mapped vegetation type, the condition of the vegetation within the application area, and the findings of the fauna survey (Emerge, 2021b), the application area is likely to comprise suitable habitat for:

- a short-tongued bee (*Leioproctus contrarius, Leioproctus douglasiellus, Neopasiphae simplicior*)
- Baudin's cockatoo (*Calyptorhynchus baudinii*)
- black-striped snake, black-striped burrowing snake (*Neelaps calonotos*)
- Carnaby's cockatoo (*Calyptorhynchus latirostris*)
- forest red-tailed black cockatoo (*Calyptorhynchus banksii naso*)
- graceful sunmoth (*Synemon gratiosa*)
- peregrine falcon (*Falco peregrinus*)
- Perth slider, lined skink (*Lerista lineata*)
- Quenda, southwestern brown bandicoot (*Isoodon fusciventer*)
- southern death adder (*Acanthophis antarcticus*)
- Swan Coastal Plain shield-backed trapdoor spider (*Idiosoma sigillatum*)
- tammar wallaby (*Notamacropus eugenii derbianus*); and
- western brush wallaby (*Notamacropus irma*).

Emerge Associates (2021b) identified three fauna habitat types in the application area:

- woodland-upland (approximately 0.66 hectares)
- shrubland (approximately 0.78 hectares); and
- predominantly cleared area (approximately 0.25 hectares).

The highest fauna habitat values were associated with woodland-upland habitat, in particular, where this vegetation was in good condition and provides a cover of native trees and shrubs, dense ground cover and contains microhabitats as logs, rocks and leaf litter. This habitat contains minimal understory vegetation providing limited cover for ground-dwelling fauna. The shrubland habitat type, on the other hand, whilst degraded and lacks contiguous vegetation cover, does provide limited cover for ground-dwelling fauna (Emerge, 2021b).

<u>Black cockatoos</u>
The application area falls within the modelled distribution of all three black cockatoo species. Black cockatoos are classified as threatened under the BC Act. Under the EPBC Act, the Carnaby's and Baudin's cockatoo are listed as Endangered and the forest red-tailed black cockatoo is listed as Vulnerable. Under the IUCN listing Carnaby's cockatoo is listed as Endangered and Baudin's cockatoo is listed as Critically Endangered.

The seasonal movements of black cockatoos mean they require large areas of habitat for breeding, night roosting and foraging, as well as connectivity between these habitats to assist their movement through the landscape (Commonwealth of Australia, 2012). The assessment has considered the potential impacts of the proposed clearing on all types of black cockatoo habitat.

The application area does not provide suitable breeding habitat for black cockatoos. Suitable breeding habitat for these species includes trees which either have a suitable nest hollow, or are of a suitable diameter at breast height (DBH) to develop a nest hollow. Suitable DBH for nest hollows is 50 centimetres for most tree species, however, is

reduced to 30 centimetres for wandoo and salmon gum (Commonwealth of Australia, 2012). Carnaby's cockatoo typically nests in eucalypt woodlands, primarily in the hollows of wandoo (*Eucalyptus wandoo*), salmon gum (*E. salmonophloia*) and marri (*Corymbia calophylla)* (Groom, 2015). The most important breeding trees for forest red-tailed black cockatoos throughout their range are large, mature marri trees, approximately 120-150 years in age with a mean overall height of 20.24 metres (Johnston, Kirkby and Sarti, 2013). Emerge Associates (2021b) identified three black cockatoo habitat trees within the survey area. None of these occur within the application area.

Commonwealth of Australia (2012) states that clearing of more than one hectare of quality foraging habitat has high risk of significant impacts. Noting typical food resources for black cockatoos, the application area contains approximately 1.33 and 0.66 hectares of primary foraging habitat for Carnaby's cockatoo and secondary foraging habitat for Baudin's cockatoo, respectively. Emerge Associates (2021b) identified small areas (approximately 0.16 hectares) of forest red-tailed black cockatoo foraging habitat within the survey area but not in the application area. Forest red-tailed black cockatoo forages within jarrah and marri woodlands and forest, and edges of karri forests including wandoo and blackbutt, within the range of the subspecies. The species largely feeds on seeds of marri and jarrah, as well as other Eucalyptus species and Allocasuarina cones (Commonwealth of Australia, 2012). Baudin's cockatoos prefer foraging within Eucalypt woodlands and forest, and proteaceous woodland and heath. During the breeding season (October to late January/early February) this species prefers marri seeds. Outside the breeding season the species may feed in fruit orchards and tips of *Pinus* spp. (Commonwealth of Australia, 2012). Carnaby's cockatoo feeds on the seeds, nuts and flowers of a large variety of plants including Proteaceous species (Banksia, Hakea and Grevillea), as well as Allocasuarina and Eucalyptus species, *Corymbia calophylla* and a range of introduced species (Valentine and Stock, 2008).

Noting the Baudin's cockatoo foraging habitat in the application area is limited to secondary foraging resources comprising less than one hectare and the primary foraging species (*Corymbia* calophylla) are absent, the proposed clearing is unlikely to have significant impacts to the conservation of this species but may reduce feeding resources for individuals using nearby roost sites (see Figure 5).

The vegetation within the application area contains black cockatoo foraging habitat which may support breeding. While breeding, black cockatoos will generally forage within a 6–12 kilometre radius of their nesting site (Commonwealth of Australia, 2012). Although the application area is not located within the mapped breeding range for Carnaby's cockatoo, the closest known breeding site (potential artificial hollow) is recorded approximately 11.4 kilometres southeast of the application area.

The assessment further identified that the application area provides significant foraging habitat that supports black cockatoo roosting. Roosting habitat is defined as a suitable tree (generally the tallest) or group of tall trees, native or introduced, usually close to an important water source, within an area of quality foraging habitat within the range of each black cockatoo species which provide black cockatoos with shelter during the heat of the day and safe resting places at night (Department of the Environment and Energy, 2017). Individual night roosting sites need suitable foraging habitat and water within six kilometres (EPA, 2019). Overlapping foraging ranges within 12 kilometres also support roosting sites and maintain habitat connectivity and movement across the landscape (EPA, 2019). There are 46 confirmed black cockatoo roosting sites mapped within the local area. Of these, 14 occur within a 6-kilometre buffer of the application area. The majority of these have been previously used by white-tailed black cockatoo (Carnaby's and Baudin's black cockatoo). One site was also used by forest red-tailed black cockatoo. The 6-kilometre vegetated buffers of the 14 roosting sites retain between 14.78 – 32.29 per cent of their original vegetation extents with only one site containing more than 30 per cent of the original extent which is a threshold below which species loss appears to accelerate exponentially at an ecosystem level (Commonwealth of Australia, 2001).

Considering the extent of the application area and that native vegetation within adjacent properties will continue to provide habitat connectivity, the proposed clearing is not likely to restrict the ability of black cockatoos to move across the landscape.

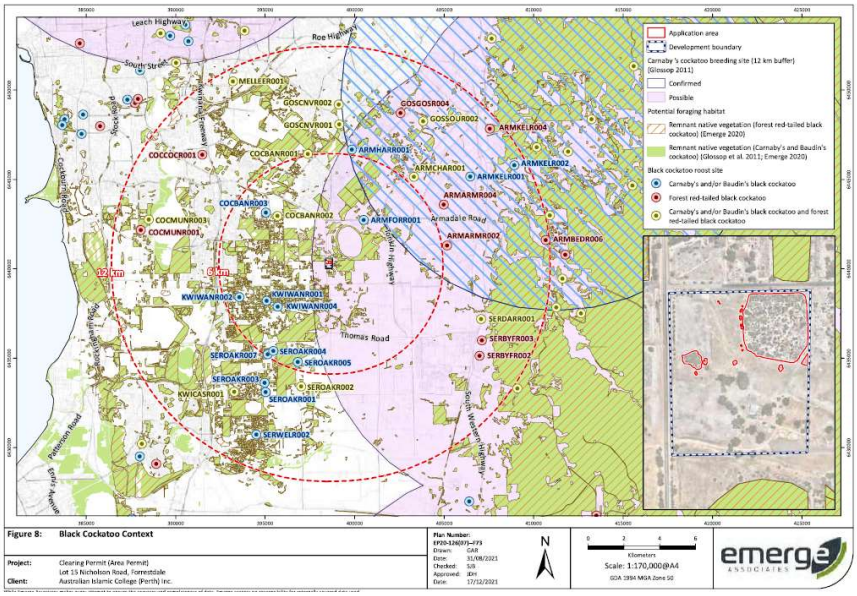

Figure 5: Black cockatoo roost sites near the application area (6km and 12km radius) (Emerge Associates, 2021b)

A short-tongued bee

Neopasiphae simplicior is a small bee. It is black in colour and smaller, with less modified antennae and legs, than other species belonging to the same genus. *N. simplicior* is endemic to Western Australia and occurs as a single population in the Forestdale Lake Nature Reserve (Houston, 2018). The species has been collected only at flowers of Thread-leaved Goodenia (*Goodenia filiformis*), a perennial herb, Slender Lobelia (*Lobelia tenulor*), an annual herb, *Angianthus preissianus* (males only), an annual herb, and Velleia sp (Houston, 2018).

A flora survey of the vegetation within the application area did not identify any of the above species (Emerge Associates, 2021a) however a basic fauna survey noted that indicator flora species for *N. simplicior* occurs within the application area (Emerge Associates, 2021b). While it is possible this species occurs within the application area, it is unlikely that the application area is representative of significant habitat for this species given limited habitat (only woodland-upland areas), condition of the vegetation and occurrence of higher quality habitat for this species adjacent to the application area.

Black-striped snake, black-striped burrowing snake

Black-striped snake, black-striped burrowing snake (*Neelaps calonotos*) is one of five species of small burrowing elapids in the Perth region. The species is more abundant north of the Swan River, whereas records are comparatively scarcer to the south. *N. calonotos* typically occupy Banksia woodlands atop soft calcareous sand and, to a lesser extent, coastal heathlands and shrublands. Although relatively abundant in both habitats, scientists recorded higher capture rates of *N. calonotos* in Banksia woodlands which are also the preferred habitat for skinks, such as *Aprasia* and *Lerista* spp., which are exclusive food resources for *N. calonotos*. *N. calonotos* is rarely found in small urban bushland remnants as these are more susceptible to weed infestation, bushfires and predation by feral species, with weeds having an adverse effect on the composition of microhabitats required by fossorial species (He, 2021).

A basic fauna survey noted that the Black-striped snake may use woodland – upland and shrubland habitat within the application area (Emerge Associates, 2021b). Given this species is rarely found in small urban bushlands the risk of it occurring within the application area is low. A fauna management condition allowing this species, if present, to move into adjacent naïve vegetation which is suitable habitat will mitigate the risk of clearing on this species.

Graceful sunmoth

The listing advice for the Graceful Sunmoth (*Synemon gratiosa)* identifies that the graceful sun moth is a medium-sized diurnal flying sun moth that is similar in appearance to a butterfly (WAISS, 1993). The graceful sun moth is found only in south-west Western Australia, along a narrow strip of approximately 630 km in length of coastal habitat, from Kalbarri south to Binningup (DEC, 2012). Extensive surveys between 2009 and 2012 found new subpopulations located in coastal heathland associated with *Lomandra maritima* (a perennial reed plant), a species

closely related to the original host plant *L. hermaphrodita*. *Lomandra maritima* is locally abundant in coastal vegetation between Binningup and Shark Bay, and the discovery of the new host plant led to additional habitat and subpopulations of the graceful sun moth being recorded.

In 2012, the Graceful Sunmoth was delisted from the threatened category and is now listed as a priority 4 species under the BC Act.

A basic fauna survey of the application area noted that suitable habitat for the Graceful Sunmoth is present within the site and that indicator species *L. hermaphrodita* was recorded within the application area. While it is possible this species occurs within the application area, it is unlikely that the application area is representative of significant habitat for this species given limited habitat (only woodland-upland areas), condition of the vegetation and occurrence of higher quality habitat for this species adjacent to the application area.

Peregrine falcon

The species is found in most habitats, from rainforests to the arid zone and at most altitudes, from the coast to alpine areas. It requires abundant prey and secure nest sites and prefers coastal and inland cliffs or open woodlands near water and may even be found nesting on high city buildings (Australian Museum, 2020). This species is widespread, highly mobile and is found in various habitats. The application area may comprise suitable habitat for this species, however, noting habitat preferences and the small extent of the proposed clearing, the application area is unlikely to comprise significant habitat for this species.

Perth slider, lined skink

Perth slider, lined skink (*Lerista lineata*) is largely restricted to the Swan Coastal Plain including Garden and Rottnest Islands, mostly within the highly developed southern Perth Metropolitan Area (AROD, 2020). The species likely has poor dispersal abilities and relies on litter ground cover and other debris for shelter, which makes it vulnerable to fire. *L. lineata* is known to occur in several bush remnants near Perth, including Forrestdale Lake Nature Reserve, Jandakot Airport, Modong Nature Reserve and Woodman Point. The species unlikely occupies small remnants of native vegetation (Threatened Species Scientific Committee, 2020).

A basic fauna survey of the application area noted that there are historical records of this species in vegetation adjacent to the application area and that there is potentially suitable habitat within the site (Emerge Associates, 2021b). While it is possible this species occurs within the application area, it is unlikely that the application area is representative of significant habitat for this species given limited habitat (woodland-upland and shrubland areas), condition of the vegetation and occurrence of higher quality habitat for this species adjacent to the application area.

