Amendment Report Oxley Solar Farm

# Appendix E Biodiversity Offset Strategy





# **Offset Strategy**

# **Oxley Solar Farm Offset Strategy Final V1.1**

September 2022

Proposal Number: 21-393



## **Document verification**

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## 1. Introduction

The Oxley Solar Farm is proposed to be located on the southern side of Waterfall Way (Grafton Road), approximately 14 kilometres (km) south-east of Armidale, in the New England region of NSW. The construction, operation and decommissioning of the ground- mounted PV solar array facility and associated Battery Energy Storage System would require up to 268 ha of the 1,047.8-ha proposal site. The residual 779.8 ha were investigated for their potential to generate biodiversity offsets that would be suitable to meet the offset obligation calculated for the proposed solar farm.

The Oxley Solar Farm would require native vegetation clearing and therefore would be required to offset these impacts under the *Biodiversity Conservation Act 2016* (BC Act). Proponents have the following options for biodiversity offsets under the Biodiversity Offset Scheme (BOS):

- (a) Acquiring or retiring credits under the BOS
  - i. Purchasing 'like-for-like' credits from the market, where credits are required through a negotiated purchase with a private seller,
  - ii. Establishing a physical biodiversity stewardship that meets the 'like-for-like' requirements to satisfy credit obligations;
- (b) Making payments into the Biodiversity Conservation Fund (BCF) using the offset payments calculator; or,
- (c) Funding a biodiversity action that benefits the threatened entity impacted by the development.

Options (a) and (b) are most relevant to this project.

### 1.1 Aims and scope

This report outlines a preliminary Biodiversity Offset Strategy to provide confidence to the proponent, community and agency stakeholders that the Proponent has identified a suitable suite of options to address its biodiversity liability under the *Biodiversity Conservation Act 2016* (BC Act).

This Strategy outlines:

- The proposal's offset obligations
- The findings of preliminary offset investigations
- The feasibility of securing offset obligations within the residual proposal site.

This Strategy is informed by the *Biodiversity Development Assessment Report: Oxley Solar Farm* v3 (NGH, 2022) prepared by NGH Pty Ltd and a supporting document to the Oxley Solar Farm Amendment Report (NGH, 2022b).

Note: The Biodiversity Assessment Report (BDAR v2.2) publicly exhibited with the EIS has now been updated to reflect layout changes, as detailed in the Oxley Solar Farm Amendment Report (NGH, 2022b). The changes have been substantive and among other objectives sought to reduce the impact on better condition Box Gum Woodland. Better condition Box Gum Woodland is represented by vegetation zones 2 and 4 in the BDAR.

# 2. Offset obligations

The BDAR v3 (NGH, 2022) involved comprehensive mapping and assessment of the biodiversity values and impacts of the proposal in accordance with the *Biodiversity Assessment Method* (BAM).

Disturbance to native vegetation generates an offset obligation for the proposal that the proponent must meet, generally prior to commencement of construction. Ecosystem and species credits are generated, based on the quantity and quality of the vegetation being removed and the likely impact of this on relevant species and communities. The ecosystem and species credits generated by the clearing are equivalent to the offset requirement for the project and are outlined in Table-1 and Table-2 below respectively. The table shows the Plant Community Types (PCT), their conservation status and structure (i.e., woodland, grassland etc) and the credits they generate as of June 2022<sup>1</sup>. Some threatened species are assumed to occur as survey effort could not be used to conclusively demonstrate they do not occur.

