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# DARLINGTON POINT

Review of FBA Assessment

## FINAL

**November 2018**

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Review of FBA Assessment

## FINAL

Prepared by
Umwelt (Australia) Pty Limited
on behalf of
Department of Planning and Environment

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# 1.0 Background

## 1.1 The Site and Project

Edify Energy has submitted an application for a large scale solar farm at Darlington Point in the Murrumbidgee LGA, in southern NSW. The project would accommodate up to 200 MW (AC) of solar generated electricity, including the provision of 100 MW (AC), for battery technology for energy storage and resupply during peak demand. The project Environmental Impact Statement (EIS) has been publicly exhibited, and Edify energy has prepared a Response to Submissions (RTS). Both the EIS and the RTS were supported by a comprehensive Biodiversity Assessment Report (BAR) prepared by Environmental Property Service (EPS) in accordance with the Biodiversity Offset Policy for Major Projects and the Framework for Biodiversity Assessment (FBA) methodology.

The current proposal (as modified by changes presented in the RTS documentation) would see 709.29 ha of land affected by the project both directly and indirectly (EPS, Table 7-1 pp. 110-111). Of this, 197.25 ha of affected land would occur under solar panel arrays, while 394.73 ha of affected land occurs between panel rows. The majority of the vegetation in these two areas corresponds with Plant Community Type (PCT) 45 Plains Grass Grassland, and impacts on this PCT form the primary subject of this review report.

Due to the complexities surrounding the prediction of impacts on native grassland under and between solar panel arrays, Edify engaged Charles Sturt University to prepare a report that was intended to be relied upon by EPS as an "Expert Report" (within the meaning of the FBA methodology) to calculate predicted biodiversity loss through the FBA/BioBanking calculator. This formed part of the exhibited EIS documentation. Following review and comment by OEH, however, the utilisation of the CSU report in that capacity has been diminished, as it has not been accepted as an Expert Report by OEH, although it does still provide a useful context in relation to the predicted grassland productivity of the site post-development.

## 1.2 Brief

The engagement by the Department of Environment and Energy (DPE) specified that the peer review would be limited to a review of the BAR prepared by EPS, dated 8 August 2018 and included as Appendix E to the Response to Submissions Report prepared by Arup (dated 9 August 2018) on behalf of Edify Energy. The review would have a particular focus on the application of the FBA methodology to identification of the offsetting requirements for residual impacts.

The brief requires:

- a review of the BAR (EPS August 2018) in accordance with the FBA
- a review of determination of residual impacts and offsetting requirements for the PCT 45 Plains Grass Grassland and habitat loss for ecosystem credit species and
- provision of advice on what the proponent needs to do to reasonably comply with the FBA, or otherwise, to identify impacts and offset requirements. This could include identifying steps that the proponent could undertake, as well as assessment options that could be considered to assist in achieving an ecologically suitable outcome.

# 2.0 Steps Undertaken for the Review

## 2.1 Key Steps and Consultation

To fulfil the brief the following steps were undertaken:

- A review of the available and most recent materials, including Darlington Point Solar Secretary's Environmental Assessment Requirements; EIS comments from OEH dated 15 June 2018; Biodiversity Development Assessment Report (BDAR) Version 05 (revised final report) and Version 07 (revised final report); report by Charles Sturt University "Effects of Solar Voltaic Farm Installation and Operation on Riverine Plain Grasslands" dated 11 April 2018; and email from OEH to DPE dated 25 September 2018 and titled "Darlington Point Solar Farm – revised BAR comments and credit requirements".

- Consultation with DPE, OEH and EPS staff (see below).

- Review of screenshots of the FBA/BioBanking calculator assessment, prepared by EPS, as well as (in final hours before draft report submission) access to the FBA/BioBanking calculator.

- Historic aerial photos were provided in the final hours prior to the submission of this draft report and were not able to be adequately scrutinised – see **Section 2.1** below.

- Analysis of biometric credit assessments, PCT allocation, threatened ecological community (TEC) allocation and assessment.

- Particular consideration of the potential and reasonably likely effects of the installation and operation of the solar farm on the vegetation and biodiversity likely to be retained (not wholly cleared/affected), especially PCT 45 Plains Grass Grassland.

In relation to key communications and meetings, the following were undertaken:

- DPE staff provided a verbal briefing on 7 September 2018.

- A teleconference meeting was held with DPE and OEH staff on 10 September 2018 to advise OEH staff of Umwelt's engagement and role, and to enable ready communication between OEH and Umwelt.

