

# Offset Plan

MANILDRA SOLAR FARM

MAY 2017



## Document Verification



Project Title:

Manildra Solar Farm

Project Number: 16-044

Project File Name: Manildra OP final v1.3 300517.docx

Revision	Date	Prepared by (name)	Reviewed by (name)	Approved by (name)
Draft v1	24/11/16	Brooke Marshall	No internal review, working draft for comment	
Final v1	12/12/16	Brooke Marshall	Dave Maynard	Brooke Marshall
Final v1.1	23/12/16	Brooke Marshall	Minor changes	Brooke Marshall
Final v1.2	02/02/17	Brooke Marshall	Minor changes	Brooke Marshall
Final v1.3	30/05/17	Brooke Marshall	Update Appendix E only	Brooke Marshall

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# 1 INTRODUCTION AND CONTEXT

## 1.1 BACKGROUND

The Manildra Solar Farm was approved in 2011 under Part 3A of the *Environmental Planning and Assessment Act 1979*. It is located in Manildra, central western New South Wales. The proponent is Manildra Solar Farm Pty Ltd ('Proponent'). The location of the site is shown in Figure 1-1.

The project includes the construction and operation of an up to 50 megawatt capacity photovoltaic solar farm over an area of up to 180 hectares, with associated electrical infrastructure, maintenance facilities, site office, access tracks, minor upgrades to adjacent roads, fencing and landscaping.

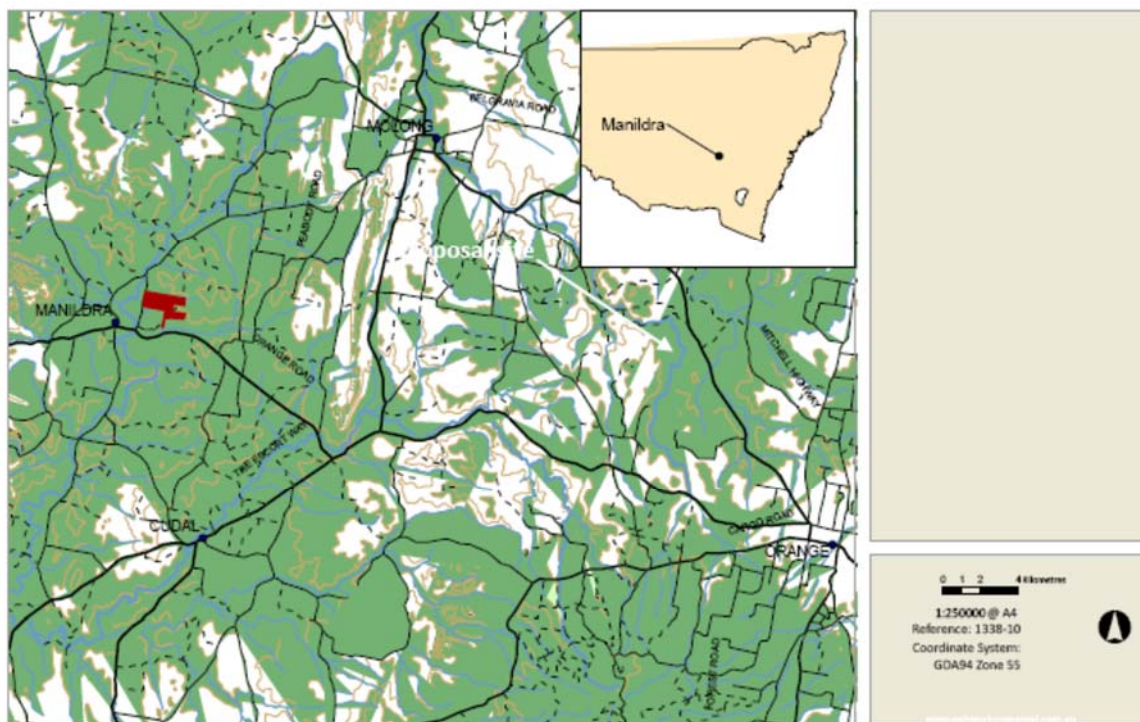


Figure 1-1. Location of the Manildra solar farm (source: nghenvironmental 2010a)

## 1.2 LEGISLATIVE CONTEXT

The Manildra Solar Farm was approved by the NSW Department of Planning and Environment (DPE) as a Major Project under Part 3A of the *Environmental Planning and Assessment Act 1979*. Major Projects must achieve a 'maintain or improve' environmental outcome to be approved. Central to the project therefore, is the requirement to offset residual biodiversity impacts that have not been able to be avoided or sufficiently minimised.

Generally, the approval contains two requirements regarding offsetting:

1. The preparation of an *offset strategy* (as set out in Condition of Approval C.2) comprising a framework document to set out the means to calculate, secure and manage the required offsets.

An offset strategy was prepared in consultation with OEHL in February 2016 (NGH Environmental 2016).

2. The preparation of an *Offset Plan* (as set out in Condition of Approval E.3) required prior to operation, to verify that appropriate offsets have been secured and will be managed in perpetuity.

This document, prepared in accordance with the Offset Strategy (NGH Environmental 2016), has been developed in consultation with OEHL (refer to Section 3) to meet this condition.

Regarding the Offset Plan, Condition of Approval E.3 includes the following requirements:

*Details of the offset strategy [package] shall be submitted for the approval of the Secretary prior to the commencement of operation or as agreed by the Secretary. The package shall:*

- a) describe how the offset shall be guaranteed, managed and monitored in perpetuity;*
- b) ensure all impacted vegetation communities and threatened species habitat has been offset as per the ratios/amounts calculated through the outcomes of the assessment carried out under Condition C2;*
- c) demonstrate how the offset ratio is consistent with the principles of "improve or maintain" for biodiversity values; and*
- d) include requirements for a post construction review to confirm the extent of clearing was commensurate with and not greater than that predicted. If clearing is greater, then the package shall demonstrate how the offset was modified and increased to the value of the actual biodiversity loss.*

The Submissions Report (NGH Environmental 2010b) and Biodiversity Assessment (nghenvironmental 2010a) completed for the project provide several additional comments relevant to offsetting the impacts of the project:

- *An Offset Plan ... would be developed in consultation with the landowner and would offset the impact of the development for the period that the impact occurs.*
- *The western paddock [noted to be in better condition than other areas onsite] may provide an appropriate Offset Site.*
- *Offsetting native pasture would only be undertaken where it is in moderate-good condition as defined by the biometric guidelines and considered to provide quality habitat.*
- *The final infrastructure layout will determine the precise amount of clearing required. At that time, and prior to construction commencing, formal agreements would be sought with the affected land owners to secure offsetting for areas of habitat permanently removed by the proposal.*

## 2 IMPLEMENTATION OVERVIEW

The following steps are documented in this Offset Plan.

1. Consult with OEH and Local Land Services (LLS) regarding contents and broad approach of this plan.
2. With reference to existing vegetation mapping for the site, collect representative biometric plot (using the Biobanking Assessment Methodology; BBAM) data from the development and Offset Site, Spring 2016, to inform BioBanking credit calculations.
3. Determine the number of credits generated by the proposed construction footprint, to determine the final offset requirement (worst case impact areas).
4. Determine the maximum number of credits available at the Offset Site.
5. Evaluate the suitability of the Offset Site, including meeting the principles of “improve or maintain” for biodiversity values and confirm the final boundaries of the Offset Site.
6. Confirm the security and management strategies for the Offset Site, demonstrating land owner involvement and including monitoring requirements for the Offset Site.
7. Confirm OEH and LLS endorsement of the final Offset Plan.
8. Request LLS to prepare a Conservation Property Vegetation Plan (CPVP) for the Offset Site.

### 3 CONSULTATION SUMMARY

OEH were consulted in the preparation of the *Offset Strategy*. Consultation with OEH (David Geering, October 2015) determined that the Biobanking Calculator could be used with benchmark data to confirm the suitability of the Offset Site.

The ability to use a CPVP as the offset security mechanism was confirmed by OEH, LLS and DPE in a meeting with the Proponent on 2 November, 2016 and is now included as the sole security mechanism in this *Offset Plan*.

OEH were consulted regarding the use of the Biobanking credit calculator in the *Offset Plan* and endorsed the draft credit reports provided in Appendix A and B of the draft plan (reports included as Appendix A and B, correspondence provided 25 November 2016, Appendix F). It is noted that this final Offset Plan reduces the size of the offset site to meet the development site credit requirement and now only marginally exceeds that requirement; that is, not all of the western paddock is now proposed as the offset site. Only the derived grassland areas within the offset site were reduced. No other changes have been made to the offset site calculations. In line with this consultation, the reduced offset includes the better quality western portion of the broader offset site originally proposed. No changes have been made to the development site offset calculations. OEH endorsed this area reduction, 22 December 2016 (also included in Appendix F).

LLS were consulted regarding management actions and comments provided by LLS via email and by phone are now addressed in this plan (Tiffany Bracey, Senior Land Services Officer LLS, December 5-23, 2016 2:01 PM) as follows:

- The plan is required to be endorsed prior to clearing.
- The plan includes protection of all revegetation planting<sup>1</sup> and a species list is provided.
- The monitoring specifies the offset site will be managed to benchmark for the Blakely's Red Gum - Yellow Box grassy tall woodland of the NSW South Western Slopes Bioregion (LA120).
- The monitoring and reporting will be undertaken as part of the project's Annual Report.

Additionally, LLS provided additional management measures, in consultation with the land owner, which are now incorporated into the document. LLS have endorsed the management, funding and security arrangements set out in this plan (02 February 2017).

OEH have been forwarded a copy of the final Offset Plan, as requested in correspondence (07 February 2017).

LLS are preparing a CPVP to administer the Offset Site in perpetuity.

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<sup>1</sup> No understorey planting is proposed.



