Byford Solar Panel Project

Native Vegetation Clearing Permit Application Report

Westgen Pty Ltd

December 2022

Page left blank intentionally

1. CONTENTS

List of Figures

List of Tables

2. PROPOSAL SUMMARY

2.1. Overview

Westgen Pty Ltd (the Proponent) proposes to the 37.5MW Byford Solar Farm, which will include large-scale battery storage, and supply clean, reliable electricity to the grid and to electricity customers of WA energy retail company Kleenheat (the Project), within the Shire of Serpentine-Jarrahdale.

The Project is a 37.5 MW AC solar power station that has been engineered and the equipment selected, focusing on proven, low-risk technology with minimum impact and long-term reliability.

The Project is presented in **Figure 1**. The Project will require clearing up to 7.2 hectares (ha) of native vegetation (disturbance footprint), within a 23 ha Project area, as presented in **Figure 2.**

The Project area is located on predominately cleared farming land with only sparse remnant vegetation remaining. Based on historical aerial imagery the Project area was cleared prior to the 1950's and has been used for agricultural purposes for over 5 decades.

2.2. Purpose

This document has been prepared in support of a Native Vegetation Clearing Permit (NVCP) (Purpose Permit) application per Part V Division 2 of the *Environmental Protection Act 1986* to undertake clearing for the Project as no clearing exemptions apply.

This NVCP application will be assessed by the Department of Water and Environmental Regulation (DWER).

2.3. Location and Context

The Project area is located within the Southeastern Metropolitan Corridor in the Shire of Serpentine-Jarrahdale, approximately 30km south-southeast of the Perth Central Business District and approximately 6km west-northwest of the Byford Town Centre. The Project area is located on the southern side of Thomas Road and the eastern side of Peverett Lane, Oakford. The Project area is located in an area predominantly used for Rural Purposes.

The Project area has an excellent solar resource and is located within 20km of two solar monitoring stations, Murdoch University and Jandakot Airport (BoM). These stations have been recording solar radiation for 15 years and 23 years respectively, recording irradiation of 2,042 kWh/ m^2 and 1,872 kWh/m^2.

2.4. Project area Description and Current Land Use

The Project area is zoned "Rural" under the Shire of Serpentine Jarrahdale Town Planning Scheme No.2 and zoned "Rural" under the Metropolitan Region Scheme. The Project area surface level rises gently heading away from the SW. The Northern part of the Project area consists of sandy surficial soils.

2.5. Alternatives

There are no viable alternatives to the location of the Project that is available for purchase; does not require clearing of better-quality vegetation and habitat; and is able to achieve the desired outcomes from the Project.

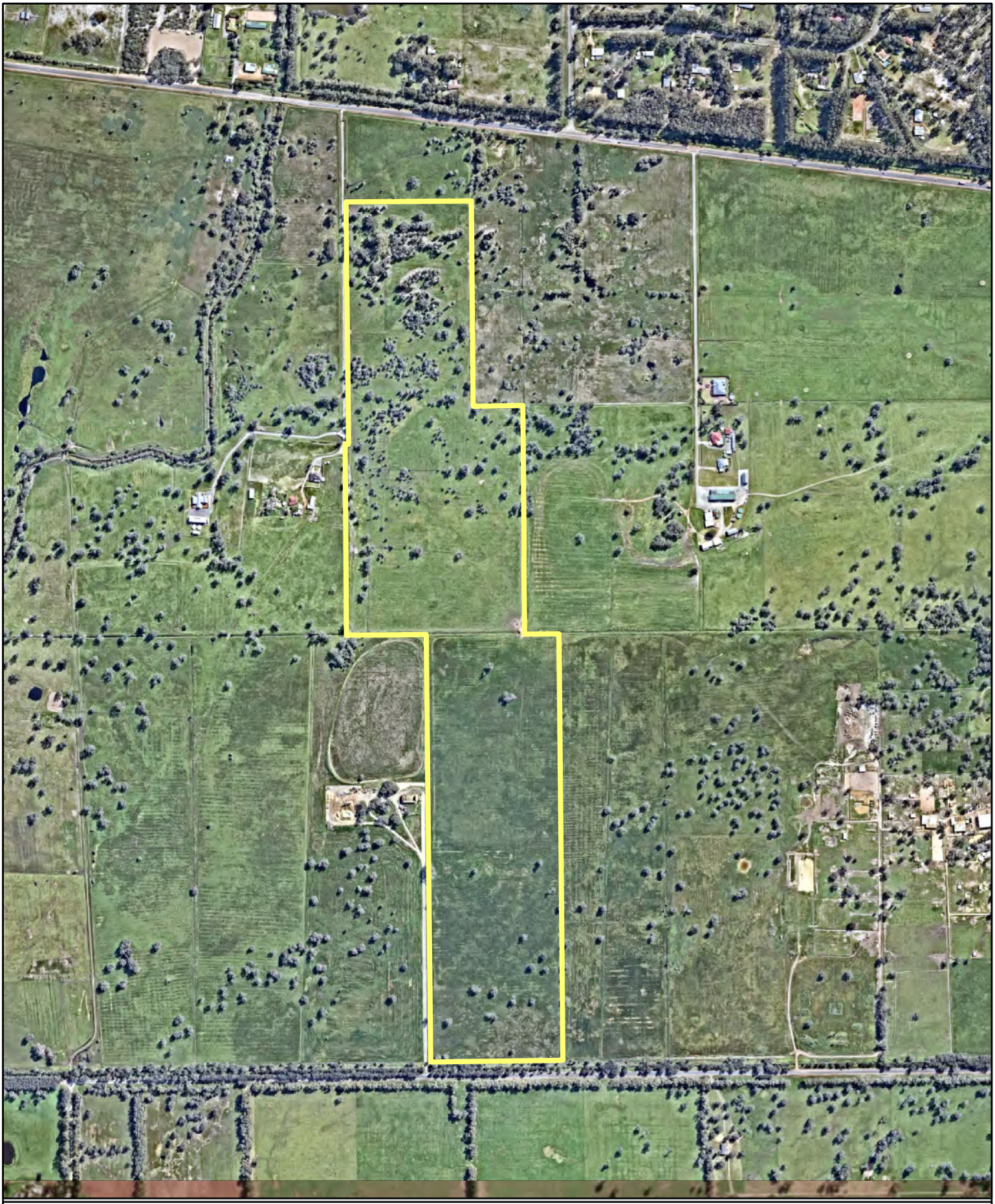
The Project Project area was selected because all the key factors required for an efficient solar Project development and operation were present at the Project area, including:

- the Project area's proximity to the Byford substation, a zone substation with capacity which allows for a low-cost interconnection of the Project with Western Power's Distribution System;
- the Project area is currently zoned rural, providing for lower land values than residential zoned land;
- the Project area is almost flat, with a less than 1% slope across the Project area;
- the Project area receives high levels of solar radiation through the year;
- the Project area is located in an outer-metropolitan area, reducing construction costs by avoiding remote labour rates and accommodation costs during the construction period;
- the Shire is located on the urban fringe and is located away from residential areas in a rural part of the Serpentine Jarrahdale Shire;
- the Project area is relatively free from air pollution caused by dust and other particulates;
- there are no structures or vegetation in close proximity to the Project area which would cause shading of the solar modules.