Quenda

Quenda is known to inhabit scrubby, swampy vegetation with low, dense understorey, located nearby water courses, pasture, or forest/woodland that is regularly burnt and is in areas of pasture and cropland lying close to dense cover. Populations which inhabit jarrah and wandoo forests are usually associated with watercourses. Quendas will thrive in more open habitat subject to exotic predator control. For example, quenda have become abundant in Lake Magenta Nature Reserve (Western Australia) in Mallee scrub and woodland following fox control (DEC, 2012).

A basic fauna survey of the application areas noted that the woodland – upland and shrubland habitats are likely to be suitable for *Isoodon fusciventer* (quenda) and further detailed that vegetation within the northern and eastern parts of the site provide adequate ground cover for this species but are limited in extent (Emerge Associates, 2021b). While it is possible this species occurs within the application area, it is unlikely that the application area is representative of significant habitat for this species given limited habitat (woodland-upland and shrubland areas), condition of the vegetation and occurrence of higher quality habitat for this species adjacent to the application area.

Southern death adder

Southern death adder is known to inhabit a wide variety of habitats in association with deep leaf litter, including rainforests, wet sclerophyll forests, woodland, grasslands, chenopod dominated shrublands, and coastal heathlands. It is known to feed on frogs, lizards and birds and, unlike most Australian venomous snakes that actively search for prey, this snake sits in one place and waits for prey to come to it. Covering itself with leaves makes it inconspicuous and it lies coiled in ambush, twitching its yellowish grub-like tail close to its head as a lure. When an animal approaches to investigate the movement, the death adder quickly strikes, injecting its venom and then waiting for the victim to die before eating it (Australian Museum, 2022).

A basic fauna survey noted that woodland – upland habitats, particularly where this habitat was mapped by Emerge Associates (2021c) as being in good condition, supports understorey vegetation and microhabitat including logs, rocks and leaf litter (Emerge Associates, 2021b). While it is possible this species occurs within the application area in good condition with dense leaf litter, it is unlikely that the application area is representative of significant habitat for this species. A fauna management condition allowing this species, if present, to move into adjacent naïve vegetation which is suitable habitat will mitigate the risk of clearing on this species.

Swan Coastal Plain shield-backed trapdoor spider

Swan Coastal Plain shield backed trapdoor spider distribution is substrate specific (Dalyellup north to at least Ledge Point with populations on Rottnest Island and Garden Island); often found in remnant bushland within the Perth metropolitan area. Burrows are typically found in Banksia woodland and heathland on sandy soils, adorned with a 'moustache-like' arrangement of twig-lines.

A basic fauna survey of the application area concluded that “If this species was to occur within the application area it would most likely be in association with the woodland upland habitat. Recent and historic records for the trapdoor spider also exist adjacent to the site. As no targeted survey of invertebrates was completed as part of this assessment it is not possible to rule out that these species may be present. However, vegetation condition provides a fair indicator of invertebrate habitat value and it is therefore reasonable to conclude that it the site is unlikely to provide important habitat for any of the identified invertebrates on that basis (Emerge Associates, 2021b).

Tammar wallaby and Western brush wallaby

Tammar wallaby are usually associated with coastal scrub, heath, dry schlerophyll forest and thickets in mallee and woodland. They are known to inhabit dense, low vegetation for shelter; utilising open grassy areas for grazing.

Western brush wallaby are usually associated with tall open forest or woodland, usually seasonally damp with low grasses and open scrub; forages through grazing on low grasses and scrub.

A basic fauna survey of the application area noted that “the woodland upland and shrubland habitat are likely to be suitable particularly where the understorey shrubland layer is present and provides cover. If the western brush wallaby occurred in the site, it would likely only be as part of a much larger home range and while possible that this species may occur, it is unlikely that a population would permanently reside within the site.” (Emerge Associates, 2021b). This assessment is also considered relevant to Tammar wallaby presence.

Significance of habitat

Noting the vegetation identified (Emerge Associates, 2021c) within the application area and its quality, the habitat requirements and distribution of the above species, the application area provides suitable habitat for each of these species. Taking into consideration the small extent of the proposed clearing relative to the surrounding native vegetation and the abundance of native vegetation within lands managed for conservation as Bush Forever sites which are likely to comprise vegetation in similar or better condition than that present within the application area, the habitat within the application area is not considered significant for species, other than Carnaby’s cockatoo, in a local context.

Whilst not considered significant habitat, impacts may occur to individuals of land-dwelling species which may be present at the time of clearing. To minimise potential impacts, the applicant will be required to undertake slow, progressive, one-directional clearing to allow terrestrial fauna to disperse ahead of the clearing activity should they occur on site at the time of clearing.

Ecological linkage

According to available databases, the application area is not mapped in any ecological linkage. However, noting the extent of urban development in the local area, the vegetation in the application area may contribute to an ecological linkage function to enable fauna to move between areas of remnant vegetation. Aerial imagery and spatial datasets further indicate that larger patches of remnant vegetation occur adjacent to the southern and eastern portions of the application area which are more likely to be used by fauna for movement across the landscape.

The applicant has given consideration to retention of higher quality vegetation within the eastern portion of the property to protect fauna habitat and maintain a linkage to larger areas of better condition vegetation outside the property boundary (see section 3.1).

3.2.3. Environmental value: water resources – Clearing Principles (f) and (i)

Outcome:

The proposed clearing will not significantly impact on this environmental value.

Conditions:

For the reasons set out below, the proposed clearing is unlikely to have any long-term adverse impacts on the hydrological and ecological values of connected wetlands. No clearing permit conditions are necessary in relation to this matter.

Assessment:

Hydrological changes

During the project design, the applicant implemented the following measures to maintain the current hydrological regime at the property (Emerge Associates, 2021a):

- all stormwater generated from the future development, that being the construction of internal roads, buildings and areas of hardstand, will be treated and retained on site. The use of retention and infiltration structure in the stormwater strategy will help maximise recharge to the superficial aquifer where possible, thereby maintaining the local hydrological regime.
- at source infiltration will ensure that the quantity and quality of water recharged to the underlying aquifer and receiving environments, such as the surrounding wetlands, will be maintained as per the existing regime
- sewage will be treated and disposed via on-site sewage system that will be specifically designed and implemented based on the identified site conditions and as detailed in the site and soil evaluation (SSE) prepared by Emerge. The SSE demonstrates that the property has the capacity to treat and dispose of sewage on-site in a manner that will not adversely impact public safety of the environment. Development of the sewage system in accordance with the SSE and the relevant guidelines and policies will ensure that any risk to the environment or people is mitigated. This will include demonstration that any sewage disposal treatment units or disposal area are located in areas that are not subject to inundation of flooding in the 10 per cent annual exceedance probability rainfall event.

Watercourses and wetlands

The application area does not intersect any watercourses but occurs within Forrestdale Sumpland classified as a multiple use wetland (MUW) (UFI 7236). In addition, four conservation category wetlands (CCW) are mapped in the locality of the application area. These wetlands are shown in Figure 6.

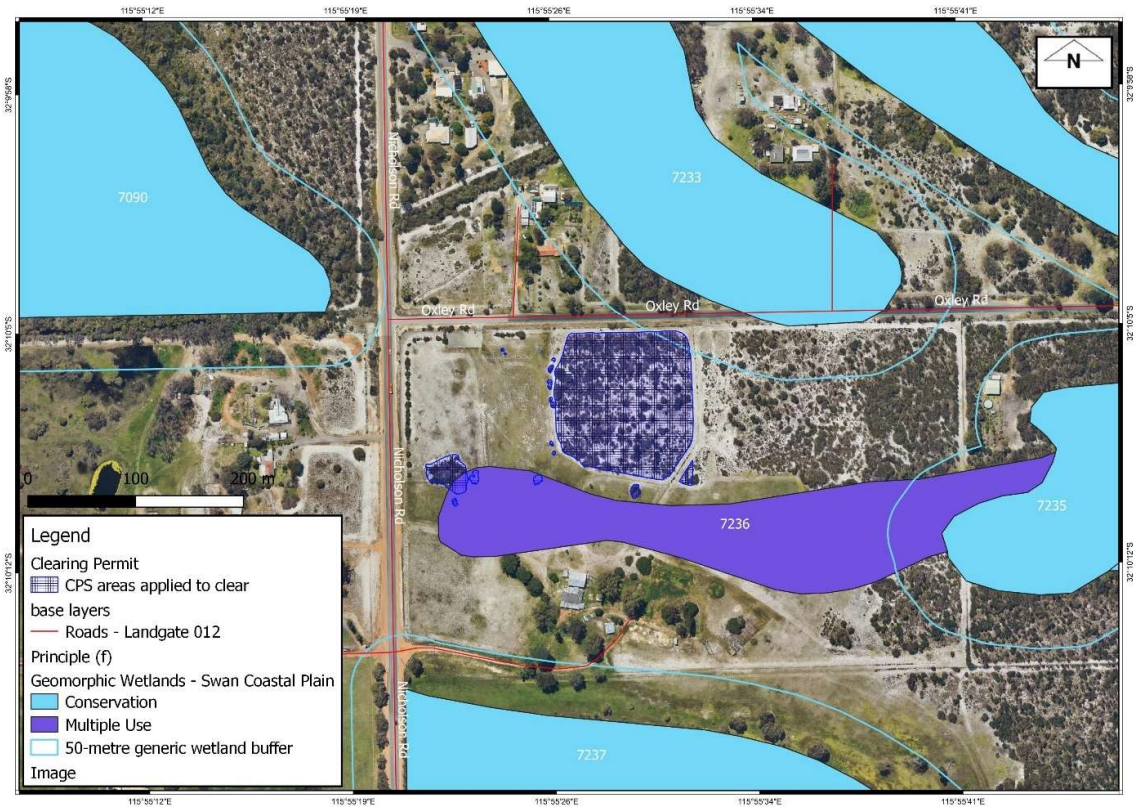

Figure 6 Wetlands mapped in the locality of the application area

Expert advice from DBCA regarding the presence of wetlands at this location was taken into consideration in this assessment and is included where relevant (DBCA, 2022).

The Delegated Officer also had regard for *Guidance Statement No. 33. Environmental Guidance for Planning and Development* (GS 33) (EPA, 2008) which provides planning advice for the management and protection of wetlands. The statement recommends retaining all remnant vegetation in their 50-metre buffers. Where wetlands and their buffers are open to the public, the EPA suggests to create a physical boundary (also known as a hard edge) to delineate the wetland and its buffer. Hard edges are a useful management tool to control the spread of weeds and grass between grassed areas and areas of native vegetation (EPA, 2008). Temporary hard edges (fencing) and ongoing management of public access to conservation category wetlands are included in the EAMP (Emerge Associates, 2021a).

Multiple Use Wetlands (MUW)

DPaW (2014) describes multiple use wetlands as wetlands with few remaining important attributes and functions. It recommends that use, development and management should be considered in the context of ecologically sustainable development and best management practice catchment planning through landcare. In MUW, the EPA urges that all reasonable measures are taken to retain the wetland's hydrological functions (including on-site water infiltration and flood detention) and, where possible, other wetland functions.

Emerge (2021a) noted that the land uses around the application area are predominantly carparking, landscape areas and internal roads which generally overlap the existing internal driveways. These landscapes are unlikely to significantly impact the environmental values of the MUW UFI 7236 mapped within the application area (Emerge Associates, 2021a).

The DWER assessment of the proposed clearing identified that the clearing on native vegetation is unlikely to have significant impacts upon riparian vegetation or the environmental values of the MUW. The wetland is mapped across approximately 3.60 hectares. The application area contains approximately 0.04 hectares of vegetation in a degraded and completely degraded (Keighery, 1994) condition within the mapped wetland scattered across four separated areas. The proposed clearing may result in sedimentation/turbidity and other water quality impacts.

However, noting that the clearing will impact approximately 1.03 per cent of the mapped wetland, the impacts will likely be only temporary and no long-term impacts on the ecological functions of the wetland are anticipated.

Conservation Category Wetlands (CCW)

CCW are wetlands with the highest priority. The objective is to preserve and protect the existing conservation values of the wetlands through various mechanisms. No development or clearing is considered appropriate as these are the most valuable wetlands and any activity that may lead to further loss or degradation is inappropriate (DPaW, 2014). The EPA urges that all conservation category wetlands and appropriate buffers are fully protected (EPA, 2008).

The following advice from DBCA (2022), regarding impacts to CCW UFI 7233, CCW UFI 7090, CCW UFI 7237 and CCW UFI 7235 was provided to the Department for consideration in this assessment.

"The above UFIs have been identified as CCW based on the ecological attributes of the site. These sites were originally mapped in 1996 and form the Geomorphic Wetlands of the Swan Coastal Plain (GWSCP) mapping. They may have been afforded CCW as the area was likely dominated by intact native vegetation providing habitat for threatened species and forming a continuous ecological linkage/wildlife corridor connecting to other wetland and bushland areas. Wetland evaluation and the determination of management categories considers a number of contributing factors including attributes (biological, physical, social and cultural) as well as wetland functions and values.

A GIS evaluation for all wetlands on the Swan Coastal Plain occurred in 2020 to replace the dataset published in 1996 (Hill et.al.). This mapping is still in draft. The new dataset, Wetland Evaluation Swan Coastal Plain (WESCP) also identified the above UFIs as CCW. An on-ground assessment in accordance with "A methodology for the evaluation of wetlands on the Swan Coastal Plain, Western Australia," (DBCA 2017) would confirm the accuracy of the mapping.
There is also a possibility the application area contains an unmapped wetland. Based on the assessment undertaken by Emerge 2021, it is unlikely the attributes within the application area meet the criteria to be afforded CCW, however in order to confirm whether the site should be identified as a wetland, an on-site evaluation would be required.