## 4 ESTIMATED CREDIT REQUIREMENT

### 4.1 APPROACH

BioBanking calculations were undertaken as follows for the development site:

- Major Project option selected for BioBanking calculations, reflecting that the project is a Major Project
- Impact areas entered, as collected from the 2010 Biodiversity Assessment, using the maximum development envelope under consideration (includes Stage 1 and 2). Note: at the time of approval of this project, the BBAM would not have required offsets for remnants less than 0.25ha in size (pers. comm. D. Geering OEH 2015). These native vegetation remnants less than 0.25ha total 0.93 ha and while they were used in the Offset Strategy calculations to ensure a precautionary outcome, are not now included in the final Offset Plan calculations.
- Plot data were collected 11 October 2016 to characterise the site values of each vegetation type to be impacted, in accordance with the BBAM.
- A credit profile was obtained via the BioBanking Credit Calculator (BCC).

The key decision points in this process are documented below. The Biodiversity Credit Report is provided in Appendix A.

### 4.2 METHOD

#### 4.2.1 Landscape assessment

A site based assessment was undertaken. Relevant lots are:

- Lot 5, 6, 67, 94, 96,199, 207 238 of DP 750162
- Lot 101 of DP 1055139
- Lot 100 of DP 1055139
- Lot 593 of DP 776039
- Lot 68 of DP 932909
- Lot 3 of DP 1203086
- Lot 1 and Lot 2 of DP 1210642

The dominant Mitchell landscape is Nangar Slopes and Ranges (80% cleared). The landscape is largely cleared and additional clearing of native vegetation on account of the development would be low. The following scores calculated using GIS:

Outer assessment circle before development: 31-35%

After development: 31-35%

Inner assessment circle before development: 6-10%

After development: <5%

No connecting links are affected by the development.

No biodiversity links including riparian areas are affected.

The resulting landscape score is 12.8.

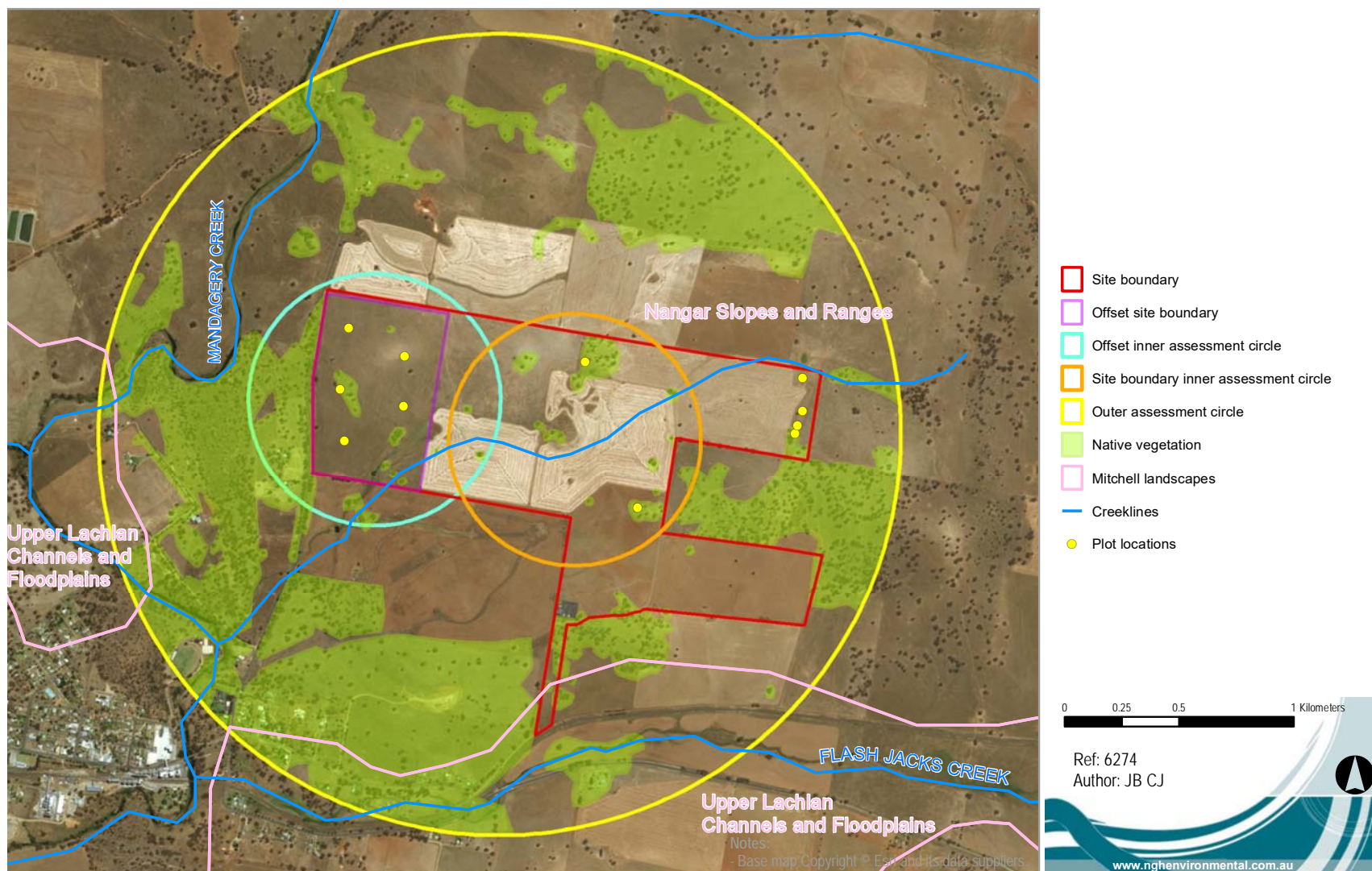


Figure 4-1 Extent of native vegetation in the study area (shows original offset site in its entirety, now reduced as shown in Section 5).

#### 4.2.2 Vegetation zones

The native vegetation zones that would be impacted by the project as entered into the BCC, their condition class and number of biometric plots required for them are provided in Table 4-1 below. The impact areas are mapped on Figure 4-2. The site score is also provided. This is based on the plot data entered (shown below).

Table 4-1 Native vegetation zones within the development site, excluding native vegetation remnants <0.25 ha

Area of impact excluding native vegetation remnants <0.25ha	Stage one (ha)	Stage two (ha)	Total (ha)	Condition class	Plots required	Site value score
Native vegetation zones:	5.50	0.83	6.33			
<i>Box Gum Woodland Derived Grassland (EEC, TSC)</i>	<b>2.92</b>	<b>0</b>	<b>2.92</b>	<b>Moderate to good</b>	<b>2</b>	<b>9.33</b>
<i>Box-Gum Woodland (EEC, TSC)</i>	<b>2.58</b>	<b>0.83</b>	<b>3.41</b>	<b>Moderate to good</b>	<b>3</b>	<b>26.67</b>
Crop or exotic pasture	105.97	23.53	129.50			
<b>Total:</b>	<b>111.47</b>	<b>24.35</b>	<b>135.83</b>			

Notes:

- No geographic / habitat features were entered.
- Exotic pasture has not been included in the assessment as it is not native vegetation or threatened species habitat.
- Native remnants less than 0.25ha have not been included, as per correspondence with D. Geering OEH.
- No additional threatened species polygons/management zones have been added. Management zones are equivalent to the vegetation zones; all site scores have been reduced to zero 'after development'.

#### 4.2.3 Plot data used in the assessment

Plot data used in the assessment are shown in Table 4-2. These were collected on 11 October 2016 by a qualified ecologist and accredited BioBanking assessor.

