



CLEARING PERMIT

Granted under section 51E of the Environmental Protection Act 1986

Purpose Permit number:	CPS 9049/1
Permit Holder:	Department of Local Government, Sport and Cultural Industries
Duration of Permit:	From 5 April 2021 to 5 April 2036

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

PART I – CLEARING AUTHORISED

1. Clearing authorised (purpose)

The permit holder is authorised to clear native vegetation for the purpose of constructing the State Football Centre and associated public open space.

2. Land on which clearing is to be done

Lot 501 on Deposited Plan 416666, Queens Park

Lot 22 on Diagram 64644, Queens Park

Unnamed Road reserves (PINs 1816337 and 12375286), Queens Park

3. Clearing authorised

The permit holder must not clear more than 4.19 hectares of native vegetation within the area cross-hatched yellow in the attached Plan 9049/1(a).

4. Period during which clearing is authorised

The permit holder must not clear any native vegetation after 5 April 2026.

PART II – MANAGEMENT CONDITIONS

5. Avoid, minimise, and reduce impacts and extent of clearing

In determining the native vegetation authorised to be cleared under this permit, the permit holder must apply the following principles, set out in descending order of preference:

- (a) avoid the clearing of native vegetation;
- (b) minimise the amount of native vegetation to be cleared; and
- (c) reduce the impact of clearing on any environmental value.

6. Weed and dieback management

When undertaking any clearing authorised under this permit, the permit holder must take the following measures to minimise the risk of introduction and spread of *weeds* and *dieback*:

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

7. Directional clearing

When conducting clearing activities under this permit in areas with adjacent native vegetation, the permit holder must conduct clearing in a slow, progressive manner from one direction to the other to allow fauna to move into adjacent native vegetation ahead of the clearing activity.

8. Wind erosion management

The permit holder must ensure that construction activities commence within three months of the cessation of clearing authorised under this permit, to reduce the risk of soil erosion by minimising the exposure time of soils prior to construction.

9. Offsets – Land Transfer

Prior to 5 April 2026, the permit holder shall provide evidence to the *CEO* that shows the areas hatched red and green on attached Plan 9049/1(b) are vested with the City of Canning, with a Management Order for the purpose of conservation.

10. Revegetation Plan

- (a) Within 12 months of clearing commencing, the permit holder must submit a Project Revegetation Plan to the *CEO* for approval for the areas cross-hatched red and green on attached Plan 9049/1(b), which shall be developed in accordance with *A Guide to Preparing Revegetation Plans for Clearing Permits* (Department of Water and Environmental Regulation (DWER) 2018).
- (b) The Project Revegetation Plan must be prepared by an *environmental specialist*.
- (c) The Project Revegetation Plan must include the following:
 - (i) *site preparation*
 - (ii) *weed control*
 - (iii) *regeneration, direct seeding or planting*, at an *optimal time* in accordance with a defined species list. Species must include suitable foraging habitat for Carnaby's cockatoo and forest red-tailed black cockatoo and species known to contribute to habitat for *Macarthuria keigheryi*
 - (iv) a *vegetation establishment period*
 - (v) *revegetation success completion criteria* shall include but not be limited to target weed cover, target vegetation condition, target density, species richness, bare ground cover and target structure

- (vi) *revegetation success completion criteria* must be consistent with *reference sites 1* for the area cross hatched red on attached Plan 9049/1(b) and *reference sites 2* for the area cross hatched green on attached Plan 9049/1(b)
- (vii) contingency actions to be undertaken if *completion criteria* are not met
- (viii) ongoing maintenance and monitoring of the areas required to be *revegetated and rehabilitated*
- (ix) timeframes for completion of the activities
- (x) management commitments that will be achieved
- (xi) The permit holder shall implement the Project Revegetation Plan as approved by the *CEO*.

11. Fauna Management

Prior to clearing authorised under this permit, the permit holder must:

- (a) Immediately prior to clearing under this permit, engage a fauna specialist to undertake a targeted search for snake-necked turtles (*Chelodina colliei*) within the area cross-hatched yellow on attached Plan 9049/1(a)
- (b) Where snake-necked turtles are identified under condition 11(a) of this Permit, engage a fauna specialist to remove and relocate snake-necked turtles to an area of *suitable habitat*.

12. Fence - Flora and vegetation management

- (a) Prior to undertaking any clearing authorised under this permit, the permit holder must erect a temporary fence around the area demarcated in red on Plan 9049/1(c), to protect *Macarthuria keigheryi* individuals
- (b) The fence required under condition 13(a) of this permit must remain for the during of construction works
- (c) Within 12 months of constructing the state football centre, the permit holder must erect permanent *conservation fencing* around the area demarcated in red on Plan 9049/1(c) to protect *Macarthuria keigheryi* from unauthorised access
- (d) Within one month of installing the fence/s required under conditions 13(a) and 13(b), the permit holder shall notify the *CEO* in writing that the fence/s have been erected.

PART III - RECORD KEEPING AND REPORTING

13. Records that must be kept

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

Table 1: Records that must be kept

No.	Relevant matter	Specifications
1.	In relation to the authorised clearing activities generally	<ul style="list-style-type: none"> (a) the species composition, structure, and density of the cleared area; (b) the location where the clearing occurred, recorded using a Global Positioning System (GPS) unit set to Geocentric

No.	Relevant matter	Specifications
		<p>Datum Australia 1994 (GDA94), expressing the geographical coordinates in Eastings and Northings;</p> <p>(c) the date that the area was cleared;</p> <p>(d) the size of the area cleared (in hectares); and</p> <p>(e) actions taken to avoid, minimise, and reduce the impacts and extent of clearing in accordance with condition 5;</p> <p>(f) actions taken to minimise the risk of the introduction and spread of weeds and dieback in accordance with condition 6;</p> <p>(g) actions undertaken in accordance with condition 7;</p> <p>(h) actions undertaken in accordance with condition 8;</p> <p>(i) actions undertaken in accordance with condition 9;</p> <p>(j) actions undertaken in accordance with condition 11;</p> <p>(k) actions undertaken in accordance with condition 12;</p> <p>(l) actions undertaken in accordance with condition 13;</p>
2.	In relation to the <i>revegetation</i> and <i>rehabilitation</i> of areas pursuant to condition 15 of this Permit	<p>(a) a description of the <i>revegetation</i> and <i>rehabilitation</i> activities undertaken;</p> <p>(b) the location and size of the areas <i>revegetated</i> and <i>rehabilitated</i> (in hectares) recorded using a GPS unit set to GDA94, expressing the geographical coordinates in Eastings and Northings or decimal degrees;</p> <p>(c) the date that <i>revegetation</i> and <i>rehabilitation</i> works began;</p> <p>(d) at least two photographs of each area revegetated taken on an annual basis at the same location each year;</p> <p>(e) a description of the revegetation activities undertaken each year for each area revegetated;</p> <p>(f) a description of the tree density and native understorey vegetation cover for each area revegetated recorded on an annual basis; and</p> <p>(g) Other actions taken in accordance with condition 10 of this Permit.</p>

14. Reporting

- (a) The Permit Holder must provide to the *CEO* on or before 30 June of each year, a written report:
 - (i) of records required under condition 14 of this Permit; and
 - (ii) concerning activities done by the Permit Holder under this Permit between 1 January to 31 December of the preceding calendar year.
- (b) If no clearing authorised under this Permit has been undertaken, a written report confirming that no clearing under this Permit has been undertaken, must be provided to the *CEO* on or before 30 June of each year.
- (c) Prior to 5 April 2036, the Permit Holder must provide to the *CEO* a written report of records required under condition 14 of this Permit where these records have not already been provided under condition 15(a) of this Permit.

DEFINITIONS

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

Table 2: Definitions

Term	Definition
botanist	means a person who holds a tertiary qualification specialising in environmental science or equivalent, and has a minimum of two (2) years work experience in Western Australian flora identification and undertaking flora surveys native to the bioregion being inspected or surveyed, or who is approved by the CEO as a suitable environmental specialist for the bioregion, and who holds a valid flora licence issued under the <i>Biodiversity Conservation Act 2016</i> .
CEO	Chief Executive Officer of the department responsible for the administration of the clearing provisions under the <i>Environmental Protection Act 1986</i> .
clearing	has the meaning given under section 3(1) of the EP Act.
completion criteria	means a measurable outcome based on suitable <i>reference sites</i> , used to determine revegetation/ <i>rehabilitation</i> success
condition	a condition to which this clearing permit is subject under section 51H of the EP Act.
conservation fencing	means fencing installed for the purpose of conservation, with the intention to exclude unauthorised access without preventing the movement of fauna;
direct seeding	means a method of re-establishing vegetation through the establishment of a seed bed and the introduction of seeds of the desired plant species.
environmental specialist	means a person who holds a tertiary qualification in environmental science or equivalent, and has experience relevant to the type of environmental advice that an environmental specialist is required to provide under this Permit, or who is approved by the CEO as a suitable environmental specialist.
fauna specialist	means a person who holds a tertiary qualification specialising in environmental science or equivalent, and has a minimum of 2 years work experience in fauna identification and surveys of fauna native to the region being inspected or surveyed, or who is approved by the CEO as a suitable fauna specialist for the bioregion, and who holds a valid fauna licence issued under the <i>Biodiversity Conservation Act 2016</i> .
fill	means material used to increase the ground level, or to fill a depression.
department	means the department established under section 35 of the <i>Public Sector Management Act 1994</i> (WA) and designated as responsible for the administration of the EP Act, which includes Part V Division 3.
dieback	means the effect of <i>Phytophthora</i> species on native vegetation.
EP Act	<i>Environmental Protection Act 1986</i> (WA)
local provenance	means native vegetation seeds and propagating material from natural sources within 100 kilometres and the same Interim Biogeographic Regionalisation for Australia (IBRA) subregion of the area cleared
mulch	means the use of organic matter, wood chips or rocks to slow the movement of water across the soil surface and to reduce evaporation.
native vegetation	has the meaning given under section 3(1) and section 51A of the EP Act.

Term	Definition
optimal time	means the optimal time for undertaking direct seeding and planting
planting	means the re-establishment of vegetation by creating favourable soil conditions and planting seedlings of the desired species
quadrat	Means a sample plot established for the purpose of data collection and monitoring vegetation characteristics, for example species composition, structure, density and condition
rehabilitate/ed/ion/ing	means actively managing an area containing native vegetation in order to improve the ecological function of that area
reference sites 1	<p>means nearby sites used to provide baseline data for planning a revegetation project. Measurements from fixed reference points or plots where biodiversity components are measured are used to set measurable completion criteria for revegetation projects. The <i>reference sites</i> must contain the following values:</p> <p>(a) Suitable foraging habitat for Carnaby's cockatoo (<i>Calyptorhynchus latirostris</i>) and forest red-tailed black cockatoo (<i>Calyptorhynchus banksii naso</i>)</p> <p>(b) Vegetation known to support <i>Macarthuria keigheryi</i></p> <p>(c) Vegetation in excellent (Keighery, 1994) or better condition</p>
reference sites 2	<p>means nearby sites used to provide baseline data for planning a revegetation project. Measurements from fixed reference points or plots where biodiversity components are measured are used to set measurable completion criteria for revegetation projects. The <i>reference sites</i> must contain the following values:</p> <p>(a) Suitable foraging habitat for Carnaby's cockatoo (<i>Calyptorhynchus latirostris</i>) and forest red-tailed black cockatoo (<i>Calyptorhynchus banksii naso</i>)</p> <p>(b) Vegetation in a good (Keighery, 1994) or better condition</p>
revegetate/ed/ion	means the re-establishment of a cover of local provenance native vegetation in an area using methods such as natural regeneration, direct seeding and/or planting, so that the species composition, structure and density is similar to pre-clearing vegetation types in that area
regeneration	means revegetation that can be established from in situ seed banks contained either within the topsoil or seed-bearing mulch
site preparation	means management of existing site topsoil and preparation of the finished soil surface for revegetation, for example by ripping or tilling the soil surface and respreading site topsoil and chipped native vegetation
suitable habitat	means habitat known to support <i>Chelodina colliei</i> within the known current distribution of the species, typically characterised by seasonal and permanent freshwater habitats including wetlands, lakes and rivers. They are also capable of living in urban and agricultural environments, such as urban lakes in the Perth metropolitan region, and farm dams (as long as there is sufficient habitat, food resources, and water quality).

Term	Definition
vegetation condition	means the rating given to native vegetation which refers to the impact of disturbance on each of the layers and the ability of the community to regenerate (Keighery 1994)
vegetation establishment period	means a period of at least two summers after the revegetation during which time replacement and infill revegetation works may be required for areas in which revegetation has been unsuccessful, and involves regular inspections of revegetation sites to monitor the success of revegetation
weeds	means any plant – (a) that is a declared pest under section 22 of the <i>Biosecurity and Agriculture Management Act 2007</i> ; or (b) published in a Department of Biodiversity, Conservation and Attractions species-led ecological impact and invasiveness ranking summary, regardless of ranking; or (c) not indigenous to the area concerned.

