Government of Western Australia
Department of Water and Environmental Regulation

# Clearing Permit Decision Report

## 1 Application details and outcome

### 1.1. Permit application details

| | |
|---|---|
| **Permit number:** | CPS 10519/1 |
| **Permit type:** | Area permit |
| **Applicant name:** | Thornlie Christian College (Inc) |
| **Application received:** | 2 February 2024 |
| **Application area:** | 0.05 hectares of native vegetation |
| **Purpose of clearing:** | Expansion of school building |
| **Method of clearing:** | Mechanical |
| **Property:** | Lot 802 on Deposited Plan 406125 |
| **Location (LGA area/s):** | City of Gosnells |
| **Localities (suburb/s):** | Southern River |

### 1.2. Description of clearing activities

The application is to clear a small area of native vegetation for the construction of science laboratories for Thornlie Christian College as an extension to an existing school building. The vegetation proposed to be cleared is an isolated patch of native vegetation within the school grounds separated from a larger remnant of vegetation by a road (see Figure 1, Section 1.5).

### 1.3. Decision on application

| | |
|---|---|
| **Decision:** | Granted |
| **Decision date:** | 17 June 2024 |
| **Decision area:** | 0.05 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 no submissions were received.

In making this decision, the Delegated Officer had regard for the site characteristics (see Appendix B), relevant datasets (see Appendix G.1), the findings of a flora and vegetation survey (see Appendix E), photographs of the vegetation (Appendix F), the clearing principles set out in Schedule 5 of the EP Act (see Appendix C), relevant planning instruments and any other matters considered relevant to the assessment (see Section 3).

The assessment identified that the proposed clearing will result in:

- the loss of native vegetation that is suitable habitat for quenda (*Isoodon fusciventer*)
- the potential introduction and spread of weeds and dieback into adjacent vegetation, which could impact on the quality of the adjacent vegetation and its habitat values; and
- the loss of vegetation growing in association with a mapped wetland.

After consideration of the available information, as well as the applicant's minimisation and mitigation measures (see Section 3.1), the Delegated Officer determined the proposed clearing is unlikely to lead to have long-term adverse impacts on environmental values and can be minimised and managed to unlikely lead to an unacceptable risk to environmental values.

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

- avoid, minimise to reduce the impacts and extent of clearing;
- take hygiene steps to minimise the risk of the introduction and spread of weeds and dieback;
- undertake slow, directional clearing to allow fauna to move into adjacent native vegetation; and
- engage a fauna specialist to be present for the duration of clearing activities and cease clearing in any areas where quenda are identified until the individual(s) have moved on, or been trapped and relocated.

## 1.5. Site map

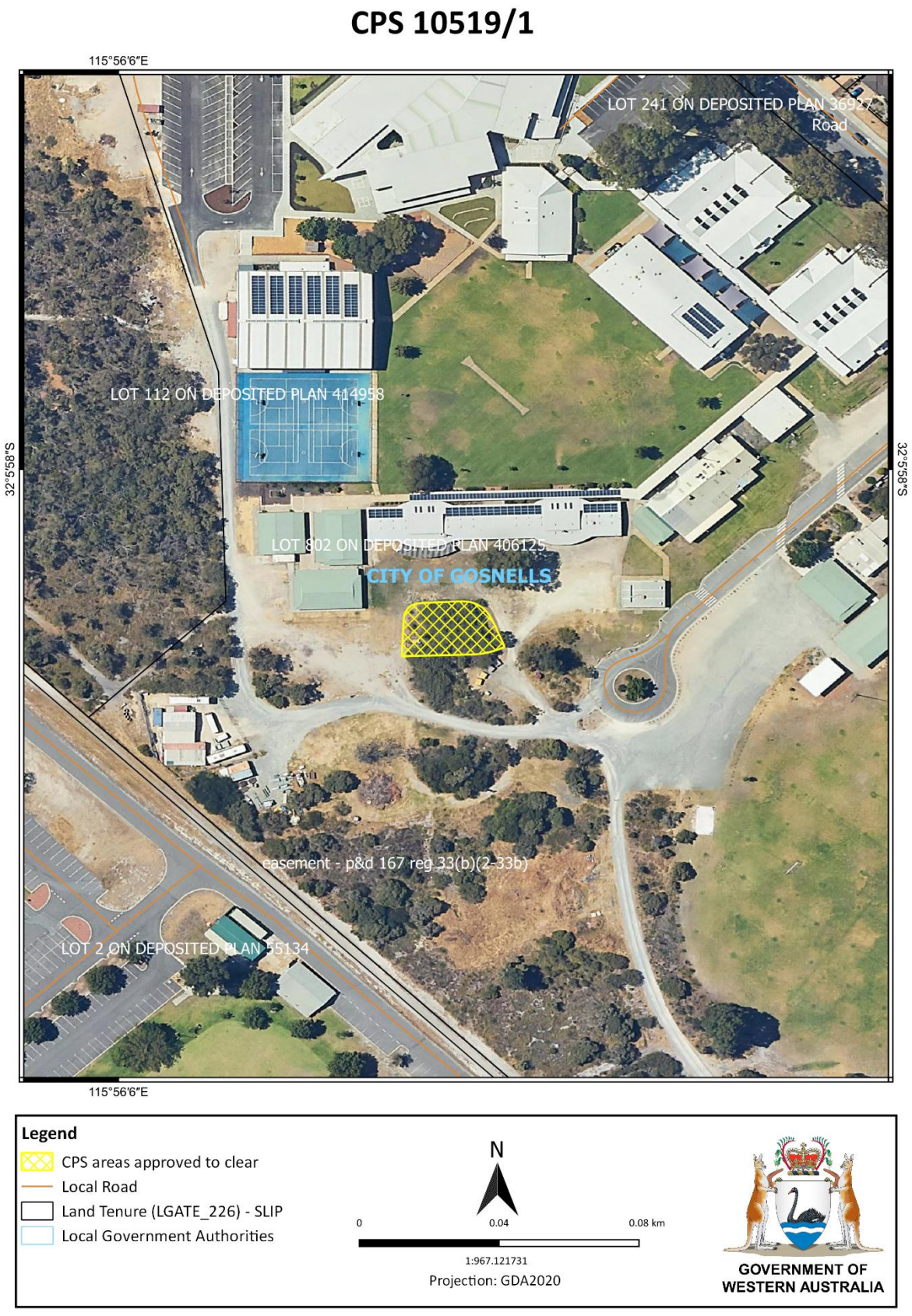


**Figure 1.** Map of the application area

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

## 2 Legislative context

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

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

- the precautionary principle
- the principle of intergenerational equity
- the 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)

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)
- Technical guidance – *Flora and Vegetation Surveys for Environmental Impact Assessment* (EPA, 2016)

## 3 Detailed assessment of application

### 3.1. Avoidance and mitigation measures

Avoidance

For the construction of new science labs and the associated Asset Protection Zone (APZ), it was determined that clearing could not be avoided as the school grounds are surrounded by remnant vegetation.

The Applicant considered alternative locations and construction options within the property, including the construction of an entirely new building in a different location, however, this would require a larger clearing footprint and the removal of better quality native vegetation, much of which is representative of the "Banksia Woodlands of the Swan Coastal Plain" Ecological Community. By building the new laboratories as an extension to an existing building, it reduces the required clearing footprint and avoids a significant ecological community.

The applicant has committed to retaining a *Eucalyptus gomphocephala* (tuart) tree within the APZ due to the species significance as habitat value to black cockatoos (Coterra, 2024d).

Mitigation

To mitigate the risk of indirect impacts to surrounding environmental values, the applicant has proposed to implement weed controls in the 12 months following the completion of the building and associated landscaping to avoid spreading weeds and dieback (Coterra, 2024b).

Following a request from the City of Gosnells (See Section 3.3.), the applicant has also committed to comply with Australian Standard *AS470-2009 – Protection of trees on development sites* to protect the retained tuart tree during clearing and construction activities and to salvage and relocate the immature grass trees within the proposed clearing area where possible (Coterra, 2024d).

The assessment identified that the proposed clearing area is suitable habitat for quenda (*Isoodon fusciventer*) and clearing activities may result in individuals being harmed (see Section 3.2.2.). To mitigate the risk to quenda, the applicant has committed to the presence of a fauna specialist on site during the clearing activities in the event a quenda is identified, to ensure that the species can be moved or relocated safely.

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

### 3.2. Assessment of impacts on environmental values

In assessing the application, the Delegated Officer has had regard for the site characteristics (see Appendix B) 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 against the clearing principles (see Appendix C) identified that the impacts of the proposed clearing present a risk to biological values (fauna, adjacent flora and vegetation), and land and water resources. The consideration of these impacts, and the extent to which they can be managed through conditions applied in line with sections 51H and 51I of the EP Act, is set out below.