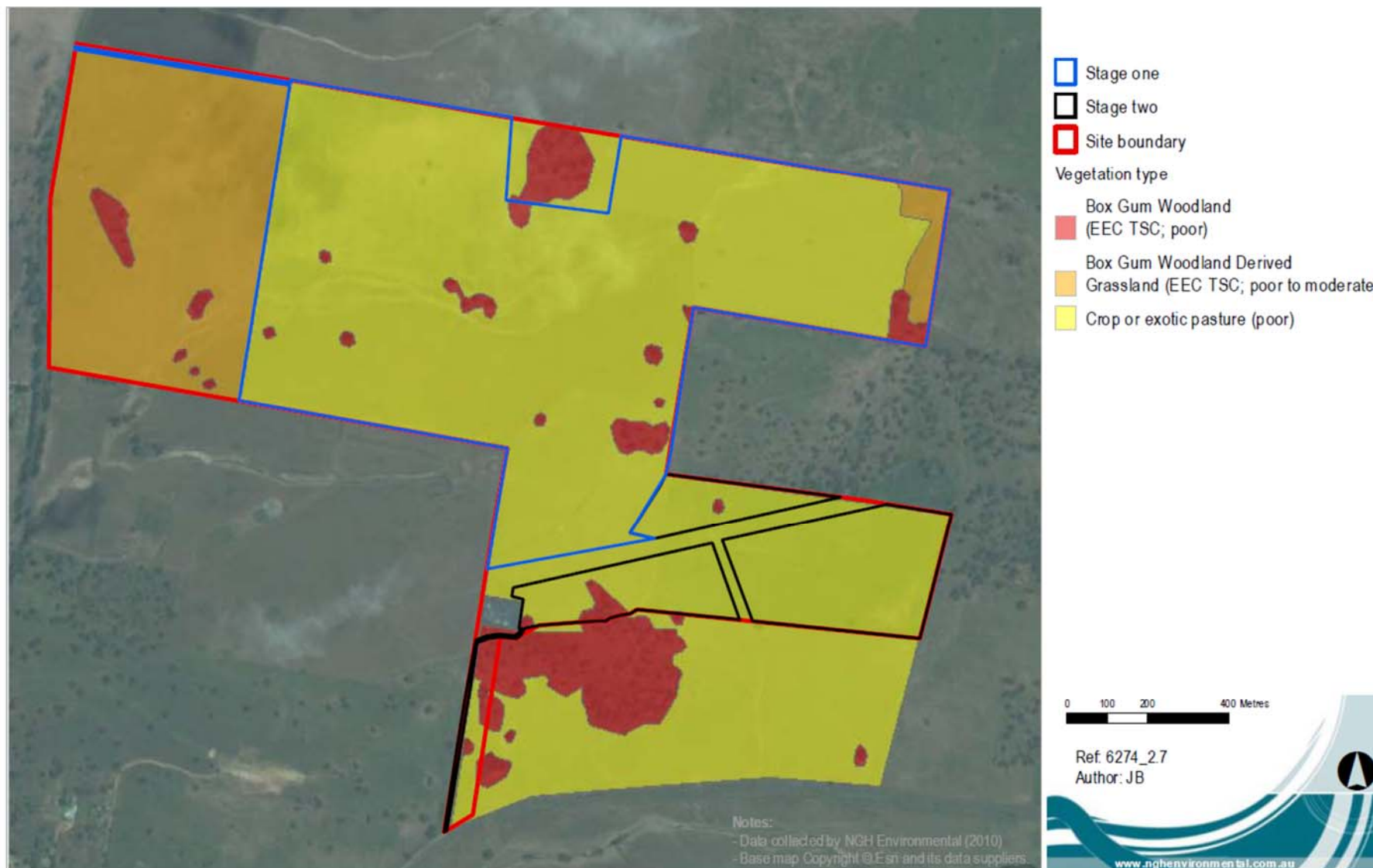


Figure 4-1 Impact areas required for development, shown as Stage 1 and 2

Table 4-2 Plot data used in the assessment (collected in Spring 2016)

**Zone 1 Blakely's Red Gum - Yellow Box grassy tall woodland of the NSW South Western Slopes Bioregion (LA120) Derived grassland**

Plot name	Native plant species richness	Native over-storey cover	Native mid-storey cover	Native ground cover (grasses)	Native ground cover (shrubs)	Native ground cover (other)	Exotic plant cover	Number of trees with hollows	Overstorey regeneration	Total length of fallen logs	Easting	Northing	Zone
DG1	5	0	0	10	0	0	90	0	0	0	661102	6328478	55H
DG2	9	0	0	6	0	10	84	0	0	0	661103	6328334	55H
DG3	10	0	0	2	0	4	94	0	0	0	661079	6328268	55H

**Zone 2 Blakely's Red Gum - Yellow Box grassy tall woodland of the NSW South Western Slopes Bioregion (LA120)**

Plot name	Native plant species richness	Native over-storey cover	Native mid-storey cover	Native ground cover (grasses)	Native ground cover (shrubs)	Native ground cover (other)	Exotic plant cover	Number of trees with hollows	Overstorey regeneration	Total length of fallen logs	Easting	Northing	Zone
DBGW1	3	16	0	0	0	0	88	5	0	24	660382	6327912	55H
DBGW2	20	16	0	10	0	22	68	2	0	16	660154	6328549	55H
DBGW3	10	32	0	0	0	30	96	1	0	30	661070	6328234	55H

Benchmark data are shown below as a basis of comparison only.

Table 4-3 Benchmark data (OEH Oct 2008).

Veg Type ID	Native plant species richness		Native over-storey cover		Native mid-storey cover		Native ground cover (grasses)		Native ground cover (shrubs)		Native ground cover (other)		Cover estimates - Source	Number of trees with hollows	Total length of fallen logs	Hollows & logs - Source
	Richness	Source	Lower	Upper	Lower	Upper	Lower	Upper	Lower	Upper	Lower	Upper				
LA 120	23	E	8	35	1	20	15	70	3	5	3	20	P	0.8	66	E



#### 4.2.4 Site surveys

Predicted species assumed to occur where returned as:

Common name	Scientific name *	TS multiplier	offset	On site *	
Barking Owl	<i>Ninox connivens</i>	3.0	Yes	<a href="#">Edit</a>	
Black-chinned Honeyeater (eastern subspecies)	<i>Melithreptus gularis gularis</i>	1.3	Yes	<a href="#">Edit</a>	
Brown Treecreeper (eastern subspecies)	<i>Climacteris picumnus victoriae</i>	2.0	Yes	<a href="#">Edit</a>	
Bush Stone-curlew	<i>Burhinus grallarius</i>	2.6	Yes	<a href="#">Edit</a>	
Diamond Firetail	<i>Stagonopleura guttata</i>	1.3	Yes	<a href="#">Edit</a>	
Flame Robin	<i>Petroica phoenicea</i>	1.3	Yes	<a href="#">Edit</a>	
Gang-gang Cockatoo	<i>Callocephalon fimbriatum</i>	2.0	Yes	<a href="#">Edit</a>	
Grey-crowned Babbler (eastern subspecies)	<i>Pomatostomus temporalis temporalis</i>	1.3	Yes	<a href="#">Edit</a>	
Hooded Robin (south-eastern form)	<i>Melanodryas cucullata cucullata</i>	1.7	Yes	<a href="#">Edit</a>	
Little Eagle	<i>Hieraaetus morphnoides</i>	1.4	Yes	<a href="#">Edit</a>	
Little Lorikeet	<i>Glossopsitta pusilla</i>	1.8	Yes	<a href="#">Edit</a>	
Painted Honeyeater	<i>Grantiella picta</i>	1.3	Yes	<a href="#">Edit</a>	
Scarlet Robin	<i>Petroica boodang</i>	1.3	Yes	<a href="#">Edit</a>	
Speckled Warbler	<i>Chthonicola sagittata</i>	2.6	Yes	<a href="#">Edit</a>	
Spotted-tailed Quoll	<i>Dasyurus maculatus</i>	2.6	Yes	<a href="#">Edit</a>	
Square-tailed Kite	<i>Lophoictinia isura</i>	1.4	Yes	<a href="#">Edit</a>	
Swift Parrot	<i>Lathamus discolor</i>	1.3	Yes	<a href="#">Edit</a>	
Turquoise Parrot	<i>Neophema pulchella</i>	1.8	Yes	<a href="#">Edit</a>	
Varied Sittella	<i>Daphoenositta chrysoptera</i>	1.3	Yes	<a href="#">Edit</a>	
Yellow-bellied Sheath-tail-bat	<i>Saccolaimus flaviventris</i>	2.2	Yes	<a href="#">Edit</a>	

Species requiring survey were returned as:

Common name	Scientific name	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Brush-tailed Phascogale	<i>Phascogale tapoatafa</i>	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Eastern Pygmy-possum	<i>Cercartetus nanus</i>	Yes	Yes	Yes	Yes					Yes	Yes	Yes	Yes
Koala	<i>Phascolarctos cinereus</i>	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Narrow Goodenia	<i>Goodenia macbarronii</i>	Yes	Yes							Yes	Yes	Yes	Yes
Regent Honeyeater	<i>Anthochaera phrygia</i>	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Squirrel Glider	<i>Petaurus norfolcensis</i>	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes

On the basis of the Biodiversity Assessment (2010), none of these latter species are considered to occur or be impacted.

## 4.3 RESULTS

The following ecosystem credits are required for the project. The full Biodiversity Credit Report generated by the BCC is provided in Appendix A.

PC type code	Plant community type name	Management zone area (ha)	Loss in LandScape Value	Loss in site value score	EEC Offset Multiplier	Credits req for TS	TS with highest credit req	TS offset multiplier	Ecosystem credits required
LA120	Blakely's Red Gum - Yellow Box grassy tall woodland of the NSW South Western Slopes Bioregion	2.92	12.80	9.33	3.0	30	Barking Owl	3.0	0
LA120	Blakely's Red Gum - Yellow Box grassy tall woodland of the NSW South Western Slopes Bioregion	3.41	12.80	26.67	3.0	79	Barking Owl	3.0	79

There are no species credits required for the project.

It is noted that there is no requirement to separately offset woodland versus derived grassland. They are different forms of the same community and either or both could be used to satisfy the offset requirement.

It is noted that the credit requirement is substantially less than the estimate provided in the Offset Strategy. The use of field collected plot data shows that the site is in much poorer condition than benchmark.

## 5 SUITABILITY OF THE OFFSET SITE

### 5.1 IDENTIFICATION AND JUSTIFICATION OF THE OFFSET SITE

Initially, the entire western paddock (mapped as Box Gum Woodland Derived Grassland on Figure 4-1) was proposed as the offset site.

The entire western paddock was identified in the early stages of the project's development as it had been subject to historic grazing but not cultivation, as the development site has been, and was therefore in better condition. To ensure the impacts of the development were minimised, the proponent elected to maximise impacts in the lower condition eastern paddock and retain the western paddock to meet offset requirements<sup>2</sup>.

The vegetation mapping carried out in late 2010 (and provided in Section 4 of this document) identified the majority of the western paddock as derived grassland whereas the eastern cultivated paddock was generally mapped as native vegetation only where tree cover remained. The landowner confirmed in 2016 that the western site has not been cultivated over the last 25 years; beyond that the site's history is unknown.

2016 plot data show a high proportion of exotic species for both the proposed offset and development site. The suitability of the western paddock to provide an appropriate offset hinges on whether the site could naturally regenerate. An assessment of this was provided by principal consultant botanist Colin Bower and is appended, Appendix H. In summary:

*Two factors acted to mask the expression of native grasses in the survey results.*

- *The timing of the survey*
- *Livestock grazing*

*In view of the above, it is likely the diversity and coverage of native grasses would be greater in a summer or autumn survey than shown by the spring survey, especially if grazing is reduced. However, the same is unlikely to be true for native forbs for which most species would be detectable in spring. The main ones still present on the site would have been revealed by the current survey.*

*Without management and given normal seasons, it is considered unlikely that the offset area would show significant natural regeneration. It seems most likely that exotic species would continue to dominate in winter and spring suppressing native herbs. Native shrubs are unlikely to reappear, although some native Acacias and Pea Flowers may persist in the soil seed bank. These may potentially germinate in response to fire. Currently, tree regeneration is being suppressed by livestock grazing.*

*Despite the low native ground cover diversity and abundance, it is considered that, with appropriate management, the condition of the native vegetation on the site would improve over time. It is expected that there are more native grass species present than revealed by the survey for the reasons outlined above.*

*The most important element of a recovery strategy for the offset area would be grazing management.*

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<sup>2</sup> Preliminary credit calculations predating this report suggested that only a proportion of the western paddock would be required to meet the offset requirements.