- Umwelt (report author Travis Peake) met with Toby Lambert from EPS on 11 September 2018 to run through the rationale behind a number of the components of the assessment, including the most recent material provided in the RTS report.

- Travis Peake held a teleconference meeting with Miranda Kerr of OEH on 21 September 2018.

- Between 21 September and 26 November Travis Peake held a number of telephone meetings/conversations with DPE staff to provide further advice on additional information/assessment undertaken by EPS and/or OEH.

No site inspection has been undertaken for this review. Although this could have been beneficial to the review, in the end it was not necessary in relation to the analysis of information provided by EPS and OEH, representatives of which had visited the site.

## 2.2 Limitations

The following matters have been important limitations in relation to the review undertaken for this report:

- Access to the FBA/BioBanking calculator was only able to be arranged on the day of the submission of this draft report (9 October 2018), however screen shots of the calculator were provided prior to this by Miranda Kerr of OEH. This was a reasonable 'next-best' option, with final checks of the calculator undertaken prior to report submission. While the calculator version could be viewed (briefly), no changes were able to be made by the author to test the impacts of relevant recommendations (different scenarios) presented later in this report. Miranda Kerr from OEH generously provided feedback based on scenario tests that she had been able to undertake.

- Historical aerial photographs were sought but not able to be provided until just hours before the draft report's submission. Historical aerial photos, together with additional interpretation of vegetation maps, could assist in an assessment of whether the areas described as PCT 45 Plains Grass Grassland are best categorised as native grassland or derived native grassland – this potentially has a significant bearing on credit generation and offsetting implications. Initial observation of the photos suggests that there was a much greater extent of woody (treed or shrub) vegetation on the site in 1967, which could suggest that the present grassland is a derived native grassland. However further interpretation would be required. Both EPS and OEH regard the selection of PCT 45 Plains Grass Grassland as being appropriate. In the end this approach was accepted and this review did not result in a different finding.

# 3.0 Key Findings

The following subsections address key elements that were the subject of the review.

## 3.1 Plains Grass Grassland Impacts in the Panel Array

In Section 8.7 of the BDAR (V07), contained in the RTS document, EPS has put forward proposed future site value scores for the relevant (up to) 10 biometric attributes to be affected in each of the vegetation management zones. Where complete removal will result, site value scores for each attribute are reduced to zero (absent) [note however that the opposite is true for exotic plant cover where a score of zero represents high percentage weed cover]. However where impacts will only be partial, then it is reasonable (in accordance with Section 10.3 of the FBA) for the Accredited Assessor to reduce the site value scores to a number that is higher than zero [or lower than 3 for exotic plant cover], reflecting the fact that the particular attribute will still be present, but perhaps in a modified form of lesser biodiversity "value". EPS has undertaken such an approach, with notes in each relevant table in Section 8.7 of their report to indicate the reasoning behind the change. For example, in Table 8-8 (page 149) of their report, for the attribute "Native Ground Cover (other)" they reduce the site value score from 2 (current) to 1 (future) and note that 'Reduction to account for mowing and microclimate impacts as discussed further in Section 8.5.' Section 8.5 of their report, titled 'Future Site Value in Solar Array Areas' provides a general discussion of how grasslands might respond to the installation and operation of solar panels. Section 8.5.6 indicates how EPS synthesised this information and applied it to the proposed development through the FBA/BioBanking calculator. EPS "retrofitted" existing vegetation zone mapping to account for the differential impacts that would be sustained by native vegetation around the solar panel arrays. Their approach, which is unconventional and not in strict keeping with the FBA, was undertaken most likely due to pressures resulting from the project approval timeline and the need to undertake a revised FBA assessment that was itself not able to rely on a proposed Expert Report from Charles Sturt University. While it provides a generalised approach to accounting for different types of impacts in different vegetation zones, it is also probably not entirely accurate.

OEH's email to DPE dated 25 September 2018, critiques this approach. In summary, the OEH assessment identifies shortcomings in the following aspects (with Umwelt's view noted as well in square brackets):

A. Multipliers for non-woody (grassland) vegetation should be removed to omit the influence of native overstorey and logs from the calculations [this is a reasonable request however the implications of EPS recording these as zero for current and future site score values versus removing them from the calculations (in accordance with FBA Section 10.3.1.2) needs to be checked in the calculator itself – further investigation of this is required].