END OF CONDITIONS



Meenu Vitarana
A/MANAGER
NATIVE VEGETATION REGULATION

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

11 March 2021

Plan 9049/1(a)

115°57'18.000"E

115°57'36.000"E

31°59'42.000"S

31°59'42.000"S

32°0'0.000"S

32°0'0.000"S

32°0'18.000"S


32°0'18.000"S

115°57'18.000"E








115°57'36.000"E



CPS layers

 CPS areas approved to clear

Legend

-  Land Tenure
-  Local Government Authorities
-  Road Centrelines
-  Highway
-  Local Rd - Sealed
-  0 - 100000
-  Image



0 0.1 0.2 km



1:4003

MGA Zone 50
Geocentric Datum of Australia 1994

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+08'00'

Officer delegated under section 20 of the
Environmental Protection Act 1986



Plan 9049/1 (b)

115°57'18.000"E





115°57'36.000"E



115°57'18.000"E

115°57'36.000"E

Legend

-  Revegetation Areas
-  Offset Areas
-  Land TenureLGATE - 226
-  Local Government Authorities
-  Highway
-  Local Rd - Sealed



0 75 150 m



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Officer delegated under section 20 of the
Environmental Protection Act 1986



MGA Zone 50
Geocentric Datum of Australia 1994

Plan 9049/1 (c)




115°57'36.000"E

32°0'0.000"S

32°0'0.000"S



115°57'36.000"E

-  Area to be fenced
-  Land Tenure (Landgate - 226)
-  Local Government Authorities



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MGA Zone 50
Geocentric Datum of Australia 1994

Officer delegated under section 20 of the
Environmental Protection Act 1986





Clearing Permit Decision Report

1 Application details and outcome

1.1. Permit application details

Permit number:	CPS 9049/1
Permit type:	Purpose permit
Applicant name:	Department of Local Government, Sport and Cultural Industries
Application received:	12 September 2020
Application area:	4.19 hectares
Purpose of clearing:	Constructing the State Football Centre and associated public open space
Method of clearing:	Mechanical
Property:	Lot 501 on Deposited Plan 416666, Lot 22 on Diagram 64644 and un-named road reserves (PINs 11816337 and 12375286), Queens Park
Location (LGA area/s):	City of Canning
Localities (suburb/s):	Queens Park

1.2. Description of clearing activities

The Department of Local Government, Sport and Cultural Industries propose to construct a State Football Centre and associated public open space on the southern side of Welshpool Road in Queens Park. The application area is within Bush Forever Site 283 (Queens Park Bushland) and comprises several small patches of remnant vegetation totalling 4.19 hectares, scattered throughout a larger footprint of 16 hectares.

The proposed development includes performance and high-intensity usage playing fields, supporting infrastructure such as change rooms, strength and conditioning spaces, spectator amenity as well as reconfiguration of an existing surface drainage network and landscaped public open space areas. The applicant notes that the State Football Centre would provide a location for high-performance training, community programs and house Football West's administration facilities (Emerge Associates (Emerge), 2020a).

The initial application area was revised to exclude two higher quality patches of remnant native vegetation (totalling around 2.2 hectares), on the eastern boundary of the site (see figure 1). This has reduced the extent of impact to habitat for threatened flora and fauna species (see Section 3.1 for further details).

1.3. Decision on application

Decision:	Granted
Decision date:	11 March 2021
Decision area:	4.19 hectares of native vegetation as depicted in Section 1.5, below.

1.4. Reasons for decision

This clearing permit application was submitted, accepted, assessed and determined in accordance with sections 51E and 51O of the *Environmental Protection Act 1986* (EP Act). The Department of Water and Environmental Regulation (DWER) advertised the application for 21 days and 31 submissions were received. Consideration of matters raised in the public submissions is summarised in Appendix B.

In undertaking their assessment and in accordance with section 51O of the EP Act, the Delegated Officer considered the site characteristics (see Appendix C), the Clearing Principles in Schedule 5 of the EP Act (see Appendix D), relevant planning instruments and any other pertinent matters they deemed relevant to the assessment (see Sections 3 and 4), the findings of biological surveys (see Appendix F), as well as relevant datasets available at the time of the assessment (see Appendix G).

The Delegated Officer also took into consideration the purpose of the clearing to establish a State Football Centre for high-performance training, community programs and housing of Football West's administration facilities.

The Delegated Officer has determined that the proposed clearing will result in the following significant impacts:

- The loss of 0.87 hectares of native vegetation that provides foraging habitat for Carnaby's cockatoo, and 11 trees that provide potential roosting habitat for this species
- The loss of 0.88 hectares of native vegetation that provides foraging habitat for forest red-tailed black cockatoo, and 11 trees that provide suitable roosting habitat for this species
- The loss of 4.19 hectares of native vegetation within Bush Forever site 283 (Queens Park Bushland, Queens Park)
- The loss of three individuals of threatened flora species *Macarthuria keigheryi* and 0.13 hectares of significant habitat for this species

The proposed clearing may also result in the following impacts:

- The potential introduction and spread of weeds and dieback into adjacent vegetation that supports riparian, threatened flora and fauna habitat
- Minor wind erosion risks
- Direct impacts to fauna utilising the site during the time of clearing

After consideration of the available information, as well as the applicant's minimisation and mitigation measures (see Sections 3.1), the Delegated Officer determined that the following requirements will be conditioned on the clearing permit to manage and address the impacts of clearing:

- Avoid and minimise measures to reduce the impacts and extent of clearing
- Take hygiene steps to minimise the risk of the introduction and spread of weeds and dieback
- Construction must occur within three months of clearing to minimise wind erosion risks
- Undertake slow, progressive one directional clearing to allow terrestrial fauna to move into adjacent habitat ahead of the clearing activity
- Offset measures to:
 - Conserve and revegetate an adjacent area of 1.57 hectares within Bush Forever Site 283, from a completely degraded to good (Keighery, 1994) condition, with suitable species for Carnaby's and forest red-tailed black cockatoo foraging
 - Conserve and rehabilitate 6.93 hectares of adjacent native vegetation within Bush Forever Site 283, to an excellent condition, to improve habitat for Carnaby's and forest red-tailed black cockatoo and *Macarthuria keigheryi*
- Fauna management measures to remove and relocate the snake necked turtle (*Chelodina colliei*)
- Construction of fencing around sensitive native vegetation that provides significant habitat for threatened flora and fauna

Given the above, and noting that the offset provided counterbalances the impacts to Carnaby's cockatoo, forest red-tailed black cockatoo, *Macarthuria keigheryi* and Bush Forever site 283, the Delegated Officer determined that the proposed clearing is unlikely to lead to an unacceptable risk to the environment.

1.5. Site map



Figure 1. Map of the application area (The area(s) crosshatched yellow indicates the areas authorised to be cleared under the granted clearing permit).

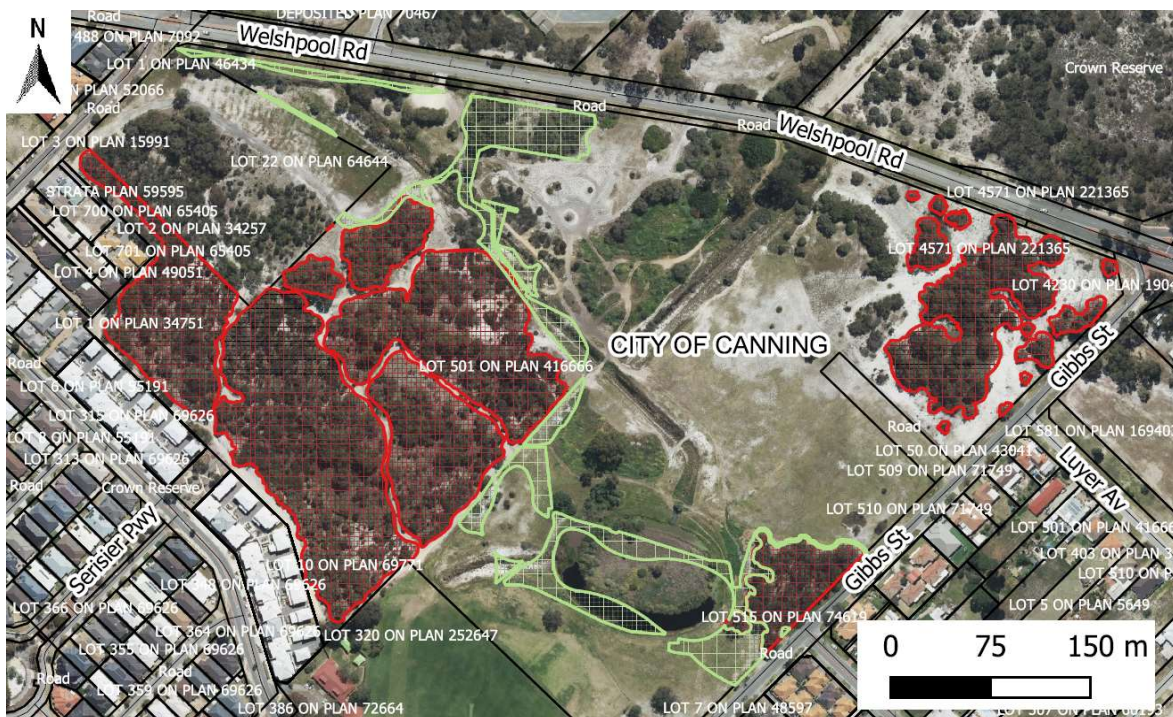


Figure 2. Map of the offset and revegetation areas (The areas cross-hatched red indicates the offset areas which will be managed for conservation and rehabilitation, including the two eastern boundary retention areas)

referred to under Section 1.2. The areas hatched green indicate areas that will be revegetated and also managed for conservation purposes).



Figure 3. Map of the area to be fenced (The area demarcated in red will be erected with temporary fencing prior to clearing and will be replaced by permanent conservation fencing following the construction activities, to protect *Macarthuria keigheryi* individuals and associated habitat).

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 polluter pays principle
- the principle of the conservation of biological diversity and ecological integrity.

Other legislation of relevance for this assessment include:

- *Biodiversity Conservation Act 2016* (WA) (BC Act)
- *Environment Protection and Biodiversity Conservation Act 1999* (Cth) (EPBC Act)
- *Planning and Development Act 2005* (WA) (P&D 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* (DER, December 2013)
- *Procedure: Native vegetation clearing permits* (DWER, October 2019)

- *Environmental Offsets Guidelines* (August 2014)
- 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

Alternatives considered

The applicant advised that as part of the design process, the proposed development footprint and associated earthworks requirements have been revised multiple times, with a key constraint for the layout being the requirement for the pitches to be orientated at no more than 15 degrees off a north-south axis (Emerge, 2020a). The applicant notes that while the pitch orientation is a constraint, the development footprint has been designed, in consultation with key stakeholders, to limit impacts to environmental values, as outlined below (Emerge, 2020a).

Avoidance measures

The applicant has provided the following avoidance and mitigation measures (Emerge, 2020a):

- Locating the development within a highly modified area that has been heavily impacted by historical disturbance
- Retaining areas of native vegetation in a better condition to those proposed for clearing. This includes
 - the retention of 0.5 hectares of native vegetation in a good (GHD, 2020) condition that is mapped as a multiple use wetland and contains a stand of riparian vegetation; and
 - the retention of 1.7 hectares of native vegetation in a good condition that provides significant habitat for Carnaby's and forest red-tailed black cockatoos and threatened flora species *Macarthuria keigheryi*
- Avoidance of five out of eight *Macarthuria keigheryi* individuals
- Altering the application area to avoid 35 of the 46 suitably sized Carnaby's and forest red-tailed black cockatoo habitat trees (trees with a diameter at breast height of greater than 500 millimetres). It is noted that none of these trees contain hollows of a suitable size for breeding (Emerge, 2020b).
- Ongoing liaison with the architects and civil engineers, to ensure that areas of clearing within the application area are further minimised during earthworks.

Mitigation measures

Revegetation

The applicant has committed to revegetating and conserving 1.57 hectares of a completely degraded area, which incorporates a portion of the application area, to a good condition. This measure has been considered as an offset measure and is detailed under Section 4.

The applicant has committed to revegetating an additional area of 0.54 hectares, however, the applicant notes that there may be some future impact to that area through the implementation of the Queens Park Master Plan and future widening of Welshpool Road, hence conservation tenure for that area cannot be committed to (Emerge, 2021d). Therefore, DWER has not considered this additional revegetation in its offset considerations.