While unassisted 'significant' regeneration is not anticipated, the information provided by principal consultant botanist Colin Bower has been included in a management strategy for the offset site. With management, the site is anticipated to improve and constitute a viable long term remnant.

The following section assesses the credits generated for the entire western paddock and then adjusts the area to meet (with only minor exceedence) the credit requirement.

## 5.2 APPROACH

The entire paddock to the west of Stage 1 of the solar farm site (delineated by mapped Box-Gum Woodland Derived Grassland on Figure 4-1) was evaluated to determine its ability to meet the offset requirement for the project.<sup>3</sup>

BioBanking calculations were undertaken at the Offset Site as follows:

- The Biobank option was selected for BioBanking calculations, reflecting that this would be the Offset Site
- Plot data were collected in October 2016 to characterise the site values of each vegetation type within the Offset Site
- The maximum available area was entered into the BioBanking calculations.

The key decision points in this process are documented below. The BioBanking Credit Report is provided in Appendix B.

## 5.3 METHOD

### 5.3.1 Landscape assessment

A site based assessment was undertaken. The landscape is largely cleared and additional clearing of native vegetation on account of the development would be low. The following scores were entered using GIS mapped native vegetation extent.;

Outer assessment circle before development: 31-35%

After development: 31-35%

Inner assessment circle before development: 6-10%

After development: 6-10%

There is no connecting link onsite.

No biodiversity links including riparian areas are affected.

The resulting landscape score is 12.0.

### 5.3.2 Vegetation zones

The native vegetation zones that would be offset for the project as entered into the BCC, their condition class and number of biometric plots required for them are provided below. The site score is also provided. This is based on the plot data entered (discussed below).

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<sup>3</sup> The offset site is reduced in Section 5.5 to more closely meet the credit requirement.

Table 5-1 Native vegetation zones within the offset site

Zone	Total (ha)	Condition class	Plots required	Site value (default increase)
Box Gum Woodland Derived Grassland (EEC, TSC)	39.44	Moderate to good	4	7.33
Box-Gum Woodland (EEC, TSC)	1.52	Moderate to good / poor	1	42.56

Notes:

- No geographic / habitat features were entered.

Table 5-2 Plot data used in the assessment (collected in Spring 2016)

**Zone 1 Blakely's Red Gum - Yellow Box grassy tall woodland of the NSW South Western Slopes Bioregion (LA120) Derived grassland**

Plot name	Native plant species richness	Native over-storey cover	Native mid-storey cover	Native ground cover (grasses)	Native ground cover (shrubs)	Native ground cover (other)	Exotic plant cover	Number of trees with hollows	Overstorey regeneration	Total length of fallen logs	Easting	Northing	Zone
OG1	9	0	0	0	0	0	100	0	0	0	659120	6328696	55H
OG2	4	0	0	0	0	0	98	0	0	0	659365	6328572	55H
OG3	8	0	0	10	0	0	88	0	0	0	659103	6328203	55H
OG4	10	0	0	10	0	0	88	0	0	0	659362	6328354	55H

**Zone 2 Blakely's Red Gum - Yellow Box grassy tall woodland of the NSW South Western Slopes Bioregion (LA120)**

Plot name	Native plant species richness	Native over-storey cover	Native mid-storey cover	Native ground cover (grasses)	Native ground cover (shrubs)	Native ground cover (other)	Exotic plant cover	Number of trees with hollows	Overstorey regeneration	Total length of fallen logs	Easting	Northing	Zone
OBGW1	16	11	0	0	0	2	86	0	0	0	659084	6328427	55H

Benchmark data are shown below as a basis of comparison only.

Table 5-3 Benchmark data (OEH Oct 2008).

Veg Type ID	Native plant species richness		Native over-storey cover		Native mid-storey cover		Native ground cover (grasses)		Native ground cover (shrubs)		Native ground cover (other)		Cover estimates - Source	Number of trees with hollows	Total length of fallen logs	Hollows & logs - Source
	Richness	Source	Lower	Upper	Lower	Upper	Lower	Upper	Lower	Upper	Lower	Upper				
LA 120	23	E	8	35	1	20	15	70	3	5	3	20	P	0.8	66	E

### 5.3.3 Site surveys

Species requiring survey to accrue credits include:

Common name	Scientific name
Brush-tailed Phascogale	<i>Phascogale tapoatafa</i>
Eastern Pygmy-possum	<i>Cercartetus nanus</i>
Koala	<i>Phascolarctos cinereus</i>
Narrow Goodenia	<i>Goodenia macbarronii</i>
Regent Honeyeater	<i>Anthochaera Phrygia</i>
Squirrel Glider	<i>Petaurus norfolcensis</i>

On the basis of the Biodiversity Assessment (2010), these species are considered to have very low likelihood of occurrence. No additional surveys were undertaken and these species do not generate credits at the Offset Site.

## 5.4 RESULTS

The following ecosystem credits are generated by the entire western paddock. This represents the maximum area available in the western paddock under default management actions. It is possible that greater numbers of credits could be produced under more intensive management.

Veg code	Vegetation name	Management zone	Management zone area (ha)	Landscape Value score	Current site value	Future site value	Gain in site value	Averted loss in site value	Number of ecosystem credits created
LA120	Blakely's Red Gum - Yellow Box grassy tall woodland of the NSW South Western Slopes Bioregion	1	39.44	12.00	7.33	7.33	0	0.00	118
LA120	Blakely's Red Gum - Yellow Box grassy tall woodland of the NSW South Western Slopes Bioregion	2	1.52	12.00	22.67	22.67	0	0.00	5

There are no species credits generated for the assessment.

## 5.5 FINAL OFFSET BOUNDARY DELINEATION – REDUCED OFFSET SITE

The entire western paddock was found to be sufficient in terms of type and amount of credits to meet the offset requirement of the worst case development footprint. Comparing the credit profiles in Appendix A and B, there would be excess Blakely's Red Gum - Yellow Box grassy tall woodland of the NSW South Western Slopes Bioregion (LA120) credits at the offset site.

- Required credits = 79
- Offset Site credits = 123
- Surplus credits = 44

As not all of the offset site is required to meet the offset requirement, a second calculation was undertaken changing only the area of derived grassland in the offset site (0035/2016/4011B version 2, 13 December 2016). The area of this vegetation type was reduced from 39.44 ha to 28 ha. The revised credit result is shown below and the BioBanking Credit Report is included in Appendix C.

Veg code	Vegetation name	Management zone	Management zone area (ha)	LandScape Value score	Current site value	Future site value	Gain in site value	Averted loss in site value	Number of ecosystem credits created
LA120	Blakely's Red Gum - Yellow Box grassy tall woodland of the NSW South Western Slopes Bioregion	1	28	12.00	7.33	7.33	0	0.00	84
LA120	Blakely's Red Gum - Yellow Box grassy tall woodland of the NSW South Western Slopes Bioregion	2	1.52	12.00	22.67	22.67	0	0.34	5

The revised offset site is sufficient in terms of type and amount of credits to meet the offset requirement of the worst case development footprint. Comparing the credit profiles in Appendix A and C, there would be a minor excess Blakely's Red Gum - Yellow Box grassy tall woodland of the NSW South Western Slopes Bioregion (LA120) credits at the offset site.

- Required credits = 79
- Offset Site credits = 89
- Surplus credits = 10

The final offset boundary has been determined to meet the credit requirement. It totals 29.52 ha. Lot numbers include:

Lot 5 DP750162 and

Lot 6 DP750162

The credit requirement has been calculated on a 'worst case' or largest impact area footprint. As determined in consultation with OEH, when reducing the offset site, we have retained the better quality western portion of the originally proposed offset site, with reference to the original Biodiversity Assessment for the project, undertaken in 2010.

The original and revised offset site are shown on Figure 5-1.

A shape file has been provided to LLS to commence the preparation of a Conservation Property Vegetation Plan (CPVP); refer to Section 6.