2.6. Avoidance and mitigation measures

Owing to the completely degraded nature of the Project area, and the desired power output requirements from the solar farm into the network, all vegetation within the disturbance footprint will be cleared.

Following the end-of-life of the Project (~25 years) the Project area will be rehabilitated in accordance with the Decommissioning and Rehabilitation Plan required under Condition 18 of the Development Approval which requires sufficient numbers of *Casuarina obesa*, *Eucalyptus r*udis and *Corymbia calophylla* in the vegetation areas (strategic positions), in order to replace the trees removed for development.



Legend

Project area

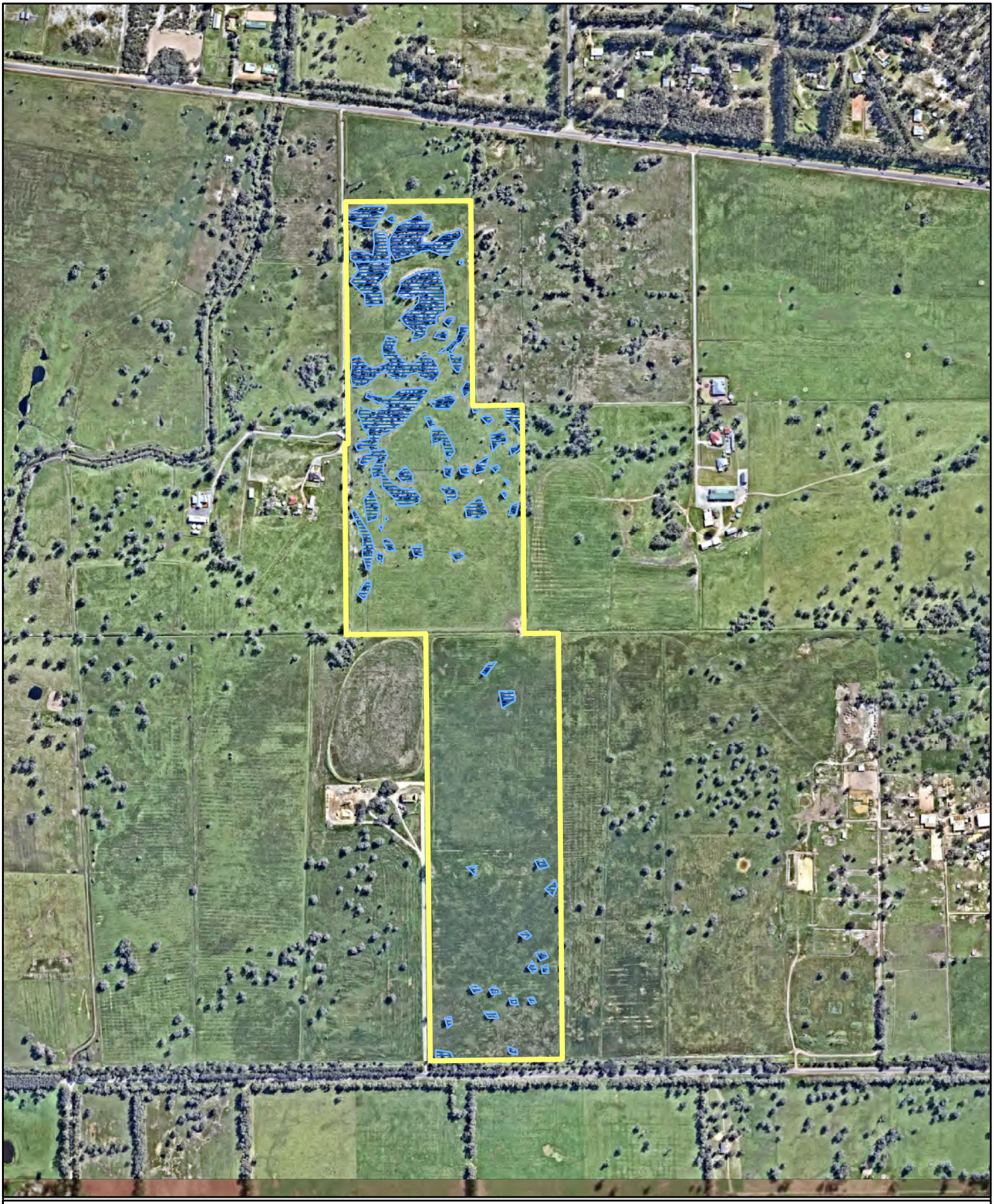
Byford Solar Project

Figure 1- Project area

westgen

0 140 280 560 m

Scale: 1:10,000



Legend

- Project area
- Clearing area

Byford Solar Project

Figure 2 - Clearing area

westgen

0 140 280 560 m

Scale: 1:10,000

3. LEGISLATIVE CONTEXT

3.1. Environmental Protection Authority – Part IV

The *Environmental Protection Act 1986* (EP Act) is the principal environmental legislation in the State. The EP Act established the Environmental Protection Authority (EPA) who are charged with development of environmental protection policies under Part III of the Act, and environmental impact assessment of proposals and schemes under Part IV. Under Part IV of the Act, a proposal likely, if implemented, to have a significant effect on the environment is to be referred to the EPA for consideration and, if required, assessment under s. 40 of the EP Act.

In the context of this Project, pre-referral consultation with the then Office of the EPA regarding the Project was undertaken in 2013. Mr. Anthony Sutton, in his role at that time as Director of Assessment and Compliance Division, confirmed that the Project does not require assessment as no significant environmental impacts or issues have been identified (**see Appendix A**).

The Project area is on cleared farming land with only sparse remnant vegetation remaining. The panels are not adjacent to any residences, so pose no visual impact. The Project will not emit any undesirable pollutants and noise emissions will be minimal.

3.2. Clearing Permit Requirement

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) which is administered by the Department of Water and Environmental Regulation (DWER).

The Clearing Regulations address several matters related to clearing of native vegetation, these matters include activities that do not require a permit to clear native vegetation under the Clearing Regulations. Regulation 5 lists 25 items under which clearing is exempt.