The applicant notes that further areas of revegetation will occur, particularly within the drainage basins and adjacent to Gibbs Street, but given the extent and timing of the revegetation works, these have not been committed to as part of the clearing permit application.

Vegetation Salvage

The applicant notes that native vegetation removed from the application area will be salvaged. This will include the salvage of plants for transplanting, or where vegetation cannot be transplanted, collecting seeds or vegetative material to allow for reestablishment of native species, including *Macarthuria keigheryi*. Specifically, the applicant notes that all *Macrozamia riedlei* within the application area will be removed and translocated, either to be included as part of future revegetation works within the application area, within the adjacent offset proposal area, or to be translocated off-site to locations determined in consultation with the City of Canning and Department of Biodiversity, Conservation and Attractions (DBCA) (as required) (Emerge, 2021b).

The applicant notes that where vegetation is cleared from the application area, large pieces of timber will also be moved to adjacent areas of vegetation (notably to the south-west of application area, or within areas of future revegetation) to provide additional fauna habitat in these areas (Emerge, 2021b).

Management Plans

As part of the Development Application process through the Western Australian Planning Commission (WAPC), the applicant has committed to producing a fauna management plan for the site, which will be specifically related to the removal of fauna prior and during the clearing process (Emerge, 2021a). This will include specific pre-clearing checks for snake-necked turtles within the site, noting the likely occurrence within the existing detention basin.

The applicant has committed to acting in accordance with its Water Management Plan, which contains a measure to manage stormwater run-off and impacts to surface water, groundwater and environmental assets, (further discussed under Section 3.3). The applicant has also committed to reinstating the constructed drainage basin which occurs on site, with the new basin proposed to be revegetated with native species. This revegetation forms part of the revegetation offset requirements described under Section 4. Potential hydrological changes that may impact habitat for *Macarthuria keigheryi* will be addressed through the implementation of the approved Water Management Plan.

The applicant has also committed to the provision of the following management plans through the Development Application process with the WAPC:

- Construction management plan
- Irrigation and nutrient management plan
- Annual water quality and condition monitoring reports

Wind Erosion Management

The applicant notes that groundwater will be used (in accordance with a DWER groundwater licence) to suppress dust over the site to reduce the potential for wind erosion and subsequent land degradation.

Fencing

The applicant has committed to temporarily fencing the north-eastern portion of the offset site prior to construction, to protect *Macarthuria keigheryi* individuals and associated habitat, with permanent fencing to be erected once construction is complete (Figure 3).

Conclusion

The Delegated Officer was satisfied that the applicant has made a reasonable effort to avoid and minimise potential impacts of the proposed clearing on environmental values.

After consideration of avoidance and mitigation measures, it was determined that offsets to counterbalance the significant residual impacts to Bush Forever site 283, Carnaby's and forest red-tailed black cockatoo foraging habitat and *Macarthuria keigheryi* habitat were 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 offsets provided are summarised in Section 4.

3.2. Assessment of impacts on environmental values

In assessing the application, the Delegated Officer had regard for the site characteristics (see Appendix C) and the extent to which the impacts of the proposed clearing present a risk to biological, conservation, or land and water resource values.

The assessment identified that the clearing presents a risk to the environmental values of flora, fauna, significant remnant vegetation and conservation areas, and that these required further consideration. 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) – Clearing Principle (b)

Background

A basic fauna and targeted black cockatoo habitat assessment undertaken by Emerge (the Fauna Assessment) identified seven fauna habitats within the application area, including (Emerge, 2020b):

- banksia woodland
- marri woodland
- melaleuca woodland
- predominantly non-native vegetation associated with a basin and drains
- predominantly turf and bare ground
- scattered native and non-native trees and shrubs
- water

The following conservation significant fauna species were identified as potentially occurring within the application area (see conservation status and scientific names of each species in Appendix C):

- Carnaby's cockatoo
- Forest red-tailed black cockatoo
- Baudin's cockatoo
- Quenda
- Perth slider
- Western brush wallaby
- Black-striped snake
- Peregrine falcon
- Swan Coastal Plain shield-backed trapdoor spider
- South-western brush-tailed phascogale
- Pacific swift

This assumption is based on the habitat requirements, distribution, mapped vegetation types, condition of the vegetation, and findings of a fauna assessment undertaken by Emerge (2020b).

The application area has undergone extensive historical disturbance, with most of the site in a degraded (Keighery, 1994) condition (Emerge, 2020a), hence the above fauna habitats have been heavily modified. The highest fauna habitat values of the site comprise marri woodland (0.23 hectares), banksia woodland (0.33 hectares) and melaleuca woodland (0.23 hectares). These areas occur as scattered patches over the site (Emerge, 2020a).

A manufactured basin and associated drains occur within the application area and provide some aquatic fauna habitat. The applicant advised that these areas were constructed to control stormwater flows on site (Emerge, 2020a).

While largely in a degraded (Keighery, 1994) condition, and not formally mapped as an ecological linkage, the application area provides a steppingstone for fauna within a highly fragmented landscape.

The Fauna Assessment identified evidence of Carnaby's cockatoo and forest red-tailed black cockatoo within the application area (Emerge, 2020b). No evidence of any other conservation listed fauna species was identified (Emerge, 2020b). Similarly, a historical flora and fauna assessment of Queen's Park Regional Open Space undertaken by Ecoscape (2010), which incorporates the immediately surrounding remnant vegetation (in a better condition than the application area), did not identify any additional conservation listed fauna.

Given the degraded (Keighery, 1994) condition of much of the higher quality woodland habitat (0.66 hectares of 0.79 hectares), and lack of dense understorey, hollow bearing trees, and identified records (through indirect evidence or otherwise) within the immediately surrounding Queens Park native vegetation remnants (Ecoscape, 2010; Emerge, 2020b), the application area is not likely to include significant habitat for quenda, Perth slider, western brush wallaby, black-striped snake, peregrine falcon, Swan Coastal Plain shield-backed trapdoor spider, south-western brush-tailed phascogale or the pacific swift.

However, quenda, Perth slider, black-striped snake and western brush wallaby may transiently visit the site, and individuals may be impacted should they occur at the time of clearing.

The Fauna Assessment also noted that native bees (non-conservation listed) had been identified within the adjacent remnant vegetation west, known as Maniana park. However, given the relatively poor condition of habitat within the site, the Fauna Assessment considered it unlikely that conservation significant bee species occur within the site (Emerge, 2020b).

The application area also provides suitable habitat for the snake necked turtle (*Chelodina colliei*). Snake necked turtles are not currently conservation listed but are in decline on the Swan Coastal Plain (Emerge, 2020b). The basin and surrounding riparian habitat within the application area provides suitable habitat for this species, and a shell of this species was recorded within the application area (Emerge, 2020b). The riparian habitat is also suitable for native ducks, frogs and other water birds.

Black cockatoos

Baudin's cockatoo

The application area is located on the outer limits of this species distribution. This species is predominantly associated with jarrah and marri forest in the Jarrah Forest bioregion. While the application area includes 0.76 hectares of suitable foraging habitat for this species, it is unlikely to be utilised by, or provide significant habitat for this species.

Carnaby's cockatoo and Forest red-tailed black cockatoo

The application area occurs within the modelled distribution and breeding range of both species. The closest known breeding site for Carnaby's cockatoo is located around 14 kilometres from the application area. The closest recorded breeding site for forest red-tailed black cockatoo is located around 30 kilometres north east of the application area. However, the Fauna Assessment notes that there is potential evidence of forest red-tailed black cockatoo breeding activity within 6 kilometres of the site through Birdlife Australia records (Emerge, 2020b).

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. For most tree species a suitable DBH is 500 millimetres (Commonwealth of Australia, 2012). The Fauna Assessment identified a total of 46 potential breeding trees within the larger survey area (*Corymbia calophylla* (mainly) and *Eucalyptus rudis*). Of these, the applicant has committed to retaining 35 trees. No hollows were observed in any of the trees proposed for clearing (Emerge, 2020b).

Given the above, the proposed clearing is unlikely to impact on significant breeding habitat for these species.

The closest known Carnaby's cockatoo and forest red-tailed black cockatoo roost sites are around 1.9 kilometres and two kilometres from the application area respectively. There are 41 and 23 known roost sites for Carnaby's cockatoo and forest red-tailed black cockatoo in the local area respectively, of which 15 and 5 occur within a six kilometre radius.

The Fauna Assessment did not identify any evidence of foraging within the application area. However, given that the application area contains numerous tall trees, including 11 with a DBH of greater than 500 millimetres (Emerge, 2020b), it provides suitable roosting habitat for both species.

Foraging habitat for each species varies (Commonwealth of Australia, 2012). Noting the mapped vegetation within the application area differs (GHD, 2020), the proposed clearing will have different levels of impact on foraging habitat. Therefore, impacts to foraging habitat will be addressed separately for each species.

Carnaby's cockatoo foraging habitat

Carnaby's cockatoo forages 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). The records of foraging activity for Carnaby's cockatoo on the SCP show that Banksia species account for nearly 50 percent of the diet for this species (Shah, 2006).

The Fauna Assessment identified foraging evidence of this species in multiple locations within the application area (Emerge, 2020b).

The Fauna Assessment divided suitable foraging habitat for these species into primary foraging habitat and secondary foraging habitat.

The Fauna Assessment notes that primary foraging habitat refers to vegetation with historical and contemporary records of regular consumption by black cockatoos. Secondary foraging habitat refers to plants that black cockatoos have occasionally been recorded consuming, or that based on their limited extent or agricultural origin, should not be considered a sustaining resource (Emerge, 2020b).

The Fauna Assessment identified 0.87 hectares of Carnaby's cockatoo foraging habitat in the application area, of which 0.65 hectares was considered primary foraging habitat. This largely corresponds with the areas recorded as banksia, and marri woodland.

The EPA technical advice for Carnaby's cockatoo notes that *Banksia* species provide the most important natural food resource on the Swan Coastal Plain (EPA, 2019). The significance of Banksia woodland habitat has been confirmed through foraging studies, which determined that Carnaby's cockatoo exploit all areas of available *Banksia* food resources on the Swan Coastal Plain (EPA, 2019). Banksia woodland in the Perth metropolitan area has been reduced to one third of its pre-European extent. The remaining portions are fragmented, with the majority (82 per cent) of remnant patches under 10 hectares (EPA, 2019).

The importance of foraging habitat increases when it occurs within foraging distance of nesting sites (12 kilometres), as it supports breeding effort. The closest known breeding site occurs around 14 kilometres from the application area.

It is also noted that food resources within the range of roost sites are important to sustain populations of black cockatoos, and foraging resources should therefore be viewed in the context of the proximity to known night roosting sites (Commonwealth of Australia 2017). Specifically, 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 41 known roosting sites within the local area, of which 15 occur within six kilometres from the application area.

The relatively small extent of proposed impact to preferred foraging habitat for Carnaby's cockatoo under this application is acknowledged. However, it is considered that the application area provides significant foraging habitat for this species, noting the following factors:

- There is evidence of Carnaby's cockatoo foraging within the application area
- There are 15 known roosting sites within 6 kilometres of the application area
- The application area includes banksia woodland habitat on the highly fragmented Swan Coastal Plain

Forest red-tailed black cockatoo foraging habitat

This species commonly inhabits dense jarrah, karri, and marri forests receiving more than 600 millimetres annual average rainfall but also occurs in a range of other forest and woodland types, including blackbutt, wandoo, tuart, Albany blackbutt, yate, and flooded gum (Commonwealth of Australia, 2012). The species predominantly feeds on the seeds of marri and jarrah which comprise around 90 percent of its diet (Commonwealth of Australia, 2012). The application area is within the northern extent of this species distribution.

The Fauna Assessment identified foraging evidence of this species in multiple locations within the application area and six individuals of forest red-tailed black cockatoos were observed flying over the site during the field survey (Emerge, 2020b).

The Fauna Assessment identified 0.88 hectares of forest red-tailed black cockatoo foraging habitat in the application area, of which 0.49 hectares was considered primary foraging habitat. This includes 0.23 hectares of *Corymbia calophylla* woodland.

As per the information presented for Carnaby's cockatoo, the small extent of proposed impact to preferred foraging habitat for this species is acknowledged. However, it is considered that the application area provides significant foraging habitat for this species, noting the following:

- There is evidence of forest red-tailed black cockatoo foraging within the application area
- There is potential evidence of breeding habitat within 12 kilometres of the application area
- There are 5 known roosting sites within 6 kilometres of the application area
- The application area includes preferred foraging habitat for this species

Conclusion

Based on the above assessment, and with consideration of the applicants measures to avoid and minimise impacts, the proposed clearing will result in the loss of 0.87 hectares and 0.88 hectares of significant foraging habitat, and suitable roost habitat for Carnaby's cockatoo and forest red-tailed black cockatoo.