### *3.2.1. Biological values (flora and ecological communities) - Clearing Principles (a), (c) and (d)*

Assessment

The desktop assessment identified that the proposed clearing area is mapped as the "Banksia Woodlands of the Swan Coastal Plain ecological community" (Banksia Woodlands) which is listed as a Priority 3 ecological community (PEC) in Western Australia and as an Endangered threatened ecological community (TEC) under the *Environment Protection and Biodiversity Conservation Act 1999* (EPBC Act). Additionally, the mapped vegetation and soil types indicate that the proposed clearing contains suitable habitat for both priority and threatened flora species.

The Banksia Woodlands PEC/TEC is characterised by a prominent layer of Banksia species with other trees such as eucalypts either amongst or emerging above the Banksia canopy and a rich understorey (DoEE, 2016). This community is considered significant due to its capacity to support a diverse range of fauna and flora species (DoEE, 2016).

The flora and vegetation survey identified five vegetation types within the broader survey area (Focused Vision, 2024):

- EmAfXp - Open Low Woodland of *Eucalyptus marginata* with *Allocasuarina fraseriana* over occasional associated *Banksia menziesii*, over Open Shrubland of *Xanthorrhoea preissii* over Low Sedgeland of *Dasypogon bromeliifolius*;
- MpKg - Open Low Woodland of *Melaleuca preissiana* over Thicket of *Kunzea glabrescens*, over Open Shrubland of *Xanthorrhoea preissii* over Low Sedgeland of *Dasypogon bromeliifolius*;
- BaKg - Closed forest of *Banksia attenuata* and of *Kunzea glabrescens* over Isolated Low Sedgeland of *Dasypogon bromeliifolius* and *Phlebocarya ciliata*;
- Tuart - Isolated Tuart trees over cleared or planted areas; and
- Planted - Planted non-endemic trees, gardens and parklands.

An assessment of the vegetation against the criteria for the Banksia Woodlands PEC/TEC (see Appendix E) identified that one of the vegetation types, EmAfXp, is representative of this community (Focused Vision, 2024).

Additionally, the survey identified several *Eucalyptus gomphocephala* (tuart) trees within the survey area and an assessment was conducted to determine whether it was representative of the "Tuart (*Eucalyptus gomphocephala*) woodlands and forests of the Swan Coastal Plain ecological community" (Tuart TEC/PEC), listed as Priority 3 in Western Australia and Critically Endangered under the EPBC Act (Focused Vision, 2024) (see Appendix E). This community was not recorded within the local area, the nearest being approximately 10.38 km from the proposed clearing.

The Conservation Advice for the Tuart TEC/PEC notes that structure of the community can vary greatly depending on factors such as rainfall, soil nutrients, landscape position, historical land use etc., but is generally characterised by an upper canopy of tuart, most commonly in woodlands or forests, but can occur in mallee formations (DoEE, 2019).

It was determined that while some of the Tuart vegetation type met some of the basic diagnostic criteria for the community, it did not meet the minimum patch size of 0.5 hectares and is in 'poor condition' (based on the condition scale within the community's Conservation Advice) (DoEE, 2019), therefore is not considered to be representative of this TEC/PEC (Focused Vision, 2024).

The proposed clearing area is entirely composed of the MpKg vegetation type in completely degraded to degraded (Keighery, 1994) condition with the majority of the vegetation composed of dense *Kunzea glabrescens* (spearwood) thicket with a weedy mid and understorey and scattered juvenile *Xanthorrhoea preissii* (grass trees). Noting the vegetation descriptions and TEC assessments discussed above, the proposed clearing is not likely to be representative of any PEC or TEC.

Given the proximity of the proposed clearing to the mapped Banksia Woodlands TEC/PEC, the proposed clearing may result in the introduction and spread weeds and dieback into this community.

***Jacksonia sericea* (P4)**

The flora and vegetation survey identified 11 individuals of *Jacksonia sericea* (waldjumi) across four different sites on the property, none of which occur within the proposed clearing area, however, do occur in close proximity to the application (approximately 0.07 km) (Focused Vision, 2024). These populations were previously unrecorded, with available databases showing two records in the local area, the nearest being 2.25 km from the proposed clearing.

Waldjumi is a low spreading shrub found in the Perth Region (Joondalup to Rockingham) in areas of low woodland or tall scrub with brown to white sand (Florabase, 1998-). According to the survey, this species was recorded across two of the vegetation types, EmAfXp and MpKg, the majority of which are within MpKg (Focused Vision, 2024) (see Appendix E). The species was also found in vegetation ranging from completely degraded to very good (Keighery, 1994) condition. Given that the application area is composed of the vegetation type MpKg in degraded condition, the proposed clearing would result in the loss of suitable habitat for the species.

Noting the above, the proposed clearing is not likely to represent significant habitat for the species given the small size of the application, ongoing disturbance from the existing school and its isolation from other native vegetation on the property because of the road. Clearing activities may introduce and spread weeds and dieback into the vegetation which may impact on the individuals close to the application.

**Threatened flora**
The proposed clearing was identified to contain suitable habitat for a number of threatened flora species based on their habitat preferences, including:

- *Caladenia huegelii* (king spider-orchid);
- *Diuris purdiei* (Purdie's donkey orchid);
- *Drakaea elastica* (glossy-leafed hammer orchid); and
- *Drakaea micrantha* (dwarf hammer-orchid)

*C. huegelii* is generally found within woodlands dominated by jarrah and banksia species with scattered sheoak and marri, generally favouring areas of dense undergrowth and sandy soils (DEC, 2009a). The recovery plan for this species characterises critical habitat for the species as their existing areas of occupancy and similar habitat surrounding existing populations (DEC, 2009a). According to available databases, there are 50 records of the king spider-orchid within the local area.

*D. purdiei* grows in areas subject to winter inundation amongst sedges and dense heath with scattered Melaleuca species, marri, jarrah and *Nuytsia floribunda* on sandy clay soils (DEWHA, 2008a). This species only flowers following summer or early autumn fires so may be present in areas that are long unburnt (DEWHA, 2008a). According to available databases, there are 15 records of Purdie's donkey orchid in the local area.

*D. elastica* grows within bare patches of sand within otherwise dense vegetation alongside winter-wet swamps composed of banksia woodlands or spearwood thicket vegetation (DEC, 2009b). It is likely that the orchid requires shady canopy for survival (DEC, 2009b). The recovery plan for this species characterises critical habitat for the species as their existing areas of occupancy and similar habitat surrounding existing populations (DEC, 2009b). According to available databases, there are four records of the species in the local area.

*D. micrantha* is found in bare sandy areas, however, this species is identified as having a preference for disturbed areas where competition from plants has been removed (DEWHA, 2008b). The dwarf hammer orchid is usually found in grey infertile sands within banksia, jarrah and sheoak woodland or forest, often under thickets of spearwood (DEWHA, 2008b). According to available databases, there are two records of the species in the local area.

The vegetation within the proposed clearing area is primarily composed of spearwood thicket and photographs provided by the applicant (Appendix F) suggest that this vegetation is very dense. Additionally, the vegetation survey (Focused Vision, 2024) states that the proposed clearing area is in degraded (Keighery, 1994) condition, likely due to ongoing disturbance from its proximity to the existing school grounds.

The flora survey initially considered that *C. huegelii, D. purdiei* and *D. elastica* were likely to occur and *D. micrantha* may occur within the proposed clearing area, however, no individuals were identified within the proposed clearing area or broader survey area (Focused Vision, 2024). The field survey occurred in early October which is within the flowering period of all four flora species and it is likely that if *C. huegelii, D. purdiei* and/or *D. elastica* were present, they would have been identified during the survey.

*D. micrantha* may be present and not detectable at the time of the survey since, as mentioned above, the species only flowers after fire. However, *D. micrantha* has not previously been recorded within the property and the two records found in the local area are from the 1980's and have not been recorded since. In addition, while the species prefers disturbed areas, the area is subject to continuous and ongoing disturbance from the school and invasion from weeds, which according to the Conservation Advice for the species is identified as being a potential threat to the species (DEWHA, 2008b). Therefore, it is considered that the proposed clearing is not likely to contain individuals of or critical habitat for *D. micrantha*.

Conclusion
Based on the above assessment, the proposed clearing may result in indirect impacts to the Banksia Woodlands TEC/PEC and Priority 4 flora species *J. sericea* through the introduction and spread of weeds and dieback. For the reasons set out above, it is considered that the impacts of the proposed clearing on these values can be managed by taking steps to minimise the risk of the introduction and spread of weeds and dieback into adjacent vegetation.

Conditions
To address the above impacts, the following management measures will be required as conditions on the clearing permit:

- hygiene management to minimise the risk of spreading weeds and dieback into adjacent vegetation.