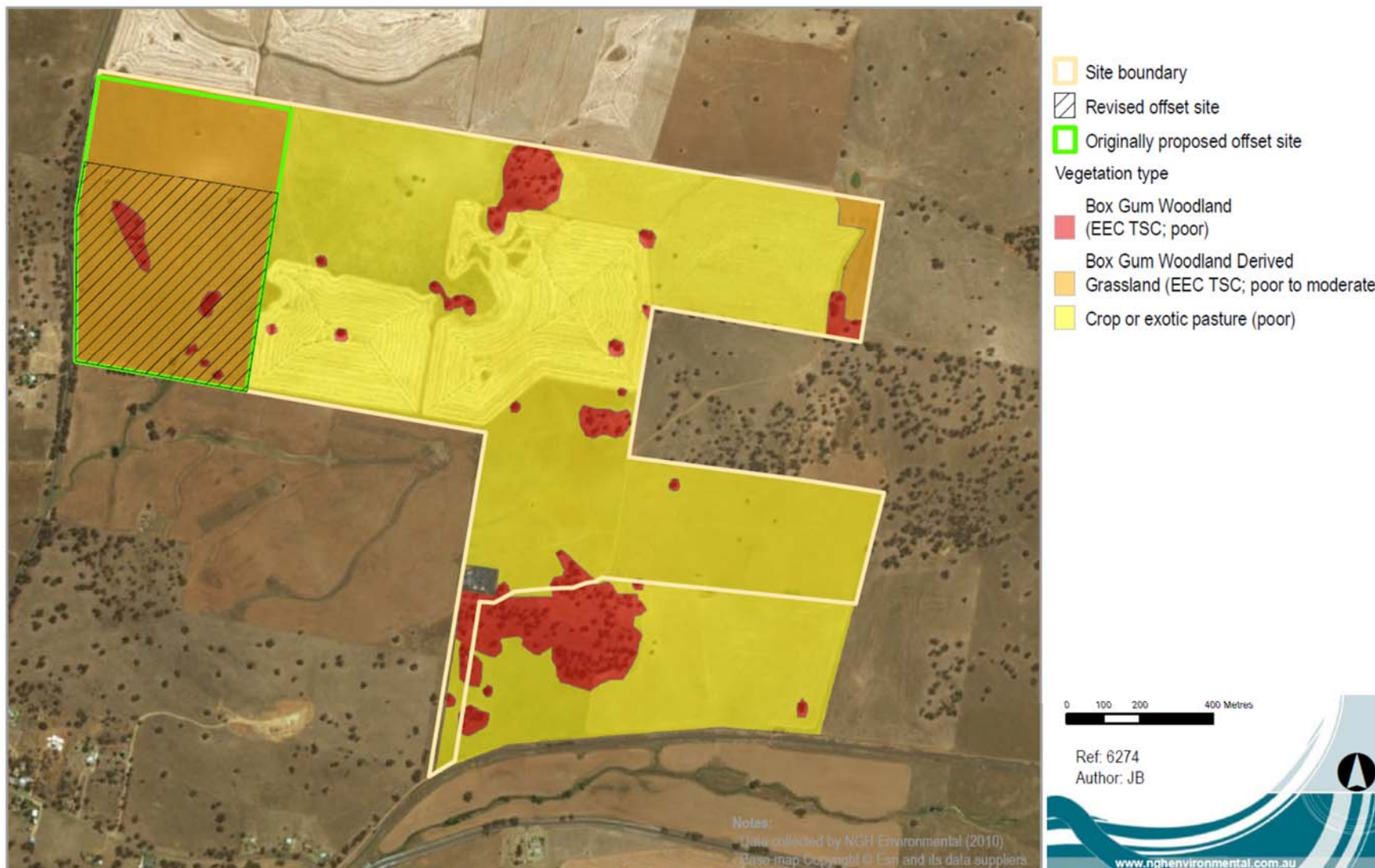


Figure 5-1 Original and revised offset site boundary

## 6 SECURITY AND MANAGEMENT

### 6.1 SECURITY MECHANISMS

#### 6.1.1 Security options

An appropriate management vehicle is required that:

- Secures the site in perpetuity.
- Allows for the ongoing management of the site (including how the designated management actions will be funded).

Three options may be considered for securing a long-term management arrangement at the Offset Site:

- Biobanking agreement (TSC Act, part 7 A).
- CPVP (Native Vegetation Act).
- Plan of management with S.88b covenant (Environmental Planning and Assessment Act).

#### 6.1.2 Selection of an option

In accordance with the endorsed Offset Strategy (prepared by NGH Environmental, March 2016), a CPVP would be established over the offset area and will be attached to the land title. To ensure that the CPVP is binding on successors in title, an abstract of the CPVP will be registered with the Land and Property Management Authority under the *Real Property Act 1900*.

The CPVP will be a legally binding agreement under both the Native Vegetation Act 2003 and the Threatened Species Conservation Act 1995. The terms of the CPVP will not be affected by any changes to local or state planning rules or new listings of threatened species. A CPVP can be varied at the landholder's request, provided the variation will still improve or maintain environmental outcomes.

The CPVP will include management actions associated with the offset area that will apply in perpetuity. The management actions address requirements from the Project Approval and are detailed in Section 6.2.

As a leaseholder of the Offset Site, for the duration of the project, the Proponent will ensure the land holders have sufficient resources and information to implement the management actions, as this forms a condition of the solar farm's consent.

The ability to use a CPVP as the offset security mechanism was confirmed by OEH, LLS and DPE in a meeting with the Proponent on 2 November, 2016.

### 6.1.3 Implementation of the CPVP for the Manildra Offset Site

The Central tablelands LLS (CTLLS) will set up and administer the CPVP. To commence this process, the CTLLS have requested the following information (email: 2 November, 2016, Tiffany Bracey LLS):

Table 6-1 LLS information request and status of information

Information request	Status
Offset site/area (lot/DP) for the Conservation PVP to be confirmed by the consultant/proponent.	The final offset boundary has been determined to meet the credit requirement. It totals 40.96 ha. Lot/DP numbers have been provided to LLS on 7 October 2016.
Conservation PVP – Offset Site to be approved in writing by OEH and advice provided to CTLLS.	Obtained 22 December, included as Appendix F.
Proponent to clearly provide the management actions and conditions for the Conservation PVP that are in line with the approved biodiversity Offset Strategy as well as the Environmental Safeguards as outlined in the approved Environmental Assessment.	Section 6.2 of this document.
Proponent or consultant to provide the shape files for the Conservation PVP site.	Shape files have been provided to the CTLLS, December 2016
Is there a Financial Planning Approval document linked to the project? Financial considerations need to be included in the Conservation PVP. Manildra Solar Farm Pty Ltd to provide lease agreement details to align with PVP and to ensure robust environmental outcome/management actions.	As the CPVP would be attached to the land title, the land owners are ultimately responsible for funding the management actions required at the Offset Site and monitoring the effectiveness of their implementation. As a leaseholder of the Offset Site, for the duration of the project, the Proponent has ensured the land owners have sufficient resources and information to implement the management actions, as this forms a condition of the solar farm's consent.  Appendix E.
Land owner needs to put in a PVP application to the CTLLS.	The landowner has been consulted regarding the CPVP, management actions and financial arrangement. The landowner would sign the CPVP.
Landowner to make themselves available for the PVP site visit, negotiations and approval.	The landowner would facilitate site access, with appropriate notice.
Clarification of who will be signing the PVP? Is it just the landowner or will the proponent also be signing the PVP. Manildra Solar Farm Pty Ltd to provide details of who will sign the documentation.	The landowner would sign the CPVP. As a lease holder of the Offset Site, Manildra Solar Farm Pty Ltd would be a cosignatory of the CPVP.



## 6.2 MANAGEMENT MEASURES

### 6.2.1 Management actions

#### Overall objective

The overall objective of the management actions is to improve the biodiversity value of the Offset Site. Specific actions will address threats and actions to improve existing values.

Specific management requirements for the Offset Site, identified within the Project Approval and Offset Strategy, are as follows:

- Fencing and signage to ensure the site is protected from inadvertent impacts of nearby agricultural activities.
- A highly controlled light grazing regime (using biomass indicators to ensure adequate ground cover is maintained in all seasons) may be appropriate, if it can enhance native species diversity.
- Controlled burning may be appropriate as a strategy to enhance native seed germination.
- Weed control and monitoring.
- Feral animal control and monitoring.
- Replanting native trees to enhance landscape connectivity in specific areas. These would preferentially be the derived native grassland areas where the likelihood of natural regeneration seems low.<sup>4</sup>

Additionally, LLS required specific measures including:

- Nest boxes installation, to offset hollows to be removed on the development site.
- Fire management (optional).
- Exclusion of apiaries within the offset site.
- Revegetation to include mid storey species.

These measures have been developed in consultation with the LLS to ensure the CPVP for the site and the Offset Plan are in alignment with regard to carrying out management actions. The Offset Plan contains additional detail in some cases.

For each action, clear targets and protocols are set out below, including allowance for actions to be adapted if required to meet the intent of the management action. A field map template is provided of the Offset Site (Appendix G) to assist in documenting management actions.

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<sup>4</sup> Additional information regarding the site's potential for natural regeneration is provided in Appendix H.  
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Management action table

Management issue	Objective	Management action details	Location	Timing of management action
1. Fencing	Restrict all impacts from adjacent agricultural activities	<ul style="list-style-type: none"> <li>• Ensure that all external gates have adequate locks.</li> <li>• Install signage at each external gate access point (within 12 months of commencement of the PVP).</li> <li>• Signs are to notify that the area is a conservation area.</li> <li>• A contact number for emergencies and further information should be provided.</li> <li>• Fencing should fully exclude stock and also illegal access for dumping of rubbish or collection of firewood.</li> <li>• Install stock exclusion fencing around the perimeter of the Offset Site. Minimum construction standards for fencing include: <ul style="list-style-type: none"> <li>○ a 7 wire fence line, comprising the following: <ul style="list-style-type: none"> <li>○ 1.57mm HT top barbed wire;</li> <li>○ lines 2.5mm HT wire;</li> <li>○ 5 metre steel picket spacing's (165cm);</li> <li>○ 5 strainers per kilometre;</li> <li>○ One stay per strainer</li> </ul> </li> </ul> </li> <li>• Carry out regular inspections of fencing and maintenance as required.</li> </ul>	Fence perimeter of Offset Site. Locks on external access points.	Within 2 years of commencement of CVPV (unless specifically stated).

Management issue	Objective	Management action details	Location	Timing of management action
2. Retain resources that currently occur		<ul style="list-style-type: none"> <li>• The clearing of native vegetation, whether remnant or regrowth, is not permitted.</li> <li>• The landholder is to retain regrowth and/or natural regeneration of native plant species.</li> <li>• No planting or spreading of non-native vegetation and farming practices that use mechanical cultivation at any time.</li> <li>• No collection of timber, rocks or removal of native vegetation is allowed within the fenced Offset Site.</li> <li>• No use of the site for recreational activities that involve the use of motorised vehicles, horse riding and exercising of domestic pets.</li> <li>• No apiaries are allowed to be installed within the Offset Site.</li> <li>• No dumping of garbage or fire wood collection.</li> </ul>	Whole of Offset Site	Ongoing from commencement date
3. Habitat creation	Offset the hollows removed by the development site, on the offset site for the term of the Manildra Solar Farm Project	<ul style="list-style-type: none"> <li>• Install nine nest boxes on the offset site suitable for Superb Parrot.</li> <li>• LLS will provide guidance to the landowner on the type, size and mounting options to install the hollows.</li> <li>• Monitor nest boxes to ensure they remain secure. If infested by bees, eradicate infestation.</li> </ul>	On existing trees within the Offset Site or mounted on timber poles at height.	Install within 2 years of commencement of CVPV. Monitor annually.