It is also considered that there may be impacts to snake necked turtle, quenda, Perth slider, western brush wallaby, and black-striped snake individuals, should they occur within the application area at the time of clearing.

Outcome

The Delegated Officer has determined that the proposed clearing requires management and offset conditions in relation to this environmental value. Therefore, the following management/offset measures will be required as conditions on the clearing permit:

- Slow directional clearing to allow quenda, Perth slider, western brush wallaby, and black-striped snake individuals to move into adjacent vegetation ahead of the clearing activity
- Revegetation and conservation of 1.57 hectares within a portion of the proposed cleared area, with suitable foraging habitat for Carnaby's cockatoo (Further information provided under Section 4)
- An offset involving the conservation and rehabilitation of adjacent remnant native vegetation in a degraded to excellent (Keighery, 1994) condition within Bush Forever site 283, which contains significant habitat for Carnaby's cockatoo and forest red-tailed black cockatoo (further information provided under Section 4).
- Identify, remove, and relocate snake necked turtles (*Chelodina colliei*) from the application area to an area of suitable habitat (DWER, n.d.).

As part of the application for Development Approval through the WAPC, the applicant has also committed to producing a fauna management plan for the site, which will relate specifically to the removal of fauna prior to and during the clearing process (Emerge, 2021a). This will include conservation and non-conservation listed fauna species.

3.2.2. Environmental value: Biological values (flora and ecological communities) – Clearing Principles (a), (c) and (d)

Threatened Flora - *Macarthuria keigheryi*

A flora survey undertaken by GHD in October 2019 did not identify any threatened flora within the application area.

A follow up targeted flora survey undertaken by Emerge on 26, 31 April and 4 September 2020 (methodology provided under Appendix F), identified eight individuals of threatened flora species *Macarthuria keigheryi*. This species is state and commonwealth listed as endangered under the *Biodiversity Conservation Act 2016* and *Environment Protection and Biodiversity Conservation Act 1999* respectively. This species is an erect or spreading perennial, herb or shrub, that grows to 0.2 to 0.4 metres high. This species flowers from September to December or February to March (Western Australian Herbarium, 1998-).

No other threatened flora was identified, or considered likely to occur, within the application area.

The recovery plan for this species notes that it prefers low-lying, winter wet, damp grey/white sands, and within the Perth Metropolitan Region, grows in open patches with low tree canopy cover among heathland and jarrah-Banksia woodland (Department of Environment and Conservation, 2009).

The survey notes that all recorded individuals were located in the north eastern corner of the site, five in a patch of marri woodland and three in a patch of banksia woodland, mapped as a very good and good (Keighery, 1994) condition respectively (Emerge, 2021e). There is also a known population (comprising two individuals) of *Macarthuria keigheryi* within remnant vegetation immediately west of the application area, within an area known as Maniana bushland.

The survey notes that areas of degraded banksia woodland and marri woodland to the west were searched but no occurrences of the species were recorded. This is attributed to the degraded condition of the vegetation and higher degree of grass weed invasion (Emerge, 2021e).

DBCA note that there are four disjunct areas in which this species is recorded; two within the Moora District 120 – 160 kilometres north of Perth, one at Beermullah within the northern extent of the Swan Coastal District around 95 kilometres north of Perth, and one in the Perth Metropolitan Region (PMR), around 10 kilometres east of Perth (DBCA, 2020). The location within the PMR includes Queens Park and has a total of 1,366 individuals recorded, of which 98 per cent occur within 'Population 5' at Perth Airport (DBCA 2020). DBCA note that Population 5 is currently proposed to be impacted by upgrades to the Airport facilities and the extent of impact on this population is not known (DBCA, 2020).

The applicant has revised the initial clearing footprint to retain five of the eight individuals. Therefore, the proposed clearing will result in the loss of three individuals and 0.13 hectares of suitable habitat for this species.

The recovery plan for this species notes that critical habitat includes the area of occupancy of all known populations, and areas of similar habitat surrounding known populations.

Based on the description of critical habitat for this species, and the uncertainty surrounding the PMR population associated with Perth Airport, the 0.13 hectares of suitable habitat for this species within the application area is considered significant.

There is also the potential for the proposed clearing to increase the risk of weeds and dieback spreading into the adjacent marri woodland remnant containing the five *Macarthuria keigheryi* individuals proposed for retention. This patch may also be subject to disturbance through the development and operation of the facility.

DBCA (2020) recommended the following measures to reduce impacts to the conservation status and local extent of *Macarthuria keigheryi*:

- Seed of threatened flora *M. keigheryi* should be collected for ex-situ conservation prior to individuals being impacted.
- The area to be protected is designed and clearly marked in the development approval (considered over the Queens Park Bushland – Bush Forever sites 424 and 283).
- Controls are put on construction to ensure no disturbance beyond the footprint.
- There are very good interface controls put in to ensure that the remaining bushland are protected during operation of the football centre – i.e., access and crowd control, fencing, paths, etc.
- There is (resources for) improved management of the remaining bushland – both the area immediately adjacent to the football centre, and in the rest of Bush Forever sites 424 and 283. A program of improved management to improve the protection and condition of the habitat (i.e., access control, weed control, and fine scale rehabilitation of degraded areas in the retained bushland) should be developed in consultation with the City of Canning, and feed into any existing management/conservation plans that cover the area.

DWER notes that the applicant has applied for a s.40 threatened flora authorisation under the *Biodiversity Conservation Act 2016*, to take threatened flora (Discussed further under Section 3.3).

Priority Flora

The Emerge targeted flora survey identified one priority flora species *Jacksonia gracillima* (P3). Targeted searches revealed 38 individuals of this species within the north eastern portion of the site mapped as marri woodland (Emerge, 2021a).

The applicant has committed to retaining the remnant where this species was found, which is the same patch as the retention area comprising the three *Macarthuria keigheryi* individuals.

Noting the survey effort that has occurred on site, and consideration of suitability of habitat for other conservation listed flora species, it is considered unlikely that any other priority flora species occur on site.

Threatened and Priority Ecological Communities

The application area is adjacent to three patches of the Banksia Dominated Woodlands of the Swan Coastal Plain (Banksia Woodlands) ecological community, which is mapped as a Priority 3 PEC in Western Australia, and Endangered under the *Environment Protection and Biodiversity Conservation Act 1999*. One of these patches is mapped within the north western portion of the site proposed for retention, however it is noted that this area is not representative of this community as it comprises marri woodland.

The GHD Flora Survey identified that vegetation community VT2 (Banksia low woodland), which comprises 0.33 hectares of the application area (in a good to degraded (Keighery, 1994) condition, aligns with the above state listed PEC and federally listed TEC (GHD, 2020).

However, this 0.33 hectare area is spread over two segmented patches, and does not meet the Commonwealths condition or size thresholds required under the diagnostic criteria for the Banksia Woodland TEC (whether considered the same patch or not) (DoEE 2016). Therefore, these patches are not considered an occurrence of this TEC.

The applicant undertook additional survey work to identify whether a small patch of native vegetation (around one hectare) in the north eastern portion of the site (recorded as *Corymbia calophylla* woodland in a good condition) was representative of Floristic Community Type (FCT) SCP3a, known as 'Corymbia calophylla – Kingia australis woodlands on heavy soils of the Swan Coastal Plain'. This community is a state and federally listed TEC (Endangered). The surveys confirmed that the patch was not representative of the TEC. Irrespective, the applicant later excluded this patch from the application area, noting that it also contains the five *Macarthuria keigheryi* individuals.

The additional survey work did however identify that this north eastern portion of the application area (comprising 1.1 hectares) is representative of the State listed PEC (P3) 'low lying *Banksia attenuata* woodlands or shrublands'. The proposed impact to this community is 0.13 hectares. This community is known from 14 patches and 317 hectares. The proposed clearing represents around 0.04 per cent of the total mapped extent of this community. Noting this, the proposed clearing is not likely to significantly impact on the known extent of this community.

Conclusion

Based on the above assessment, and with consideration of the applicants measures to avoid and minimise impacts, the Delegated Officer has determined that the proposed clearing will result in the following impacts to conservation listed flora and ecological communities:

- Loss of three *Macarthuria keigheryi* (threatened flora) individuals and 0.13 hectares of significant habitat for this species
- Loss of 0.33 hectares of the 'Banksia Dominated Woodlands of the Swan Coastal Plain' PEC (Priority 3) and 0.13 hectares of the 'low lying *Banksia attenuata* woodlands or shrublands PEC (Priority 3)
- Potential indirect impacts to vegetation supporting threatened and priority flora and ecological communities through the introduction of spread and weeds and dieback

Outcome

The Delegated Officer has determined that the proposed clearing requires management and offset conditions in relation to this environmental value. Therefore, the following management/offset measures will be required as conditions on the clearing permit:

- Fencing of the remnant native vegetation containing populations of *Macarthuria keigheryi* and *Jacksonia gracillima*
- Weed and dieback hygiene management measures
- An Offset involving the conservation and rehabilitation of adjacent remnant native vegetation in a degraded to excellent (Keighery, 1994) condition within Bush Forever site 283, which contains significant habitat for *Macarthuria keigheryi* (further information provided under Section 4).

It is noted that propagation of the species was considered as a requirement on the clearing permit. However, DBCA provided comment on this potential and advised that in the case of *Macarthuria keigheryi*, current knowledge suggests translocation success may not be achievable, as translocation attempts using a number of propagative methods have failed (DBCA, 2020). Therefore, alternate mitigation and offset measures have been considered and conditioned.

3.2.3. Environmental value: Biological values (riparian flora) – Clearing Principle (f)

According to available datasets, around 50 per cent of the application area intersects a multiple use category (MU) geomorphic wetland (dampland). The larger mapped wetland comprises around 13.3 hectares. MU wetlands are considered highly modified with few remaining important attributes and functions.

Large bare patches form much of the mapped wetland, and only a small portion of the application area intersecting the wetland contains riparian vegetation. This is in the form of mixed native and non-native shrubs and sedges, largely associated with the presence of an artificial basin.

There is also a small portion of degraded riparian habitat (0.23 hectares of *Melaleuca* woodland) within the north eastern portion of the application area, just outside the mapped dampland, and adjacent to a separate mapped MU dampland described below.

A conservation category (CC) wetland is mapped adjacent to the south west portion of the site. This small dampland comprises around 0.8 hectares of *Melaleuca preissiana* low open forest (Ecoscape, 2010). This wetland is currently fenced from the application area and forms part of a larger 8.5 hectare patch of remnant vegetation.

A separate MU wetland (dampland) is mapped adjacent to the application area. This was once categorised as resource enhancement, however was later downgraded to MU by DBCA due to the loss of vegetation structure, degradation of habitat value, and loss of hydrological function caused by adjacent disturbance and edge effects (DBCA, 2020). The GHD Flora Survey noted the wetland contains riparian habitat in the form of *Eucalyptus rudis* tall forest with scattered *Melaleuca preissiana* and *Kunzea glabrescens* over scattered introduced herbs with a mostly absent understorey (GHD, 2020). This area initially formed part of the application area, however, was later excluded by the applicant to reduce impacts to riparian habitat.

The applicant has committed to having the adjacent CC and MU wetlands managed as a conservation areas by the City of Canning, and to ensuring that rehabilitation measures are undertaken to increase the value of these areas, including the larger vegetative remnant the CC wetland forms part of (See Section 4).

The application area includes vegetation growing in association with two constructed drainage channels in the western and northern portions of the application area, and a constructed drainage basin in the southern portion of the application area. Vegetation within the drainage channels and the compensating basin ranges in condition from degraded to completely degraded, and includes native sedges and shrubs, non-native tree species and weedy grass species. The basin also includes some native water plants (Emerge, 2020a).

The applicant has advised that the north-south drainage channel and portion of the east-west drainage channel, in addition to the compensating basin will be removed as part of the development. However, the applicant has committed to reconfiguring the drainage basin, and revegetating with native species, as well as revegetating the western portion of the drainage channel, to provide a natural landscape setting (Emerge, 2020a).

Potential hydrology impacts associated with the proposed end land use are discussed under Section 3.3 (Planning and other matters).

Conclusion

Based on the above assessment, and with consideration of the applicants measures to avoid and minimise impacts, the Delegated Officer has determined that the proposed clearing will impact on scattered riparian vegetation growing in association with an artificial basin and drainage channels, and 0.23 hectares of *Melaleuca* woodland adjacent to two highly modified mapped multiple use wetlands. The application area is also adjacent to conservation category and multiple use damplands. Noting the extent of impact to largely degraded riparian vegetation, the proposed clearing of riparian habitat is not considered significant.

As part of the applicants offset proposal to address other environmental impacts, the applicant has committed to the following measures which will mitigate impacts to riparian habitat

- retaining, rehabilitating and conserving the mapped multiple use dampland adjacent to the eastern portion of the application area
- rehabilitating and conserving the larger remnant that the conservation category dampland forms part of
- reconstructing the drainage basin and revegetating with native species, including riparian species
- revegetating the western portion of the drainage channel

These measures relate to the applicants offset proposal (see Section 4) and will form a conditional requirement of the clearing permit.