There are a number of areas where the exemptions under the Regulations do not apply. These areas are Environmentally Sensitive Areas (ESA) declared by the Minister under section 51B of the EP Act. A list of ESAs is provided in *Environmental Protection* (Environmentally Sensitive Areas) *Notice 2005*. The clearing of native vegetation in an ESA, or its buffered extent, requires a clearing permit.

In the context of the Proposal, Regulation 5 Item 25 generally provides an exemption for clearing that is the result of carrying out exploration under an authority granted under the *Mining Act 1978*. However, the Cocanarup Timber Reserve was listed under the Register of National Estate and meets the definition of an ESA under section 51B of the EP Act. As a result, any disturbance to native vegetation within this area, requires a clearing permit in accordance with the EP Act and the Clearing Regulations.

The key guidance documents which inform this assessment are:

- *A guide to the assessment of applications to clear native vegetation* (DER, 2014)
- *Procedure: Native vegetation clearing permits* (DWER, 2019)

3.3. Planning and Development Act 2005

The *Planning and Development Act 2005* (P&D Act) is the principal planning legislation, governing the majority of approval processes for the Project. The PD Act is the governing legislation that will guide planning approval processes.

The Project has been considered under the P&D Act, with planning approval granted following the assessment by the Metropolitan East Joint Development Assessment Panel in December 2016 (see **Appendix B**).

4. LOCAL AND REGIONAL CONTEXT

4.1. Bioregion

The Proposal is located within the Swan Coastal Plain (SWA) bioregion under the Interim Biogeographic Regionalisation of Australia (IBRA). The Swan Coastal Plains bioregion is divided into two sub-regions: Dandaragan Plateau (SWA01) and Perth (SWA02). The Proposal is wholly contained within the Perth sub-region (DEE, 2017), which is described as a low-lying coastal plain, mainly covered with woodlands and dominated by Banksia or Tuart on sandy soils (Mitchell *et al*. 2002).

4.2. Regional Vegetation

Vegetation occurring within the region was initially mapped at a broad scale (1: 1 000 000) by Beard during the 1970s. This dataset formed the basis of several regional mapping systems, including the biogeographical region dataset (Interim Biogeographic Regionalisation for Australia) for Western Australia physiographic regions defined by Beard (1981).

The Project area coincides with the one vegetation association as presented in **Table 1**.

Table 1: Pre-European Vegetation Associations

Vegetation Association	Description	Region	Pre-European Extent	Current Extent	Extent remaining (%)	% within DBCA Reserve (Current Extent)
Pinjarra 968 (IBRA Region)	Medium woodland; jarrah, marri and wandoo	IBRA	136,188.20	9,017.32	6.62	21.61
		LGA	24,351.49	1,121.13	4.60	12.49

Vegetation Complexes within the Project area have been defined by Heddle et al. (1980) and are based on vegetation in association with landforms and underlying geology. Native vegetation complexes as described by Heddle et al. (1980) within the Project area comprise:

- Beermullah Complex – Mixture of low open forest of *Casuarina obesa* and open woodland of *Eucalyptus calophyla – E. wandoo – E. marginata*. Minor components include closed scrub of *Melalueca spp*. and occurrence of *Actinostrobus pyramidalis*

This complex is below the minimum threshold of 10% target for the retention of vegetation complexes in constrained areas on the Swan Coastal Plain (EPA, 2000). The current remaining extent of these vegetation complexes (GoWA 2019) are detailed in **Table 2**.

Table 2: Vegetation Complexes

Vegetation Complex	System Code	Pre-European Extent	Current Extent	% remaining in LGA
Beermullah Complex within the Shire of Serpentine - Jarrahdale	36	6,707.27	447.21	6.67

4.3. Local Vegetation

One Tree Botanical (2017) identified two local vegetation types within the Project area (Figure 3):

- Vegetation Type A - Isolated Trees to Open Woodland of Flooded Gum *Eucalyptus rudis* subsp. *rudis* over pasture on low lying sandy flats
- Vegetation Type B - Isolated Trees of Swamp Sheoak *Casuarina obesa* over pasture on low lying sandy flats interspersed with scattered small clay pans

Complete descriptions of these vegetation types are contained in **Appendix C.**

4.4. Vegetation Condition

The entire Project area has been assessed to be in a 'Completely Degraded' condition, as shown in Figure 4 (One Tree Botanical, 2017).

4.5. Soils and Geology

The entire Project area is underlain by sandy clay from the Guilford Formation. The soil is white/grey to brown at the surface and is classified as fine to coarse grained.

The Project area coincides with two soil systems comprised of:

- Pinjarra System - Poorly drained coastal plain with variable alluvial and aeolian soils. Variable vegetation includes Jarrah, marri, wandoo, paperbark sheoaks and rudis.
- Bassendean System - Sand dunes and sandplains with pale deep sand, semi-wet and wet soil. Banksia-paperbark woodlands and mixed heaths

4.6. Conservation Areas

Four conservation areas are located within 5 km of the Project area, these are:

- Jandakot Regional Park – 2 km (North-West)
- Modong Nature Reserve – 3 km (West)
- Forrestdale Lake Nature Reserve – 5 km (North)
- Brickwood Reserve – 5 km (South-East)
- Cardup Nature Reserve – 5 km (South-East)

4.7. Environmentally Sensitive Areas

The Project area does not coincide with any mapped Environmentally Sensitive Areas.

5. ASSESSMENT METHODOLOGY

5.1. Desktop Assessment

The desktop assessment consisted of a review of the following:

- Threatened and Priority flora and ecological community records within 10 km and adjacent to the Project area, (DBCA, BC Act)
- WA Herbarium Review records within 10 km and adjacent to the Project area, (DBCA, BC Act)
- The Protected Matters Search Report (PMST), 10 km buffer applied, (Federal Dept. of Agriculture Water and Environment, EPBC Act)
- Index of Biological Surveys for Assessments Database
- Dieback Information Delivery and Management System
- Western Australia Groundwater Atlas

5.2. Field Survey

A Level 1 flora, vegetation and fauna assessment was undertaken by One Tree Botanical on 19 October 2016. This assessment was undertaken in accordance with the then current EPA guidance for flora and vegetation (EPA, 2004a) and terrestrial fauna surveys (EPA, 2004b).

The findings of this survey are summarised in the following section and provided in **Appendix C**.