### *3.2.2. Biological values (fauna) - Clearing Principle (b)*

Assessment

The preliminary assessment identified 3,109 records across 48 species of fauna in the local area, comprised of 32 birds (mostly migratory species), seven invertebrates, six mammals and three reptiles. Of these records, quenda (*Isoodon fusciventer*), was found to have suitable habitat within the proposed clearing area. The fauna analysis determined that the application area is unlikely to comprise of suitable habitat for the remaining fauna species recorded in the local area, including black cockatoos.

Quenda (*Isoodon fusciventer*) are a small ground dwelling marsupial endemic to the South West of Western Australia and are listed as Priority 4 species. Quenda require a dense understorey for cover and are often found digging in leaf litter for invertebrates, earthworms, beetles and plant material, generally inhabiting dense understorey vegetation of forests, woodlands, shrubland and heathland (DBCA, 2017a). There are 984 records of quenda in the local area, the nearest being 0.12 km from the proposed clearing.

The proposed clearing is likely to provide suitable habitat for quenda since, based on photographs provided by the applicant (see Appendix F), the thickets of spearwood appear to be large and dense which would provide appropriate cover for the species, in addition to its location within a mapped wetland that would likely be swampy during the winter. Furthermore, quenda are known to feed in forest or woodland adjacent to these dense areas, similar to that of the vegetation adjacent to the application and the school.

Given the small size of the proposed clearing and the presence of better condition vegetation within the property, the proposed clearing is not likely to represent significant habitat for quenda. Despite this, since the species has previously been recorded within the property and the application is suitable habitat for quenda, the proposed clearing may result in direct harm or mortality of individuals that may be residing in the vegetation.

Conclusion

Based on the above assessment, the proposed clearing may result in the injury or mortality of quenda that may be residing within the vegetation.

For the reasons set out above, it is considered that the impacts of the proposed clearing on quenda can be managed by clearing in a slow, directional manner towards adjacent native vegetation and engaging a fauna specialist to be present throughout clearing activities to relocate any quenda individuals that may be present.

Conditions

To address the above impacts, the following management measures will be required as conditions on the clearing permit:

- slow, directional clearing from north to south to allow fauna to move into adjacent vegetation;
- applicant to engage a fauna specialist to be present for the duration of clearing activities, with clearing required to cease in any areas where quenda are identified until the individual(s) have moved on, or been trapped and relocated.

### *3.2.3. Land and water resources (wetlands) - Clearing Principles (f) and (i)*

Assessment

Management categories are assigned to wetlands based on the evaluation of their attributes, functions and values. Three categories are used within the Swan Coastal Plain, namely (DBCA, 2017b);

- multiple use wetlands (MUW) – are considered wetlands with few remaining important attributes and functions;
- resource enhancement wetlands (REW) – are wetlands which may have been partially modified but still supports substantial ecological attributes and functions; and
- conservation category wetlands (CCW) – support a high level of environmental wetlands. These are the highest priority wetlands and the management objective is the preservation of wetland attributes and functions.

The preliminary assessment identified that the proposed clearing is located within both a mapped MUW (UFI 14896) and REW (UFI 15623) and is approximately 0.03 km from a CCW (UFI 15624) (Figure 2). Clearing of vegetation within 50 metres of a CCW is not consistent with EPA Guidance Statement No.33 (EPA, 2008), given that vegetation within these areas acts as a buffer to protect the CCW from impacts from surrounding disturbances.

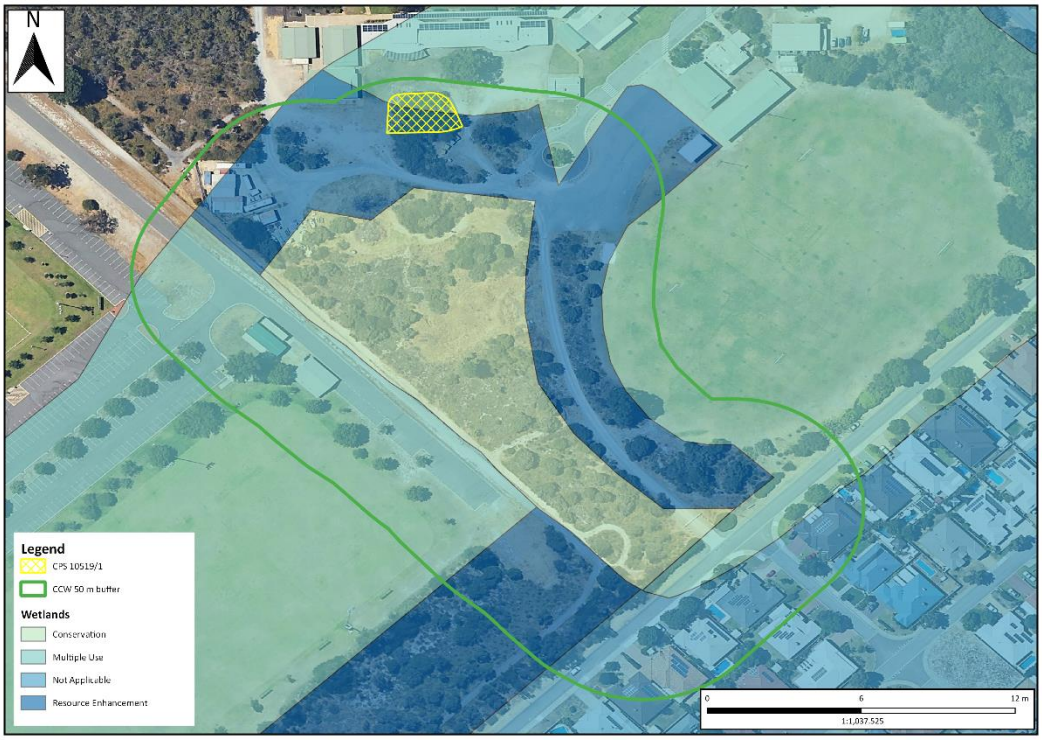


**Figure 2.** Wetland mapping within the proposed clearing area and surroundings including the buffer for the CCW.

According to *A methodology for the evaluation of wetlands on the Swan Coastal Plain, Western Australia* (DBCA, 2017), one of the primary criteria for a wetland to be considered to be conservation category is that it is dominated by vegetation in good (Keighery, 1994) or better condition vegetation. The proposed clearing area and mapped CCW are both composed of the same vegetation type (MpKg) which is indicative of wetland habitat, however, according to the survey, the majority of the vegetation within the mapped CCW is in degraded (Keighery, 1994) condition (Figure 3) (Focused Vision, 2024) and therefore is not likely to meet the criteria for a conservation category wetland. Furthermore, as there is a road separating the proposed clearing area from the CCW, the vegetation is not likely to provide significant buffering value to the wetland.


**Figure 3.** Vegetation condition of the mapped CCW according to the vegetation survey (Focused Vision, 2024).

The majority of both the REW and MUW that overlap the application area are composed of previously cleared areas associated with the school grounds and have limited vegetation cover. Given that these wetlands are largely now developed land subject to ongoing disturbance, in addition to the small size of the proposed clearing, it is not likely that the application will significantly impact on the functions of these wetlands.

Conclusion
Based on the above assessment, the proposed clearing will result in the loss of vegetation growing in association with a wetland. For the reasons set out above, it is considered that the impacts of the proposed clearing on wetlands does not constitute a significant residual impact.

Conditions
No wetland management conditions required.

### 3.3. Relevant planning instruments and other matters

Other relevant authorisations required for the proposed land use include:

- Development approval under the *Planning and Development Act 2005* (issued by the City of Gosnells).

The City of Gosnells (the City) advised DWER that local government approvals are required, and that the proposed clearing is consistent with the City's Local Planning Scheme, with a Development Approval granted by the City on 10 May 2024 (Coterra, 2024c). The City did not raise objections to the proposal, however, made the following requests (City of Gosnells, 2024):

- existing immature grass trees (*Xanthorrhoea preissii*) be salvaged and relocated if possible; and
- a condition to protect the Tuart (*Eucalyptus gomphocephala*) tree within the APZ in accordance with *AS470-2009 – Protection of trees on development sites* throughout the duration of clearing and construction activities.

Noting the above, the Applicant has committed to the salvaging and relocation of the immature grass trees where possible and to comply with AS470-2009 to protect the tuart tree during clearing and construction activities as part of their avoidance and mitigation measures as discussed in Section 3.1 (Coterra, 2024d).