Outcome

Based on the above assessment, the Delegated Officer has determined that the proposed clearing does not require management conditions in relation to this environmental value.

3.2.4. Environmental value: Conservation areas – Clearing Principle (h)

The application area is located within Bush Forever (BF) site 283 known as 'Queens Park Bushland, Queens Park'. The proposed clearing will impact on 4.19 hectares of native vegetation within this BF site. The larger BF site comprises around 50 hectares and includes higher quality native vegetation west and east of the application area. The vegetation within Bush Forever Site No. 283 provides an ecological linkage with remnant vegetation to the north of the application within Bush Forever Site No. 424, which occurs around 30 metres north of the application area on the northern side of Welshpool Road.

Aside from Bush Forever areas, the next closest conservation area is the Greater Brixton Street (Kenwick) Wetlands 'A' class reserve, located around three kilometres south east.

Due to the location of the proposed clearing (adjacent to a main road), and highly modified condition of the vegetation under application, the proposed clearing is not likely to significantly impact on ecological connectivity functions of Bush Forever Site No. 283.

The highly modified condition of much of the application area relative to the higher quality adjacent native vegetation within BF site 283 is noted. However, the proposed clearing will impact on significant environmental values within BF site 283, including:

- Three individuals of *Macarthuria keigheryi* and 0.13 hectares of significant habitat for this species
- 0.87 hectares of significant foraging habitat for Carnaby's cockatoo
- 0.88 hectares of significant foraging habitat for forest red-tailed black cockatoo
- Significant remnant vegetation within a highly fragmented landscape

The proposed clearing may also increase the risk of weeds and dieback spreading into adjacent remnant vegetation within BF Site 283.

Conclusion

Based on the above assessment, and with consideration of the applicants measures to avoid and minimise impacts, the Delegated Officer has determined that the proposed clearing will result in the loss of 4.19 hectares of native vegetation within BF site 283, including significant habitat for Carnaby's cockatoo, forest red-tailed black cockatoo and *Macarthuria keigheryi*.

Outcome

The Delegated Officer has determined that the proposed clearing requires management and offset conditions in relation to this environmental value. Therefore, the following management/offset measures will be required as conditions on the clearing permit:

- Revegetation and conservation of 1.57 hectares within a portion of the proposed cleared area, with suitable foraging habitat for Carnaby's cockatoo and forest red-tailed black cockatoo (Further information provided under Section 4)
- An Offset involving the conservation and rehabilitation of adjacent remnant native vegetation in a degraded to excellent (Keighery, 1994) condition within Bush Forever site 283, which contains significant habitat for *Macarthuria keigheryi*, Carnaby's cockatoo and forest red-tailed black cockatoo (further information provided under Section 4).
- Undertaking weed and dieback management to mitigate impacts to adjacent BF vegetation.

3.2.5. Environmental value: Conservation areas – Clearing Principle (e)

The national objectives and targets for biodiversity conservation in Australia has a target to prevent clearance of ecological communities with an extent below 30 per cent of that present pre-1750, below which species loss appears to accelerate exponentially at an ecosystem level (Commonwealth of Australia, 2001). Within constrained areas (areas of urban development in cities and major towns) on the Swan Coastal Plain, the threshold for representation of the pre-clearing extent of a particular native vegetation complex is 10 per cent (EPA, 2008). The application area is classified as a constrained area.

As indicated in section C.2., the Swan Coastal Plain Interim Biogeographic Regionalisation of Australia (IBRA) bioregion, the Hedde vegetation complex (Southern River Complex) mapped within the application area and the extent of vegetation remaining in the local area are all greater than the abovementioned 10 per cent vegetation threshold for constrained areas. These retain 32.5, 18.4 and 14.9 per cent of their pre-European vegetation extents, respectively (Government of Western Australia, 2019a; Government of Western Australia, 2019b).

While the remnant vegetation extents for the local area and mapped vegetation complex are above the 10 and 30 per cent vegetation thresholds outlined above, the application area is surrounded by development and is generally considered to occur within an area that has undergone extensive clearing.

The application area is within a highly cleared landscape, provides significant habitat for conservation significant fauna and flora species and is within Bush Forever site 283. Therefore, the application area is considered to be a significant remnant within an extensively cleared landscape.

Conclusion

Based on the above assessment, and with consideration of the applicants measures to avoid and minimise impacts, the Delegated Officer has determined that although the application area forms part of a significant remnant in an area that has been extensively cleared, an offset is not required due to being in a highly constrained area as part of the Metropolitan Regional Scheme (MRS).

It is however noted that the offset described under Section 4, will result in the protection, rehabilitation and establishment of significant native vegetation in an extensively cleared landscape.

There is a risk of weeds and dieback spreading into remnants of native vegetation adjacent to the proposed clearing.

Outcome

The Delegated Officer has determined that the proposed clearing requires weed and dieback management conditions to protect this environmental value.

3.3. Relevant planning instruments and other matters

City of Canning (the City) comment

The City provided comment on the proposed clearing and advised it is a project partner in the development of the State Football Centre in the Queens Park Open Space, led by the Department of Local Government, Sport and Cultural Industries (DLGSC). The City noted its commitment to retaining and enhancing the natural assets of the development project area and wider Queens Park Open Space, agreeing to create a world class sporting facility in a bushland setting, protect and enhance the existing bushland and retain and restore wetlands (City of Canning, 2020).

Environmental considerations

The City provided a number of suggestions regarding the management of environmental values, these include (City of Canning, 2020):

- The applicant should develop an offset proposal, inclusive of a revegetation and translocation plan, in liaison with the City and the Friends of Queens Park Bushland group
- Offset revegetation works must complement, protect and buffer the existing ecological communities and wetlands, using local provenance species
- The proposed works should consider the requirement to maintain and optimise ecological connectivity employing best-practice revegetation, waterwise principles and environmentally sensitive design
- The very good condition vegetation in the north-eastern corner should be retained and protected
- Efforts to retain and relocate native vegetation in the detailed planning phase in landscaped areas and carparks, for example, should be attempted

- There may be impacts associated with the clearing and future drawdown on ground water for irrigation purposes. The City requests that a hydrology management plan outlines the potential impact of drawdown on native vegetation and how this will be managed and monitored
- The City recommends that *Macarthuria keighryi* specimens are either salvaged and relocated as part of the revegetation and translocation plan or used as provenance stock for asexual propagation requirements
- Prior to any clearing, a fauna management plan is recommended to identify any water-dwelling animals e.g. Oblong Turtles or frogs, which may require temporary relocation during earthworks.
- Environmental enhancement works across the wider application area must be conducive to the existing community types and cockatoo foraging habitat, where applicable.
- best-practice *Phytophthora* and weed hygiene measures should be implemented throughout the project, identified through the development of a hygiene management plan

The City concluded that the proposed clearing can be reasonably justified by the social and recreational benefits that the State Football Centre will create for the wider Perth community, subject to imposing suitable requirements to ensure environmental impacts are mitigated and threatened species and ecological communities within the Queens Park Open Space are protected for the future (City of Canning, 2020).

Department of Planning, Lands and Heritage (DPLH), Bush Forever Comment

DPLH noted that the application falls within Bush Forever area 283 (BFA 283) – Queens Park Bushland. The site implementation category is Bush Forever reserves (existing or proposed) and is reserved Parks and Recreation under the Metropolitan Region Scheme (MRS).

State Planning Policy 2.8 Bushland Policy for the Perth Metropolitan Region (SPP 2.8) recommends all proposals and decision making affecting a BFA should under section 5.1.1:

- recognise regionally significant bushland protection and its management as a primary purpose and a fundamental planning consideration in its own right as part of an area's essential environmental infrastructure; and
- ensure that all reasonable steps have been taken to avoid, minimise and offset any likely adverse impacts on regionally significant bushland.

Under clause 5.1.2.1 (i) (e) of SPP 2.8, proposals or decision making should seek to support a general presumption against the clearing of regionally significant bushland or other degrading activities, except where a proposal or decision is justified with regard to wider social or recreational needs and all reasonable alternatives have been considered in order to avoid or minimise any direct loss of regionally significant bushland, and reasonable offset strategies are secured to offset any loss of regionally significant bushland, where appropriate and practical.

DPLH acknowledged that the development footprint has been modified to account for the environmental assets contained onsite and recommends the retention of conservation significant vegetation in the north-eastern and south-eastern portions of the application area.

Planning Approval

The land the subject of this clearing permit is reserved as Parks and Recreation under the Metropolitan Region Scheme (MRS).

In accordance with Division 3 of the MRS, development approval is required for the proposed development. The *Planning and Development Act 2005* (P&D Act), introduced a new Part 17 that grants the Western Australian Planning Commission (WAPC) temporary decision-making powers (during a State of Emergency recovery period) to determine applications for development approval for certain types of significant developments. The applicant has chosen to use this new assessment pathway for the State Football Centre. The WAPC is supported in its decision-making process by the State Development Assessment Unit (SDAU), within the Department of Planning, Lands and Heritage. The City's role in the development approval process will be to provide comment/recommendation on the Development Application to the SDAU.

The applicant has applied for Development Approval, and a decision is yet to be made by the WAPC. The WAPC has however released some draft conditions which will likely be included on any Development Approval, based on advice from key stakeholders. These draft conditions include the following requirements:

- A Wetland and Bushland Management Plan for the resource enhancement wetland, the retained *Corymbia callophylla* woodland area, and the adjoining Bush Forever site's vegetation shall be prepared and submitted

on advice from the Department of Biodiversity, Conservation and Attractions and the City of Canning, to ensure the protection and management of the environmental values.

- A Fauna Management Plan shall be submitted for approval on advice from the Department of Biodiversity, Conservation and Attractions and City of Canning.
- An Acid Sulphate Soils Dewatering Plan shall be submitted for approval by the Western Australian Planning Commission on advice from the Department of Water and Environmental Regulation and City of Canning.
- An environmental management plan shall be prepared, outlining Environmental Asset Management and Monitoring, Hydrology Management and Mosquito Management. The plan is also to include a light spill evaluation to minimise impact on habitat. The plan shall be submitted on advice from the City of Canning.
- Prior to the commencement of building works, a detailed Landscaping and Revegetation Plan, including ongoing management requirements, shall be submitted on the advice of the City of Canning.

Other Matters

Aboriginal heritage

There are no Aboriginal Sites of Significance 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.

Contaminated sites

Lots 22 and 501 were classified under the *Contaminated Sites Act 2003* as 'decontaminated' on 22 October 2012. The 'decontaminated' classification is based on the results of monitoring and investigations undertaken from 1996 to 2012 that demonstrated that no contamination (including pesticides) were present at the site.

The classification notes that a screening risk assessment has indicated that the levels of substances present on the site do not pose an unacceptable risk to human health, the environment or any environmental value under all land uses.

Potential Environmental Impacts – End Land Use

The end land use associated with the State Football Centre has the potential to impact on the surrounding environmental values through impacts on hydrology, and increased traffic in and around native vegetation retention area.

Regarding hydrology, the applicant has prepared a Water Management Plan which details *stormwater management, groundwater management, and water quality management*. It is considered that these measures, in addition to the management plans that will be required by the WAPC under the planning approval process, will be adequate to manage impacts associated with the end land use.

Groundwater Licence

The applicant proposes to undertake dewatering and will require groundwater for dust suppression and construction activities (short term) and for irrigation of the playing fields (long term).

The applicant therefore requires a licence to take groundwater from DWER, under Section 5C of the *Rights in Water and Irrigation Act 1914*.

The applicant has applied for a license to take groundwater from DWER. The application is currently awaiting additional information from the applicant in the form of monitoring bore pump testing results, prior to a decision being made on the licence.

Department of Agriculture, Water and the Environment (DAWE)

The proposed action to develop a state football centre with supporting infrastructure within the Queens Park Regional Open Space, Canning was determined not a controlled action by the Commonwealth Department of Agriculture, Water and the Environment (DAWE) under the *Environment Protection and Biodiversity and Conservation Act 1999* (reference 2020/8824 - State Football Centre, Canning, Western Australia), provided it is undertaken in a manner set out in the referral decision. This includes fencing of remnant native vegetation containing populations of *Macarthuria keigheryi* (DAWE, 2020).

Section 40 Authorisation to take threatened flora

The applicant has applied to DBCA for authorisation under Section 40 of the *Biodiversity Conservation Act 2016* to take threatened flora, and specifically three individuals of *Macarthuria keigheryi*. DBCA is in the process of determining this application. It is noted that under this process, DBCA have the authority to condition certain management measures, including seed collection and measures associated with the end land use. Noting this, the clearing permit has not been conditioned with additional flora management measures for *Macarthuria keigheryi* within the application area, to avoid duplication.