6. ASSESSMENT FINDINGS

6.1. Flora and Vegetation

6.1.1 Flora

The desktop assessment undertaken by One Tree Botanical (2017) identified no State or Commonwealth listed flora taxa occurring within the Project area. Within the wider region, the desktop assessment identified 53 State and Commonwealth listed Flora taxa as potentially occurring, of these. One Tree Botanical (2017) identified 11 taxa as potentially occurring:

- *Aponogeton hexatepalus* – P4
- *Centrolepis caespitosa* – P4
- *Drosera occidentalis subsp. occidentalis* – P4
- *Eucalyptus rudis* subsp. *cratyantha* – P4
- *Lepidosperma rostratum* – T, EN
- *Ornduffia submersa* – P4
- *Parsonsia diaphanophleba* - P4
- *Schoenus pennisetis* - P3
- *Stylidium longitubum* – P4
- *Verticordia lindleyi* subsp. *Lindleyi – P4*
- *Verticordia plumosa* var. *ananeotes* – T

One Tree Botanical (2017) did not record any State or Commonwealth listed flora taxa during the field survey.

6.1.2 Threatened and Priority Ecological Communities

The Project area does not coincide with any occurrences of Threatened or Priority Ecological Communities.

One Tree Botanical (2017) recorded the presence of one Priority Ecological Community (PEC), *Casuarina obesa* association (P1), is located immediately adjacent to the southern boundary of the Project area, within the Abernethy Road reserve. This occurrence was assessed in a 'Degraded' condition, however this is expected with this community given its reduction in area from land clearing and remnants being largely contained in road reserves.

6.2. Dieback

The Project area would be considered dieback uninterpretable due to the lack of indicator species present. As the Project area has been cleared and subject to constant degrading processes, particularly grazing over the last 80 years, dieback does not represent a significant matter for consideration.

6.3. Terrestrial Fauna

The desktop assessment (One Tree Botanical, 2017) identified 37 listed fauna taxa as potentially occurring within the regional area. Following a likelihood of occurrence assessment, 13 fauna taxa were considered as 'Possible' of occurring, there were:

- Forest Red−tailed Black−Cockatoo *Calyptorhynchus* (*banksii naso*) (Vu)
- Baudin's Black−Cockatoo (*Calyptorhynchus baudinii*) (En)
- Carnaby's black-cockatoo (*Calyptorhynchus latirostris*) (En)
- Common Greenshank (*Tringa nebularia*) (M)
- Cattle egret (*Ardea ibis*) (M)
- Glossy Ibis (*Plegadis falcinellus*) (M)
- Great Egret (*Ardea modesta*) (M)
- Peregrine Falcon (*Merops ornatus*) (S)
- Rainbow Bee−eater (*Merops ornatus*) (M)
- Osprey (*Pandion haliaetus*) (M)
- Hooded Plover (*Charadrius rubricollis*) (P4)
- Pectoral Sandpiper (*Calidris melanotos*) (M)
- Sharp−tailed Sandpiper (*Calidris acuminata*) (M)

Due to the completely degraded nature of the vegetation present, in particular the complete lack of understory and scattered trees, the Project area is not considered to contain critical or important habitat for conservation significant fauna species.

Legend

Project area

Vegetation Type

Casuarina obesa Association (Swan 4) (Priority 1) (outside project area boundary).

Isolated Trees of Swamp Sheoak Casuarina obesa over pasture on low lying sandy flats with scattered small claypans.

Isolated Trees to Open Woodland of Flooded Gum Eucalyptus rudis subsp. rudis over pasture on low lying sandy flats.

Mix of Eucalyptus rudis subsp. rudis, horticultural species and weeds.