Wetland UFI 7233:

- Development is proposed within the 50m buffer of this wetland which may impact the values of the wetland.
- Kunzea glabrescens and Melaleuca preissiana have been identified to occur and are symbolic wetland species, providing habitat values. These species often exist in the presence of limited other species which may not necessarily imply degraded vegetation condition, as suggested by Emerge 2021.
- Sections of the 50m generic CCW buffer are void of vegetation and include a road, however it is likely that the underground hydrological processes are still contributing to the CCW rating, therefore a void in the presence of native vegetation may not discount the current CCW classification.

Wetland UFI 7090:

Development will not be occurring within the 50m generic wetland buffer, however the CCW may experience cumulative impacts from vegetation clearing and change in land use over time.

Wetland UFI 7237:

Development is proposed within the 50m generic wetland buffer. The proposed land use (educational institution) is likely to cause increased disturbance within the wetland buffer.

Wetland UFI 7235:

- Due to the continuous intact vegetation on the eastern boundary of UFI 7236 connecting to intact vegetation within UFI 7235, it is likely this portion of Multiple Use Wetland (MUW) UFI 7236 is in alignment with the values of CCW UFI 7235 [Figure 2] below demonstrates this (source draft WESCP mapping). See [Figure 1] (source GWSCP mapping), p5 of this proforma for comparison.
- The vegetation within the eastern portion of CCW UFI 7235 adjoins to Bush Forever 345. This further supports the connecting vegetation within the eastern portion of MUW UFI 7236 having a higher conservation value.
- Note: Page 14, Environment and Assessment Management Plan (Emerge 2021) states: '…MUW (UFI 16021) is the only mapped wetland within the application area…' Wetland UFI 16021 does not exist within the application area. This may be an error and the reference is likely to UFI 7236.

[Figure 2] Draft WESCP mapping showing larger CCW boundary in comparison with [Figure 1] above using GWSCP mapping.

<u>Risks to wetland values:</u>
- The development encroaches on the standard 50m buffer distance. Regardless of a void in the presence of native vegetation, the buffer still provides a protective function to existing wetland values. The encroachment of development within this buffer can impact weed invasion, pressure from feral and native animals (herbivory) including mosquito nuisance and indirect impacts to surrounding CCW and Ramsar listed Forestdale Lake located northeast of the application area. Further modifications to the wetland buffer may reduce the likelihood for vegetation to naturally recover to support surrounding CCW values, which can have a flow on effect to the hydrological processes supporting the system.
- Landscaping and construction involving soil excavation can impact wetland values:
- Use of fertilisers to maintain landscaping, particularly within wetland buffers is not recommended as it can lead to excess nutrients and contamination entering the waterway.
- Excavation can risk exposing Acid Sulphate Soils (ASS). As parts of the site have a moderate-high risk of ASS this should be managed adequately.
- Due to parts of the site containing highly permeable clayey soil, micro-organisms such as faecal bacteria and other contaminants can easily be transported into wetlands, significantly impacting water quality. Appropriate design of sewage treatment and disposal systems is recommended.
- UFI 7236 and 7235 within Lot 15 and also surrounding wetlands are mapped as sumplands. Seasonal inundation generally occurs within sumplands and vegetation clearing may increase the risk of inundation, as vegetation can hold sediment together to reduce inundation. Given the proximity of the sumplands to the application area adequate management of inundation is recommended.

(DBCA, 2022)

DBCA also noted that the site is considered a sewerage sensitive area as defined in the Government Sewerage Policy (GSP) as it is within 1 km of significant wetlands and within estuary catchments on the Swan Coastal Plain (State Government of Western Australia, 2019) (DBCA, 2022).

DBCA advice went on to recommend that;
"The vegetation and ecological communities surrounding the proposed development are considered water dependent ecosystems and therefore may be subject to hydrological impacts from adjacent land uses. It is noted that proposed development will not be connected to reticulated sewerage and that on-site septic systems are planned.

Development within the generic 50m CCW wetland buffer should be excluded as the function of the buffer is to protect existing wetland values, regardless of the absence of native vegetation.

Vegetation clearing may alter hydrological processes of the wetland system. The retention of vegetation within the generic 50m wetland buffer may help maintain current wetland values and habitat connectivity, particularly for species utilising wetland systems for breeding and/or roosting i.e., black cockatoos.

The preparation of a management plan detailing management measures to minimise impacts from dust, weeds and disease during construction, including the cleaning of all machinery prior to site entry will assist in identification and management of risks. This is particularly important when managing access to CCW UFI 7235 as this area appears to have little to no current disturbance, thus existing values of the CCW should be protected.

A detailed monitoring and management plan incorporating the proposed mitigation actions identified by Emerge 2021 below would assist in managing above risks. Wetland values will be maintained and protected through:

- *maintenance of the hydrological regime (on-site treatment and retention),*
- *managing public access to the CCW UFI 7235,*
- *sensitive and transitional landscaping,*
- *benign land uses within transitional boundary areas,*
- *locating any on-site sewage systems at least 100 m from the outer edge of any conservation category wetlands (CCWs),*
- *appropriate design of sewage treatment units and disposal areas,*
- *appropriate consideration of functional buffer requirements, and the sensitive use of fertilisation in sporting and*

- *landscaped areas - the development of an Irrigation and Nutrient Management Plan minimising irrigation and fertiliser use through water and fertiliser sensitive design is supported.*

Based on desktop assessment and the draft WESCP mapping, the other half of Lot 15 (not proposed for development) contains a CCW and intact native vegetation adjoining to Bush Forever 345. The proposal is likely to result in secondary impacts to this area. Disturbance should be minimised to the remaining un-developed portion of Lot 15. A monitoring and management plan will help to conserve the values of CCW UFI 7235 as mapped in the draft WESCP.

(DBCA, 2022)

To ensure that the environmental values of the CCWs are maintained and protected, the applicant will implement a Revegetation Environmental Management Plan in accordance with condition 22 of their Development Approval, in order to demonstrate environmental improvement to the land and to revegetate UFI 7233 & UFI 7235 and their buffers (City of Armadale, 2022).

The development approach for the property incorporated provision of a soft transition to the surrounding retained vegetation and wetlands which includes planting of endemic species, and thereby protecting and reinforcing vegetation values. The land uses proposed along the property boundaries are predominantly carparking, landscaped areas and internal roads which generally maintain the locations of existing internal driveways. These land uses are unlikely to significantly impact wetland values. Any runoff from the entry roads and car parks will be treated and retained within the site and will not be discharged into wetlands. This approach is anticipated to maintain the existing hydrological regime and ensure that no surface water pollutants from the development enter the nearby wetlands.

Any on-site sewage treatment units and disposal areas will be located at least 100 metres from the outer edge of any CCW which is in line with the requirements of the *Government Sewerage Policy (2019)*. The provision of this setback and other requirements will ensure that sewage is disposed of in a manner that protects the adjacent wetlands Emerge Associates, 2021a).

Emerge Associates (2021a) advised that the potential impacts to the wetland during the project development will be mitigated through the preparation of a construction management plan which will include:

- temporary fencing prior to construction/clearing works surrounding the existing vegetation which will be retained. This will encompass the CCW to the east of the property and ensure that riparian vegetation is retained
- induction of personnel that outlines locations and extent of vegetation to be retained and how access to this area must be restricted; and
- management measures to minimise impacts from dust or weed encroachment during construction.

The ongoing management of the CCW will consider (Emerge Associates, 2021a):

- maintenance of the natural hydrological regime through implementation of the drainage strategy
- management of the public access to the CCW 7235 to minimise the potential for people to impact on the environmental values of this wetland; and
- planting of species appropriate to the soil and hydrological conditions present.

The management of surface water runoff from the proposed development, including management of uncontrolled surface water runoff into the nearby conservation category wetland has been addressed through the preparation of the EAMP (Emerge Associates, 2021a). The measures presented within Table 1 are to be applied during site works.

Table 1 Mitigation measures for nearby CCWs

Impact	Mitigation	Purpose
CCWs	Implementation of a drainage strategy.	To ensure the natural hydrological regime is maintained.
	Manage public access to the CCW UFI 7235.	To minimise the potential for people to impact on the environmental values of the CCW.
	Planting of flora species appropriate to the soil and hydrological conditions present.	To protect and maintain the values of the wetland.
	Establishment of temporary fencing prior to construction/clearing works surrounding the existing vegetation which is to be retained.	This will encompass the CCW to the east of the site (UFI 7235) and ensure riparian vegetation is retained.
	Induction for personnel.	Ensure employees understand the location and extent of the vegetation to be retained and now access is restricted.
Sewerage	On-site sewerage systems will be located at least 100 m from the outer edge of any nearby conservation category wetland and appropriate consideration of functional buffer requirements and the sensitive use of fertilisation in sporting and landscaped areas will be applied.	This is consistent with the requirements of the *Government Sewerage Policy* (DPLH 2019). The provision of this setback will ensure that sewage is disposed of in a manner that protects the adjacent wetlands.
Surface runoff	Any runoff from the entry roads and car parks will be treated and retained within the site and will not be discharged into the wetland.	This approach will maintain the existing hydrological regime and ensure that no surface water pollutants enter the wetland from the development.

Noting the separation distance between the application area and the closest CCW (<50 metres in some instances) and expert advice from DBCA, as well as taking into account the land uses within the wetland buffers, and the mitigation revegetation of the wetlands and their buffers in accordance with Development Approval, the Delegated Officer determined that the proposed clearing of native vegetation, after avoidance and mitigation measures are taken into consideration, is not likely to have significant residual impact on wetlands within and adjacent to the application area.

The Delegated Officer determined that native vegetation within the application area is growing in, or in association with a wetland and that clearing may impact the hydrological flows and quality in the immediate vicinity of the application area. The Delegated Officer considers that the mitigation measures proposed are sufficient to reduce the risk of clearing of native vegetation on these environmental values to a point where the clearing is environmentally acceptable.

3.3. Relevant planning instruments and other matters

Other relevant authorisations required for the proposed land use include:

- Development approval under the *Planning and Development Act 2005* (issued by the JDAP and administered by the City of Armadale)
- Licence to abstract water under the *Rights in Water and Irrigation Act 1914* (potential requirement)

The Department's Planning Advice Section (Swan-Avon region) advised that a water licence, nor a permit has been issued to this property. Furthermore, the Department have not received a water licence application to assess (DWR, 2022). The Applicant has advised that may seek to secure a RIWI Act licence, but this is not essential as they will use scheme water if they cannot secure an allocation. Based on this advice, the requirement for a water licence is not considered to be a constraint to a determination on the clearing permit.

The City of Armadale advised DWER that local government approvals are required, and that the proposed clearing is consistent with the Shire's Local Planning Scheme. The Shire did not have any objections to the proposed clearing and noted that an application for an educational establishment was determined by the Joint Development Assessment Panel (JDAP) on 16 December 2021 for car parking, driveways and buildings. The Determination is subject to a number of conditions including:

- Condition 1: A fence restricting vehicle and pedestrian access to Bush Forever sites No 345 is to be constructed to the specification of DBCA on Bush Forever Site boundary to protect native vegetation to the satisfaction of the City of Armadale
- Condition 16: To meet drainage requirements prior to commencement of works, the developer/owner shall, to the specifications and satisfaction of the City of Armadale:
  a) Submit a stormwater management plan incorporating water sensitive design principles for approval and implement the approved plan thereafter;
  b) Incorporate relevant measures pertaining to environmental protection;
  c) Show any drainage easements as may be required on the Certificate of Title in favour of the City; and
  d) Relocate, remove or upgrade any drainage infrastructure on the lot or within the adjoining road reserve that is impacted by the proposed development.
- Condition 22: An updated Environmental Assessment and Management Plan (EAMP) shall be provided to the satisfaction of the City of Armadale. The revised EAMP will provide a targeted and specific program of works for the management of threats and environmental enhancement in accordance with Policy PLN 2.7 for the native plant communities shown in [Figure 5] of the Environmental Assessment and Management Plan (Emerge Associates 2021) and Wetlands, UFI 7233 & UFI 7235 and their buffers shown on [Figure 18] of the Environmental Assessment and Management Plan (Emerge Associates 2021). The EAMP will be implemented for the duration of the approved use within the site to the satisfaction of the City of Armadale.
- Condition 23: Prior to commencement of works, an Irrigation and Nutrient Management Plan consistent with the detail recommended in the Environmental Assessment and Management Plan (Emerge Associates, 2021a) shall be submitted to and approved by the City of Armadale. The development shall be implemented and maintained as per the approved management plans thereafter to the satisfaction of the City of Armadale.
- Condition 24(j): j) Measures to mitigate environmental impacts, including fauna relocation, dieback management, nutrient discharge and sediment and erosion control

(City of Armadale, 2022)

No Aboriginal sites of significance have been mapped within the application area. It is the permit holder's responsibility to comply with the *Aboriginal Heritage Act 1972* (WA) and ensure that no Aboriginal Sites of Significance are damaged through the clearing process.

The proposal was referred to the Commonwealth DCCEEW under the EPBC Act in relation to impacts to Carnaby's cockatoo and the Commonwealth-listed Banksia Woodland TEC (reference EPBC 2021/9134). On 1 June 2022, DCCEEW made a referral decision under section 75 of the EPBC Act that the project is 'Not a Controlled Action'.

4 Suitability of offsets

Through the detailed assessment outlined in Section 3.2 above, the Delegated Officer has determined that the following significant residual impacts remain after the application of the avoidance and mitigation measures summarised in Section 3.1:

- Loss of 0.67 hectares of low-quality foraging habitat for Carnaby's cockatoo
- Loss of 0.66 hectares of moderate quality foraging habitat for Carnaby's cockatoo

To counterbalance the above impacts, the applicant has submitted an offset proposal that involves a financial contribution for the protection and ongoing management of native vegetation.