Management issue	Objective	Management action details	Location	Timing of management action
4. Highly managed grazing	Strategic grazing to enhance biodiversity	<ul style="list-style-type: none"> <li>• Grazing is prohibited at flowering and seed set for native grasses.</li> <li>• Stock grazing would not occur in any areas with less than 85% ground cover.</li> <li>• Regenerating trees and plantings (both trees and groundcover) must be protected from stock. Tree guards in areas to be grazed must be sheep and cattle proof, such as:               <ul style="list-style-type: none"> <li>○ 3-4 metal stakes</li> <li>○ Sheep yard mesh</li> </ul> </li> <li>• (These can be reused once plants are tall enough to withstand grazing).</li> </ul>	Whole of Offset Site	Ongoing from commencement date

Management issue	Objective	Management action details	Location	Timing of management action
5. Weed control	Minimise the occurrence of weeds within the site, particularly Weeds of National Significance (WoNS) and listed noxious weeds.	<ul style="list-style-type: none"> <li>Conduct a survey to determine the location and extent of WoNS and noxious weeds within the Offset Site. Baseline weed mapping is to be performed by personnel trained and experienced in weed identification.</li> <li>Map the locations and density of weed infestations (mark up a site map (Appendix G) to document this) separately identifying listed noxious weed species. The following are known to occur either on the development or Offset Site: <ul style="list-style-type: none"> <li>African boxthorn *<i>Lycium ferocissimum</i></li> <li>Bathurst burr *<i>Xanthium spinosum</i></li> <li>Scotch thistle *<i>Onopordum acanthium</i></li> </ul> </li> <li>Targeted weed control would be carried out in accordance with Carbone Council guidelines (<a href="http://www.cabonne.nsw.gov.au/environment/noxious-weeds">http://www.cabonne.nsw.gov.au/environment/noxious-weeds</a>).</li> <li>Weed control activities will be undertaken by personnel suitably experienced in weed identification and treatment.</li> <li>Weed control activities would be informed by weed mapping and annual monitoring.</li> <li>Reporting of annual weed control works to be prepared annually. Reporting is to include: <ul style="list-style-type: none"> <li>Areas worked</li> <li>Timing of works</li> <li>Weeds targeted</li> <li>Techniques and equipment used</li> <li>Issues encountered</li> <li>Recommendations for ongoing weed control.</li> </ul> </li> </ul>	Whole of Offset Site	<p>Complete weed mapping at commencement.</p> <p>Update annually.</p> <p>Target weed species in accordance with Carbone Council guidelines</p>

Management issue	Objective	Management action details	Location	Timing of management action
		<ul style="list-style-type: none"> <li>○ Updated mapping (can be hardcopy mark ups) of key infestations treated</li> </ul>		
6. Weed hygiene	Manage weeds effectively	<ul style="list-style-type: none"> <li>• Prevent the movement of weed material from weed infested areas into the offset area.</li> <li>• Ensure that all vehicles and equipment entering the Offset Site are clean and free of weed seed prior to entry.</li> <li>• Treat noxious infestations.</li> </ul>	At each external access point	At all times.
7. Feral animal control	Control feral animal abundance	<ul style="list-style-type: none"> <li>• Monitor site for rabbit scat and warrens.</li> <li>• If present, contact the local Livestock Health and Pest Authority (LHPA) for advice regarding best management practices.</li> </ul>	Whole of Offset Site	Annually

Management issue	Objective	Management action details	Location	Timing of management action
8. Revegetation	Establish and maintain the site within benchmark values for the community.	<ul style="list-style-type: none"> <li>• The native species composition and density is to be established and maintained within benchmark for the vegetation type (refer Table 6-3 below, specifically, 23 native plant species; 8-35% overstorey cover; 1-20% midstorey cover, groundcover grasses; 15-70%).</li> <li>• Planting of trees and shrubs would be undertaken to increase the tree and shrub density in a mosaic pattern, targeting derived grassland areas where the likelihood of natural regeneration seems low.</li> <li>• In areas targeted for supplementary planting, 20 trees per hectare is a guide.</li> <li>• Planting would comprise tree and shrub species present within the surrounding Box-Gum Woodland. Suggested species include: <ul style="list-style-type: none"> <li>○ <i>Brachychiton populneus</i></li> <li>○ <i>Eucalyptus albens</i></li> <li>○ <i>Eucalyptus blakelyi</i></li> <li>○ <i>Eucalyptus melliodora</i></li> <li>○ <i>Eucalyptus microcarpa</i></li> <li>○ <i>Astroloma humifusum</i></li> <li>○ <i>Enchylaena tomentosa</i></li> <li>○ <i>Eremophila debilis</i></li> </ul> </li> <li>• Plants used for planting must be obtained from locally collected provenances. Tubestock would be planted with water crystals and provided with stock protection guards (see note on sheep and cattle guards below).</li> <li>• Revegetation should aim to maintain around 75% survival rate of supplementary planted revegetation, with reference to the overall objective: to establish and maintain the site within benchmark (Table 6-3).</li> </ul>	Whole of Offset Site	Planting to commence within 2 years of PVP commencement. Supplementary planting to occur annually in response to monitoring. Overall benchmark objective to be met in the long-term, but evidence that actions are moving the site in this direction will be required.

Management issue	Objective	Management action details	Location	Timing of management action
<p>9. Controlled burning (optional)</p>	<p>The application of fire may stimulate shrub regeneration if a shrub seed bank persists in the soil.</p>	<ul style="list-style-type: none"> <li>• A Fire Management Strategy (FMS) would be developed in conjunction with an ecologist, bushfire planners and the Rural Fire Service. The FMS would include:               <ul style="list-style-type: none"> <li>○ Mapping of fence lines and gates</li> <li>○ Mapping of trails including trail categories relating to appropriate vehicle type</li> <li>○ Mapping of water points</li> <li>○ Mapping of management zones, biodiversity values, their recommended fire frequencies, season and intensity and controlled burning objectives (burn season will depend on the objectives, whether it be fuel/biomass burn or an ecological burn).</li> </ul> </li> <li>• The Strategy will include management measures which facilitate the exclusion of fire from regeneration and revegetation areas to allow young plants to mature to a stage where they are able to withstand bushfire and regenerate (resprout or seed) naturally following such an event.</li> <li>• Bushfire management controls will consider any locations that should be protected from burning.</li> </ul>	<p>To be determined by the FMS</p>	<p>To be determined by the FMS</p>



## 6.3 MONITORING AND REPORTING

In accordance with the Approval, the monitoring requirements include a post construction review to confirm the extent of clearing was commensurate with and not greater than that predicted. If clearing is greater, the Proponent would need to increase the Offset Site size or secure additional land to the value of the actual biodiversity loss.

The management actions will be reviewed at intervals no less than 4 years and no more than 6 years by a suitably qualified person. To allow for adaptive management, minor alterations can be made prior to the 4 year period (e.g. recording additional weed or pest outbreaks and controls).

For the duration of the project (up to 50 years), the success of the management actions would be audited and reported as part of the annual environmental report for the project.

At the decommissioning stage of the solar farm, the management responsibilities will fall to the land owner. It is anticipated at this stage, the key management actions will have been adapted to ensure that they are meeting their objectives and continuation of the management actions are not considered likely to require further auditing.

Table 6-2 Monitoring and reporting schedule

Monitoring and reporting event	Timing	Responsibility
<p>Verify the extent of development site impacts and assess whether the area exceeds the areas used in this Offset Plan (Section 4).</p> <p>If the area of native vegetation exceeds Section 4 assumptions, the Proponent would increase the Offset Site size or secure additional land to the value of the actual biodiversity loss, in consultation with OEH and LLS.</p> <p>Report findings to DPE, to fulfil Project Approval conditions.</p>	Completion of the construction	Proponent / operator
<p>Monitor site condition against biometric benchmarks and base line data (included in this report, Section 5 and restated below).</p> <p>Report on management actions conducted and their effectiveness. Recommend if changes are required to monitoring or management actions to better meet objectives for the next year.</p> <p>Actions may be required if the offset site is not within benchmarks for Blakely's Red Gum - Yellow Box grassy tall woodland of the NSW South Western Slopes Bioregion (LA120).</p>	Annually, for life of solar farm development (or not less than 25 years), as part of the project's Annual Environmental Report.	Proponent / operator
<p>Record management actions undertaken and their effectiveness. Recommend if changes are required to monitoring or management actions to better meet objectives for the next year.</p>	Annually.	Landowner
<p>Management plan review – for effectiveness and the need for adaptation</p>	Every 4 years	Proponent / operator for life of project and then the landowner

Table 6-3 Benchmark data (OEH Oct 2008) for Blakely's Red Gum - Yellow Box grassy tall woodland of the NSW South Western Slopes Bioregion (LA120)

Veg Type ID	Native plant species richness		Native over-storey cover		Native mid-storey cover		Native ground cover (grasses)		Native ground cover (shrubs)		Native ground cover (other)		Number of trees with hollows	Total length of fallen logs	Hollows & logs Source
	Richness	Source	Lower	Upper	Lower	Upper	Lower	Upper	Lower	Upper	Lower	Upper			
LA 120	23	E	8	35	1	20	15	70	3	5	3	20	0.8	66	E

## 7 CONCLUSION

This Offset Plan addresses Condition E.3 of the Project Approval, identifying prior to operation, appropriate offsets that will be securely managed in perpetuity.