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 0.87 hectares of significant foraging habitat for Carnaby's cockatoo
- Loss of 0.88 hectares of suitable foraging habitat for forest red-tailed black cockatoo
- Loss of three individuals and 0.13 hectares of significant habitat for threatened flora species *Macarthuria keigheryi*
- Loss of 4.19 hectares of native vegetation within Bush Forever site 283

To address the above residual impacts, the applicant has proposed environmental offsets comprising of:

Revegetation

- On-site revegetation of 1.57 hectares with local provenance species within Bush Forever site 283. The revegetation will:
 - be supported by a comprehensive revegetation plan, outlining revegetation activities, including completion criteria based on nearby reference sites
 - achieve a good (Keighery, 1994) vegetation condition
 - comprise local provenance species and suitable foraging habitat for Carnaby's cockatoo and forest red-tailed black cockatoo
 - provide east west linkage values between areas of remnant native vegetation within Bush Forever Site 283

Rehabilitation

- Rehabilitation of 6.93 hectares of native vegetation in a degraded to excellent (Keighery, 1994) condition within Bush Forever site 283. The vegetation currently provides significant habitat for Carnaby's cockatoo, forest red-tailed black cockatoo and significant and supporting habitat for an adjacent population *Macarthuria keigheryi* within the same remnant. The revegetation will:
 - be supported by a comprehensive rehabilitation plan, outlining rehabilitation activities, including completion criteria based on nearby reference sites
 - achieve an excellent (Keighery, 1994) vegetation condition
 - improve habitat for Carnaby's cockatoo, forest red-tailed black cockatoo and *Macarthuria keigheryi*

Conservation Land Tenure Change

- A change in land tenure of 6.93 hectares of adjacent native vegetation and 1.57 hectares of revegetation (referred to above) from recreation to conservation, to be managed by the City of Canning. The benefit of the change is the elevated long-term security of the land holding. Any proposed future land-use must be consistent with the conservation purpose, as opposed to the former recreation purpose.

In assessing whether the proposed offset is adequately proportionate to the significance of the environmental values being impacted, a calculation using the EPBC Act Offsets calculator was undertaken. The calculation indicates that the proposed offset is sufficient to adequately address the impacts of the proposed clearing. The justification for the values used in the offset calculation is provided in **Error! Reference source not found.**

End

Appendix A. Additional information provided by applicant

During the assessment of the application, DWER wrote to the applicant to advise that the proposed clearing will impact on:

- Suitable habitat for Carnaby's cockatoo, forest red-tailed black cockatoo and Baudin's cockatoo
- Three threatened flora (*Macarthuria keigheryi*) individuals
- 4.19 hectares of native vegetation within Bush Forever Site 283

Noting that the applicant had previously demonstrated several avoidance and minimisation measures, the applicant was invited to provide further information in the form of a satisfactory environmental offset.

Summary of comments	Consideration of comment
<p>The applicant submitted an offset proposal which included:</p> <ul style="list-style-type: none"> • On site revegetation • A change to conservation land tenure of 6.93 hectares of adjacent native vegetation, in a degraded to excellent condition, that contains <i>Macarthuria keigheryi</i>, Carnaby's cockatoo and forest red-tailed black cockatoo habitat 	<p>In assessing whether the proposed offset is adequately proportionate to the significance of the environmental values being impacted, a calculation using the EPBC Act Offsets calculator was undertaken.</p> <p>The offset calculation indicated that the proposed offset did not adequately address the significant residual impacts of the proposed clearing.</p> <p>The Delegated Officer subsequently requested a revised offset proposal.</p>
<p>The applicant submitted a revised offset proposal which included:</p> <ul style="list-style-type: none"> • On site revegetation, to be vested with a Management Order for the purpose of conservation, to a good condition, with suitable foraging habitat for Carnaby's cockatoo and forest red-tailed black cockatoo • The protection of 6.93 hectares of adjacent native vegetation, in a degraded to excellent condition • Rehabilitation of the above 6.93 hectares area of native vegetation, to improve vegetation condition and habitat quality for <i>Macarthuria keigheryi</i>, Carnaby's cockatoo and forest red-tailed black cockatoo. 	<p>The Delegated Officer undertook a subsequent calculation using the EPBC Act Offsets calculator.</p> <p>The offset calculation indicated that the proposed offset adequately addresses the significant residual impacts of the proposed clearing (see Section 4).</p>

Appendix B. Details of public submissions

31 submissions were received in relation to this clearing permit application. 27 of these were related to providing support for Submission A (2020) and did not provide specific comments on the proposed clearing. Therefore, the content of these submissions have not been included below. The remaining 4 submissions (A-D) are referred to in the tables below.

Submission A (2020)

Summary of comments	Consideration of comment
<p><u>Ecological linkage</u></p> <p>Concerns around the loss of a vegetated corridor linking remnant native vegetation west and east of the application area. Although it is a mix of native and introduced species, it is the only vegetated corridor between these areas. It supports wildlife moving across the landscape and likely increases the exchange of genetic material between these areas. Concerns also exist around the lag times should vegetation re-establishment be proposed.</p>	<p>It is noted that the linkage values comprised of scattered native and non-native vegetation in a degraded condition, and therefore the proposed clearing, noting the retention of surrounding higher quality vegetation, is not expected to significantly impact on linkage values in the local area.</p> <p>However, the applicant has proposed to revegetate a portion of 1.57 hectares with local provenance species (as shown in the areas cross hatched green in Figure 2) which will help to maintain east west linkage values.</p>

Summary of comments	Consideration of comment
<p><u>Threatened flora</u></p> <p>Concerns that the proposed development will directly impact three individuals of threatened flora <i>Macarthuria keigheryi</i> and indirectly on the remaining eight plants not providing an adequate buffer.</p> <p>The submission recommends propagation and establishment of a new population of this species in the Queens Park Open Space. The new population is to be derived from the plants removed as to preserve the local genes.</p>	<p>Impacts to <i>Macarthuria keigheryi</i> have been offset as described under Section 4.</p> <p>The applicant will also be required to Demonstrate attempts to collect seed from three individuals of <i>Macarthuria keigheryi</i> proposed for impact, to provide to DBCA (if successful) for ex-situ conservation.</p> <p>It is noted that propagation of the species was considered as a requirement on the clearing permit. However, DBCA provided comment on this potential and advised that in the case of <i>Macarthuria keigheryi</i>, current knowledge suggests translocation success may not be achievable, as translocation attempts using a number of propagative methods have failed (DBCA, 2020).</p> <p>Therefore, alternate mitigation and offset measures have been considered and conditioned.</p>
<p><u>Vegetation retention</u></p> <p>The submission recommends that clearing in the two areas of environmental significance in the north-eastern and south-eastern portions of the application area should be avoided. This stance should remain even if the north-eastern portion of the application area is determined not to be the Threatened Ecological Community (TEC) 'Corymbia calophylla - <i>Kingia australis</i> woodlands on heavy soils of the Swan Coastal Plain'.</p>	<p>The applicant has committed to retaining these areas and these areas are not included within the approved clearing area.</p>
<p><u>Fencing</u></p> <p>The submission recommends the reinstatement of fencing around the retained remnant vegetation in the north-east portion of the site, prior to clearing commencing. The fence will reduce the possibility of vegetation destruction occurring outside of the permitted area and help to protect the remaining <i>Macarthuria keigheryi</i> plants.</p>	<p>The clearing permit will include a condition to construct fencing around the patch of remnant vegetation containing the five threatened flora species proposed for retention.</p>
<p><u>Vegetation salvaging</u></p> <p>The submission supports the proposed mitigation activities of salvaging of plants for transplanting, harvesting the seeds and vegetative material to allow for re-establishment of native species, including all <i>Macrozamia</i> sp. and <i>Xanthorrhoea</i> sp.</p> <p>The submission recommends that the follow-up care of all plants subject to transplantation or propagation as a result of this development should be a condition of the clearing permit granted, and also that 'all' large (diameter greater than 200 mm) pieces of timber are retained and moved to adjacent areas.</p>	<p>The applicant has committed to salvaging native vegetation and timber, as discussed under Section 3.1.</p>
<p><u>Revegetation</u></p> <p>The submission notes concern around successfully revegetating the site given the City of Canings difficulties in previous attempts to revegetate nearby areas. Further concerns around the availability of funding for revegetation are raised. Given the above, the submission questioned the merit of revegetation as a mitigation measure.</p>	<p>The applicant has committed to revegetating a 1.57-hectare area (See section 4).</p> <p>The applicant will be required to submit a comprehensive revegetation plan (to DWER for approval) for the revegetation proposed. This will include detailed information of revegetation actions and completion criteria, to provide DWER with confidence that revegetation will be successful.</p>

Summary of comments	Consideration of comment
<p><u>Offset</u></p> <p>The submission recommends an offset that would create a vegetated corridor between the Threatened Ecological Community (TEC) of the greater Queens Park Regional Open Space and the TEC known as the Cannington Swamp, to support wildlife moving across the landscape and increase the exchange of genetic material between the two areas.</p> <p>Specifically, the submission recommends that the Gerard Street road reserve, be redesigned to contain a vegetated corridor along a median that lies between the two lanes of carriageway. The submission notes that the road reserve forms a proposed linkage recognised in the City of Canning's Local Biodiversity Strategy. The submission therefore recommends a report be produced relating to the proposed development of a vegetated median along Gerard Street.</p>	<p>Please see section 4 which outlines the proposed offset, which has been deemed as adequate to offset the significant residual impacts of clearing.</p>
<p><u>Clearing Permit Conditions</u></p> <p>The applicant recommends the following conditions be placed on the clearing permit:</p> <ul style="list-style-type: none"> • Propagation and establishment of a new population of <i>Macarthuria keigheryi</i> in the Queens Park Open Space • Remnant vegetation in north-eastern and south-eastern portions of the application area be retained • Permanent fencing is to be installed along the new boundary of the remnant vegetation in the north-east section of the application area prior to clearing commencing • All <i>Macrozamia</i> sp. and <i>Xanthorrhoea</i> sp. are to be salvaged for transplanting into the Queens Park Regional Open Space • Perennial herbaceous species, should be transplanted • Native plants that cannot be transplanted are to have their genetic material salvaged and propagated for planting into the Queens Park Regional Open Space • The necessary follow-up care of all plants subject to transplantation or propagation to ensure their long-term survival. • All large (greater than 200 mm diameter) pieces of timber are to be retained and moved to adjacent areas of the Queens Park Regional Open Space. • A report relating to the proposed development of a vegetated median along Gerard Street, is to be completed • The vegetated median along Gerard Street, described at point 9, being constructed within 10 years of clearing being approved. 	<p>These items have been addressed in the above considerations for comment.</p>

Submission B (2020):

Summary of comments	Consideration of comment
<p>The submission noted the following concerns:</p> <ul style="list-style-type: none"> • The proposed clearing of higher quality vegetation and wetland vegetation on the eastern boundary of the clearing footprint is excessive, noting the clearing footprint is larger than required based on the current development design. • Impacts to non-conservation listed wildlife, noting that the constructed basin within the application area provides a breeding ground for frogs, ducks, snakes and swamphens. • The surrounding sandy areas are a breeding ground for rainbow bee-eaters. 	<p>The applicant has committed to retaining the higher quality and wetland vegetation on the eastern boundary of the site, and these areas are not included within the approved clearing area.</p> <p>As part of the Development Approval process, the applicant has committed to providing a fauna management plan which will consider impacts to non-conservation listed fauna species.</p>

Summary of comments	Consideration of comment
<ul style="list-style-type: none"> Loss of habitat for Carnaby's cockatoo, forest red-tailed black cockatoos, little eagle, black faced shrikes, Nankeen night heron, and white necked heron. Revegetation does not alleviate this pressure for many years and increases the stress on fauna habitat in the short to mid-term Impact on local community who utilise the area for recreation <p>The Submission recommended the applicant revise the clearing application to remove the areas of mature trees and the wetland from the application area. The submission recommended the applicant meet with the local community before December to discuss the plans for the development.</p>	<p>The applicant has provided an offset to address impacts to Carnaby's cockatoo and forest red-tailed black cockatoo habitat as discussed under Section 4.</p> <p>The applicant will be required to submit a comprehensive revegetation plan (to DWER for approval) for the revegetation proposed. This will include detailed information of revegetation actions and completion criteria, to provide DWER with confidence that revegetation will be successful.</p> <p>Comments regarding impacts to the local community are outside the scope of this assessment.</p>

Submission C (2020)