The Delegated Officer determined that the acquisition of 6.72 hectares of native vegetation would sufficiently counterbalance the above impacts and that in this instance a financial offset was acceptable. The Delegated Officer determined that a rate of $22,057.50 per hectare was suitable as it represents the average unimproved land evaluation of eight potential offsets sites within the nearby Shire of Serpentine-Jarrahdale.

Based on this assessment, the Delegated Officer considers that a financial contribution of $148,226.40 to the Environmental Offsets Fund is appropriate to counterbalance the significant residual impacts of this project.

Consideration of suitability of financial offset:

When considering the suitability of offsets for this project the Delegated Officer considered that:

- the applicant has sufficiently addressed the mitigation hierarchy to avoid and mitigate clearing of native vegetation as far as practical
- the environmental values being impacted can be offset
- the offset proposed includes only direct offsets, which are actions designed to provide for on-ground improvement, rehabilitation and conservation of habitat. It is noted that direct offsets vary, depending on the specific circumstances of environmental impacts, and include acquisition, restoration, revegetation and rehabilitation of natural areas outside the project area.
- the offset is appropriate, cost effective, relevant and proportionate to the impacted environmental values.

In this case, the Delegated Officer determined that a financial contribution to the Part V Environmental Offsets Fund is appropriate, noting the associated challenges to achieving self-sustaining revegetation as an isolated remnant in an urban area which is in close proximity to the application area. The Department is aware of larger properties available for purchase within the Shire of Serpentine-Jarrahdale (adjacent local government area) which include Carnaby cockatoo foraging habitat in similar or better condition.

Given the occurrence of larger, intact potential offset sites that can better support Carnaby's cockatoo populations in this area, the Department determined that a financial contribution to the purchase of one of these larger properties would provide an acceptable environmental outcome to account for the loss of Carnaby cockatoo foraging habitat.

In assessing whether the proposed offset is adequately proportionate to the significance of the environmental values being impacted, a calculation using the WA Offsets calculator was undertaken. The calculation indicates that the acquisition of 6.72 hectares of native vegetation as an offset is sufficient to adequately address the impacts of the proposed clearing.

The Delegated Officer considers that this adequately counterbalances the significant residual impacts listed above.

The justification for the values used in the offset calculation is provided in Appendix E.

Appendix A. Additional information provided by applicant

Summary of comments	Consideration of comment
Emerge Associates Environmental Assessment and Management Plan (Emerge Associates, 2021a)	The purpose of this Environmental Assessment and Management Plan (EAMP) is to provide a synthesis of information regarding the environmental values and attributes of the site. The EAMP is the key supporting environmental document for the development application, ultimately facilitating the consideration of environmental issues by the local government and various state government agencies and authorities. This report has been referenced throughout this Decision Report were relevant.
Basic Fauna and Targets Black cockatoo survey report (Emerge Associates, 2021b)	This report provides information on the fauna and black cockatoo values within Lot 15 Nicholson Road in Forrestdale. The assessment included a desktop review of relevant background information and a field survey was undertaken on 11 March 2021. During the field survey opportunistic sightings of fauna were recorded and an assessment was made on the fauna habitat within the site and its suitability to provide habitat for conservation significant fauna. A targeted black cockatoo survey was also undertaken to determine the presence of habitat for threatened black cockatoo species. This report has been referenced throughout this Decision Report were relevant.
Flora and Vegetation Assessment (Emerge Associates, 2021c)	This report provides information on the flora and vegetation values within Lot 15 Nicholson Road in Forrestdale. As part of the assessment a desktop review of relevant background information was completed and a field survey was undertaken on 16 November 2020, 11 March and 13 October 2021. During the field surveys an assessment was made on the type, condition and values of vegetation across the site. Targeted searches for conservation significant flora species were also undertaken within areas of potential habitat. This report has been referenced throughout this Decision Report were relevant.
Figures supporting clearing permit application CPS 9553/1 (Emerge Associates, 2022a)	This document includes several figures to support the clearing permit application. These figures have been included in this Decision Report where relevant.
Emerge Associates (2022b) – response to request for additional information	On 15 June 2022, DWER sought additional information from the Applicant. Further information was provided on 27 June 2022. This information has been incorporated into the Decision Report were necessary.
Emerge Associates (2022c) – Offset Proposal	On 22 July 2022, DWER sought additional information from the applicant in regards to a suitable offset proposal. On 16 August 2022, the Applicant provided a suitable offset proposal. This proposal was reviewed and endorsed by DWER Management on 29 August 2022. Details of the endorsed offset proposal and rationale for acceptance are included under section 4 of this Decision Report.

Appendix B. Details of public submissions

Table 2 - Summary of public submissions (Submitter, 2022)

Summary of comments	Consideration of comment
That the proposed facility could be completely situated within cleared areas if land east of the power transmission easement were used. This indicates that AIC has not properly considered the "avoidance" principle in the design of this project. AIC should be requested to submit plans for the alternative option for consideration by DWER.	Section 3.1 of this report details the applicant's consideration of the avoidance and mitigation principles. The Delegated Officer determined that location of the project on the western side of Lot 15 provides better separation distance to adjacent native vegetation and vegetation in association with a conservation category wetland.
That the value of this vegetation as "low lying *Banksia attenuata* woodlands and shrublands" PEC has been underestimated and should be protected from clearing and or offsets applied (e.g. rehabilitation of degraded areas east of the easement).	DWER considered the impacts of the clearing on low lying Banksia attenuata woodlands and shrublands under clearing principles (a) (biodiversity) and (d) (threatened ecological communities). DWER also sought expert advice from DBCA regarding the significance of this occurrence and potential impacts of clearing. This assessment and expert advice is included under section 3.2.1 of this report. DWER is satisfied that clearing will not have a significant residual impact on this environmental value and therefore offsets have not been applied for this value.
That the hydrological assessment of the site with regards to impacts on surrounding wetlands is incomplete. AIC have failed to detail the effect of fill material to be used to raise the multiple use wetland (MUW) in the centre of the planned development as well the effect of possible groundwater abstraction on local groundwater levels.	DWER acknowledges that there may be operational matters that the applicant will need to be resolve with the local authority. These matters are beyond the scope of this assessment as they relate to the end landuse and not the clearing of native vegetation. It is outside the scope of the regulatory framework under Part V of the EP Act to address this comment further.
AIC's commitment to use "endemic plantings" identifies tree species (e.g. *Agonis flexuosa*, *Banksia grandis*) that are not endemic to area. Local tree species *Banksia attenuata*, *B menziesii*, *B illicifolia*, *Eucalyptus todtiana*, and *Melalueca pressiana* must be included in the planting selection, with this stipulated as a condition of any approval.	DWER acknowledges that this project is also regulated by Development Approval issued by JDAP and administered by the City of Armadale. This includes the requirement to revegetate areas within Lot 15. The Development Approval is the primary regulatory instrument against which revegetation requirements are already conditioned. DWER has not sought to duplicate regulation of revegetation efforts for this project, noting that a monetary offset contribution has been provided to counterbalance the significant residual impacts of the clearing. Operational matters that the applicant will need to resolve with the local authority relating to fulfillment of their responsibilities under their Development Approval (including for revegetation) are outside of the scope of the regulatory framework under Part V of the EP Act.
AIC has committed to the long-term eradication of weeds in the eastern portion of the lot. No plans are given on how such a complex undertaking is to be achieved. Details must be provided if such a commitment is to be used as an offset to the impacts of any clearing.	DWER acknowledges that this project is also regulated by Development Approval issued by JDAP and administered by the City of Armadale. This includes the requirement to undertake weed control in areas within Lot 15 but outside of the clearing permit boundary. DWER recognises that the Development Approval has been conditioned for weed management, on which basis DWER has not sought to duplicate regulation of weed management efforts outside of the application area. Operational matters that the applicant will need to resolve with the local authority relating to fulfillment of their responsibilities under their Development Approval (including for weed management) are outside of the scope of the regulatory framework under Part V of the EP Act. DWER acknowledges that clearing of native vegetation within the footprint of the clearing permit, may increase the spread of weeds and dieback and has therefore included a condition on the permit to manage the spread of weeds and dieback while undertaking clearing activities.

Appendix C. Site characteristics

C.1. Site characteristics

<table>
<tr><th>Characteristic</th><th>Details</th></tr>
<tr><td>Local context</td><td>The application area occurs approximately 25 kilometres southeast of the Perth Central Business District within the Swan Coastal Plain (SCP) Interim Biogeographic Regionalisation for Australia (IBRA) bioregion, Perth subregion.

The application area is also mapped in the Perth Metropolitan Area where the Environmental Protection Authority (EPA) has a modified objective to retain at least 10 percent of the pre-clearing extent of vegetation complexes for defined constrained areas (EPA, 2008).

Spatial data indicate the local area (10-kilometre radius of the application area, which is equal to approximately 32,149.28 hectares) retains approximately 30.53 per cent (9,814.44 hectares) of the original native vegetation cover.</td></tr>
<tr><td>Ecological linkage</td><td>The application area is not mapped within any ecological linkage.

The closest mapped linkage is Perth Regional Ecological Linkage mapped by WA Local Government Association's (WALGA) biodiversity project (Del Marco et al., 2004) approximately 90 metres north of the application area.</td></tr>
<tr><td>Conservation areas</td><td>The application area is not mapped within any conservation area.

The closest conservation areas are Bush Forever Site 344 and 345 mapped approximately 130 metres west and 140 metres east/south of the application area respectively.</td></tr>
<tr><td>Vegetation description</td><td>Emerge Associates (2021c) mapped the vegetation units shown in Table 1 within the application area. Representative photos are available in Appendix G.

Table 3 Vegetation unit mapped within the application area (Emerge 2021a)
<table>
<tr><th>Plant community</th><th>Description</th><th>Area (ha)</th><th>Area (%)</th></tr>
<tr><td>BaBmSi</td><td>Low sparse to open woodland of Banksia menziesii, B. attenuata, B. ilicifolia, Eucalyptus todtiana and Nuytsia floribunda over sparse to open shrubland of Kunzea glabrescens, Scholtzia involucrata, Acacia pulchella var. glaberrima, Macrozamia riedlei</td><td>0.87</td><td>51</td></tr>
<tr><td>KgSi</td><td>Tall shrubland to closed tall shrubland of Kunzea glabrescens over shrubland to open shrubland of Scholtzia involucrata over sparse forbland Conostylis aculeata, Lyginia barbata and Lomandra caespitosa.</td><td>0.79</td><td>47</td></tr>
<tr><td></td><td>Heavily disturbed areas comprising weeds with occasional native shrubs and forbs and planted vegetation.</td><td>0.04</td><td>2</td></tr>
<tr><td></td><td>Total</td><td>1.70</td><td>100</td></tr>
</table>
This is inconsistent with the SCP Southern River Complex vegetation complex mapped within the application area by Heddle et al., (1980). This vegetation complex is described as open woodland of Corymbia calophylla (Marri) - Eucalyptus marginata (Jarrah) - Banksia species with fringing woodland of Eucalyptus rudis (Flooded Gum) - Melaleuca rhaphiophylla (Swamp Paperbark) along creek beds.

The mapped vegetation type retains approximately 18 per cent of the original extent (Government of Western Australia, 2019b).</td></tr>
<tr><td>Vegetation condition</td><td>Emerge Associates (2021c) mapped the vegetation conditions (Keighery, 1994) detailed in Table 4 within the application area. The full Keighery (1994) condition rating scale is provided in Appendix E.

Table 4 Vegetation condition mapped within the application area (Emerge Associates, 2021c)
<table>
<tr><th>Vegetation condition (Keighery, 1994)</th><th>Area (ha)</th><th>Area (%)</th></tr>
<tr><td>Good</td><td>0.87</td><td>51</td></tr>
<tr><td>Degraded</td><td>0.79</td><td>47</td></tr>
<tr><td>Completely degraded</td><td>0.04</td><td>3</td></tr>
</table></td></tr>
</table>

<table>
<tr><th>Characteristic</th><th>Details</th></tr>
<tr><td></td><td>
<table>
<tr><td>Total</td><td>1.70</td><td>100</td></tr>
</table>
</td></tr>
<tr><td>Climate and landform</td><td>

Rainfall – Mean Annual: 900 millimetres
Evapotranspiration – Areal Actual: 800 millimetres
Topography: the elevation of the site ranges from 25 metres in relation to the Australian height datum (AHD) in the central portion of the site to local high points at 30 metres AHD in the northern and southern portions
Groundwater Salinity (Total Dissolved Solids): 500-1000 milligrams per litre total dissolved solids. This level of salinity is described by Mayer, Ruprecht and Bari (2005) as marginal.

</td></tr>
<tr><td>Soil description</td><td>
DPIRD (2022) mapped the soils detailed in Table 5 within the application area.

Table 5 Soils mapped within the application area (DPIRD, 2022)
<table>
<tr><th>Name</th><th>Description (Schoknecht et al., 2004)</th><th>Area (ha)</th><th>Area (%)</th></tr>
<tr><td>Bassendean B1 Phase</td><td>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 two metres; banksia dominant.</td><td>1.66</td><td>98</td></tr>
<tr><td>Bassendean B3 Phase</td><td>Closed depressions and poorly defined stream channels with moderately deep, poorly to very poorly drained bleached sands with an iron-organic pan, or clay subsoil. Surfaces are dark grey sand or sandy loam.</td><td>0.04</td><td>2</td></tr>
<tr><td></td><td>Total</td><td>1.70</td><td>100</td></tr>
</table>
</td></tr>
<tr><td>Land degradation risk</td><td>
Bassendean B1 Phase has a high risk of acidification, water repel, water storage and microbial purification, and moderate risk of sub surface compact.