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

**End**

# Appendix A. Additional information provided by applicant

| Summary of comments | Consideration of comment |
|---|---|
| Development approval granted by the City of Gosnells | See Section 3.3. Relevant planning instruments and other matters |
| Applicant agrees with the City of Gosnells requests to protect the retained tuart tree and salvage immature grass trees | See Section 3.1. Avoidance and mitigation measures and Section 3.3. Relevant planning instruments and other matters |

# Appendix B. Site characteristics

## B.1. Site characteristics

| Characteristic | Details |
|---|---|
| Local context | The area proposed to be cleared is part of a remnant patch of vegetation that has largely been cleared and is fragmented within the intensive land use zone of Western Australia. It is surrounded by previously cleared areas and buildings and is adjacent to larger patches of remnant vegetation.<br><br>Spatial data indicates the local area (10-kilometre radius from the centre of the area proposed to be cleared) retains approximately 16.88 per cent of the original native vegetation cover. |
| Ecological linkage | The proposed clearing is not mapped within a formal ecological linkage. The application area may function as part of an informal ecological linkage given its location within the Perth Metropolitan Area. |
| Conservation areas | The proposed clearing is not located within a conservation area. There are three Bush Forever sites located within one kilometre of the proposed clearing, the nearest being Bush Forever Site 125 (Holmes Street Bushland), approximately 0.69 km from the application. |
| Vegetation description | The vegetation survey (Focused Vision, 2024) indicated the vegetation within the proposed clearing area consists of *Melaleuca pressiana* low open woodland over *Kunzea glabrescens* tall open woodland over *Xanthorrhoea preissii* open shrubland over *Dasypogon bromeliifolius* low sedgeland. The full survey descriptions and maps are available in Appendix E.<br><br>This is inconsistent with the mapped vegetation type:<br>• Southern River Complex, which is described as open woodland of *Corymbia calophylla* (Marri) - *Eucalyptus marginata* (Jarrah) - Banksia species with fringing woodland of *Eucalyptus rudis* (Flooded Gum) - *Melaleuca rhaphiophylla* (Swamp Paperbark) along creek beds (Government of Western Australia 2019).<br><br>The mapped vegetation type retains approximately 18.43 per cent of the original extent (Government of Western Australia, 2019). |
| Vegetation condition | The vegetation survey (Focused Vision, 2024) indicates the vegetation within the proposed clearing area is in degraded (Keighery, 1994) condition, described as:<br>• 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.<br><br>The full Keighery (1994) condition rating scale is provided in Appendix D.<br><br>The full survey descriptions and mapping are available in Appendix E. |
| Climate and landform | The region experiences a mediterranean climate with cool winters and hot summers with a mean annual rainfall of 970 millimetres.<br><br>The landform within the proposed clearing area is characterised as flat to very gently undulating well drained sandplain. |

| Characteristic | Details |
|---|---|
| Soil description | The soil is mapped as the Bassendean B2 Phase described as flat to very gently undulating sandplain with well to moderately well drained deep bleached grey sands with a pale yellow B horizon or a weak iron-organic hardpan 1-2 m. |
| Land degradation risk | The proposed clearing is mapped as high to extreme risk for phosphorous export and high susceptibility to sub-surface acidification. |
| Waterbodies | The proposed clearing is mapped in both a multiple-use category wetland and a resource enhancement category wetland. A conservation category wetland is also mapped approximately 0.03 km south of the proposed clearing. |
| Hydrogeography | The proposed clearing area is mapped within the Perth Groundwater Area proclaimed under the RIWI Act. The mapped soil is not at high risk of water erosion. |
| Flora | There are 274 records across 76 species of conservation significant flora in the local area (10-kilometre radius). Five species are recorded within one kilometre of the proposed clearing, namely:<br>• *Aponogeton hexatepalus* (P4)<br>• *Caladenia huegelii* (T)<br>• *Diuris purdiei* (T)<br>• *Drosera patens* (P1); and<br>• *Schoenus capillifolius* (P3)<br>The vegetation survey did not identify any threatened or priority flora within the proposed clearing area, however, several individuals of *Jacksonia sericea* (P4) were identified in the adjacent vegetation that have not previously been recorded (Focused Vision, 2024). The nearest *J. sericea* record according to available databases is more than two kilometres from the proposed clearing. |
| Ecological communities | There are nine threatened and priority ecological communities recorded in the local area (10-kilometre radius). The proposed clearing is mapped within the "Banksia Woodlands of the Swan Coastal Plain ecological community" listed as Priority 3 in Western Australia and Endangered under the EPBC Act. |
| Fauna | There are 3,109 records across 48 species of conservation significant fauna in the local area (10-kilometre radius). Three species are recorded within one kilometre of the proposed clearing, namely:<br>• *Isoodon fusciventer* (quenda) (P4) – 0.12 km<br>• *Zanda latirostris* (Carnaby's cockatoo) (EN) – 0.25 km<br>• *Calyptorhynchus banksii naso* (forest red-tailed black cockatoo) (VU) – 0.54 km<br>Additionally, there is a record of *Zanda* sp. 'white-tailed black cockatoo' approximately 0.54 km from the proposed clearing. |

## B.2. Vegetation extent

| | Pre-European extent (ha) | Current extent (ha) | Extent remaining (%) | Current extent in all DBCA managed land (ha) | Current proportion (%) of pre-European extent in all DBCA managed land |
|---|---|---|---|---|---|
| IBRA bioregion* | | | | | |
| Swan Coastal Plain | 1,501,221.93 | 579,813.47 | 38.62 | 222,916.97 | 38.45 |
| Vegetation complex** | | | | | |
| Southern River Complex | 58,781.48 | 10,832.18 | 18.43 | 940.36 | 1.60 |
| Local area | | | | | |
| 10km radius | 22,545.50 | 3,804.82 | 16.88 | - | - |

*Government of Western Australia (2019a)

**Government of Western Australia (2019b)

### B.3. Flora analysis table

With consideration for the site characteristics set out above, relevant datasets (see Appendix G.1), and biological survey information, impacts to the following conservation significant flora required further consideration.

| Species name | Conservation status | Suitable habitat features? [Y/N] | Suitable vegetation type? [Y/N] | Suitable soil type? [Y/N] | Distance of closest record to application area (km) | Number of known records (total) | Are surveys adequate to identify? [Y, N, N/A] |
|---|---|---|---|---|---|---|---|
| *Caladenia huegelii* | T | Y | Y | Y | 0.15 | 50 | Y |
| *Diuris purdiei* | T | Y | Y | Y | 0.44 | 15 | Y |
| *Drakaea elastica* | T | Y | Y | Y | 2.39 | 4 | Y |
| *Drakaea micrantha* | T | Y | Y | Y | 3.29 | 2 | Y |
| *Jacksonia sericea* | P4 | Y | Y | Y | 0.07 | 13 | Y |

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

### B.4. Fauna analysis table

| Species name | Conservation status | Suitable habitat features? [Y/N] | Suitable vegetation type? [Y/N] | Distance of closest record to application area (km) | Number of known records (total) | Are surveys adequate to identify? [Y, N, N/A] |
|---|---|---|---|---|---|---|
| *Isoodon fusciventer* (quenda, southwestern brown bandicoot) | P4 | Y | Y | 0.12 | 984 | N/A |

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

### B.5. Ecological community analysis table

| Community name | Conservation status | Suitable habitat features? [Y/N] | Suitable vegetation type? [Y/N] | Suitable soil type? [Y/N] | Distance of closest record to application area (km) | Number of known records (total) | Are surveys adequate to identify? [Y, N, N/A] |
|---|---|---|---|---|---|---|---|
| Banksia Woodlands of the Swan Coastal Plain ecological community | P3 (WA)<br>EN (EPBC Act) | N | N | Y | 0 | 1194 | Y |

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

## Appendix C. Assessment against the clearing principles

| Assessment against the clearing principles | Variance level | Is further consideration required? |
|---|---|---|
| **Environmental value: biological values** | | |
| Principle (a): *"Native vegetation should not be cleared if it comprises a high level of biodiversity."*<br><br>Assessment:<br>The proposed clearing area is mapped as the Banksia Woodlands of the Swan Coastal Plain ecological community listed as Priority 3 in Western Australia. The vegetation survey (Focused Vision, 2024) identified that the vegetation within the proposed clearing area is not representative of this ecological community.<br><br>The degraded condition of the vegetation is not likely to support high biodiversity and is subject to ongoing disturbance due to its proximity to the school buildings. | Not likely to be at variance | Yes<br><br>*Refer to Section 3.2.1, above.* |
| Principle (b): *"Native vegetation should not be cleared if it comprises the whole or a part of, or is necessary for the maintenance of, a significant habitat for fauna."*<br><br>Assessment: | At variance | Yes<br><br>*Refer to Section 3.2.2, above.* |