Summary of comments	Consideration of comment
<p>The submission noted the following:</p> <ul style="list-style-type: none"> Concerns in the reduction of natural areas within the City of Canning that provide shelter and food sources for local native fauna as well as linkage of natural areas throughout the City. Recommend plant species are salvaged/ transplanted including <i>Macrozamia</i>, <i>Xanthorhoea spp</i> and <i>Macarthuria keigheryi</i> Welcome the suggestion of the proposed offset, creating a vegetated corridor along a section of Gerard St to create a linkage with the Threatened Ecological Community within Cannington Claypan (Swamp). 	<p>The applicant has committed to salvaging native vegetation and timber, as discussed under Section 3.1.</p> <p>The applicant has committed to providing an offset to address the significant residual impacts of clearing, as shown in Section 4. This includes offsets to address the impact to significant foraging habitat for Carnaby's cockatoo and forest red-tailed black cockatoo.</p>

Submission D (2020)

Summary of comments	Consideration of comment
<p>The submission noted the following:</p> <ul style="list-style-type: none"> Concerns with the long-term damage of irreplaceable flora (native/introduced) and fauna species The construction should limit impacts to native vegetation. 	<p>The applicant has undertaken a number of avoidance and minimisation measures in the planning design process, and will be undertaking a number of mitigation measures, as detailed under Section 3.1.</p> <p>The applicant has committed to providing an offset to address the significant residual impacts of clearing, as shown in Section 4.</p>

Appendix C. Site characteristics

C.1. Site characteristics

Characteristic	Details
Local context	<p>The application area is in the Swan Coastal Plain Bioregion, Perth Subregion and City of Swan. It is bound by remnant vegetation to the west, industrial land uses to the north-west, remnant vegetation to the north-east, residential land to the south-east and Maniana Park to the south. Welshpool Road borders the application area to the north.</p> <p>The application area largely comprises scattered patches of native vegetation within a highly cleared landscape.</p>

Characteristic	Details																																						
Climate and Landform	The application is located within the Bassendean System comprising gently undulating dunes made up of well-bleached white-grey sands. The climate of the area is warm and temperate. The winter months have higher rainfall than summer months with an annual rainfall of around 755 millimetres.																																						
Vegetation description and condition	<p>Flora surveys indicate that the application area comprises the following vegetation types (Emerge, 2020a; GHD, 2020):</p> <table border="1" style="width: 100%; border-collapse: collapse;"> <thead> <tr> <th style="background-color: #D9E1F2;">Plant community</th> <th style="background-color: #D9E1F2;">Vegetation condition</th> <th style="background-color: #D9E1F2;">Area (ha)</th> </tr> </thead> <tbody> <tr> <td><i>Corymbia calophylla</i> (VT1)</td> <td>'Degraded'</td> <td>0.23</td> </tr> <tr> <td rowspan="2"><i>Banksia</i> low woodland (VT2)</td> <td>'Good'</td> <td>0.13</td> </tr> <tr> <td>'Degraded'</td> <td>0.20</td> </tr> <tr> <td><i>Melaleuca preissiana</i> low woodland (VT3)</td> <td>'Degraded'</td> <td>0.23</td> </tr> <tr> <td rowspan="3">Mixed, introduced trees and shrubs (VT4)</td> <td>'Degraded'</td> <td>0.09</td> </tr> <tr> <td>'Degraded – completely degraded'</td> <td>0.29</td> </tr> <tr> <td>'Completely degraded'</td> <td>0.56</td> </tr> <tr> <td>Scattered natives over weeds (VT5)</td> <td>'Completely degraded'</td> <td>0.39</td> </tr> <tr> <td rowspan="2">Mixed shrubs and sedges/grasses (VT6)</td> <td>'Degraded – completely degraded'</td> <td>0.45</td> </tr> <tr> <td>'Completely degraded'</td> <td>1.04</td> </tr> <tr> <td><i>Adenanthos cygnorum</i> tall shrubland (VT7)</td> <td>'Degraded'</td> <td>0.15</td> </tr> <tr> <td>Revegetation</td> <td></td> <td>0.43</td> </tr> <tr> <td colspan="2" style="text-align: right;">Total</td> <td>4.19</td> </tr> </tbody> </table> <p>The full survey descriptions and maps are available online.</p> <p>According to broad scale vegetation mapping of the Swan Coastal Plain, the application area is mapped as the Southern River Complex. This complex is described as open woodland of <i>Corymbia calophylla</i> (Marri), <i>Eucalyptus marginata</i> (Jarrah) and <i>Banksia</i> species with fringing woodland of <i>Eucalyptus rudis</i> (Flooded Gum), and <i>Melaleuca raphiophylla</i> (Swamp Paperbark) along creek beds (Hedde et al, 1980).</p> <p>Flora surveys indicate the vegetation within the application area is in a good to completely degraded (Keighery, 1994) condition, with the majority in a degraded to completely degraded (Keighery, 1994) condition (GHD, 2020; Emerge, 2020a).</p> <p>The full Keighery (1994) condition rating scale, with a description of each condition, is provided in Appendix E.</p>	Plant community	Vegetation condition	Area (ha)	<i>Corymbia calophylla</i> (VT1)	'Degraded'	0.23	<i>Banksia</i> low woodland (VT2)	'Good'	0.13	'Degraded'	0.20	<i>Melaleuca preissiana</i> low woodland (VT3)	'Degraded'	0.23	Mixed, introduced trees and shrubs (VT4)	'Degraded'	0.09	'Degraded – completely degraded'	0.29	'Completely degraded'	0.56	Scattered natives over weeds (VT5)	'Completely degraded'	0.39	Mixed shrubs and sedges/grasses (VT6)	'Degraded – completely degraded'	0.45	'Completely degraded'	1.04	<i>Adenanthos cygnorum</i> tall shrubland (VT7)	'Degraded'	0.15	Revegetation		0.43	Total		4.19
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Soil description	Soil landscape mapping indicates the application area comprises S8 Phase (212BS_S8), described as sand, very light grey at the surface, yellow at depth, fine to medium-grained, sub-rounded quartz, moderately well sorted of eolian origin (DPIRD, 2017).																																						
Conservation areas	The entire application area forms part of Bush Forever site 283 known as 'Queens Park Bushland, Queens Park'. Bush Forever site 424 occurs around 30 metres north of																																						

Characteristic	Details														
	the application area on the northern side of Welshpool Road. There are no other nearby conservation areas.														
Ecological linkage	<p>There are no formal mapped linkages intersecting the application area. However, the vegetation under application provides non-contiguous ecological linkage values between patches of remnant vegetation (Bush Forever sites) west and east/north-east.</p> <p>The City of Canning also recognises several ecological linkages under its Local Biodiversity Strategy, and a portion of the vegetation under application forms part of one of these ecological linkages (City of Canning, 2020).</p>														
Land degradation risk	<p>According to land degradation risk mapping, the highest risk is on site is associated with wind erosion, as 50-70 per cent of the application areas mapped land unit has a high to extreme wind erosion risk (see all categories below).</p> <p>Groundwater salinity is mapped at between 500-1000 mg per litre total dissolved solids. This level is considered marginal.</p> <table border="1" data-bbox="469 737 1411 1031"> <thead> <tr> <th data-bbox="469 737 716 789">Risk categories</th> <th data-bbox="716 737 1411 789">Landform Unit S8</th> </tr> </thead> <tbody> <tr> <td data-bbox="469 789 716 825">Wind erosion</td> <td data-bbox="716 789 1411 825">50-70% of map unit has a high to extreme wind erosion risk</td> </tr> <tr> <td data-bbox="469 825 716 861">Water erosion</td> <td data-bbox="716 825 1411 861"><3% of map unit has a high to extreme water erosion risk</td> </tr> <tr> <td data-bbox="469 861 716 911">Salinity</td> <td data-bbox="716 861 1411 911"><3% of map unit has a moderate to high salinity risk or is presently saline</td> </tr> <tr> <td data-bbox="469 911 716 947">Flood risk</td> <td data-bbox="716 911 1411 947"><3% of the map unit has a moderate to high flood risk</td> </tr> <tr> <td data-bbox="469 947 716 987">Water logging</td> <td data-bbox="716 947 1411 987">3-10% of map unit has a moderate to very high waterlogging risk</td> </tr> <tr> <td data-bbox="469 987 716 1031">Phosphorus export risk</td> <td data-bbox="716 987 1411 1031">30-50% of map unit has a high to extreme phosphorus export risk</td> </tr> </tbody> </table>	Risk categories	Landform Unit S8	Wind erosion	50-70% of map unit has a high to extreme wind erosion risk	Water erosion	<3% of map unit has a high to extreme water erosion risk	Salinity	<3% of map unit has a moderate to high salinity risk or is presently saline	Flood risk	<3% of the map unit has a moderate to high flood risk	Water logging	3-10% of map unit has a moderate to very high waterlogging risk	Phosphorus export risk	30-50% of map unit has a high to extreme phosphorus export risk
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Phosphorus export risk	30-50% of map unit has a high to extreme phosphorus export risk														
Waterbodies	<p>According to available datasets, around 50 per cent of the application area intersects a multiple use category geomorphic wetland (dampland).</p> <p>An additional multiple use category wetland (dampland) is mapped adjacent to the application area.</p> <p>There are no natural watercourses mapped within the application area.</p> <p>There are three areas of artificial wetlands/watercourses present within the application area, relating to drainage areas and a run-off basin. One drainage line crosses Welshpool Road into the survey area, and supports mostly introduced trees and sedges, with some native water plants present (Emerge, 2020a).</p> <p>The wetland (basin), consists of an island in the centre of a circular channel. This area supports very few native trees or shrubs but has patches of native sedges (Emerge, 2020a).</p>														
Flora	<p>According to available datasets, there are records of 25 threatened and 76 priority flora species within the local area. Of these, a likelihood of analysis identified eight species that may occur within the application based on habitat suitability (vegetation type, soil type and vegetation condition).</p> <p>A total of Priority and threatened flora species known from the local area are presented in section C.3 below.</p> <p>Flora surveys identified one threatened flora species, <i>Macarthuria keigheryi</i> (eight individuals) and one priority 3 flora species, <i>Jacksonia gracillima</i> (38 individuals). The</p>														

Characteristic	Details
	applicant has amended the clearing footprint to avoid all <i>Jacksonia gracillima</i> individuals and five <i>Macarthuria keigheryi</i> individuals (Emerge, 2020a).
Ecological communities	<p>The application area is adjacent to three patches of native vegetation mapped as the 'Banksia woodlands of the Swan Coastal Plain' (Banksia Woodland) threatened ecological community (TEC) (endangered). These areas are also mapped as the state listed 'Banksia dominated woodlands of the Swan Coastal Plain IBRA region' priority ecological community (PEC) (priority 3).</p> <p>The GHD flora survey identified that vegetation community VT2 (Banksia low woodland), comprising 0.33 hectares of the application area, aligns with the above state listed PEC and federally listed TEC.</p> <p>This 0.33 hectare portion does not meet the condition or size thresholds required under the diagnostic criteria for the Banksia Woodland TEC (DoEE 2016), and is therefore not considered an occurrence of this TEC.</p>
Fauna	<p>A Fauna and Black Cockatoo Habitat Assessment identified forest red-tailed black cockatoo and Carnaby's cockatoo foraging evidence within the application area. No other conservation listed species were identified (Emerge, 2020a).</p> <p>The assessment also identified a south western snake necked turtle (<i>Chelodina colliei</i>) shell (Emerge, 2020a).</p> <p>A further eight fauna species have potential to occur based on the suitability of habitat within the application area for these species. These conservation listed fauna species are presented in section C.4 below.</p>

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	1,501,222	579,814	38.6	153,955	10.3
Vegetation complex					
Hedde vegetation complex 'Southern River Complex' **	58,781	10,832	18.4	940	1.6
Local area					
10km radius	33,328	4,972	14.9	-	-

*Government of Western Australia (2019a)

**Government of Western Australia (2019b)

C.3. Flora records table

The below table shows threatened and priority flora recorded within the local area that may occur within the application area based on habitat suitability.