Bassendean B3 Phase has a high risk of acidification site drainage, waterlogging, microbial purification and phosphorus loss. In addition, the soil system also has a moderate risk of sub surface compact and excavation ease.

Both systems have low risks of wind erosion, salinity (DPIRD, 2021). However, given the application area contains deep sandy soils, the clearing may increase the risk of wind erosion if the cleared application area is exposed to wind effects for a prolonged period.
</td></tr>
<tr><td>Waterbodies</td><td>
The application area:

does not intersect any mapped watercourse. The closest watercourses is a manmade drain which occurs approximately 150 metres northwest of the application area.
is mapped within a multiple use wetland (unique feature identifier (UFI) 7236).

There is a number of CCW in the locality of the application area. The closest CCW are:

UFI 7233 located approximately 38 metres northeast of the application area
UFI 7090 located approximately 165 metres northwest of the application area
UFI 7237 located approximately 176 metres south of the application area; and
UFI 7235 located approximately 235 metres west of the application area.

</td></tr>
<tr><td>Hydrogeography</td><td>
The application area:

is mapped within Perth Groundwater Area, as proclaimed under the RIWI Act
is not within a proclaimed surface water area
does not fall within a public drinking water source area (PDWSA) or within protection zones for PDWSA.

</td></tr>
<tr><td>Flora</td><td>According to available databases, a total of 10 flora species listed as threatened under the BC Act and 35 Priority listed flora by DBCA have been recorded within the local area. Emerge Associates (2021c) conducted flora and vegetation surveys of the application are in November 2020, March and October 2021. Noting the findings of the</td></tr>
</table>

Characteristic	Details
	surveys, as well as the similarities shared between the soil and vegetation types in habitats for these flora taxa and within the application area, the application area may provide habitat for *Schoenus pennisetis* (Priority 3).
Ecological communities	According to available databases: • eight ecological communities listed as Threatened under the EPBC Act, as well as BC Act are mapped within the local area • three ecological communities listed as Threatened under the EPBC and Priority by DBCA are mapped within the local area • one TEC listed under the BC Act is mapped within the local area • one PEC listed by DBCA is mapped within the local area. Emerge Associates (2021c) identified that the vegetation within the application area represents two conservation significant ecological communities: • Low lying *Banksia attenuata* woodlands or shrublands; and • Banksia dominated woodlands of the Swan Coastal Plain IBRA Region.
Fauna	According to available databases, a total of 55 conservation significant fauna species have been recorded within the local area (DBCA, 2021b). Noting the habitat requirements, distribution of the recorded species, the mapped vegetation type, the condition of the vegetation within the application area, and the findings of the fauna survey (Emerge Associates, 2021b), the application area is likely to comprise suitable habitat for: • a short-tongued bee (*Leioproctus contrarius, Leioproctus douglasiellus, Neopasiphae simplicior*) • Baudin's cockatoo (*Calyptorhynchus baudinii*) • black-striped snake, black-striped burrowing snake (*Neelaps calonotos*) • Carnaby's cockatoo (*Calyptorhynchus latirostris*) • forest red-tailed black cockatoo (*Calyptorhynchus banksii naso*) • graceful sunmoth (*Synemon gratiosa*) • peregrine Falcon (*Falco peregrinus*) • Perth slider, lined skink (*Lerista lineata*) • quenda, southwestern brown bandicoot (*Isoodon fusciventer*) • southern death adder (*Acanthophis antarcticus*) • Swan Coastal Plain shield-backed trapdoor spider (*Idiosoma sigillatum*) • tammar wallaby (*Notamacropus eugenii derbianus*); and • western brush wallaby (*Notamacropus irma*).

C.2. Vegetation extent

	Pre-European extent (ha)	Current extent (ha)	Extent remaining (%)	Current extent in all DBCA managed land (ha)	Current proportion (%) of pre-European extent in all DBCA managed land
IBRA bioregion*					
Swan Coastal Plain	1,501,221.93	579,813.47	38.62	38.45	14.85
Vegetation complex in IBRA bioregion					
Southern River Complex **	57,781.48	10,832.18	18.43	940.36	1.60
Local area					
10km radius	32,149.28	9,814.44	30.53	-	-

*Government of Western Australia (2019a) **Government of Western Australia (2019b)

C.3. Flora analysis table

With consideration for the site characteristics set out above, relevant datasets (see Appendix G), and biological survey information (Emerge, 2021a), impacts to the following conservation significant flora required further consideration.

Species name	Conservation status	Suitable habitat features ?	Suitable vegetation type?	Suitable soil type?	Distance of closest record to application area (m)	Number of records in local area*	Are surveys adequate to identify?
Schoenus pennisetis	P3	Yes	Yes	Yes	3,749	4	No

T: threatened, CR: critically endangered, EN: endangered, VU: vulnerable, P: priority

*The table may include duplicate records. The total number of each species is indicative only.

C.4. Fauna analysis table

With consideration for the site characteristics set out above, relevant datasets (see Appendix G), and biological survey information (Emerge, 2021b), impacts to the following conservation significant flora required further consideration.

Species name	Conservation status	Suitable habitat features?	Distance of closest record to application area (m)	Are surveys adequate to identify?
A short-tongued bee	EN, P3	Yes	2,140	No
Baudin's cockatoo	EN	Yes	7,206	No
Black-striped snake, black-striped burrowing snake	P3	Yes	1,516	No
Carnaby's cockatoo	EN	Yes	1,015	No
Forest red-tailed black cockatoo	VU	Yes	2,191	No
Graceful sunmoth	P4	Yes	4,911	No
Peregrine falcon	OS	Yes	1,075	No
Perth slider, lined skink	P3	Yes	1,223	No
Quenda, southwestern brown bandicoot	P4	Yes	1,447	No
Southern death adder	P3	Yes	8,614	No
Swan Coastal Plain shield-backed trapdoor spider	P3	Yes	2,487	No
Tammar wallaby	P4	Yes	8,302	No
Western brush wallaby	P4	Yes	2,775	No

CR: critically endangered, EN: endangered, VU: vulnerable, EX: Presumed extinct species, IA (M) Migratory birds protected under an international agreement, CD: Conservation dependent fauna, OS: Other specially protected fauna

C.5. Ecological community analysis table

Community name	Conservation status (WA)	Conservation status (Cth)	Suitable habitat features?	Closest record to application area (m)	Are surveys adequate to identify?
Banksia Dominated Woodlands of the Swan Coastal Plain IBRA Region	Priority 3	Endangered	Yes	22	Yes
Low lying *Banksia attenuata* woodlands or shrublands	Priority 3	Endangered	Yes	5,985	Yes

T: threatened, CR: critically endangered, EN: endangered, VU: vulnerable, P: priority

Appendix D. Assessment against the clearing principles

Assessment against the clearing principles	Variance level	Is further consideration required?
Environmental value: biological values		
Principle (a): *"Native vegetation should not be cleared if it comprises a high level of biodiversity."* Assessment: The application area contains values which are considered to indicate a high level of biodiversity; namely, vegetation representative of federally listed TEC and significant habitat for conservation significant fauna. The application area is not likely to provide significant habitat for threatened or priority flora species.	At variance	Yes *Refer to Section 3.2.1, above.*
Principle (b): *"Native vegetation should not be cleared if it comprises the whole or a part of, or is necessary for the maintenance of, a significant habitat for fauna."* Assessment: The proposed clearing area contains significant foraging habitat for Carnaby's cockatoo. Ground dwelling conservation significant fauna may also utilise the application area. The proposed clearing area provides foraging habitat for the black cockatoos. No black cockatoo hollow-bearing trees were recorded within the application area (Emerge Associates, 2021b).	At variance	Yes *Refer to Section 3.2.2, above.*
Principle (c): *"Native vegetation should not be cleared if it includes, or is necessary for the continued existence of, threatened flora."* Assessment: The application area is unlikely to contain habitat for threatened flora species listed under the BC Act due to the completely degraded condition (Keighery, 1994) of the vegetation within the application area, comprising a thick understorey layer of *Rubus* sp.	Not likely to be at variance	No
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."* Assessment: The proposed clearing area contains species composition indicative of a TEC listed under the EPBC Act.	At variance	Yes *Refer to Section 3.2.1, above.*
Environmental value: significant remnant vegetation and conservation areas		
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."* Assessment: The extent of the mapped vegetation type is consistent with the national objectives and targets for biodiversity conservation in Australia. Vegetation in the proposed clearing area is not considered to be part of a significant ecological linkage in the local area, however, may contribute to linkage function with adjacent areas of native vegetation.	Not likely to be at variance	No

Assessment against the clearing principles	Variance level	Is further consideration required?
The application area is classified as a constrained area on the SCP, where the threshold for representation of the pre-clearing of native vegetation is 10 per cent.		
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 area."* Assessment: Given the separation distance between the application area and the nearest conservation area, the proposed clearing is not likely to have an impact on the environmental values of nearby conservation areas. The application area is in close proximity to Bush Forever sites 344 and 345. Noting the separation distance and the condition of vegetation within the separation distance, the proposed clearing is unlikely to cause adverse environmental impacts on this conservation areas.	Not likely to be at variance	No
Environmental value: land and water resources		
Principle (f): *"Native vegetation should not be cleared if it is growing in, or in association with, an environment associated with a watercourse or wetland."* Assessment: The application area is mapped within a multiple use wetland, and therefore, the vegetation proposed to be cleared is growing in an environment associated with a wetland. Noting the small amount of clearing of vegetation within the mapped wetlands scattered across three portions of the application area, the clearing is unlikely to impact on an environment associated with wetlands.	At variance	Yes *Refer to Section 3.2.3, above.*
Principle (g): *"Native vegetation should not be cleared if the clearing of the vegetation is likely to cause appreciable land degradation."* Assessment: The mapped soils are not susceptible to land degradation in form of soil erosion, salinity and eutrophication. Noting the extent of the application area and native vegetation within the local area, the proposed clearing is not likely to have an appreciable impact on land degradation.	Not likely to be at variance	No
Principle (i): *"Native vegetation should not be cleared if the clearing of the vegetation is likely to cause deterioration in the quality of surface or underground water."* Assessment: Given the extent of native vegetation in the local area and extent of vegetation within the application area, the proposed clearing will unlikely lead to a perceptible rise in the watertable and an increase in groundwater levels. The clearing within wetland environments associated with a conservation category wetland system may impact the hydrological regime within the hyper-local area. Given the small extent of vegetation proposed to be cleared, any change resulting from the clearing of native vegetation is considered to be minor and temporary. No long-term impacts on quality of surface and underground water are anticipated as a result of clearing native vegetation.	May be at variance	Yes *Refer to Section 3.2.3, above.*

Assessment against the clearing principles	Variance level	Is further consideration required?
Principle (j): *"Native vegetation should not be cleared if the clearing of the vegetation is likely to cause, or exacerbate, the incidence or intensity of flooding."* Assessment: Given the extent of clearing within the mapped wetland is small (0.036 hectares), the proposed clearing is unlikely to contribute to cause or exacerbate the incidence or intensity of flooding.	Not likely to be at variance	No

Appendix E. Vegetation condition rating scale

Vegetation condition is a rating given to a defined area of vegetation to categorise and rank disturbance related to human activities. The rating refers to the degree of change in the vegetation structure, density and species present in relation to undisturbed vegetation of the same type. The degree of disturbance impacts upon the vegetation's ability to regenerate. Disturbance at a site can be a cumulative effect from a number of interacting disturbance types.

Considering its location, the scale below was used to measure the condition of the vegetation proposed to be cleared. This scale has been extracted from:

- Keighery, B.J. (1994) *Bushland Plant Survey: A Guide to Plant Community Survey for the Community*. Wildflower Society of WA (Inc). Nedlands, Western Australia.

Measuring vegetation condition for the South West and Interzone Botanical Province (Keighery, 1994)

Condition	Description
Pristine	Pristine or nearly so, no obvious signs of disturbance.
Excellent	Vegetation structure intact, with disturbance affecting individual species; weeds are non-aggressive species.
Very good	Vegetation structure altered, with obvious signs of disturbance. For example, disturbance to vegetation structure caused by repeated fires, the presence of some more aggressive weeds, dieback, logging and/or 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/or 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/or 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.