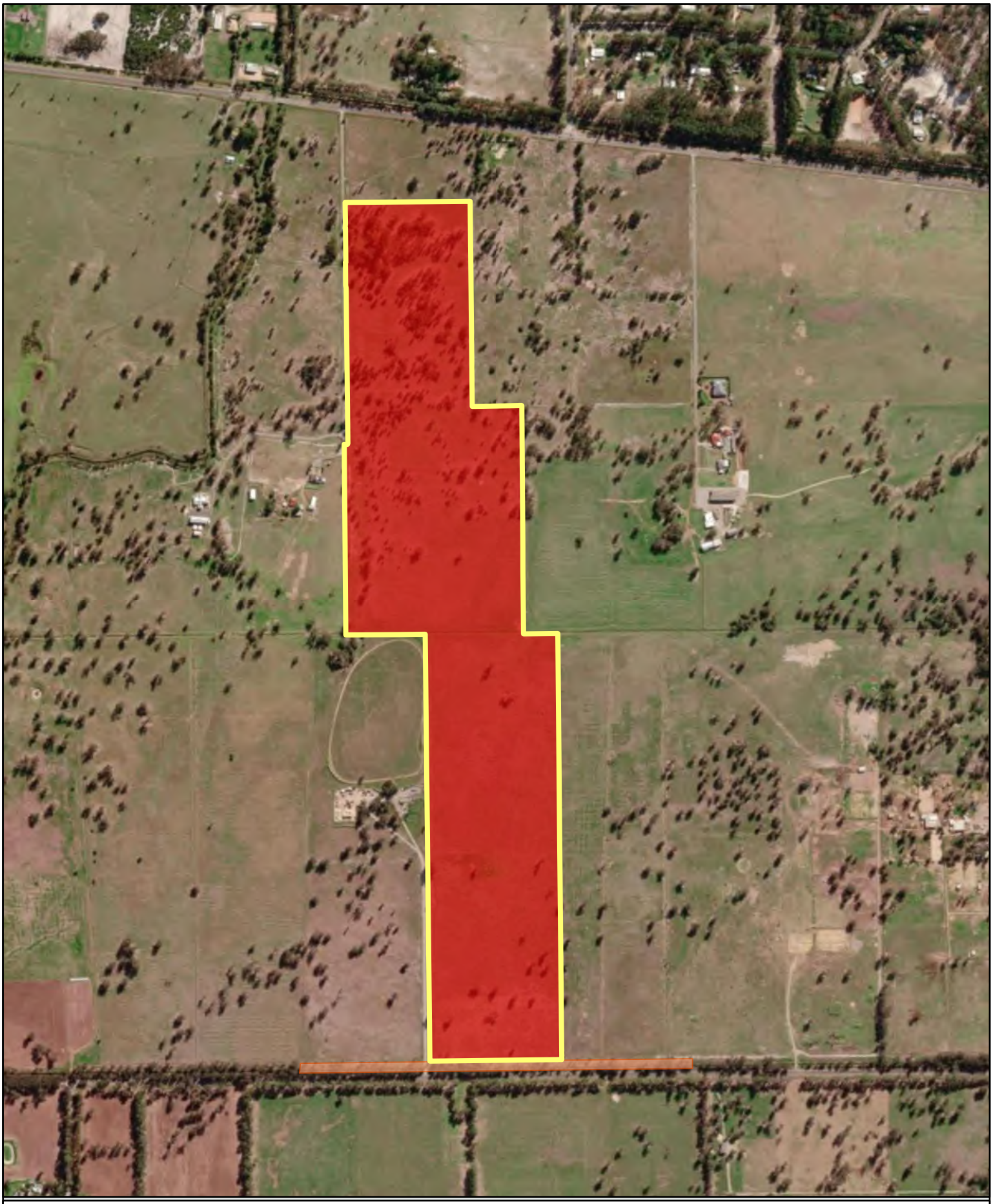
Byford Solar Project

Figure 3- Vegetation Types

westgen

0 140 280 560 m

Scale: 1:10,000



Legend

Project area

Vegetation Condition

Completely Degraded

Degraded to Completely Degraded

Byford Solar Project

Figure 4- Vegetation Condition

westgen

0 140 280 560 m

Scale: 1:10,000

7. ASSESSMENT AGAINST THE 10 CLEARING PRINCIPLES

In assessing whether clearing for the Proposal is likely to have a significant impact on the environment, the Proposal was assessed against the ten clearing principles (EP Act 1986, Schedule 5) in accordance with 'A Guide to the Assessment of Applications to Clear Native Vegetation' (DER, 2014). This assessment is presented in **Table 3**.

.

Table 3: Assessment against the Clearing Principles

Clearing Principle	Assessment
(a) Native vegetation should not be cleared if it comprises a high level of biological diversity.	The Project area does not contain vegetation that comprises a high level of biological diversity. Based on a review of historical imagery the majority of the Project area has been cleared prior to the 1950's. During this time it has been used exclusively for grazing of livestock. The Project will require the removal of up to 7.2 ha of vegetation, consisting primarily of scattered trees. Vegetation within the Project area considered to be in a 'Completely Degraded' condition absent any native biological diversity. Two local vegetation units were recorded: • Vegetation Type A - Isolated Trees to Open Woodland of Flooded Gum *Eucalyptus rudis* subsp. *rudis* over pasture on low lying sandy flats • Vegetation Type B - Isolated Trees of Swamp Sheoak *Casuarina obesa* over pasture on low lying sandy flats interspersed with scattered small clay pans These vegetation units are like those found in adjacent fields, consistent with the local region's surrounding historical land use. One occurrence of the PEC Casuarina obesa association (P1) was recorded immediately adjacent to the southern boundary of the Project area, within the Abernethy Road reserve. Although assessed to be in 'Degraded', the vegetation comprised an open Forest of *Casuarina obesa* over Closed Grassland and/or Closed forbland of introduced flora (weeds) scattered native shrubs included Mohan *Melaleuca viminea*, Spearwood *Kunzea glabrescens* and variable Hakea sp. consistent with the PEC. No State or Commonwealth listed flora taxa were recorded within the Project area. The Project area is severely degraded due to extensive clearing and a long history of livestock grazing and weed infestation. Understorey is absent throughout the Project area and it is considered unlikely that habitat suitable for supporting conservation significant flora taxa occurs. Management measures including include adequate setbacks and internal demarcation will ensure the Project will not impact this occurrence of the PEC. The Desktop assessment identified the following species as having a possibility of occurring within the Project area: • Forest Red−tailed Black−Cockatoo (*Calyptorhynchus banksii naso*) (Vu) • Baudin's Black−Cockatoo (*Calyptorhynchus baudinii*) (En) • Carnaby's black-cockatoo (*Calyptorhynchus latirostris*) (En) • Common Greenshank (*Tringa nebularia*) (M) • Cattle egret (*Ardea ibis*) (M) • Glossy Ibis (*Plegadis falcinellus*) (M) • Great Egret (*Ardea modesta*) (M) • Peregrine Falcon (*Merops ornatus*) (S) • Rainbow Bee−eater (*Merops ornatus*) (M) • Osprey (*Pandion haliaetus*) (M) • Hooded Plover (*Charadrius rubricollis*) (P4) • Pectoral Sandpiper (*Calidris melanotos*) (M) • Sharp−tailed Sandpiper (*Calidris acuminata*) (M)

Clearing Principle	Assessment
	Due to the completely degraded nature of the vegetation present, in particular the complete lack of understory and scattered trees, the Project area is not considered to contain critical or important habitat for conservation significant fauna species. Carnaby's Cockatoo is probably the significant species of greatest note; however vegetation present is considered to provide only low quality habitat in the form of potential breeding habitat within *Eucalyptus rudis*. The Project area also absent supporting habitat such as water or foraging habitat for the species. Impacts to terrestrial fauna are considered in Principle B. Considering the above, the Project is not at variance with **Principle (a)**
(b) Native vegetation should not be cleared if it comprises the whole or a part of, or is necessary for the maintenance of, a significant habitat for fauna indigenous to Western Australia.	The Project area is absent understory or significant canopy coverage that would be provide sufficient supporting habitat for conservation significant fauna taxa. The Desktop assessment identified the following species as having a possibility of occurring within the Project area: • Forest Red−tailed Black−Cockatoo *Calyptorhynchus* (*banksii naso*) (Vu) • Baudin's Black−Cockatoo (*Calyptorhynchus baudinii*) (En) • Carnaby's black-cockatoo (*Calyptorhynchus latirostris*) (En) • Common Greenshank (*Tringa nebularia*) (M) • Cattle egret (*Ardea ibis*) (M) • Glossy Ibis (*Plegadis falcinellus*) (M) • Great Egret (*Ardea modesta*) (M) • Peregrine Falcon (*Merops ornatus*) (S) • Rainbow Bee−eater (*Merops ornatus*) (M) • Osprey (*Pandion haliaetus*) (M) • Hooded Plover (*Charadrius rubricollis*) (P4) • Pectoral Sandpiper (*Calidris melanotos*) (M) • Sharp−tailed Sandpiper (*Calidris acuminata*) (M) No migratory species are expected to utilise the Project area due to the absence of any significant vegetation or waterbodies. Migratory species are expected to utilise habitat within the Jandakot Regional Park and Forrestdale Lake Nature Reserve, located 2 km and 5 km respectively from the Project area. No evidence of the presence of Black Cockatoo was noted during the field survey. In addition, no evidence of Black Cockatoo (e.g. foraging residue) was noted during either the field survey on during the Project area inspection undertaken by EDS Environmental on 2 October 2022. This is not unsurprising given the lack of suitable quality foraging habitat for Black Cockatoos present within the Project area. Further consideration for Black Cockatoos is provided below. **Black Cockatoo**