Table-1 Ecosystem credit requirements

Plant Community Type	Associated Threatened Ecological Community (BC Act)	Impact area (ha)	Ecosystem credits
PCT 84: River Oak - Rough- barked Apple - red gum - box riparian tall woodland (wetland) of	No associated TEC	0.29 ha Riparian	5
and Nandewar Bioregion		0.11 ha Sedgeland	3
PCT 510: Blakely's Red Gum - Yellow Box grassy woodland of the New England Tableland Bioregion	Associated with the TEC White Box Yellow Box Blakely's Red Gum Woodland (BC- CEEC)	0.55 ha Woodland	24
	Associated with the TEC White Box-Yellow Box- Blakely's Red Gum Grassy Woodland and Derived Native Grassland (EPBC – CEEC)	2.12 ha Derived Native Grassland	35
PCT 567: Broad-leaved Stringybark - Yellow Box shrub/grass open forest of the	Associated with the TEC White Box Yellow Box Blakely's Red Gum	1.13 ha Woodland	27
New England Tableland Bioregion		88.6 ha Derived Native Grassland	1363

<sup>&</sup>lt;sup>1</sup> The BAM calculator used to calculate credits is regularly updated. Results are only considered final when a BDAR or Biodiversity Stewardship Application, is endorsed.

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Table-2 Species credit requirements

Threatened species	Associated PCTs	Area of habitat impacted (ha)	Species credits
Adelotus brevis - endangered	PCT 84 Riparian	0.29	11
population in the Nandewar and New England Tableland	PCT 510 Woodland	0.18	9
Bioregions (Fauna)	PCT 510 Derived Native Grassland	0.94	19
	PCT 567 Woodland 0.27		8
	PCT 567 Derived Native Grassland	32.7	604
	PCT 84 Sedgeland	0.11	6
<i>Litoria subglandulosa /</i> Glandular	PCT 84 Riparian 0.29		11
	PCT 567 Derived Native 6.4 Grassland		117
	PCT 84 Sedgeland	0.11	6
<i>Myotis macropus /</i> Southern Myotis (Fauna)	PCT 510 Derived Native Grassland	0.12	2
	PCT 567 Derived Native Grassland	24.1	297
Picris evae / Hawkweed (Flora)	PCT 510 Woodland	0.55	19
Thesium australe / Austral	PCT 510 Woodland	0.55	14
	PCT 510 Derived Native Grassland	2.1	21
	PCT 567 Woodland	1.1	16
	PCT 567 Derived Native Grassland	88.6	818

The full Biodiversity Credit Report is provided in the Oxley Solar Farm BDAR V3.1 (NGH, 2022).

Figure-1 below maps the areas generating offsets. The 'disturbance footprint' for which consent is sought is inclusive of all construction and operational impacts anticipated for the project. Refer to the BDAR (NGH, 2022) Section 7 for full assessment assumptions, methodology and detailed results.



Figure-1 Impacts generating offsets including all ecosystem and species credit areas.

### Oxley Solar Farm BDAR Update Figure 10-1 Areas requiring offsets and not requiring offsets

legend
Subject Land
Development Footprint
Area requiring offset
Area not requiring offset
Glandular Frog
Tusked Frog
Southern Myotis
Hawkweed
Toadflax



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Ref: 21-393 Oxley Solar Farm BDAR Update \ Figure 10-1 Areas requiring offsets and not requiring offsets Author: C. Vincent Date created: 27.09.2022 Datum: GDA94 / MGA zone 56



### 2.1 Serious and Irreversible Impact candidates

Three SAII candidates are relevant to the proposed Oxley Solar Farm:

- White Box-Yellow Box- Blakely's Red Gum Woodland
- Tusked Frog (assumed to occur)
- Glandular Frog (assumed to occur)

#### 2.1.1 White Box-Yellow Box- Blakely's Red Gum Woodland

This community is represented onsite by PCT 510 and 567. NGH's estimates are that:

- The extent of occurrence of White Box-Yellow Box- Blakely's Red Gum Woodland and derived grasslands is 702,800 km<sup>2</sup>; likely to under-estimate the true value (NSW Threatened Species Scientific Committee 17/0/2020)
- The area of occupancy of White Box-Yellow Box- Blakely's Red Gum Woodland and derived grasslands is 151,100 km<sup>2</sup>; likely to under-estimate the true value (NSW Threatened Species Scientific Committee 17/0/2020)
- The percent reduction that has occurred for PCT 510 is currently 79% (with an estimated 155,000 ha pre-European extent and current extent of 32,000 ha).
- The percent reduction that has occurred for PCT 567 is currently 62% (with an estimated 47,000ha pre-European extent and current extent of 18,000 ha).
- The impacts to Box-Gum Woodland are verified to include:
  - $\circ$   $\,$  0.55 ha of PCT 510 and 1.13 ha of PCT 567  $\,$
  - A total of 1.681 ha (1.4%) within the Development site
  - 0.0011% of the area of occupancy of White Box-Yellow Box- Blakely's Red Gum Woodland and derived grasslands
- The remaining 117.45 ha that is avoided would be protected from impacts from the proposed solar farm and be available for either continued agricultural use or enhancement as a commitment of the proposal. Its composition can be categorised as:
  - o 52.12 ha of PCT 510 woodland
  - o 65.33 ha of PCT 567 woodland.

#### 2.1.2 Tusked Frog (assumed to occur)

<u>Tusked Frog</u> is listed as a SAII entity. An estimate of the decline in the species' population size in NSW is not available on the TBCD 2022 database or in the NSW Scientific Committee - final determination. Website 'Amphibiaweb' provided some detail, stating that the extent of occurrence for this species is approximately 480,700km<sup>2</sup>, however this includes QLD and NSW (there is no separated state data).

The New England Tablelands and Nandewar population of Tusked Frog represents a distinct and disjunct high-elevation population that is at the western limit of the species' range in NSW. The Final determination (2001) states historically they occurred west in the Nandewar Bioregion (adjacent to the New England Tablelands) and were recorded in 'most parts' of the later mentioned bioregion.

A search on BioNet for this endangered population on 6 June 2022 found 18 records ranging from 1992 to 2020. The closest record is approximately 79.5km south of the Subject Land from 2007.

In consideration of the habitat preferred by this species, a conservative estimate is that:

- 543.8 ha of potential habitat occurs within the Development Site; of this:
  - 34.5 ha (6.3% of potential habitat within the Development site) would be impacted (either by clearing of vegetation or shading by panels within the array area)
  - 509.3 ha (93% would be retained within the development site.

#### 2.1.3 Glandular Frog (assumed to occur)

<u>Glandular Frog</u> is also listed as a SAII entity. NGH's estimate is that:

- 301.45 ha of potential habitat occurs within the Development Site. Of this:
  - o 6.8 ha (2.3% of potential habitat within the Development site) would be impacted
  - $\circ$  294.7 ha (98% would be retained within the development site).

### 2.2 Additional avoidance and mitigation measures

Since the EIS was exhibited (supported by BDAR v2.2), further work on the project layout has been undertaken to reduce the impact on biodiversity. Of most relevance to this strategy:

- No solar panels would be installed in areas of Box Gum Woodland with a vegetation integrity score of 30 or more (zones 2 and 4).
- Increased setbacks have been achieved from Gara River and the Oxley Wild Rivers National Park;
  - No infrastructure now proposed in the native vegetation between Gara Road and Gara River or the area immediately south of Gara River, on the site's west
  - Increased setbacks from Gara River on the site's north-eastern boundary have also been implemented.

Together, these additional avoidance measures would reduce the proposal's direct impacts on native vegetation, including riparian and aquatic habitats. Refer to the comparison in Figure 2 Table 3 of the original and updated proposal impacts. Furthermore, additional consideration and protection measures for water quality are included in the BDAR V3.1, intended to protect the Tusked and Glandular Frogs. It is noted that the majority of the impact area assumed by the assessment would remain available for the Tusked and Glandular Frogs in operation, being affected by panel shading more than directly disturbed by the proposal. A groundcover management plan aims to monitor and protect the vegetation under the panels, and it is assumed frog species would continue to move under and around panels.