In accordance with the Approval, the monitoring requirements include a post construction review to confirm the extent of clearing was commensurate with and not greater than that predicted. If clearing is greater, the Proponent would need to increase the Offset Site size or secure additional land to the value of the actual biodiversity loss.

In accordance with the Submissions Report (NGH Environmental 2010b) and Biodiversity Assessment (NGH Environmental 2010a), which form part of the Approval, this plan has been:

- Developed in consultation with the landowner.
- Includes in perpetuity security.

Consultation with agencies has been undertaken to verify:

- The CPVP mechanism is allowable to secure the offset
- The Offset Site is suitable to meet the offset requirements generated by the development site
- The management actions and funding arrangement are suitable to the management objectives of the Offset Site

LLS are now preparing a CPVP to administer the Offset Site in perpetuity.

# APPENDIX A BIOBANKING CREDIT REPORT – DEVELOPMENT SITE

# Biodiversity credit report



This report identifies the number and type of biodiversity credits required for a major project.

Date of report: 4/11/2016

Time: 4:51:11PM

Calculator version: v4.0

## Major Project details

**Proposal ID:** 0035/2015/2353MP  
**Proposal name:** Manildra solar farm OP  
**Proposal address:** 1 1 NSW 2865

**Proponent name:** infigen energy  
**Proponent address:** 56 Pitt St sydney NSW 2000  
**Proponent phone:** 1

**Assessor name:** Brooke Marshall  
**Assessor address:** 1/216 Carp St Bega NSW 2250  
**Assessor phone:** 64928333  
**Assessor accreditation:** 0035

## Summary of ecosystem credits required

Plant Community type	Area (ha)	Credits created
Blakely's Red Gum - Yellow Box grassy tall woodland of the NSW South Western Slopes Bioregion	6.33	79.12
<b>Total</b>	6.33	79

## Credit profiles

### 1. Blakely's Red Gum - Yellow Box grassy tall woodland of the NSW South Western Slopes Bioregion, (LA120)

Number of ecosystem credits created	79
IBRA sub-region	Upper Slopes - Lachlan

Offset options - Plant Community types	Offset options - IBRA sub-regions
<p>Blakely's Red Gum - Yellow Box grassy tall woodland of the NSW South Western Slopes Bioregion, (LA120)</p> <p>White Box grassy woodland in the upper slopes sub-region of the NSW South Western Slopes Bioregion, (LA219)</p> <p>Fuzzy Box Woodland on alluvial brown loam soils mainly in the NSW South Western Slopes Bioregion, (LA145)</p> <p>Red Box - White Box +/- Red Stringybark hill woodland in the NSW South Western Slopes Bioregion, (LA252)</p>	<p>Upper Slopes - Lachlan</p> <p>and any IBRA subregion that adjoins the IBRA subregion in which the development occurs</p>

## **APPENDIX B BIOBANKING CREDIT REPORT – ORIGINAL OFFSET SITE**

This report identifies the number and type of credits required at a BIOBANK SITE

Date of report: 25/10/2016

Time: 1:36:33PM

Calculator version: v4.0

## Biobank details

**Proposal ID:** 0035/2016/4011B  
**Proposal name:** Manildra offset  
**Proposal address:** 1 1  
  
**Proponent name:** infigen  
**Proponent address:** 1 1  
**Proponent phone:** 1  
  
**Assessor name:** Brooke Marshall  
**Assessor address:** 1/216 Carp St Bega NSW 2250  
**Assessor phone:** 64928333  
**Assessor accreditation:** 0035

### Additional information required for approval:

- Use of local benchmark
- Expert report...
- Request for additional gain in site value



## Ecosystem credits summary

Plant Community type	Area (ha)	Credits created
Blakely's Red Gum - Yellow Box grassy tall woodland of the NSW South Western Slopes Bioregion	40.96	293.00
<b>Total</b>	40.96	293

## Credit profiles

### 1. Blakely's Red Gum - Yellow Box grassy tall woodland of the NSW South Western Slopes Bioregion, (LA120)

Number of ecosystem credits created

293

IBRA sub-region

Upper Slopes - Lachlan

## Species credits summary

### Additional management actions

Additional management actions are required for:

<b>Vegetation type or threatened species</b>	<b>Management action details</b>
Blakely's Red Gum - Yellow Box grassy tall woodland of the NSW South Western Slopes Bioregion	Exclude commercial apiaries
Blakely's Red Gum - Yellow Box grassy tall woodland of the NSW South Western Slopes Bioregion	Exclude miscellaneous feral species
Blakely's Red Gum - Yellow Box grassy tall woodland of the NSW South Western Slopes Bioregion	Feral and/or over-abundant native herbivore control
Blakely's Red Gum - Yellow Box grassy tall woodland of the NSW South Western Slopes Bioregion	Fox control
Blakely's Red Gum - Yellow Box grassy tall woodland of the NSW South Western Slopes Bioregion	Slashing

## **APPENDIX C BIOBANKING CREDIT REPORT – REVISED OFFSET SITE**

This report identifies the number and type of credits required at a BIOBANK SITE

Date of report: 13/12/2016

Time: 1:53:48PM

Calculator version: v4.0

## Biobank details

**Proposal ID:** 0035/2016/4011B  
**Proposal name:** Manildra offset  
**Proposal address:** 1 1 NSW 2865  
  
**Proponent name:** infigen  
**Proponent address:** 1 1 NSW 2000  
**Proponent phone:** 1  
  
**Assessor name:** Brooke Marshall  
**Assessor address:** 1/216 Carp St Bega NSW 2250  
**Assessor phone:** 64928333  
**Assessor accreditation:** 0035

### Additional information required for approval:

- Use of local benchmark
- Expert report...
- Request for additional gain in site value

## Ecosystem credits summary

<b>Plant Community type</b>	<b>Area (ha)</b>	<b>Credits created</b>
Blakely's Red Gum - Yellow Box grassy tall woodland of the NSW South Western Slopes Bioregion	29.52	89.00
<b>Total</b>	29.52	89

## Credit profiles

**Species credits summary**

**Additional management actions**

## **APPENDIX D SPECIES LISTS FROM PLOT DATA**

Manildra Solar Farm October 2016																							
	Sample Site	DBGW1		DBGW2		DBGW3		DG1		DG2		DG3		OBGW1		OG1		OG2		OG3		OG4	
Scientific Name	Common Name	No.	Cover	No.	Cover	No.	Cover	No.	Cover	No.	Cover	No.	Cover	No.	Cover	No.	Cover	No.	Cover	No.	Cover	No.	Cover
<b>CLASS FILICOPSIDA</b>																							
<b>Aspleniaceae</b>																							
<i>Pleurosorus rutifolius</i>	Bristly Cloak Fern													1									
<b>CLASS MAGNOLIOPSIDA</b>																							
<b>SUBCLASS MAGNOLIIDAE</b>																							
<b>Apiaceae</b>																							
<i>Hydrocotyle laxiflora</i>	Stinking Pennywort													1									
<b>Asteraceae</b>																							
<i>*Arctotheca calendula</i>	Capeweed				10									2		2							
<i>Calotis lappulacea</i>	Yellow Burr-daisy								3		5			3		5				2		5	
<i>*Carduus pycnocephalus</i>	Slender Thistle													10									
<i>*Carthamus lanatus</i>	Saffron Thistle			10					250	10	90	5				10						200	5
<i>*Centaurea calcitrapa</i>	Star Thistle			1		10			50	1	50	5		40	2	90	3	40		100	1	30	1
<i>*Chondrilla juncea</i>	Skeleton Weed																					200	2
<i>Cotula australis</i>	Carrot Weed							10						500	2								
<i>*Cirsium vulgare</i>	Spear Thistle	1				3								2				1					
<i>*Conyza sp.</i>						1																	
<i>Cymbonotus lawsonianus</i>	Bears-ear			2																			
<i>Euchiton sphaericus</i>																4							
<i>*Hypochoeris glabra</i>	Smooth Catsear								10							500	30			300	10	5000	20
<i>*Hypochoeris radicata</i>	Catsear			10		20		1		50	1	20		500	5	200	5			150	5	200	1
<i>*Lactuca serriola</i>	Prickly Lettuce					10																	
<i>*Silybum marianum</i>	Variegated Thistle	10	1	20		3								5	1			2					
<i>*Sonchus oleraceus</i>	Common Sowthistle	30		5		5						3		5		2							
<i>Stuartina muelleri</i>	Spoon Cudweed					15		300	2	300	2	70	1			400	5						
<i>Triptilodiscus pygmaeus</i>	Common Sunray			50																			
<i>Vittadinia sp.</i>												2										1	
<b>Boraginaceae</b>																							
<i>*Echium plantagineum</i>	Paterson's Curse	150	10	20																			
<b>Brassicaceae</b>																							
<i>*Brassica sp.</i>																	5						
<i>*Capsella bursa-pastoris</i>	Shepherd's Purse	1		2		500	15	50		30		150	5	200	3	10		300	10				
<i>*Lepidium africanum</i>				1																			
<i>*Sisymbrium orientale</i>	Indian Hedge Mustard	50	1	15		15						1											
<b>Campanulaceae</b>																							
<i>Wahlenbergia luteola</i>				30		5				10		5											
<b>Caryophyllaceae</b>																							
<i>*Cerastium glomeratum</i>	Mouse-ear Chickweed					5		500	2	80		100	2	80		90	1	15		30		500	5
<i>*Petrorhagia nanteuilii</i>																				1		1000	1
<i>*Polycarpon tetraphyllum</i>	Four-leaved Allseed											50											
<i>*Sagina apetala</i>	Annual Pearlwort							20		50		200	1										
<i>*Stellaria media</i>	Common Chickweed							20															
<b>Chenopodiaceae</b>																							
<i>Maireana microphylla</i>	Small-leaf Bluebush															2							
<b>Convolvulaceae</b>																							









## APPENDIX E

### FINANCIAL ARRANGEMENTS TO MANAGE THE OFFSET SITE

Below is the extract out of the executed lease agreement between the project company and the landowner of the offset site. Note, the lease is a confidential document and cannot be provided in full.