Appendix F. Offset metric rationale

Field Name	Description	Justification for value used
IUCN Criteria	The IUCN criteria for the value being impacted	**1.2%** - Afforded to Carnaby's cockatoo habitat as this species is listed as Endangered under the BC Act and the EPBC Act.
Area of impact (habitat/community) or Quantum of impact (features/individuals)	The area of habitat/community impacted or number of features/individuals impacted	**0.67** - The application area comprises 0.67 hectares of low quality Carnaby's cockatoo foraging habitat; and **0.66** - The application area includes 0.66 hectares of moderate quality Carnaby's cockatoo foraging habitat.
Quality of impacted area (habitat/community)	The quality score for area of habitat/community being impacted - a measure of how well a particular site supports a particular threatened species or ecological community and contributes to its ongoing viability	**2 -** Quality score is based on the Draft Offset Procedure and biological surveys of the application area which identified that for 'low' quality habitat, primary foraging species are no greater than 10% coverage in degraded condition. **5** - Quality score is based on the Draft Offset Procedure and biological surveys of the application area which identified that for 'moderate' quality habitat, primary foraging species range between 10% and 50% coverage
Time over which loss is averted (habitat/community)	This describes the timeframe over which changes in the level of risk to the proposed mitigation site can be considered and quantified	**20** - In accordance with the WA Offsets Procedure The offset value (i.e. offset area requirement when using area mode) is calculated using a 20-year time period, which represents the foreseeable future over which loss is averted. This includes where the offset is in perpetuity. Given the applicant proposes to make a financial contribution, and the Department will control the land acquisition, to the selected offset area, a value of 20 was selected for this calculation.
Time until ecological benefit (habitat/community) or Time horizon (features/individuals)	This describes the estimated time (in years) that it will take for the main benefit of the quality (habitat/community) or value (features/individuals) improvement of the proposed mitigation to be realised	**1 -** the time until offset secure is selected at 1 year as it will be conditioned on the permit that within 1 year of the approval, evidence must be provided to the Department that the financial contribution has been made to the offset fund.
Start area (habitat/community) or Start value (features/individuals)	The area of habitat/community or number of features/individuals proposed to mitigate the impacts	The required hectares for each value as reverse calculated to support a financial contribution offset: **1.94** hectares required to address impacts to low quality Carnaby's habitat; and **4.77** hectares required to address impacts to moderate quality Carnaby's habitat; and

Start quality (habitat/community)	The quality score for the area of habitat/community proposed as mitigation - a measure of how well a particular site supports a particular threatened species or ecological community and contributes to its ongoing viability	**7** - A quality score of (7) (Very Good to Excellent) has been assigned given an offset site would be selected and is considered available on the Swan Coastal Plain. A quality score of 7 is a reasonable and realistic target.
Future quality without offset (habitat/community) or Future value without offset (features/individuals)	The predicted future quality score (habitat/community) or value (features/individuals) of the proposed mitigation site without the mitigation	**7** - A quality score of (7) (Very Good to Excellent) has been assigned given an offset site would be selected and is considered available on the Swan Coastal Plain. A quality score of 7 is a reasonable and realistic target.
Future quality with offset (habitat/community) or Future value with offset (features/individuals)	The predicted future quality score (habitat/community) or value (features/individuals) of the proposed mitigation site with the mitigation	**7** - A quality score of (7) (Very Good to Excellent) has been assigned given an offset site would be selected and is considered available on the Swan Coastal Plain. A quality score of 7 is a reasonable and realistic target.
Risk of loss (%) without offset (habitat/community)	This describes the chance that the habitat/community on the proposed mitigation site will be completely lost (i.e. no longer hold any value for the protected matter of concern) over the foreseeable future without the mitigation	**15%** - this value is estimated as a specific offset site has not been selected. The Draft Offset Procedure advised that: "An offset should reduce the risk of future loss to an acceptable level, such as through reservation, change of purpose or the use of a conservation covenant. An offset where the risk of future loss after offset remains 20 per cent or higher would not likely be accepted by a decision-maker. A high risk of future loss without offset may only be used where existing approvals are in place. For these examples, the offset provides significant averted loss as there is high certainty that the impact will occur."
Risk of loss (%) with offset (habitat/community)	This describes the chance that the habitat/community on the proposed mitigation site will be completely lost (i.e. no longer hold any value for the protected matter of concern) over the foreseeable future with the mitigation	**5% -** estimated on the basis that the Department administers the offset fund and regulates the selection of an appropriate offset site for acquisition.
Confidence in result (%) – risk of loss (habitat/community)	The capacity of measures to mitigate risk of loss of the mitigation site	**90%** - determined in accordance with the intent of the Draft Offset Procedure, which estimates confidence percentage of 90-95% is appropriate for financial offsets conditioned on the permit. This value is to be used for as "land acquisition offsets provide the highest estimated confidence in the predicted result. This is because transfer of funds does not rely on implementation of a revegetation or threat management plan and is less subject to environmental risks."

Confidence in result (%) – Change in quality (habitat/community) or Change in value (features/individuals)	The level of certainty about the successful achievement of the proposed change in quality (habitat/community) or value (features/individuals)	**90%** - determined in accordance with the intent of the Draft Offset Procedure, which estimates confidence percentage of 90-95% is appropriate for financial offsets conditioned on the permit. This value is to be used for as "land acquisition offsets provide the highest estimated confidence in the predicted result. This is because transfer of funds does not rely on implementation of a revegetation or threat management plan and is less subject to environmental risks."
Revegetation credit (net present value)	The net present value of the mitigation (area of habitat/community or number of individuals/features) that will be applied to the quantum of impact	**0** – no mitigation credit is proposed

Appendix G. Biological survey information excerpts / photographs of the vegetation

Australian Islamic College commission Emerge Associates to undertake a flora and vegetation survey and a basic fauna and targeted black cockatoo assessment of Lot 15. The figures and information below have been directly extracted from these reports as detailed under Appendix B.

Key findings for vegetation and flora

- Non-native vegetation is present across 10.1 ha of the site.
- Remnant native vegetation is present across 6.6 ha of the site in varying levels of condition.
- A total of 58 native and 40 non-native (weed) species were recorded in the site.
- No threatened or priority flora species were recorded within the site.
- One priority species, Schoenus *pennisetis* (P3) may occur within plant communities Kg and KgMp. Further survey between August and September would be required to confirm whether *S. pennisetis* occurs in the site.
- The vegetation within the site was classified into five plant communities: BaBmSi, KgSi, KgMp, Kg and non-native vegetation.
- Plant community BaBmSi was mapped as being in good condition, whilst plant communities KgSi, KgMp and Kg were mapped as being in degraded condition. The non-native vegetation was mapped as being in completely degraded condition.
- Plant communities BaBmSi, KgSi and Kg were considered to represent floristic community type (FCT) 21c 'low lying *Banksia attenuata* woodlands and shrublands'. Plant community KgMp was considered to represent FCT 11 'wet forests and woodlands'.
- A 0.6 ha patch of the *Environment Protection and Biodiversity Conservation Act 1999* (EPBC Act) listed 'banksia woodlands of the Swan Coastal Plain' threatened ecological community (TEC) occurs in the south-eastern portion of the site. This patch also represents the State listed priority ecological community (PEC) of the same name.
- A 2.17 ha patch of the State listed PEC 'low-lying *Banksia attenuata* woodlands and shrublands' (P3) occurs in the north and south-east portions of the site.

Key findings for basic fauna assessment

- A total of 22 native and two non-native fauna species were recorded within the site.
- Four fauna habitats were identified within the site: woodland upland, woodland wetland, shrubland and predominantly cleared area. The woodland upland habitat in the northern and south eastern portions of the site has the highest habitat values due to the presence of more intact native vegetation and microhabitats. However, due to the relatively poor condition of habitats generally, the site is likely to primarily be utilised by common and widespread native species without specific habitat requirements.
- One conservation significant species, Carnaby's cockatoo is likely to occur in the site. It is possible that a further 13 conservation significant species may also occur within the site. These species would primarily be associated with the woodland upland and to a lesser extent shrubland habitats, if they occurred at all. The likelihood that the site would provide important habitat for these species is low, due to the relatively poor condition and limited extent of habitat within the site.

Key findings for black cockatoo assessment

- The site occurs within the modelled distribution of Baudin's cockatoo, Carnaby's cockatoo and forest red tailed black cockatoo and there are records within the broader area. Therefore, while
- no evidence of any black cockatoo species was recorded within the site, due to the presence of suitable habitat that may utilise the site. Carnaby's cockatoo are considered more likely to occur within the site than the other species due to the larger amount of higher value foraging habitat present than is available for Baudin's and forest red-tailed black cockatoo.
- The site occurs within the modelled breeding range of the forest red tailed black cockatoo. Three habitat trees were recorded in the site, of which none contain hollows that are suitable for use by black cockatoos for breeding. Therefore, the site does currently not provide breeding habitat for any species of black cockatoo.
- No evidence of black cockatoo roosting activity was observed within the site. Potential roosting habitat suitable for all three species of black cockatoo occurs within the site in the form of tall native and non-native trees.
- Extensive areas of remnant vegetation that may provide foraging habitat are located within the local area adjacent to the site. ha of high and low value foraging habitat for forest red-tailed black cockatoo.

Table 5: Description and extent of plant communities identified within the site

Plant community	Description	Area (ha)
BaBmSi	Low sparse to open woodland of *Banksia menziesii, B. attenuata, B. ilicifolia, Eucalyptus todtiana* and *Nuytsia floribunda* over sparse to open shrubland of *Kunzea glabrescens, Scholtzia involucrata, Acacia pulchella* var. *glaberrima, Macrozamia riedlei* and *Macarthuria australis* over sparse forbland of *Desmocladus flexuosus, Conostylis aculeata, Lyginia barbata* and *Lomandra* spp. and open grassland of **Ehrharta calycina* and **Briza maxima* (**Plate 1**)	2.17
Kg	Tall shrubland to closed tall shrubland of *Kunzea glabrescens* over sparse low shrubland of *Brachyloma preissii* and *Acacia pulchella* var. *glaberrima* (or absent) and forbland (or absent) (**Plate 2**).	0.98
KgMp	Sparse woodland of *Melaleuca preissiana* over tall closed shrubland of *Kunzea glabrescens* over forbland of **Hypochaeris* spp. and grassland of **Cynodon dactylon* (or understorey layers absent) (**Plate 3**).	1.06
KgSi	Tall shrubland to closed tall shrubland of *Kunzea glabrescens* over shrubland to open shrubland of *Scholtzia involucrata* over sparse forbland *Conostylis aculeata, Lyginia barbata* and *Lomandra caespitosa* (**Plate 4**).	2.41
Non-native	Heavily disturbed areas comprising weeds with occasional native shrubs and forbs and planted vegetation (**Plate 5**).	10.11

*Plate 1: Plant community **BaBmSi** in 'good' condition*

*Plate 2: Plant community **Kg** in 'degraded' condition*

*Plate 3: Plant community **KgMp** in 'degraded' condition*

*Plate 4: Plant community **KgSi** in 'degraded' condition*

Plate 5: Non-native vegetation in 'completely degraded' condition

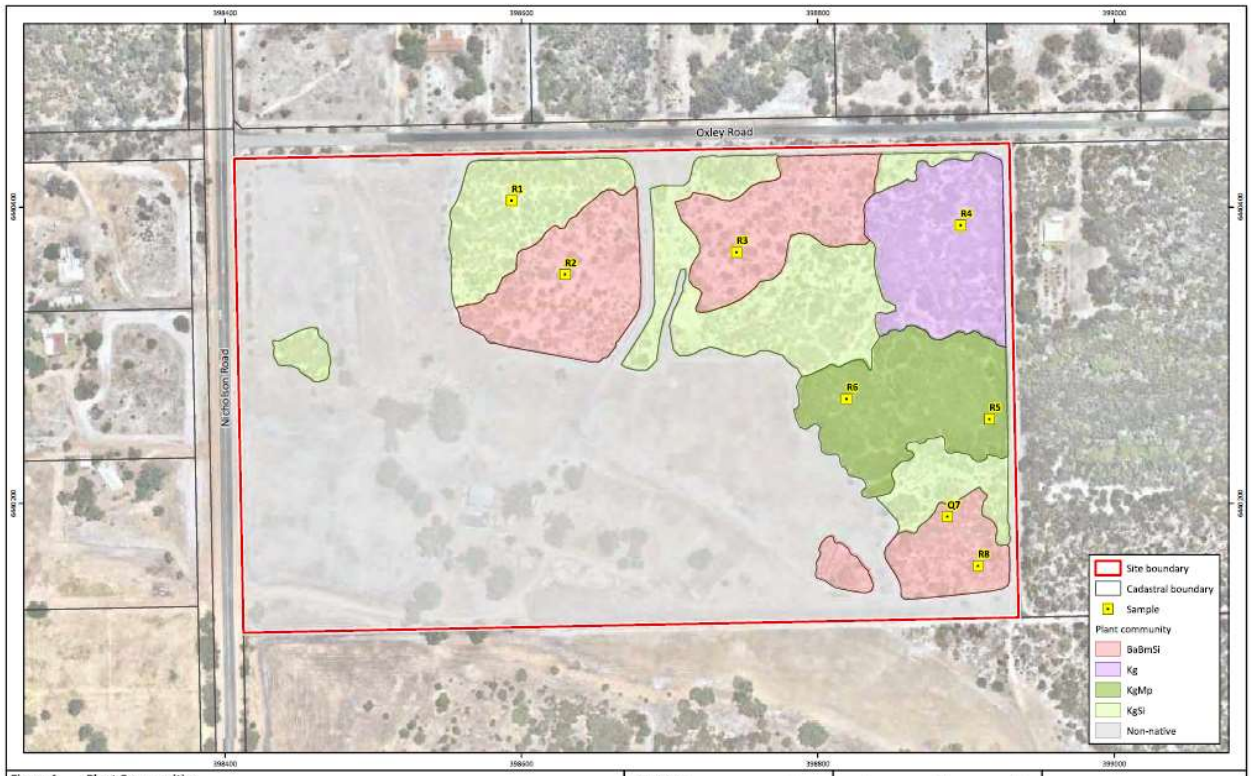

Figure 4: Plant Communities

Project:	Detailed Flora and Vegetation Assessment Lot 15 Nicholson Road, Forrestdale
Client:	Australian Islamic College (Perth) Inc.