Species name	Conservation status (state listing)	Description and habitat requirements	Distance of closest record to application area (km)	Number of known records (total)	Are surveys adequate to identify? [Y, N, N/A]	Did surveys identify? [Y, N, N/A]
<i>Aponogeton hexatepalus</i>	Priority (P) 4	Rhizomatous or cormous, aquatic perennial, herb, leaves floating. Fl. green-white, Jul to Oct. Mud. Freshwater: ponds, rivers, claypans.	2.3	29	Yes	No
<i>Babingtonia urbana</i>	P3	Shrub 0.4 to 0.7 m high with erect stems. Fl. White to pale pink. Jan to March. Sandy soils in damp, swampy areas.	3.3	25	Yes	No
<i>Conospermum undulatum</i>	T	Erect, compact shrub, 0.6-2 m high. Fl. white-ocher, May to Oct. Grey or yellow-orange clayey sand.	0.86	83	Yes	No
<i>Hydrocotyle lemnoides</i>	P4	Aquatic, floating annual, herb. Fl. purple, Aug to Oct. Swamps.	2.4	26	Yes	No
<i>Jacksonia gracillima</i>	P3	Grey, white sand on flats.	10	29	Yes	Yes
<i>Lasiopetalum glutinosum</i> subsp. <i>glutinosum</i>	P3	No habitat information available.	1.7	46	Yes	No
<i>Macarthuria keigheryi</i>	T	Erect or spreading perennial, herb or shrub, 0.2-0.4 m high, 0.3-0.6 m wide. Fl. Sep to Dec or Feb to Mar. White or grey sand	Recorded within the application area	23	Yes	Yes
<i>Styphelia filifolia</i>	P3	Shrub to 0.9 m high. Fl. white, Mar to May. Sandy soils in low lying Banksia or Jarrah woodland.	3.7	36	Yes	No

C.4. Fauna records table

The below table shows conservation listed fauna recorded within the local area that may occur within the application area based on habitat suitability.

Species name	Conservation status (state listing)	Did surveys identify? [Y, N, N/A]
<i>Calyptorhynchus banksii naso</i> (forest red-tailed black cockatoo)	Vulnerable	Yes – evidence of foraging
<i>Calyptorhynchus latirostris</i>	Endangered	Yes – evidence of foraging
<i>Calyptorhynchus baudinii</i> (Baudin's cockatoo)	Endangered	No
<i>Apus pacificus</i> (pacific swift)	Protected under International Agreement	No
<i>Falco peregrinus</i> (peregrine falcon)	Other specially protected	No
<i>Idiosoma sigillatum</i> (Swan Coastal Plain shield-backed trapdoor spider)	P3	No

Species name	Conservation status (state listing)	Did surveys identify? [Y, N, N/A]
<i>Isodooon fusciventer</i> (quenda)	P4	No
<i>Phascogale tapoatafa wambenger</i> (south-western brush-tailed phascogale)	Conservation dependant	No
<i>Lerista lineata</i> (Perth slider)	P3	No
<i>Neelaps calonotos</i> (black striped snake)	P3	No

Appendix D. Assessment against the clearing principles

Assessment against the clearing principles	Variance level	Is further consideration required?
Environmental value: biodiversity values		
<p><u>Principle (a):</u> “Native vegetation should not be cleared if it comprises a high level of biodiversity.”</p> <p><u>Assessment:</u></p> <p>The application area comprises a high level of biodiversity as it contains:</p> <ul style="list-style-type: none"> • Three individuals of the threatened flora species <i>Macarthuria keigheryi</i> and 0.13 hectares of significant habitat for this species • significant foraging habitat for Carnaby’s cockatoo and forest red-tailed black cockatoo • A small portion (0.33 hectares) of vegetation representative of the state listed Priority 3 ‘Banksia dominated woodlands of the Swan Coastal Plain IBRA region’ ecological community • A small portion (0.13 hectares) of the state listed Priority 3 ‘low lying <i>Banksia attenuata</i> woodlands or shrublands’. 	At variance	Yes <i>Refer to Section 3.2.1, above.</i>
<p><u>Principle (b):</u> “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.”</p> <p><u>Assessment:</u></p> <p>The application area contains 0.87 and 0.88 hectares of foraging habitat for forest red-tailed black cockatoo and Carnaby’s cockatoo, within a highly cleared area of the Swan Coastal Plain. The application area also contains suitable habitat for an additional 8 species of conservation significant fauna, and several non-conservation listed fauna species.</p>	At variance	Yes <i>Refer to Section 3.2.1, above.</i>
<p><u>Principle (c):</u> “Native vegetation should not be cleared if it includes, or is necessary for the continued existence of, threatened flora.”</p> <p><u>Assessment:</u></p> <p>The application area contains 0.13 hectares of significant habitat and three individuals of <i>Macarthuria keigheryi</i>, listed as threatened (endangered) under the BC Act.</p>	At variance	Yes <i>Refer to Section 3.2.1, above.</i>

Assessment against the clearing principles	Variance level	Is further consideration required?
<p><u>Principle (d):</u> <i>“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.”</i></p> <p><u>Assessment:</u></p> <p>The application area is not representative of any known state listed threatened ecological communities.</p>	Not likely to be at variance	Yes <i>Refer to Section 3.2.1, above.</i>
Environmental value: significant remnant vegetation and conservation areas		
<p><u>Principle (e):</u> <i>“Native vegetation should not be cleared if it is significant as a remnant of native vegetation in an area that has been extensively cleared.”</i></p> <p><u>Assessment:</u></p> <p>The extent of the mapped vegetation type and native vegetation in the local area is less than the national objectives and targets for biodiversity conservation in Australia. Furthermore, the application area provides significant habitat for fauna and flora species and is considered significant.</p> <p>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.</p>	At variance	Yes <i>Refer to Section 3.2.1, above.</i>
<p><u>Principle (h):</u> <i>“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.”</i></p> <p><u>Assessment:</u></p> <p>The application area is entirely within Bush Forever Site 283 and will result in the removal of 4.19 hectares of native vegetation from this site.</p>	At variance	Yes <i>Refer to Section 3.2.1, above..</i>
Environmental value: land and water resources		
<p><u>Principle (f):</u> <i>“Native vegetation should not be cleared if it is growing in, or in association with, an environment associated with a watercourse or wetland.”</i></p> <p><u>Assessment:</u></p> <p>Around 50 per cent of the application area is mapped as a multiple use wetland. The application area includes riparian vegetation in the form of <i>Melaleuca preissiana</i> woodland, and native sedges associated with a constructed basin and drains on site.</p>	At variance	Yes <i>Refer to Section 3.2.1, above..</i>
<p><u>Principle (g):</u> <i>“Native vegetation should not be cleared if the clearing of the vegetation is likely to cause appreciable land degradation.”</i></p> <p><u>Assessment:</u></p> <p>Due to the sandy soil types, the application area has an increased risk of wind erosion. However, noting the fragmented, highly modified condition of the application area, the proposed clearing is not likely to cause appreciable land degradation.</p> <p>To further minimise this potential the applicant will be required to commence construction within three months of clearing, to reduce the exposure of bare sandy soils. The applicant will also be undertaking dust suppression actions to reduce wind erosion.</p>	Not likely to be at variance	No

Assessment against the clearing principles	Variance level	Is further consideration required?
<p><u>Principle (i):</u> "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."</p> <p><u>Assessment:</u></p> <p>Groundwater salinity levels are marginal, and there is not expected to be any surface expression of salinity due to clearing.</p> <p>There is the potential for minor sedimentation of surrounding dampland areas due to clearing. However, noting that the site is already in a highly modified state, and that the applicant will be required to construct within three months of clearing to reduce the exposure of bare sandy soils, effects of sedimentation are likely to be minor and short lived.</p> <p>The applicant has also advised that mitigation measures to be employed during clearing (dust suppression and surface stabilisation where required); and the long-term management of exposed surfaces post-clearing (surface sealing for the carpark and the building, installation of playing turf and mulching and revegetation of public open space areas), will help to limit the risk of sedimentation affecting surface water.</p>	Not likely to be at variance	No
<p><u>Principle (j):</u> "Native vegetation should not be cleared if the clearing of the vegetation is likely to cause, or exacerbate, the incidence or intensity of flooding."</p> <p><u>Assessment:</u></p> <p>The mapped soils are highly permeable and noting the largely degraded condition of the application area and applicants intention to reinstate the drainage basin, the proposed clearing is not likely to exacerbate flooding.</p>	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.

Condition	Description
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. Biological survey information excerpts / photographs of the vegetation / DWER site inspection report

The application area has been subject to several biological surveys, which are detailed below:

GHD Flora Survey

GHD were commissioned to undertake a survey which incorporated the majority of the application area. The survey incorporated the following methods (GHD, 2020):

- A desktop assessment to assist in survey design
- A broad flora and vegetation survey undertaken on 22 October 2019
- survey methodology undertaken with reference to the EPA Technical Guidance – Flora and Vegetation Surveys for Environmental Impact Assessment (EPA 2016), including:
 - data collection through sampling quadrats, relevés, photographic reference points located in identified vegetation types and walking transects
 - analysis of vegetation types and condition
 - searches for conservation significant flora
- Nil limitations were identified

The survey noted that historical records of threatened flora *Macarthuria keigheryi* within the site and wider local area, and that the site contained habitat for the species, but did not record any occurrences this species.

Emerge Targeted Flora Survey

Emerge undertook a further *Macarthuria keigheryi* targeted flora survey within the entirety of the application area, which included site visits from a botanist and ecologist on 26 and 31 August and 4 September.

All areas of potential habitat, particularly the areas of VT1 and VT2, were traversed on foot and searches were made for *M. keigheryi*. Waypoints of individuals of the species were recorded using a hand-held 'global positioning system' (GPS) and tracklogs were recorded for all searchers.

The survey identified eight individuals of this species (Emerge, 2021e).

The survey methods noted that this species dies back to rootstock during the summer, and as such the species can be described as 'cryptic'. Given this characteristic, some or all of the recorded occurrences may have remained dormant over the spring of 2019 and hence been undetectable during the GDH survey.

Emerge Basic Fauna and Targeted Black Cockatoo Fauna Assessment (Fauna Assessment)

Emerge undertook the Fauna Assessment on 29 July 2020, this involved (Emerge, 2020b):

Fauna component

Transects were traversed across the site, during the day, and the characteristics of fauna habitat and presence of fauna species was recorded. Microhabitats such as logs, rocks and leaf litter were investigated and secondary evidence of species presence such as tracks, scats, skeletal remains, foraging evidence or calls was also noted. An opportunistic fauna species list was compiled, and fauna habitat values were described, with particular reference to conservation significant fauna species with potential to occur within the site.

Targeted black cockatoo component

Transects were traversed across the site and the presence of potential black cockatoo breeding, night roosting and foraging habitat was recorded. If observed, the presence of black cockatoos within or near the site was noted. Active searches for secondary evidence of breeding, roosting and foraging activity such as chew marks, branch clippings, droppings, moulted feathers and chewed marri or banksia fruit were conducted.

With regard to breeding habitat the Fauna assessment noted that If hollows potentially suitable for breeding by a black cockatoo were recorded, the hollow was inspected further using a drone and/or a pole-mounted camera to confirm whether the hollows' internal dimensions were suitable. The internal hollow inspection also searched for signs of hollow use such as chew marks around the hollow entrance, nesting material such as feathers and presence of birds perching at the entrance or entering the hollow.

Emerge Supplementary Survey Work

Further site visits within the application area were undertaken by Emerge on the following dates to identify the potential occurrence of a SCP3a, known as '*Corymbia calophylla* – *Kingia australis* woodlands on heavy soils of the Swan Coastal Plain', which is a threatened ecological community.

These additional searches were carried out on:

- 20 July 2020
- 2 and 19 October 2020
- 10 November 2020

The methodology involved:

- Traversing the application area on foot and recording the composition and condition of vegetation.
- Detailed sampling of the vegetation was undertaken using relevés focused on the marri woodland vegetation
- Relevés were used due to the small size of the vegetation patches and to maximise the species recorded in each sample (as opposed to 10 m x 10 m quadrats).

The data recorded within each sample included:

- site details (site name, site number, observers, date, location)
- environmental information (slope, aspect, bare-ground, rock outcropping soil type and colour class, litter layer, topographical position, time since last fire event)
- biological information (vegetation structure and condition, 'foliage projective cover' (FPC), degree of disturbance and species present).

Additional plant taxa not observed within samples were recorded opportunistically as the botanist traversed the site. Photographs were taken throughout the field visit to show conditions. The locations of conservation significant flora species were recorded using a hand-held GPS unit.

Appendix G. Sources of information

G.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)
- Cadastre (LGATE-218)
- Cadastre Address (LGATE-002)
- Consanguineous Wetlands Suites (DBCA-020)
- 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)
- 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)
- Remnant Vegetation, All Areas
- Soil Landscape Mapping – Best Available
- Soil Landscape Mapping – Systems
- Soil Landscape Land Quality – Flood Risk (DPIRD-007)
- Soil Landscape Land Quality – Wind Erosion Risk (DPIRD-016)
- Soil Landscape Land Quality – Water Erosion Risk (DPIRD-013)
- Soil Landscape Land Quality – Waterlogging Risk (DPIRD-015)
- Soil Landscape Land Quality – Water Repellence Risk (DPIRD-014)
- Soil Landscape Land Quality – Subsurface Acidification Risk (DPIRD-011)
- Soil Landscape Land Quality – Phosphorus Export Risk (DPIRD-010)
- South Coast Significant Wetlands (DBCA-018)
- RIWI Act, Surface Water Areas and Irrigation Districts (DWER-037)
- RIWI Act, Groundwater Areas (DWER-034)

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

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