| Assessment against the clearing principles | Variance level | Is further consideration required? |
|---|---|---|
| The proposed clearing area is not likely to represent significant habitat for threatened or priority fauna species given the degraded condition (Keighery, 1994) and ongoing disturbance, however, the habitat is suitable for quenda who may utilise the vegetation for cover during the day. | | |
| Principle (c): *"Native vegetation should not be cleared if it includes, or is necessary for the continued existence of, threatened flora."*<br><br>Assessment:<br>There are two threatened flora species recorded in close proximity to the proposed clearing, both of which may have suitable habitat within the application area.<br><br>The flora and vegetation survey did not identify any threatened flora species within the proposed clearing area or broader survey area (Focused Vision, 2024). | Not likely to be at variance | Yes<br><br>*Refer to Section 3.2.1, above.* |
| Principle (d): *"Native vegetation should not be cleared if it comprises the whole or a part of, or is necessary for the maintenance of, a threatened ecological community."*<br><br>Assessment:<br>The proposed clearing area is mapped as the Banksia Woodlands of the Swan Coastal Plain ecological community listed as Endangered under the EPBC Act. The vegetation survey (Focused Vision, 2024) identified that the vegetation within the proposed clearing area is not representative of this ecological community. | Not likely to be at variance | Yes<br><br>*Refer to Section 3.2.1, above.* |
| **Environmental value: significant remnant vegetation and conservation areas** | | |
| Principle (e): *"Native vegetation should not be cleared if it is significant as a remnant of native vegetation in an area that has been extensively cleared."*<br><br>Assessment:<br>The extent of the native vegetation in the local area is consistent with the national objectives and targets for biodiversity conservation in Australia within a constrained area where a 10 per cent retention target is applied. | Not likely to be at variance | No |
| Principle (h): *"Native vegetation should not be cleared if the clearing of the vegetation is likely to have an impact on the environmental values of any adjacent or nearby conservation area."*<br><br>Assessment:<br>Given the distance to the nearest conservation area and small size of the application, the proposed clearing is not likely to have an impact on the environmental values of nearby conservation areas. | Not likely to be at variance | No |
| **Environmental value: land and water resources** | | |
| Principle (f): *"Native vegetation should not be cleared if it is growing in, or in association with, an environment associated with a watercourse or wetland."*<br><br>Assessment:<br>The proposed clearing is mapped within both a multiple use category and resource enhancement category wetland which may impact on the functions of these wetlands. Additionally, the proposed clearing is within 50 m of a mapped conservation category wetland. | At variance | Yes<br><br>*Refer to Section 3.2.3, above.* |
| Principle (g): *"Native vegetation should not be cleared if the clearing of the vegetation is likely to cause appreciable land degradation."*<br><br>Assessment:<br>The mapped soils are highly susceptible to subsurface acidification and nutrient export. Noting the extent and location of the application area and the | Not likely to be at variance | No |

| Assessment against the clearing principles | Variance level | Is further consideration required? |
|---|---|---|
| condition of the vegetation, the proposed clearing is not likely to have an appreciable impact on land degradation. | | |
| Principle (i): *"Native vegetation should not be cleared if the clearing of the vegetation is likely to cause deterioration in the quality of surface or underground water."*<br><br>Assessment:<br>Given that the proposed clearing is mapped within a wetland and is in close proximity to a conservation category wetland, the proposed clearing may impact surface or ground water quality. | May be at variance | Yes<br><br>*Refer to Section 3.2.3, above.* |
| Principle (j): *"Native vegetation should not be cleared if the clearing of the vegetation is likely to cause, or exacerbate, the incidence or intensity of flooding."*<br><br>Assessment:<br>The mapped soils and topographic contours in the surrounding area do not indicate the proposed clearing is likely to contribute to increased incidence or intensity of flooding. | Not likely to be at variance | No |

## Appendix D. Vegetation condition rating scale

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

Considering its location, the scale below was used to measure the condition of the vegetation proposed to be cleared. This scale has been extracted from Keighery, B.J. (1994) *Bushland Plant Survey: A Guide to Plant Community Survey for the Community*. Wildflower Society of WA (Inc). Nedlands, Western Australia.

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

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

## Appendix E. Biological survey information excerpts

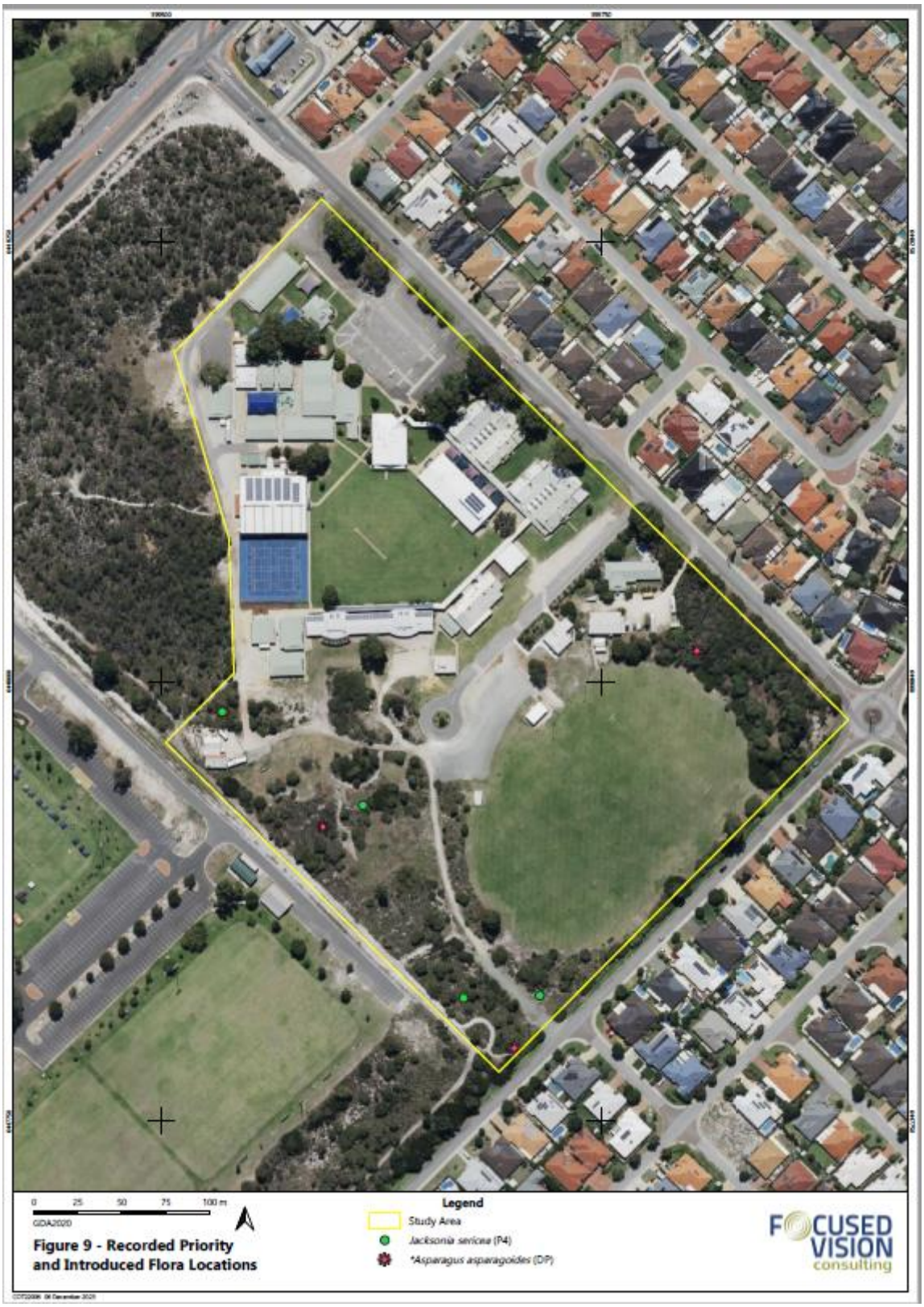


**Figure 4.** Map of the locations of *Jacksonia sericea* and declared weeds (Focused Vision, 2024).

| Broad Vegetation Type (Landform) | Unit Code | Vegetation Unit Description | Representative Quadrats or Relevés (r) | Area (ha) | % of Study Area |
|---|---|---|---|---|---|
| **Banksia Woodland (Wetland)** | BaKg | *Banksia attenuata* Low Open Forest over *Kunzea glabrescens* Tall Open Shrubland over *Dasypogon bromeliifolius* and *Phlebocarya ciliata* Low Sparse Sedgeland. | P05r | 0.04 | 0.40 |
| **Eucalyptus Woodland (Upland)** | EmAfXp | *Eucalyptus marginata, Allocasuarina fraseriana* and *Banksia menziesii* Low Open Woodland over *Xanthorrhoea preissii* Open Shrubland over *Dasypogon bromeliifolius* Low Sparse Sedgeland. | P01r | 0.05 | 0.5 |
| **Melaleuca Woodland (Wetland)** | MpKg | *Melaleuca preissiana* Low Open Woodland of over *Kunzea glabrescens* Tall Open Shrubland over *Xanthorrhoea preissii* Open Shrubland over *Dasypogon bromeliifolius* Low Sedgeland. | P02r, P03, P04r, P06r | 1.82 | 18.04 |
| **Eucalyptus Woodland (Upland)** | EmXp | Degraded *Eucalyptus marginata* Low Open Woodland over *Xanthorrhoea preisii* Open Shrubland. | N/A | 0.19 | 1.88 |
| **Eucalyptus Woodland (Upland)** | Eg | Isolated *Eucalyptus gomphocephala* (planted) over cleared or planted areas. | NA | 0.19 | 1.88 |
| **Planted** | | Planted non-endemic trees and gardens | NA | 1.82 | 8.42 |
| **Cleared** | | Cleared areas devoid of vegetation | NA | 6.95 | 68.88 |
| | | | **TOTAL** | **10.09** | **100** |