Clearing Principle	Assessment
	The Project area is within the modelled distribution for all three Black Cockatoo species, but outside the known and predicted breeding range for Baudins Cockatoo. Within the Project area, there is low value habitat suitable for Black Cockatoos, comprised of scatted trees of *Eucalyptus rudis* (potential breeding/roosting) and *Casuarina obesa* (low quality foraging). **Foraging habitat** Foraging habitat within the Project area is low quality, consisting of *Casuarina obesa* which provides limited foraging for Forest Red-tailed Black Cockatoos. This vegetation accounts for approximately 5 ha within the Project area. Groom (2011) does not list *Eucalyputs rudis* as foraging for any of the Black Cockatoo species, however it can provide roosting habitat. No foraging evidence was recorded during either the field survey or a separate Project area visit undertaken by EDS Environmental (October 2022) within the Project area. The Project area is considered to provide low quality foraging habitat for Forest Red-tailed Black Cockatoos only. Within 6 km and 12 km of the Project area, there is approximately 2,637 ha and 14,149 ha of potential foraging habitat for all three Black Cockatoo species (DBCA, 2020). Clearing for the Project represents 0.3% and 0.05% of the foraging habitat within 6 and 12 km of the Project area, respectively. Potential foraging habitat within 12 km of the Project area is shown in Figure 5. While the Project area contains suitable foraging species, the quality of this habitat is 'Low' (One Tree Botanical, 2017) **Breeding** The Project area does not contain breeding habitat for either Forest Red-tailed Black Cockatoo or Baudin's Cockatoo. For Forest Red-tailed Black Cockatoo, and similarly, for Baudins Cockatoo, Jarrah and Marri are the most important breeding tree throughout their range; however, breeding has also been recorded in Tuarts. Suitable breeding trees are large and mature, approximately 120-150 years in age and a mean overall height of 20.24 m (Johnston, Kirkby and Sarti, 2013). The closest known Forest red-tailed Black Cockatoo breeding Project area is approximately 10 km east in the Darling Range and therefore this species is not expected to utilise the Project area for breeding. For Carnaby's Cockatoo, there appears to be conjecture about the suitability and/or preference for the use of *Eucalyptus rudis* as breeding habitat. Within the Project area 94 trees of suitable DBH where recorded, of these one was observed during the field assessment as having a potentially relevant hollow. No evidence of use was observed. Regardless of the unlikely prospect of breeding habitat being present within the Project area, the Proponent will engage a suitably qualified zoologist to undertake pre-clearance surveys of all trees with a diameter at breast height (DBH) ≥ 500 mm. **Roosting** Within the Peel-Perth region, foraging and water resources within 6 km and overlapping foraging within 12 km are required to support roosting and breeding Project areas and maintain habitat connectivity to facilitate movement through the landscape (Groom, 2015). EPA (2019) note that the proximity of foraging and water is critical to support roosting and breeding Project areas. The absence of quality foraging habitat within the Project area and its immediate surroundings reduces the likelihood that vegetation within the Project area provides suitable breeding habitat.

<table>
<tr><th>Clearing Principle</th><th>Assessment</th></tr>
<tr><td></td><td>No evidence of roosting within the Project area was recorded and is unlikely to occur. Two roost Project areas are located within 3 km of the Project area, both within the Jandakot Regional Park and Modong Nature Reserve and a further three occur within 6 km (Figure 5). Berry (2008) observed that Carnaby's Cockatoo prefers roosting at Project areas close to known food and water sources. Energy expenditure could be reduced where they are able to feed and drink close to (within a 6 km radius around a roost Project area) roost Project areas before and after nocturnal roosting (Berry 2008). Le Roux (2017) determined that a greater area of Banksia and pine vegetation was associated with roost Project areas that had high Black Cockatoo counts. This highlights the importance of Banksia and pine in supporting significant roost Project areas, an observation that has been supported in a number of Carnaby's Cockatoo related studies (Valentine and Stock 2008, Johnston et al. 2016). Noting this, it is unlikely that the Project area would support any significant roosting habitat.

Within the local area, several habitat patches are likely to provide higher quality foraging habitat, consisting of greater abundance and quality of banksia species and in close proximity wetlands and waterbodies. The Project area is therefore considered of poorer habitat value in the context of the local area, and Black Cockatoo populations will continue to be supported by more locally significant habitat resources once clearing has been undertaken.

Considering the above, the Project is unlikely to be at variance with Principle (b)</td></tr>
<tr><td>(c) Native vegetation should not be cleared if it includes, or is necessary for the continued existence of, rare flora.</td><td>The desktop and field assessment did not identify any flora species listed as 'Threatened' under the BC Act occurring within the Project area. Given the condition of the vegetation present within the Project area, it is considered unlikely that any habtiat exisits within the Project area that would support listed conservation flora taxa.

Considering the above, the Project is not at variance with Principle (c)</td></tr>
<tr><td>(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.</td><td>No State listed Threatened Ecological Communities are known to occur within the Project area and will not be impacted.

Considering the above, the Project is not at variance with Principle (d)</td></tr>
<tr><td>(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.</td><td>The Project area coincides with the mapped extent of Vegetation Association 968.

The national objectives and targets for biodiversity conservation in Australia have a target to prevent clearance of ecological communities with an extent below 30 per cent of that present pre-1750 (Commonwealth of Australia, 2001).

Vegetation Association 968 has been subjected to widespread clearing, mainly to facilitate agriculture. The table below presents the vegetation statistics for Vegetation Association 968.
<table>
<tr><th>Vegetation Association</th><th>Description</th><th>Region</th><th>Pre-European Extent</th><th>Current Extent</th><th>Extent remaining (%)</th><th>% within DBCA Reserve (Current Extent)</th></tr>
<tr><td>Pinjarra 968 (IBRA Region)</td><td>Medium woodland; jarrah, marri and wandoo</td><td>IBRA</td><td>136,188.20</td><td>9,017.32</td><td>6.62</td><td>21.61</td></tr>
</table>
</td></tr>
</table>