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Entity BDAR v2.2 **BDAR 3.1** Net Submitted Submitted with EIS with Amendment Report Zone 1 (84 Riparian), VI = 49.8 0.03 ha 0.29 ha + 0.26 ha Zone 2 (510 Woodland) (SAII), VI = 69.0 5.4 ha 0.55 ha - 4.85 ha + 1.52 ha Zone 3 (510 Derived Native Grassland), 0.6 ha 2.12 ha VI = 26.6Zone 4 (567 Woodland) (SAII), VI = 37.7 3.9 ha 1.13 ha - 2.77 ha Zone 5 (567 Derived Native Grassland), 76.9 ha 88.58 ha + 11.68 ha VI = 24.6Zone 6 (84 Sedgeland), VI = 76.4 0.2 ha 0.11 - 0.09 ha Hollow bearing trees to be removed by 20 5 -15 the proposal. Tusked Frog Adelotus brevis (assumed 26 ha 34.52ha + 8.52 ha present) potential habitat 26 ha Glandular Frog Litoria subglandulosa 6.76 ha -19.24 ha (assumed present) potential habitat Southern Myotis Myotis Macropus 7.6 ha 24.25 ha + 16.65 ha (assumed present) potential habitat Hawkweed Picris 4.9 ha evae (assumed 0.55 ha -4.35 ha present) potential habitat 86.7 ha Austral Toadflax Thesium australe 92.38 ha + 5.68 ha (assumed present)

Table-3 Comparison of BDAR V2.2 (EIS) and V3.1 (Amendment Report)

Notes:

- The method for calculating impacts in each zone has been updated since BDAR v2.2. This
  has resulted in an increase in impact areas for some zones due to the additional areas for
  Gara Road crossing and causeway upgrades, now included, as well as a generous
  constructability buffer added to ensure all temporary and construction impacts are
  adequately captured.
- The zone area increases show that these are generally in the lower condition (lower VI) zones, appropriately avoiding and minimising impacts, with particular focus on reducing impacts in the two SAII zones (zones 2 and 4).
- The method for calculating threatened species polygons has been updated since BDAR v2.2. This has resulted in an increase in assumed area for some species, namely, the

Tusked Frog, Southern Myotis and Austral Toadflax, not due to an increase in the project's impacts.



Development Footprint changes from EIS to submissions/amendment



250 500 m 



Data Attribution © NGH 2022 © OSD 2022 © ESRI and their suppliers 2022 © NSW Government data 2022 Ref: 21-393 Submissions and Amendment workspace 20220523 \ Development Footprint changes from EIS to submissions/amendment Author: kyle m Date created: 19.09.2022



Figure 2 Comparison of changes made between the EIS and the now refined Development footprint

# 3. Proposed offset mechanism

The retirement of biodiversity (ecosystem and species) credits must be carried out in accordance with the NSW BOS. Generally, three options can be considered:

#### (a) Acquiring or retiring credits under the BOS

- i. Purchasing 'like-for-like' credits from the market, where credits are required through a negotiated purchase with a private seller,
- ii. Establishing a physical biodiversity stewardship that meets the 'like-for-like' requirements to satisfy credit obligations;
- (b) Making payments into the Biodiversity Conservation Fund (BCF) using the offset payments calculator; or,
- (c) Funding a biodiversity action that benefits the threatened entity impacted by the development.

Options (a) and (b) are most relevant to this project.

# 4. Investigations to date

### 4.1 Methods

NGH has detailed information on the biodiversity values of the residual areas of the project site, as these were initially proposed to be developed. Having excluded the higher biodiversity value areas, these are now being considered for stewardship to meet the Proposal's offset requirement.

The areas within the proposal site (subject site on the map below) that would not be developed (subject site minus Development footprint) were entered into the BAM calculator.

While insufficient BAM plots are currently held to generate an accurate calculation of credits able to be generated at a Stewardship site on this land, the existing plot data have been extrapolated to provide a preliminary estimate.