**Figure 5.** Table of vegetation types mapped within the survey area (Focused Vision, 2024).

| Vegetation Condition Rating | Total Area (ha) | % of Study Area |
|---|---|---|
| Very Good | 0.05 | 0.50 |
| Good | 0.02 | 0.20 |
| Degraded-Good | 0.45 | 4.46 |
| Degraded | 0.79 | 7.83 |
| Degraded-Completely Degraded | 1.19 | 11.79 |
| Completely Degraded | 0.64 | 6.34 |
| Cleared | 6.95 | 68.88 |
| **TOTAL** | **10.09** | **100** |

**Figure 6.** Table of the vegetation condition within the survey area (Focused Vision, 2024).


**Figure 7.** Map of the vegetation types within the survey area (Focused Vision, 2024).


**Figure 8.** Vegetation condition mapping within the survey area (Focused Vision, 2024).

| Vegetation Unit | BaKg | EmAfXp | MpKg |
|---|---|---|---|
| a) Swan Coastal Plain or Jarrah Forest location | + | + | + |
| b) Soils and landform either deep Bassendean, Spearwood or occasionally Quindalup sands, sandy colluvium, Aeolian sands of the Ridge Hill Shelf or Whicher Scarp | + | + | + |
| c) Distinctive sclerophyllous layer dominated by *Banksia attenuata, Banksia menziesii, Banksia ilicifolia* or *Banksia prionotes* | + | + | |
| d) With (although can be without) an emergent tree layer of *Corymbia calophylla, Eucalyptus marginata* or *Eucalyptus gomphocephala* | | + | |
| e) With (although can be without) other trees including *Eucalyptus todtiana, Nuytsia floribunda, Allocasuarina fraseriana, Callitris arenaria, Callitris pyramidalis* or *Xylomelum occidentale* | | + | + |
| f) Understorey/mid-ground sclerophyllous shrub layer including mostly Asteraceae, Dilleniaceae, Droseraceae, Ericaceae, Fabaceae, Haemodoraceae, Iridaceae, Myrtaceae, Orchidaceae, Proteaceae, Restionaceae | | + | + |
| g) Herbaceous ground layer including mostly Apiaceae, Asteraceae, Cyperaceae, Haemodoraceae, Poaceae, Restionaceae, Stylidiaceae | + | + | + |
| **Confirmed Characteristic** | **No** | **Yes** | **No** |

**Figure 9.** Banksia Woodlands PEC/TEC characteristics assessment of the vegetation types (Focused Vision, 2024).

| Vegetation Unit | Eg |
|---|---|
| a) Swan Coastal Plain bioregion | + |
| b) Soils and landform either Spearwood or Quindalup dune systems, occasionally occurring on Bassendean dunes and Pinjarra plains | + |
| c) Contains a minimum of two *Eucalyptus gomphocephala* (Tuart) situated within 60 m of each tree's canopies | + |
| d) Occurs as a woodland but can occur as a forest, open forest, open woodland and various mallee forms | + |
| e) Other tree species include: *Agonis flexuosa, Banksia grandis, Banksia attenuata, Eucalyptus marginata*, less commonly *Corymbia calophylla, Banksia menziesii* and *Banksia prionotes* | |
| f) Understorey is structurally variable. Common species include: *Hardenbergia comptoniana, Daucus glochidiatus* and *Trachymene pilosa* (although can be without) | |
| **Confirmed Characteristic** | **Yes** |

| Vegetation Unit | Vegetation Unit Code | FVC Mapped Condition | Corresponding Conservation Advice Condition Rating | Area (ha) | Eligible as TEC |
|---|---|---|---|---|---|
| T01 | Eg | Degraded-Completely Degraded | Poor | 0.10 | No |
| T02 | Eg | Degraded-Completely Degraded | Poor | 0.05 | No |
| T03 | Eg, EmXp, MpKg | Degraded-Completely Degraded | Poor | 0.18 | No |

**Figure 10.** Assessment of Tuart TEC/PEC against vegetation within the survey area (Focused Vision, 2024).

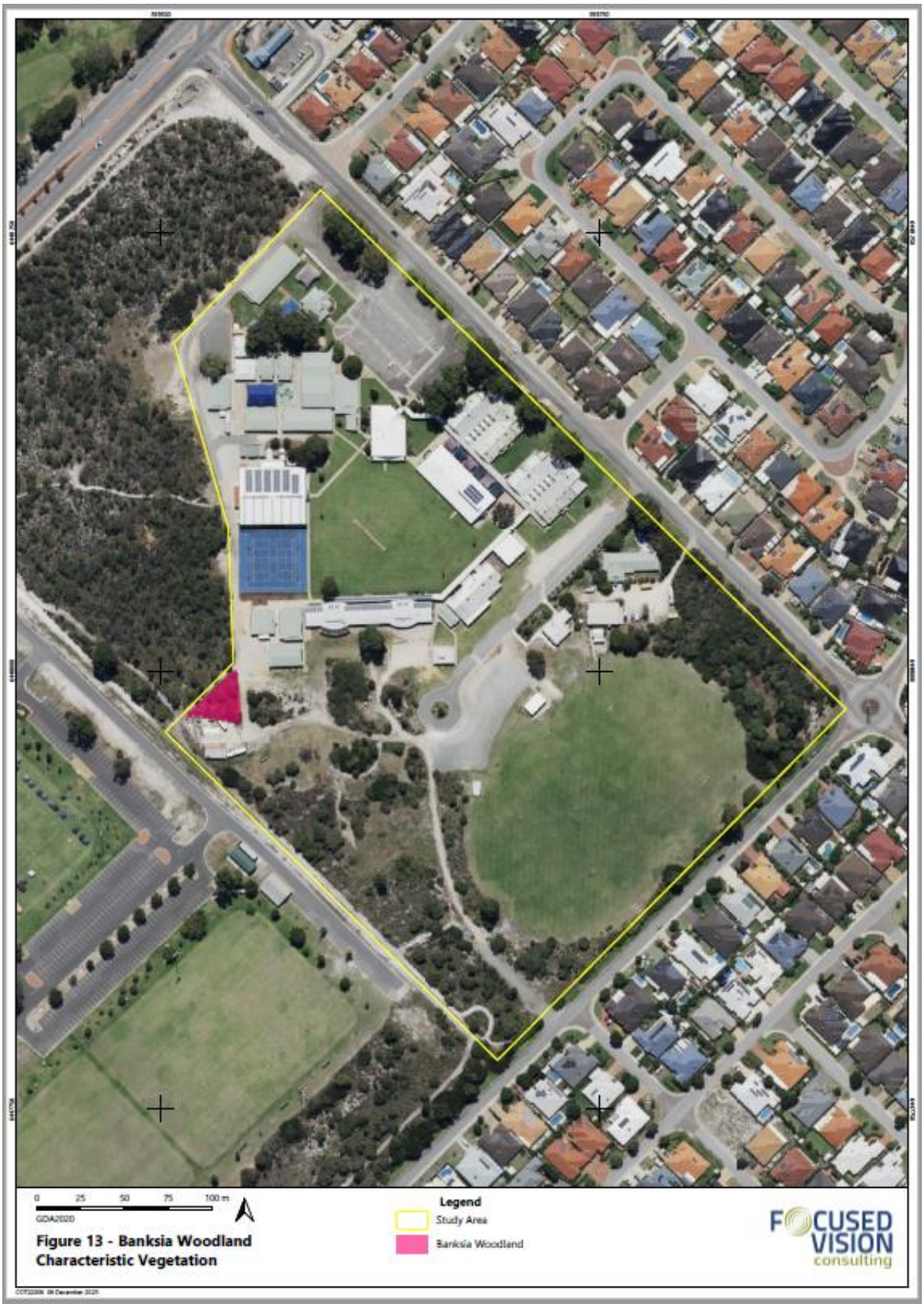


**Figure 11.** Vegetation representative of the banksia Woodlands PEC/TEC within the proposed clearing area (Focused Vision, 2024).