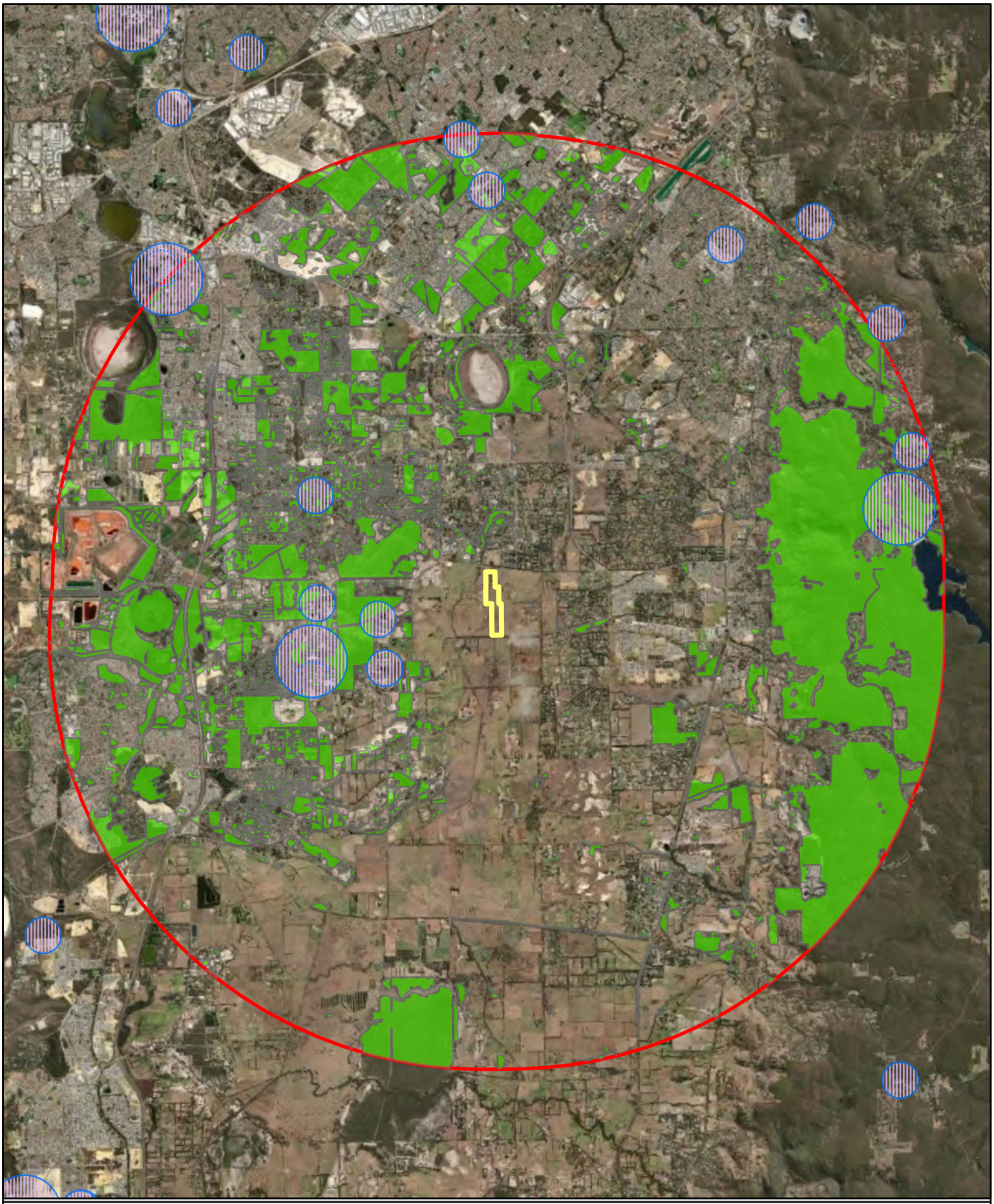
<table>
<tr><th>Clearing Principle</th><th>Assessment</th></tr>
<tr><td></td><td>
<table>
<tr><td></td><td></td><td>LGA</td><td>24,351.49</td><td>1,121.13</td><td>4.60</td><td>12.49</td></tr>
</table>
As presented in the above table, Vegetation Association 968 has 6.62% of its pre-1750 extent remaining within the Swan Coastal Plain IBRA region, while 4.6% remains within the Shire of Serpentine-Jarrahdale. Clearing associated with the Project (7.2 ha) will reduce the extent of Vegetation Association 968 remaining within the Shire of Serpentine-Jarrahdale by no more than 0.8%. This reduction is not considered significant when the vegetation is considered in the context of its condition.
Considering the above, the Project is not at variance with Principle (e)
</td></tr>
<tr><td>(f) Native vegetation should not be cleared if it is growing in, or in association with, an environment associated with a watercourse or wetland.</td><td>
The Project area coincides with Armadale Palusplain wetland (Resource Enhancement). This wetland covers an extensive area between Cardup, Oakford and Armadale. Historically, the Project area has been drained for agriculture with artificial open drains present across the Project area.
The native vegetation in the Project area consists of scattered trees with the overall condition considered to be 'Completely Degraded' and has been subject to intensive livestock grazing over several decades. The mapped wetland extent is not considered to represent a natural functioning wetland ecosystem.
Following the end-of-life of the Project (~25 years) the Project area will be rehabilitated in accordance with the Decommissioning and Rehabilitation Plan required under Condition 18 of the Development Approval which requires sufficient numbers of Casuarina obesa, Eucalyptus rudis and Corymbia calophylla in the vegetation areas (strategic positions), to replace the trees removed for the Project.
No known natural watercourses intersect the Project area.
Considering the above, the Project may be at variance with Principle (f)
</td></tr>
<tr><td>(g) Native vegetation should not be cleared if the clearing of the vegetation is likely to cause appreciable land degradation.</td><td>
The Department of Primary Industries and Regional Development (DPIRD), provides a series of soil degradation risk mapping at the sub-system level. The Project area coincides with both the Bassendean and Pinjarra system. The table below summarises the soil degradation risk within the Project area.
<table>
<tr><th>Aspect</th><th>Degradation risk</th></tr>
<tr><td>Wind Erosion</td><td>Bassendean - 15% of map unit has a high to extreme risk
Pinjarra - 20% of map unit has a high to extreme risk</td></tr>
<tr><td>Waterlogging</td><td>Bassendean - 95% of map unit has a moderate to very high risk
Pinjarra - 100% of map unit has a moderate to very high risk</td></tr>
<tr><td>Water Erosion</td><td>Bassendean & Pinjarra - 0% of map unit has a very high risk to extreme risk</td></tr>
<tr><td>Salinity</td><td>Bassendean – 0% of map unit has a moderate risk</td></tr>
</table>
</td></tr>
</table>

<table>
<tr><th>Clearing Principle</th><th>Assessment</th></tr>
<tr><td></td><td>
<table>
<tr><td></td><td>Pinjarra - 10% of map unit has a moderate risk</td></tr>
<tr><td>Flood Risk</td><td>Bassendean & Pinjarra - 0% of map unit has a moderate to high risk</td></tr>
</table>
Water logging is the main potential soil degradation risk and is particularly linked to the Pinjarra system which is described as 'Broad poorly drained flats and poorly defined stream channels with moderately deep to deep sands over mottled clays; acidic or less commonly alkaline grey and yellow duplex soils to uniform bleached or pale brown sands over clay'.
The Project area has been extensively cleared for livestock grazing and other rural purposes, it has also be subject to draining with a number of artificial drainage lines occurring within the Project area, limiting the impact of waterlogging. Noting the current condition of Project area, it is unlikely that the Project will cause appreciable land degradation above that already occurring within the Project area and adjacent field.
Considering the above, the Project is not at variance with Principle (g)
</td></tr>
<tr><td>(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.</td><td>
There are five identified conservation areas within 5 km of the Project area, these are:

Jandakot Regional Park – 2 km (North-West)
Modong Nature Reserve – 3 km (West)
Forrestdale Lake Nature Reserve – 5 km (North)
Brickwood Reserve – 5 km (South-East)
Cardup Nature Reserve – 5 km (South-East)

DER (2014) defines conservation areas as "a conservation park, national park, nature reserve, marine nature reserve, marine park or marine management area within the meaning of the Conservation and Land Management Act 1984 or any other land or waters reserved or managed for, or purposes including, nature conservation". Noting this, there are no adjacent or nearby conservation areas to the Project area.
Considering the above, the Project is not at variance with Principle (h)
</td></tr>
<tr><td>(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.</td><td>
The Project area has been substantially cleared of native vegetation for over five decades and subject to grazing by livestock for the majority of that time. The Project area does not contain any significant water resources and will not involve dewatering.
Noting the extent and nature of vegetation clearing, the Project will not alter the local hydrology of the area and no impacts to surface water quality are expected. As no dewatering or drainage modifications are required, underground water quality will not deteriorate.
Considering the above, the Project is not at variance with Principle (i)
</td></tr>
<tr><td>(j) Native vegetation should not be cleared if clearing the vegetation is likely to cause, or exacerbate, the incidence or intensity of flooding.</td><td>This Project require the clearing of up to 7.2 ha (calculated based on canopy area) of scattered trees. The removal of a relatively small area of vegetation (<0.1% within 20 km), that will be rehabilitated, makes it unlikely that the incidence or intensity of flooding will increase. The Project area has been subject to drainage over several decades and while the Project area experiences water logging, clearing will not significantly exacerbate this.</td></tr>
</table>

Clearing Principle	Assessment
	Furthermore, in considering DER (2014) it is noted in these guidelines that '*Consideration of this principle may require extensive modelling of the whole catchment and should only be considered for large clearing proposals*. *For small clearing applications ensuring that the Proposal is not at variance to Principles (g) and (j) is considered sufficient*.' Given the small amount of clearing, that vegetation will remain in the surrounding area, it is unlikely that this Project will cause or exacerbate the incidence or intensity of flooding. The Considering the above, the Project is **not at variance with Principle (j)**



Legend

- Project area
- Potential Black Cockatoo Foraging Habitat
- Confirmed Roost Sites
- 12 km Buffer

Byford Solar Project

Figure 5- Regional Black Cockatoo Habitat

westgen

0 1,500 3,000 6,000 m

Scale: 1:135,467

8. REFERENCES

Beard JS 1981, Swan, 1:1000000 vegetation series: explanatory notes to sheet 7: the vegetation of the Swan area, University of Western Australia Press, Nedlands, Western Australia.

Berry, Patrick. (2008). BERRY, P.F. 2008. Counts of Carnaby's Cockatoo (Calyptorhynchus latirostris) and records of flock composition at an overnight roosting site in metropolitan Perth. Western Australian Naturalist 26: 1-11.. Western Australian Naturalist. 26. 1-11.

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

Department of Agriculture, Water and Environment (DAWE) (2022). EPBC Act Protected Matters Search Tool. Retrieved from: https://www.environment.gov.au/epbc/protected-matters-search-tool. Accessed: 29/10/2022

Department of Biodiversity, Conservation and Attractions. Threatened and Priority Flora Database, WA Herbarium Database, Threatened and Priority Ecological Communities Databases, accessed 2022.

Department of Environment and Conservation (DEC) (2003). Phytophthora cinnamomi and the disease caused by it. Volume I – Management guidelines. Department of Environment and Conservation.

Department of Environment and Energy (DEE) 2017, Interim Biogeographic Regionalisation for Australia, Version 7, [Online], Australian Government, Available from: http://www.environment.gov.au/topics/land/national-reserve-system/science-maps-and-data/australias-bioregions-ibra [29/10/2022].

Department of Environment Regulation (DER) (2014). A Guide to the Assessment of Applications to Clear Native Vegetation, under Part V of the Environmental Protection Act 1986. Publish Guideline prepared by the DER.

Department of Water and Environmental Regulation (DWER) (n.d.). Clearing Permit System Map Viewer, DWER and Environmental Regulation. Retrieved from: https://cps.der.wa.gov.au/main.html. Accessed: 30/01/2022

Environmental Protection Authority, 2019, Carnaby's Cockatoo in Environmental Impact Assessment in the Perth and Peel Region, EPA, Western Australia

Groom, C. (2011). Plants used by Carnaby's Black Cockatoo. Department of Environment and Conservation. Available from https://www.dpaw.wa.gov.au/images/documents/plants-animals/animals/p4c_plantlist_20110415.pdf.

Groom C 2015, Roost site fidelity and resource use by Carnaby's Cockatoo (Calyptorhynchus latirostris), on the Swan Coastal Plain, Western Australia. Thesis submitted for the degree of Doctor of Philosophy, University of Western Australia, Crawley.

Heddle, E. M., Loneragan, D. W. and Havel, J. J. 1980. Vegetation complexes of the Darling System, Western Australia. In: Atlas of natural resources Darling System Western Australia. Department of Conservation and Environment, Perth, Western Australia.

Johnstone, R. E., Kirkby, T., and Sarti, K. (2013a). The breeding biology of the forest red-tailed black cockatoo Calyptorhynchus banksii naso Gould in south-western Australia. I. Characteristics of nest trees and nest hollows. Pacific Conservation Biology 19.

Johnston, T. R., Stock, W. D., & Mawson, P. R. (2016). Foraging by carnaby's black-cockatoo in banksia woodland on the Swan coastal plain, Western Australia. *Emu - Austral Ornithology, 116*(3), 284-293. https://doi.org/10.1071/MU15080

Le Roux, C. (2017). Nocturnal roost tree, roost site and landscape characteristics of Carnaby's Black-Cockatoo (Calyptorynchus latirostris) on the Swan Coastal Plain.

One Tree Botanical (2017). Level 1 Flora, Vegetation and Fauna Assessment. Unpublished report, prepared for NewGen Pty Ltd.

Valentine, L. E., & Stock, W. (2008). Food resources of Carnaby's black-cockatoo (Calyptorhynchus latirostris) in the Gnangara sustainability strategy study area. Western Australian Department of Environment and Conservation.

Western Australian Herbarium (1998–). FloraBase—the Western Australian Flora. Department of Biodiversity, Conservation and Attractions. https://florabase.dpaw.wa.gov.au/, accessed 2022.

APPENDIX A: EPA SERVICES CORROSPONDENCE

APPENDIX B: PLANNING APPROVAL

APPENDIX C: ONE TREE BOTANICAL ASSESSMENT REPORT (2017)