No additional management actions were added; that is the credits generated assume only required management actions and therefore, particularly for the poor condition areas, represent a very conservative estimate. There is scope to generate more credits by committing to appropriate enhancement actions.

Depending on the degree of fragmentation, land ownership and whether the area is formed in the solar farm boundary the final results may differ. Further assessment for a formal stewardship would consider these issues in detail.

### 4.2 Results

The preliminary results indicate that the credit requirements for the Project could partially be met by creating stewardship areas immediately adjacent to the Development footprint (Table-1). Note limitations above.

### 4.2.1 Ecosystem credits

It is noted that, in accordance with the BAM, 'like for like' trading can occur between PCTs. In this instance, the derived native grassland zone of PCT 567 can be traded with woodland zone of PCT 567 and all zones of PCT 510 (woodland or grassland). The final column shows the aggregated result. The subject land could generate sufficient credits to offset PCT 84 however would only partially generate the required credits for PCT 510/567.

Active management of the stewardship site could increase the credit generation of these areas. Further assessment and BAM plots would be required to determine the actions and credit generation for active management. If the deficit in credits is unable to be met by active management of the stewardship site then the remaining credit obligation will be met by purchasing credits from the market (Option ai; Section 3) or direct payment to the BCT (option b; Section 3).

#### 4.2.2 Species credits

As all species credits required by the project are generated on the assumption they occur (ie they were not detected in surveys), they cannot generate credits unless further surveys demonstrate they do occur. It is likely that, unless BCD accept further surveys to demonstrate these assumed species do not occur within the Development site (and generate a credit requirement), that the

credit obligation will need to be met by purchasing credits from the market (Option ai; Section 3) or direct payment to the BCT (option b; Section 3) and will not be able to be met by an offset site established adjacent to the Development footprint.

Table-1 Suitability of the areas adjacent to the Development footprint to meet the offset requirement

Zone	PCT / condition	Credit requirement (generated from Development footprint)	Potential stewardship site (Subject land minus Development footprint)		Net credits per zone	Aggregated credits, where trading between PCTs and zones is allowed
			Area (ha)	Estimated		
				Credits		
Zone 2	PCT 510 Woodland	24	51.6	357	333	
Zone 3	PCT 510 Derived Native Grassland	35	187.53	143	108	-580 deficit credits
Zone 4	PCT 567 Woodland	27	65.32	277	250	
Zone 5	PCT 567 Derived Native Grassland	1363	107.76	92	-1271	
Zone 1	PCT 84 Riparian	5	32.15	120	75	79 ourplus gradita
Zone 6	PCT 84 Sedgeland	5	6.11	8	3	

Note:

All subject land surveyed that is not within the Development footprint has been included in this table to estimate the number of credits that may theoretically be generated in a Stewardship site established immediately adjacent to the Development project. This is an estimate, subject to further survey requirements to confirm the results, but is considered conservative as no 'active management' of these areas has been assumed, which would have the effect of increasing credits generated per hectare.



Figure 3 Areas that may generate ecosystem credits if secured in a Stewardship site.

# 5. Conclusion

Using BAM data collected for the assessment of the biodiversity impacts of the Oxley Solar Farm proposal, the residual areas of the Subject land were investigated for their potential to meet the credit obligation generated by the proposed solar farm impacts.

This report has concluded that:

- Securing part of the proposal's ecosystem credits in the local area via a new local Stewardship site is feasible. Active management would increase the credits generated. The remaining credits required would be met by either purchasing credits from the market or direct payment to the BCT.
- Species credit requirements would more likely be met either by purchasing credits from the market or direct payment to the BCT.

### 6. References

- DPIE. (2010, May 25). Vegetation Map for the Northern Rivers CMA VIS\_ID 524. Retrieved from SEED NSW: https://datasets.seed.nsw.gov.au/dataset/vegetation-map-for-the-northern-rivers-cma-vis\_id-524fdb07
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