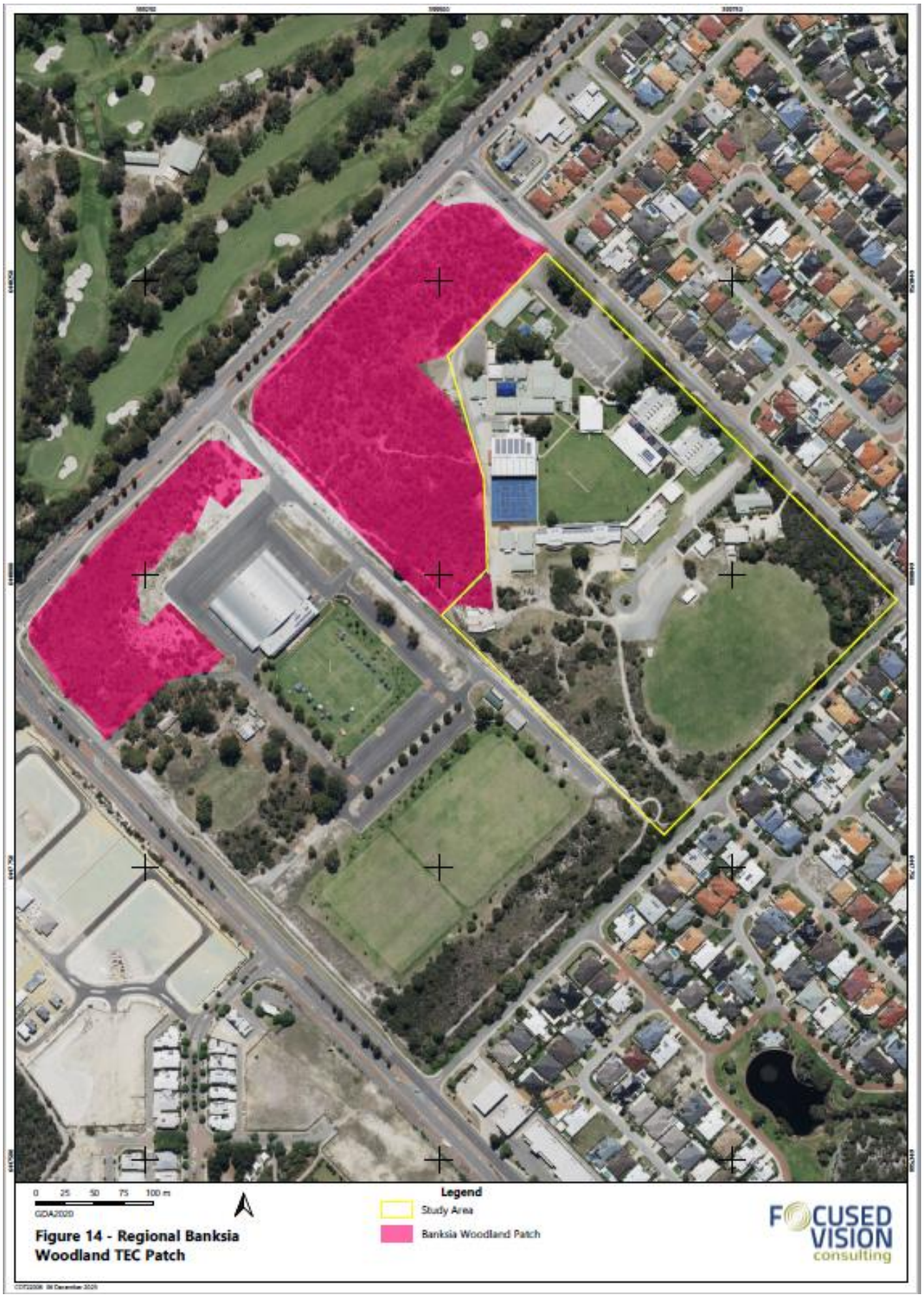


**Figure 12.** Banksia Woodlands PEC/TEC in surrounding vegetation (Focused Vision, 2024).

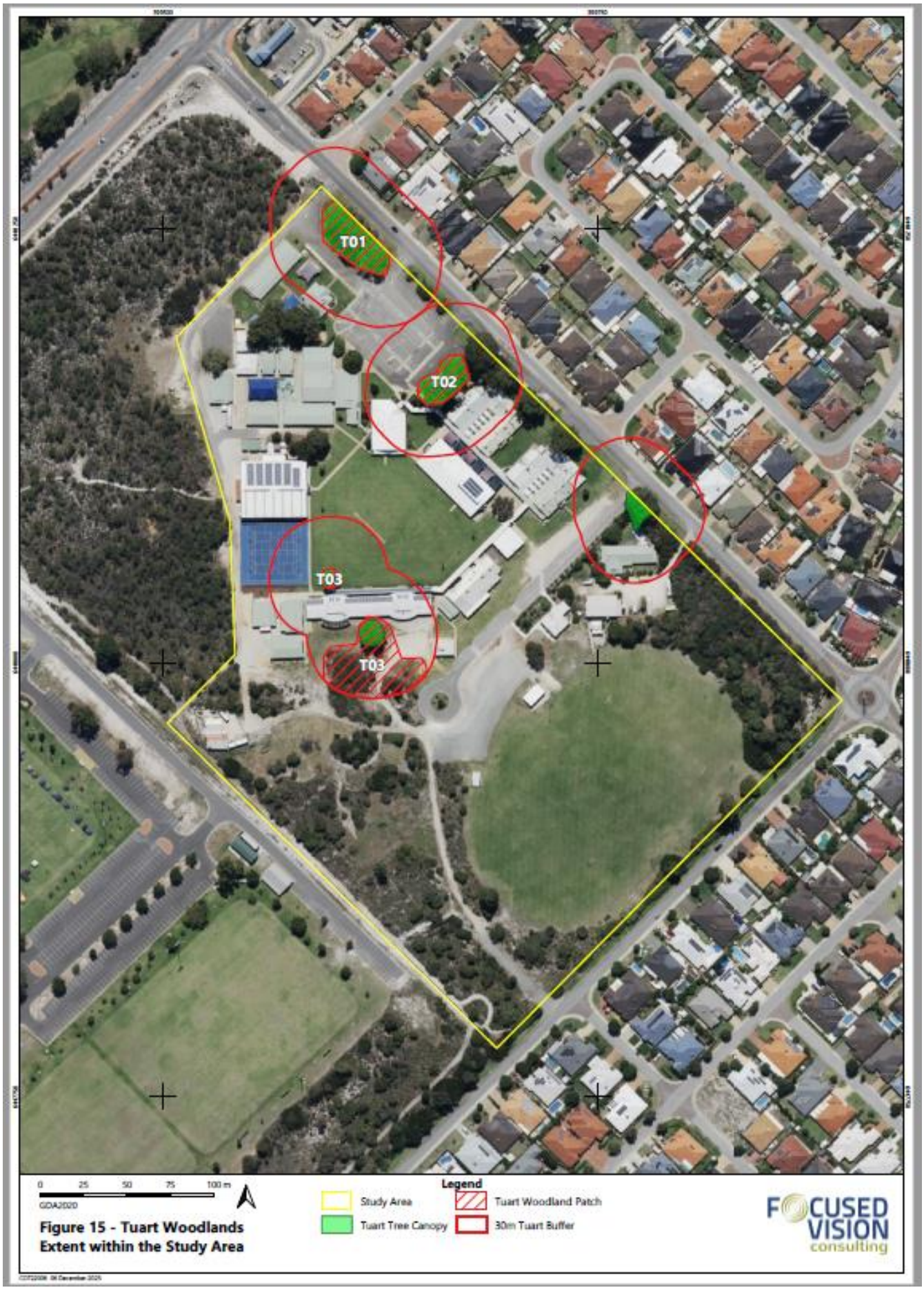


**Figure 13.** Tuart vegetation extent within the study area (Focused Vision, 2024).

## Appendix F. Photographs of the vegetation

Plate 2-1: Northwest corner of vegetation within APZ facing south

Plate 2-2: Northeast corner of vegetation within APZ, facing southwest

Plate 2-3: Easternmost vegetation, facing west

**Figure 14.** Photographs of the proposed clearing area (Coterra, 2023).

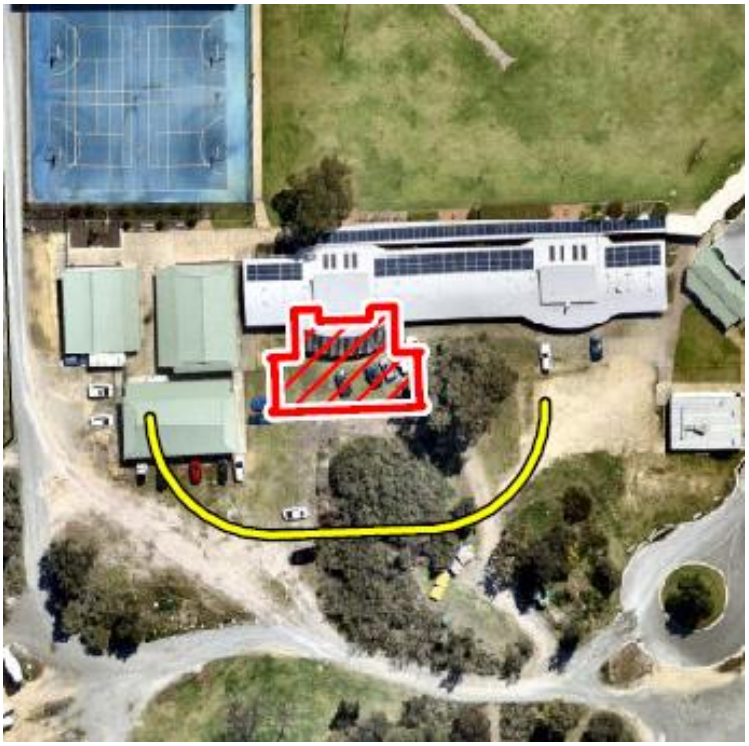

**Figure 15.** Map of the proposed building expansion and Asset Protection Zone (APZ) which includes the proposed clearing area (Coterra, 2023).

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

- Soil Landscape Land Quality – Waterlogging Risk (DPIRD-015)
- Soil Landscape Land Quality – Wind Erosion Risk (DPIRD-016)
- Soil Landscape Mapping – Best Available
- Soil Landscape Mapping – Systems

Restricted GIS Databases used:

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

## G.2. References

City of Gosnells (2024) *Advice for clearing permit application CPS 10519/1*, received 2 May 2024 (DWER Ref: DWERDT942675).

Commonwealth of Australia (2001) *National Objectives and Targets for Biodiversity Conservation 2001-2005*, Canberra.

Coterra on behalf of Thornlie Christian College (Inc) (Coterra) (2024a) *Clearing permit application CPS 10519/1*, received 2 February 2024 (DWER Ref: DWERDT903933).

Coterra on behalf of Thornlie Christian College (Inc) (Coterra) (2024b) *Supporting information for clearing permit application CPS 10519/1,* received 2 February 2024 (DWER Ref: DWERDT917672).

Coterra on behalf of Thornlie Christian College (Inc) (Coterra) (2024c) *Additional supporting information for clearing permit application CPS 10519/1 – Granted Development Application from the City of Gosnells*, received 13 May 2024 (DWER Ref: DWERDT947316).

Coterra on behalf of Thornlie Christian College (Inc) (Coterra) (2024d) *Additional supporting information for clearing permit application CCPS 10519/1 – Additional avoidance and mitigation measures,* received 21 May 2024 (DWER Ref: DWERDT950900)

Department of Biodiversity, Conservation and Attractions (DBCA) (2017a). *Fauna notes – Living with Quenda*. Available from http://www.dbca.wa.gov.au/

Department of Biodiversity, Conservation and Attractions (DBCA) (2017b). *A methodology for the evaluation of wetlands on the Swan Coastal Plain*. Draft prepared by the Wetlands Section of the Department of Biodiversity, Conservation and Attractions and the Urban Water Branch of the Department of Water and Environmental Regulation, Perth. Available from: https://www.dbca.wa.gov.au/management/wetlands/wetland-mapping

Department of Environment and Conservation (2009a). *Grand Spider Orchid* (Caladenia huegelii) *Recovery Plan*. Commonwealth Department of the Environment, Water, Heritage and the Arts, Canberra. Available from: http://www.environment.gov.au/resource/grand-spider-orchid-caladenia-huegelii-recovery-plan.

Department of Environment and Conservation (2009b). *Glossy-leafed Hammer Orchid* (Drakaea elastica) *Recovery Plan*. Department of Environment and Conservation, Western Australia. Available from: http://www.environment.gov.au/biodiversity/threatened/recovery-plans/national-recovery-plan-glossy-leafed-hammer-orchid-drakaea-elastica.

Department of Environment Regulation (DER) (2013). *A guide to the assessment of applications to clear native vegetation*. Perth. Available from: https://www.der.wa.gov.au/images/documents/your-environment/native-vegetation/Guidelines/Guide2_assessment_native_veg.pdf.

Department of the Environment and Energy (DoEE) (2016). *Approved Conservation Advice (incorporating listing advice) for the Banksia Woodlands of the Swan Coastal Plain ecological community*. Canberra: Department of the Environment and Energy. Available from: http://www.environment.gov.au/biodiversity/threatened/communities/pubs/131-conservation-advice.pdf.