The Grantor authorises the Grantee or its solicitors to complete the Lease to include:

- the details of the Lessee;
- the Commencement Date;
- any details required in order to put the Lease in registrable form as determined by the LPI including;

a plan showing the proposed boundaries of the Solar Farm in Schedule 1 to the Lease, provided that such boundaries are substantially similar to the boundaries shown on the Indicative Plan. If there are material differences on that plan to the boundaries shown on the Indicative Plan (Updated Indicative plan), the Grantee must obtain the Grantor's prior written consent to include the Updated Indicative Plan in Schedule 1 to the Lease, with such consent not to be unreasonably withheld.

The Grantor must notify the Grantee within 10 Business Days of the Grantee's request for consent whether it gives or withholds its consent, failing which the Grantor is deemed to give its consent; and

an amount for the PVP Maintenance Payment in clause 5(a) of Exhibit 1 to the Cotton Lease, the relevant extract of which is provided below;

#### 5. PVP Maintenance Payment

- (a) In the event that the Tenant proceeds to exercise its rights under clause 21 of the Lease to prepare and register a PVP against the Leased Area, the Tenant must pay to the Landlord or to such other party as the Landlord directs in writing, an annual maintenance payment of \$10,000 ("PVP Maintenance Payment").

Page 4 of 7

- (b) The PVP Maintenance Payment will be payable within 15 Business days after the end of the immediately preceding Instalment Period for the Term of the Lease, commencing on the date of registration of the first PVP against the Leased Area ("**Registration Date**").

- (c) If an Instalment Period starts within the Term and ends after expiry or sooner determination of the Lease, the Tenant must pay a final instalment of PVP Maintenance Payment to the Landlord within 15 Business Days after the end of that period.

- (d) The PVP Maintenance Payment will be adjusted on each anniversary of the Registration Date to an amount represented by A in the formula:

$$A = B \times \frac{C}{D}$$

where

"B" is the PVP Maintenance Payment for the year immediately preceding the relevant anniversary of the Registration Date;

"C" is the Index Number for the calendar quarter ending immediately prior to the relevant anniversary of the Registration Date; and

"D" is the Index Number for the calendar quarter ending immediately prior to the immediately preceding anniversary of the Registration Date or if none, then preceding the Registration Date.

## APPENDIX F CORRESPONDENCE



Our Ref. DOC16/599321

Your Ref.

Manildra Solar Farm Pty Ltd  
Level 22, 56 Pitt Street  
SYDNEY NSW 2000

Dear Sir

### **Manildra Solar Farm Biodiversity Offsets**

The Office of Environment Heritage (OEH) has reviewed the BioBanking calculations for both the development and proposed offset sites for the Manildra Solar Farm and the draft Offset Management Plan.

OEH understands that Manildra Solar Pty Ltd intends to include the entire western paddock, Figure 4-1 in the Offset Management Plan, as the offset site. OEH is satisfied that this area meets the credit requirements of the project. As previously advised in our letter to ngh environmental dated 11 December 2015, as the Manildra Solar Farm was approved prior to 1 October 2014 a Property Vegetation Plan (PVP) registered on title under the Native Vegetation Act is an allowable mechanism for securing this offset.

As the Offset Management Plan (OMP) has yet to be completed OEH is not able to formally endorse it. The management actions within the OMP will need to be developed to the satisfaction of the Local Land Services prior to the plan being submitted to OEH.

Should you require further information regarding issues that are the responsibility of the OEH please contact David Geering on 02 6883 5335 or [david.geering@environment.nsw.gov.au](mailto:david.geering@environment.nsw.gov.au).

Yours sincerely

**STEVEN COX**  
**Senior Team Leader Planning, North West Region**  
**Regional Operations**

25 November 2016



Our Ref. DOC16/645412

Your Ref.

Ms Brooke Marshall  
ngh environmental  
PO Box 470  
BEGA NSW 2550

Dear Brooke

### **Manildra Solar Farm Biodiversity Offsets**

In response to your request of 19 December 2016 to reduce the size of the proposed offset for the Manildra Solar Farm the Office of Environment Heritage (OEH) has reviewed the BioBanking calculations for both the development and proposed offset sites for the Manildra Solar Farm and the draft Offset Plan (OP).

OEH understands that Manildra Solar Pty Ltd now intends to reduce the offset area from 40.96 hectares, the entire western paddock, to 29.52 hectares, the area depicted in Figure 5-1 in the December 2016 version of the Offset Plan. OEH is satisfied that this area meets the credit requirements of the project.

As the Offset Plan has yet to be completed OEH is not able to formally endorse it. The management actions within the OP will need to be developed to the satisfaction of the Local Land Services prior to the plan being resubmitted to OEH.

Should you require further information regarding issues that are the responsibility of the OEH please contact David Geering on 02 6883 5335 or [david.geering@environment.nsw.gov.au](mailto:david.geering@environment.nsw.gov.au).

Yours sincerely

**STEVEN COX**  
**Senior Team Leader Planning, North West Region**  
**Regional Operations**

22 December 2016


## APPENDIX G FIELD MAP TEMPLATE





## FIELD MAP TEMPLATE

### Manildra Solar Farm

 Revised offset site

0 25 50 100 Metres

A4 @ 1:4100  
Ref: 6274\_010915  
Author: JB





Notes:  
- Data digitised by NGH Environmental (2016)  
- Base map Copyright © Esri and its data suppliers.

[www.nghenvironmental.com.au](http://www.nghenvironmental.com.au)

## **APPENDIX H ADDITIONAL INFORMATION: REGENERATION POTENTIAL**



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PO Box 300, Orange, NSW 2800  
Telephone/Fax: 02 6369 0252  
Mobile: 0428 263 274  
E-mail: colbower@bigpond.net.au  
ABN: 43 060 913 622

17 November 2016

Brooke Marshall  
NGH Environmental  
PO Box 470  
BEGA NSW 2550

Dear Brooke,

### **Manildra Solar Farm Offset Area**

Thank you for your enquiry regarding the potential for natural regeneration on the offset area for the Manildra Solar Farm.

FloraSearch conducted five BioBanking quadrats as per the Framework for Biodiversity Assessment (FBA) (OEH, 2014) on 10 October 2016. One was in a remnant patch of White Box trees on a hilltop and the other four were scattered through areas of derived grassland (Figure 1). Two factors acted to mask the expression of native grasses in the survey results.

1. The timing of the survey coincided with the annual spring flush of introduced grasses and forbs which germinate in autumn and grow through winter reaching their peak biomass and coverage in spring to early summer when they flower and seed before dying back. By contrast, native grasses tend to be dormant in winter, commence growth in spring and reach their peak biomass and coverage in summer to autumn. For accurate identification it is necessary to observe flowering plants. Accordingly, surveys in spring are likely to underestimate the diversity of native grasses.

On the other hand, with a few exceptions, native and introduced forbs tend to have similar life cycles with both growing through winter and flowering in spring.

2. Livestock grazing may also affect the results of spring surveys. Grazing in autumn and winter reduces the biomass of native grasses, with the tussocks of perennial species often chewed to ground level by sheep. Heavily grazed native grasses may be difficult to detect in spring surveys.

In view of the above, it is likely the diversity and coverage of native grasses would be greater in a summer or autumn survey than shown by the spring survey, especially if grazing is reduced. However, the same is unlikely to be true for native forbs for which most species would be detectable in spring. The main ones still present on the site would have been revealed by the current survey.

### **The Current Situation**

As would be expected, the five quadrats reveal variation in the diversity and coverage of both native and introduced species across the site (Table 1). The data show a relatively low diversity of native grasses and higher numbers of native forbs which vary greatly in incidence between plots. However, as shown by the FBA cover data, the abundance of native grasses and forbs was low relative to the exotics. Owing to the long history of agriculture and grazing, native shrubs are absent and there is no regeneration of the native trees.

Table 1. Numbers of native and introduced ground cover species on five 20 × 20 m quadrats.

Quadrat no.	Description	Grasses		Forbs	
		Native	Introduced	Native	Introduced
OBGW1	Box-Gum Woodland remnant	3	5	11	17
OG1	Grassland	1	4	7	14
OG2	Grassland	1	5	2	12
OG3	Grassland	4	5	3	9
OG4	Grassland	3	4	7	14

### Prospects for Improvement

Without management and given normal seasons, it is considered unlikely that the offset area would show significant natural regeneration. It seems most likely that exotic species would continue to dominate in winter and spring suppressing native herbs. Native shrubs are unlikely to reappear, although some native Acacias and Pea Flowers may persist in the soil seed bank. These may potentially germinate in response to fire. Currently, tree regeneration is being suppressed by livestock grazing.

Despite the low native ground cover diversity and abundance, it is considered that, with appropriate management, the condition of the native vegetation on the site would improve over time. It is expected that there are more native grass species present than revealed by the survey for the reasons outlined above. In this regard, it is worth noting that the landholder, who has a keen interest in native grasses, being a prominent member of the Grasslands Society, reported that parts of the offset area support a large population of Red Grass, *Bothriochloa macra*. This species was not sighted during the survey, despite looking for it, owing to prior heavy grazing and the survey timing.

The most important element of a recovery strategy for the offset area would be grazing management. Grazing should be low when native grasses are growing and seeding in summer and autumn. Heavier grazing should be applied when exotic grasses and forbs are beginning to flower, in order to minimise seeding as far as possible, without damaging the native grasses too much. Strategic grazing would also assist in allowing tree regeneration to occur by minimising the removal of seedlings by livestock. The application of fire may stimulate shrub regeneration if a shrub seed bank persists in the soil. In addition, drought years have the potential to swing the balance away from the exotics to the better adapted natives.

Signed:



Principal Consultant Botanist





Figure 1. Location of FBA quadrat sample site within the Manildra Solar Farm offset area.