Plan Number: EP20-126(05)--F09
Drawn: AFF
Date: 11/03/21
Checked: SKP
Approved: RAW
Date: 10/05/2021

N

0 50 100
Metres
Scale: 1:3,000@A4
GDA 1994 MGA Zone 50

emerge ASSOCIATES

While Emerge Associates makes every attempt to ensure the accuracy and completeness of data, Emerge accepts no responsibility for externally sourced data used
©Landgate (2021). Nearmap Imagery date: 4/03/2021

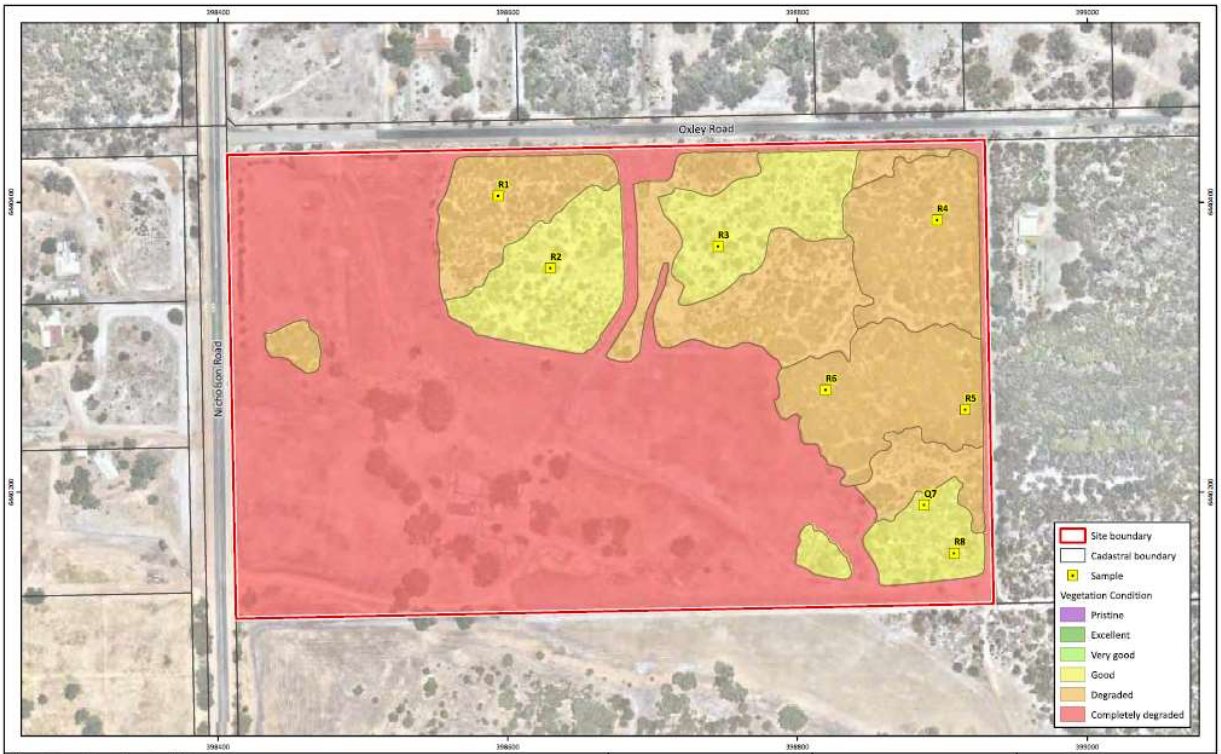

Figure 5: Vegetation Condition

Project:	Detailed Flora and Vegetation Assessment Lot 15 Nicholson Road, Forrestdale
Client:	Australian Islamic College (Perth) Inc.

Plan Number: EP20-126(05)--F10
Drawn: AFF
Date: 11/03/21
Checked: SKP
Approved: RAW
Date: 10/05/2021

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Metres
Scale: 1:3,000@A4
GDA 1994 MGA Zone 50

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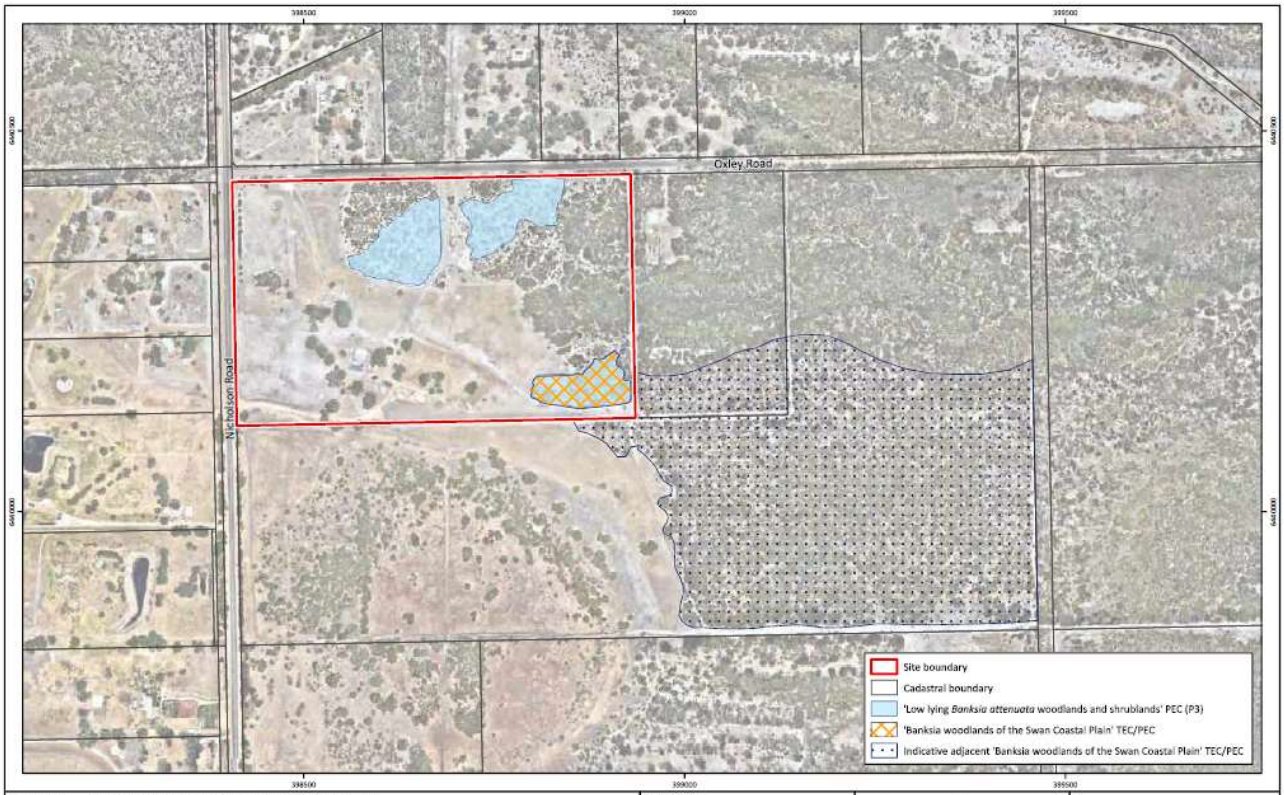

Figure 6: Threatened and Priority Ecological Communities

Project: Detailed Flora and Vegetation Assessment
Lot 15 Nicholson Road, Forrestdale
Client: Australian Islamic College (Perth) Inc.

Plan Number: EP20-126(05)--F11
Drawn: AFF
Date: 11/03/21
Checked: SKP
Approved: RAW
Date: 10/05/2021

While Emerge Associates makes every attempt to ensure the accuracy and completeness of data, Emerge accepts no responsibility for externally sourced data used
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A description and the area of each habitat is provided in **Table 6** and representative photographs of each are provided in **Plate 1** to **Plate 4.** The location of each habitat is shown on **Figure 4.**

Plate 1: Woodland – upland habitat

Plate 2: Woodland – wetland habitat

Plate 3: Shrubland habitat

Plate 4: Predominantly cleared areas habitat

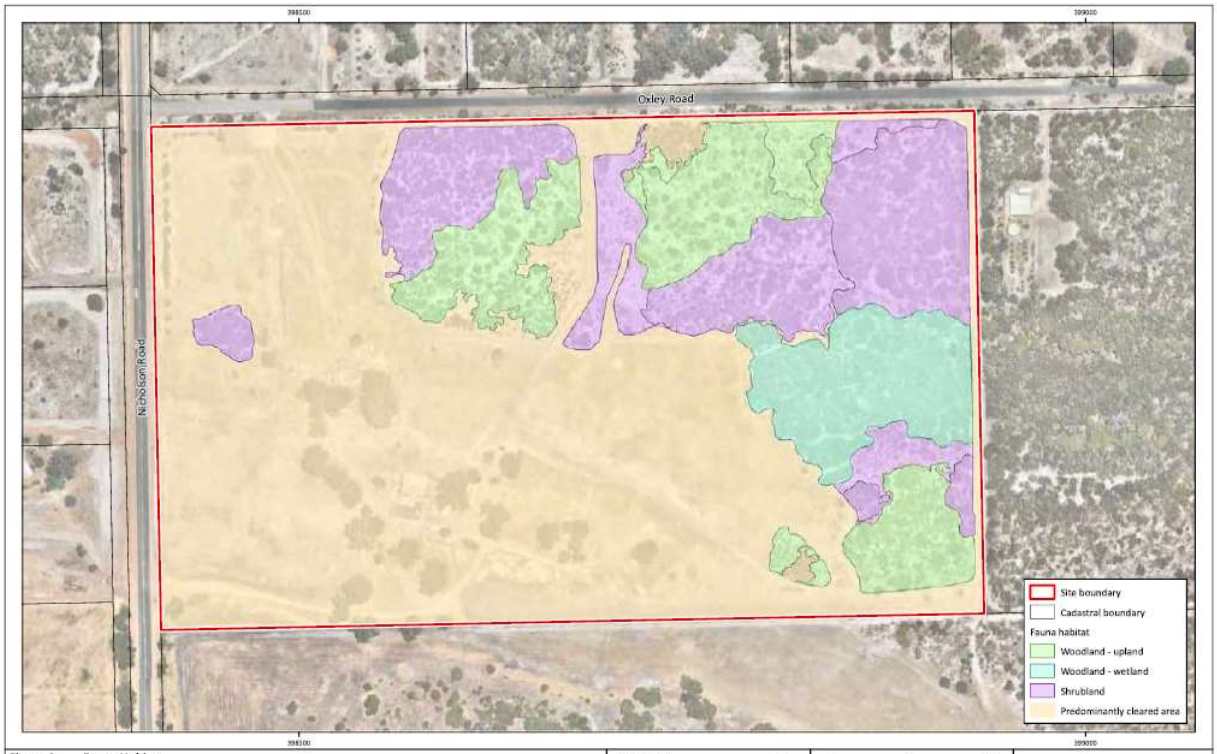

Figure 4: Fauna Habitat

Project:	Basic Fauna and Targeted Black Cockatoo Assessment Lot 15 Nicholson Road, Forrestdale
Client:	Australian Islamic College (Perth) Inc.

Plan Number: EP20-126(06)--F15
Drawn: GAR
Date: 26/03/2021
Checked: SCM
Approved: RAW
Date: 25/05/2021

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Metres
Scale: 1:2,750@A4
GDA 1994 MGA Zone 50

emerge ASSOCIATES

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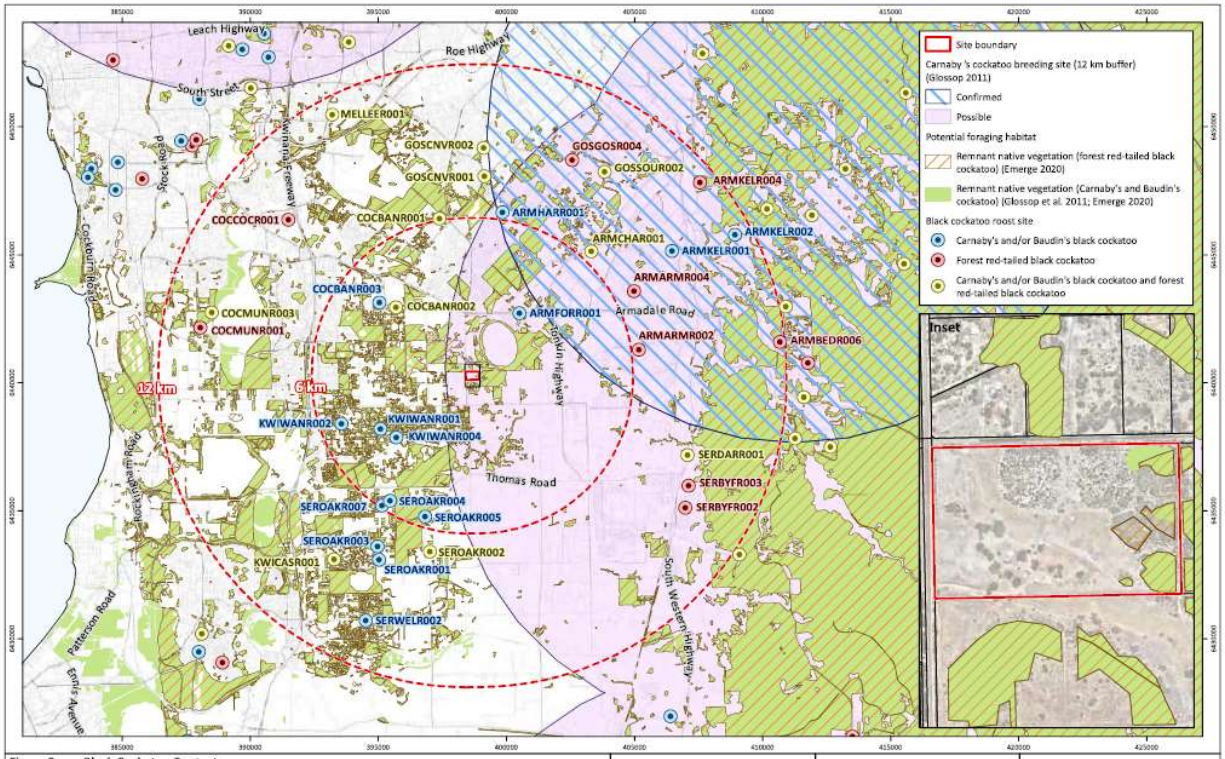

Figure 5: Black Cockatoo Context

Project:	Basic Fauna and Targeted Black Cockatoo Assessment Lot 15 Nicholson Road, Forrestdale
Client:	Australian Islamic College (Perth) Inc.