Department of the Environment and Energy (DoEE) (2019). *Approved Conservation Advice (incorporating listing advice) for the Tuart* (Eucalyptus gomphocephala) *woodlands and forests of the Swan Coastal Plain ecological community*. Canberra: Department of the Environment and Energy. Available from: http://www.environment.gov.au/biodiversity/threatened/communities/pubs/153-conservation-advice.pdf.

Department of the Environment, Water, Heritage and the Arts (DEWHA) (2008a). *Approved Conservation Advice for* Diuris purdiei *(Purdie's Donkey-orchid)*. Canberra: Department of the Environment, Water, Heritage and the Arts. Available from: http://www.environment.gov.au/biodiversity/threatened/species/pubs/12950-conservation-advice.pdf.

Department of the Environment, Water, Heritage and the Arts (DEWHA) (2008b). *Approved Conservation Advice for* Drakaea micrantha *(Dwarf Hammer-orchid)*. Canberra: Department of the Environment, Water, Heritage and the Arts. Available from: http://www.environment.gov.au/biodiversity/threatened/species/pubs/81853-conservation-advice.pdf.

Department of Primary Industries and Regional Development (DPIRD) (2019). *NRInfo Digital Mapping. Department of Primary Industries and Regional Development.* Government of Western Australia. URL: https://maps.agric.wa.gov.au/nrm-info/

Department of Water and Environmental Regulation (DWER) (2019). *Procedure: Native vegetation clearing permits*. Joondalup. Available from: https://dwer.wa.gov.au/sites/default/files/Procedure_Native_vegetation_clearing_permits_v1.PDF.

Environmental Protection Authority (EPA) (2008). *Environmental Guidance for Planning and Development (GS 33)*. Available from: https://www.epa.wa.gov.au/policies-guidance/environmental-guidance-planning-and-development-gs-33

Environmental Protection Authority (EPA) (2016). *Technical Guidance - Flora and Vegetation Surveys for Environmental Impact Assessment*. Available from: http://www.epa.wa.gov.au/sites/default/files/Policies_and_Guidance/EPA%20Technical%20Guidance%20-%20Flora%20and%20Vegetation%20survey_Dec13.pdf.

Government of Western Australia (2019) *2018 South West Vegetation Complex Statistics. Current as of March 2019*. WA Department of Biodiversity, Conservation and Attractions, Perth, https://catalogue.data.wa.gov.au/dataset/dbca

Government of Western Australia. (2019) *2018 Statewide Vegetation Statistics incorporating the CAR Reserve Analysis (Full Report). Current as of March 2019.* WA Department of Biodiversity, Conservation and Attractions. https://catalogue.data.wa.gov.au/dataset/dbca-statewide-vegetation-statistics

Heddle, E. M., Loneragan, O. W., and Havel, J. J. (1980) *Vegetation Complexes of the Darling System, Western Australia*. In Department of Conservation and Environment, Atlas of Natural Resources, Darling System, Western Australia.

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

Northcote, K. H. with Beckmann G G, Bettenay E., Churchward H. M., van Dijk D. C., Dimmock G. M., Hubble G. D., Isbell R. F., McArthur W. M., Murtha G. G., Nicolls K. D., Paton T. R., Thompson C. H., Webb A. A. and Wright M. J. (1960-68) *Atlas of Australian Soils*, Sheets 1 to 10, with explanatory data. CSIRO and Melbourne University Press: Melbourne.

Schoknecht, N., Tille, P. and Purdie, B. (2004) *Soil-landscape mapping in South-Western Australia – Overview of Methodology and output*s Resource Management Technical Report No. 280. Department of Agriculture.

Shepherd, D.P., Beeston, G.R. and Hopkins, A.J.M. (2001) *Native Vegetation in Western Australia, Extent, Type and Status*. Resource Management Technical Report 249. Department of Agriculture, Western Australia.

Western Australian Herbarium (1998-). *FloraBase - the Western Australian Flora*. Department of Biodiversity, Conservation and Attractions, Western Australia. https://florabase.dpaw.wa.gov.au/