Plan Number: EP20-126(06)--F16
Drawn: GAR
Date: 26/03/2021
Checked: SCM
Approved: RAW
Date: 25/05/2021

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Kilometers
Scale: 1:170,000@A4
GDA 1994 MGA Zone 50

emerge ASSOCIATES

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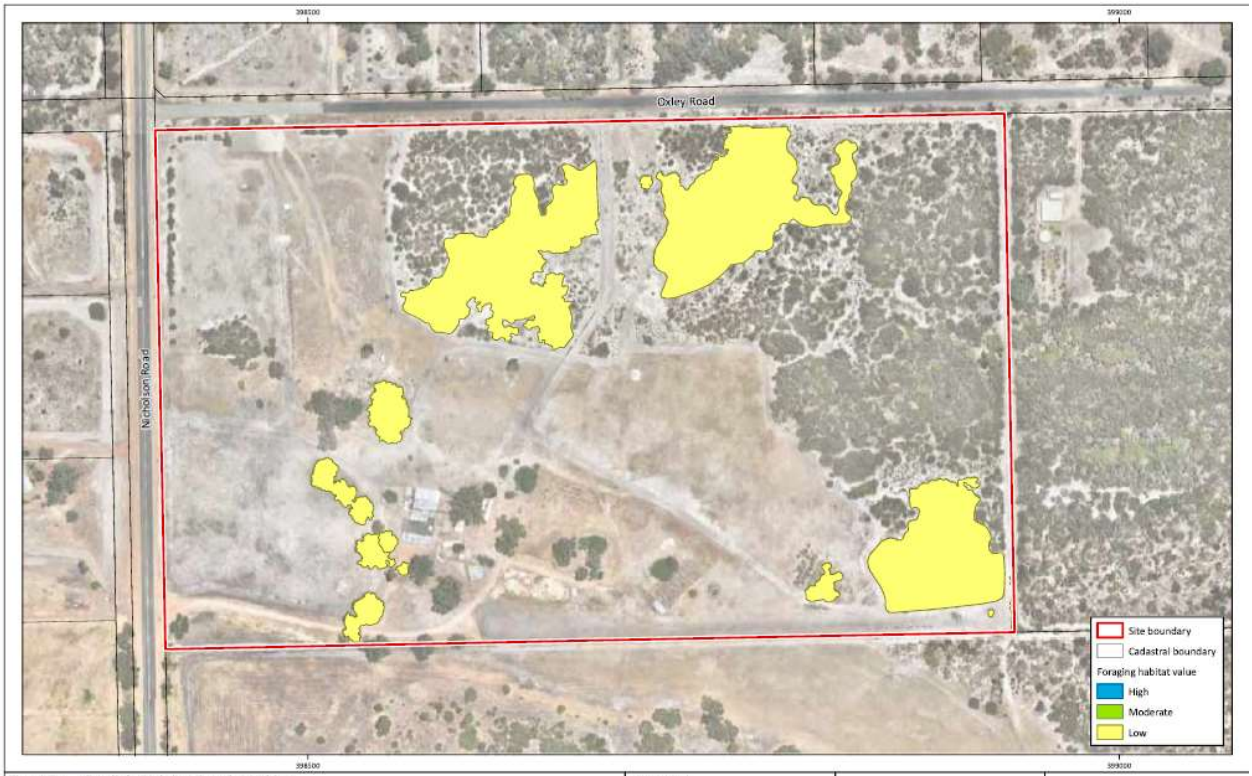

Figure 7: Baudin's Cockatoo Foraging Habitat

Project:	Basic Fauna and Targeted Black Cockatoo Assessment Lot 15 Nicholson Road, Forrestdale
Client:	Australian Islamic College (Perth) Inc.

Plan Number: EP20-126(06)–f18a
Drawn: GAR
Date: 23/08/2021
Checked: TAA
Approved: TAA
Date: 24/08/2021

N

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Metres
Scale: 1:2,750@A4
GDA 1994 MGA Zone 50

emerge ASSOCIATES

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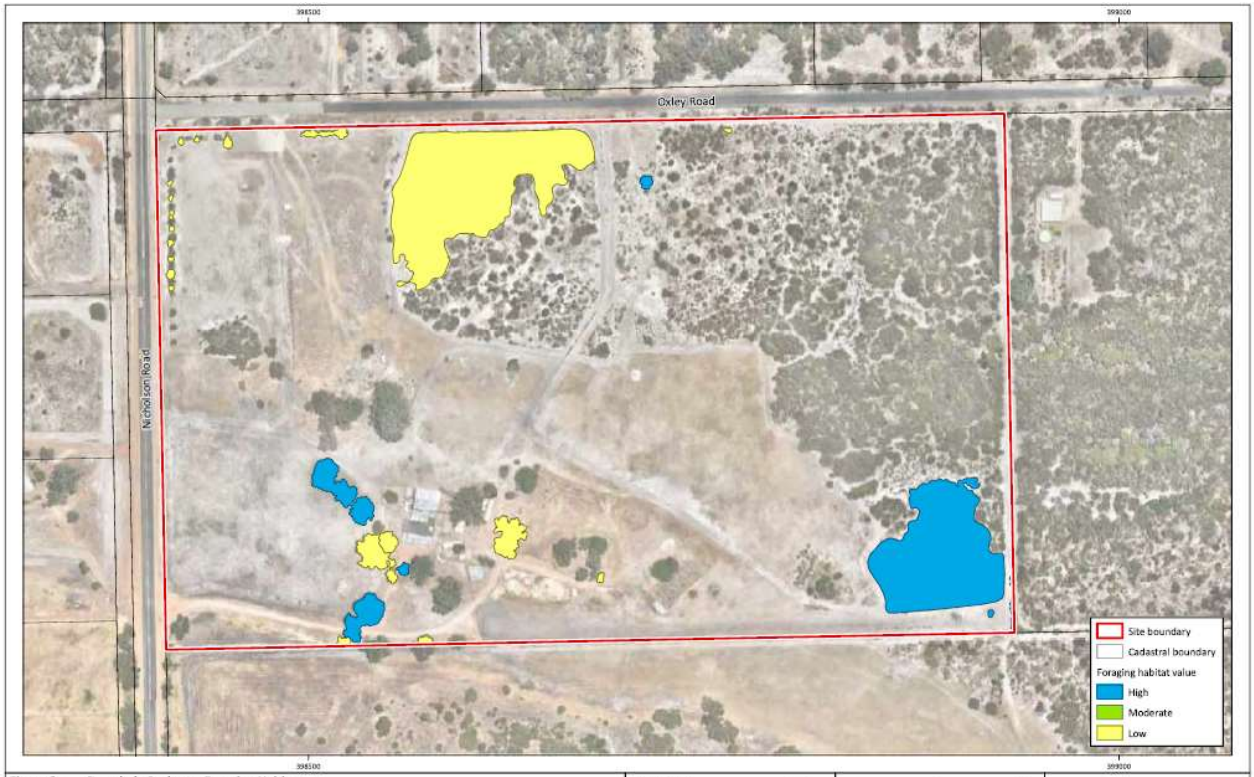

Figure 8: Carnaby's Cockatoo Foraging Habitat

Project:	Basic Fauna and Targeted Black Cockatoo Assessment Lot 15 Nicholson Road, Forrestdale
Client:	Australian Islamic College (Perth) Inc.

Plan Number: EP20-126(06)–f19a
Drawn: GAR
Date: 23/08/2021
Checked: TAA
Approved: TAA
Date: 24/08/2021

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GDA 1994 MGA Zone 50

emerge ASSOCIATES

While Emerge Associates makes every attempt to ensure the accuracy and completeness of data, Emerge accepts no responsibility for externally sourced data used

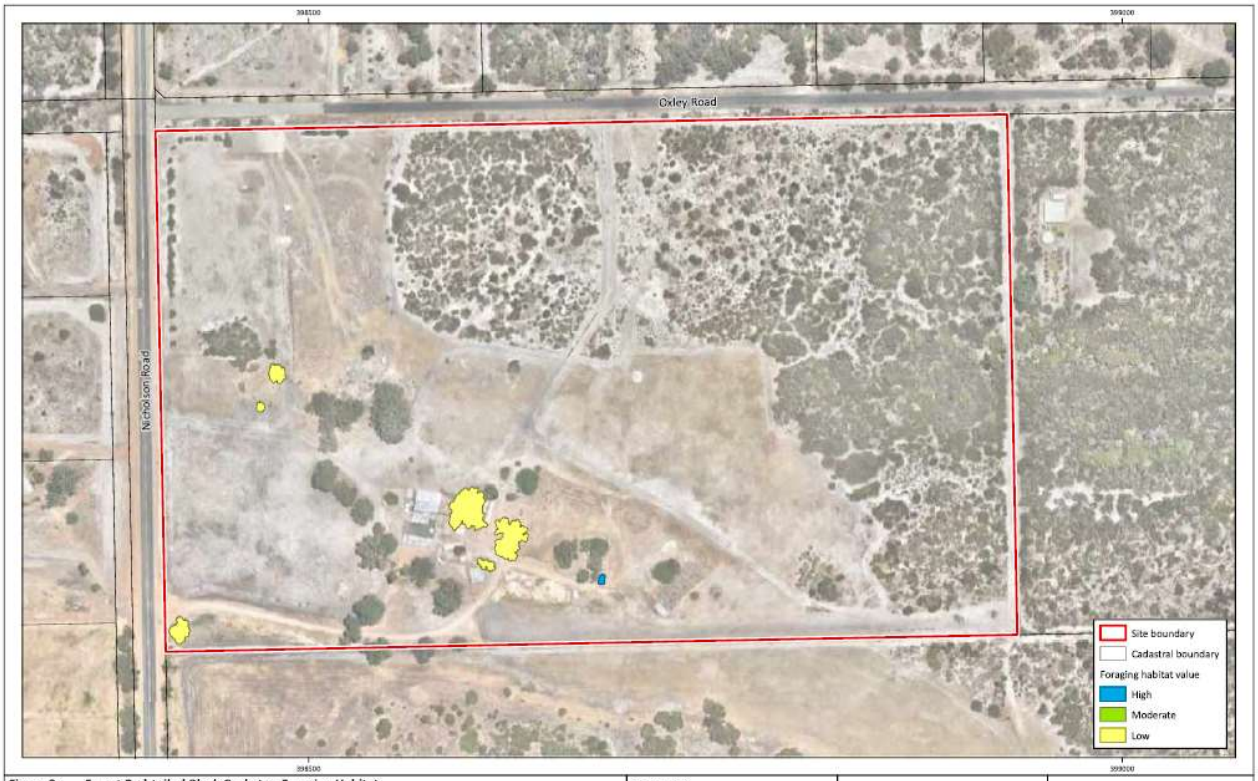

Figure 9: **Forest Red-tailed Black Cockatoo Foraging Habitat**

Project: Basic Fauna and Targeted Black Cockatoo Assessment
Lot 15 Nicholson Road, Forrestdale
Client: Australian Islamic College (Perth) Inc.

Plan Number: EP20-126(06)–f20a
Drawn: CAR
Date: 23/08/2021
Checked: TAA
Approved: TAA
Date: 24/08/2021

N

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Metres
Scale: 1:2,750@A4
GDA 1994 MGA Zone 50

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Appendix H. Sources of information

H.1. GIS databases

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

- 10 Metre Contours (DPIRD-073)
- Aboriginal Heritage Places (DPLH-001)
- Aboriginal Heritage Places (DPLH-001)
- Cadastre (LGATE-218)
- Cadastre Address (LGATE-002)
- Contours (DPIRD-073)
- DBCA – Lands of Interest (DBCA-012)
- DBCA Legislated Lands and Waters (DBCA-011)
- Directory of Important Wetlands in Australia – Western Australia (DBCA-045)
- Environmentally Sensitive Areas (DWER-046)
- Flood Risk (DPIRD-007)
- Groundwater Salinity Statewide (DWER-026)
- Hydrography – Inland Waters – Waterlines
- Hydrological Zones of Western Australia (DPIRD-069)
- IBRA Vegetation Statistics
- Imagery
- Local Planning Scheme – Zones and Reserves (DPLH-071)
- Native Title (ILUA) (LGATE-067)
- Offsets Register – Offsets (DWER-078)
- Pre-European Vegetation Statistics
- Public Drinking Water Source Areas (DWER-033)
- Ramsar Sites (DBCA-010)
- Regional Parks (DBCA-026)
- Remnant Vegetation, All Areas
- RIWI Act, Groundwater Areas (DWER-034)
- RIWI Act, Surface Water Areas and Irrigation Districts (DWER-037)
- Soil Landscape Land Quality – Flood Risk (DPIRD-007)
- Soil Landscape Land Quality – Phosphorus Export Risk (DPIRD-010)
- Soil Landscape Land Quality – Subsurface Acidification Risk (DPIRD-011)
- Soil Landscape Land Quality – Water Erosion Risk (DPIRD-013)
- Soil Landscape Land Quality – Water Repellence Risk (DPIRD-014)
- Soil Landscape Land Quality – Waterlogging Risk (DPIRD-015)
- Soil Landscape Land Quality – Wind Erosion Risk (DPIRD-016)
- Soil Landscape Mapping – Best Available
- Soil Landscape Mapping – Systems

Restricted GIS Databases used:

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

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