B. The 'Non-panel' assessment zone is confusing because it includes grassland 'between panel rows' and 'outside array'. These areas have different potential impacts. A map of management zones, in accordance with standard FBA methodology, would assist in understanding how biometric site score values have been apportioned [this is a reasonable request].

C. OEH states that it has little confidence in predictions of the future site value scores based on the management regime proposed in Section 10 (Table 10-1) of the report.

D. OEH is concerned, in particular, that EPS has not modified the future site value score for the 'exotic plant cover' attribute for Management Zone 6 PG Mod – panel, and has instead maintained it at 3 (being the best possible outcome, i.e. limited exotic plant cover), rather than make an assumption that exotic plant cover will increase under altered management and environmental conditions [see Umwelt view below].

E. Likewise OEH are concerned that EPS have not reduced the future site score values for 'native plant species' richness and argue that the areas beneath and adjoining panels could be affected in a manner that reduces their native species richness [see Umwelt view below].

The focus of this review has been on PCT 45 Plains Grass Grassland and in particular that part of the PCT identified by EPS as 'Management Zone 6 PG Mod – panel' (182.15 ha) and 'Management Zone 7 PG Mod – non-panel' (434.14 ha). These are the areas of Plains Grass Grassland occurring in moderate-good condition underneath panels MZ 6), as well as between panels and adjacent to panels (MZ 7). The following paragraphs address calculations for these management zones. On point D above it is reasonable for OEH to have concerns; however it is equally reasonable for EPS to identify that because exotic plant cover is currently low, despite the subject site's history as a sheep and cattle property, it could be expected that it would remain low under another altered environmental/ management regime. In their report they present some evidence from other solar farms, however none of these is conclusive. It does appear that this is an area in which it would be highly valuable to commission research to inform future impact-offset assessments. A reasonable worst case approach would be to reduce the Exotic Plant Cover future site value score from 3 to 2 in both management zones.

Regarding point E above, EPS have maintained the future site score value at 3 for 'native plant species' richness in both management zones. This suggests that, for Plains Grass Grassland in areas adjoining and between panels, native species diversity will remain at or above benchmark values prior to and after development. It is reasonable for OEH to be wary around the potential lack of evidence regarding this prediction. However the benchmark for this attribute is 8 species, and for the 8 biometric plots sampled (minimum requirement was 7) in this vegetation type the average native species richness is 11.875, while the median is 12. On average there would need to be a reduction of 4 or more native species, or one third, for the benchmark to not be met and for the future site value score to be reduced to 2 or less (which is the score where the number of native plant species richness is 50-≤100% of the benchmark). It is possible, but probably relatively unlikely, that the raw native species richness would drop by 4 or more species in this category. It is highly unlikely that it would drop by 6 species and therefore score a value of 1 (>10-<50% benchmark). As above, this is a further area in which it would be highly valuable to commission research to inform future impact-offset assessments.

Similar feedback (in principle) to that above is relevant to the poor condition management zones for Plains Grass Grassland, being Management Zones 9 and 10, which cover 12.11 and 28.87 ha respectively.

Based on the above, it is the author's view that the future site value score for Management Zones 6 and 7 are largely suitable, however the reduction in the exotic plant cover score from 3 to 2 in both instances could be appropriate. The maintenance of the native plant richness scores at 3 could be justifiable. In the author's view it is not unreasonable to accept the maintenance of the native plant richness score at 3. Further research on this area is warranted and it could be appropriate for DPE to consider conditioning such a requirement in its project assessment.

Finally, it is noted that prior to the RTS document, the proponent was relying on a proposed Expert Report from authors based at Charles Sturt University. In response to comments from OEH, this reliance was removed, and a new FBA assessment undertaken (and presented in the BDAR in the RTS document). The Charles Sturt University report is still used in the BDAR to inform certain aspects, but it is no longer being treated as an Expert Report by the proponent.

No further discussion on the Charles Sturt University report is required at this stage, however it is valid that a more targeted assessment of likely biodiversity value changes would be warranted than is available in that report.

**Recommendations:**

1. **The proponent should provide a map of management zones and indication of how future site score values have been apportioned across vegetation zones.**

2. **The proponent to provide more detail, if it is available, to allow for a more thorough assessment of future site value scores in PCT 45 Plains Grass Grassland in Management Zones 6 and 7 (under and between the panel arrays). Ideally this would be done in a collaborative manner with OEH. The retention of native species richness future site value scores at 3 should be considered, as well as a reduction of the exotic plant cover scores from 3 to 2. The removal of certain 'non-woody' multipliers should be considered in accordance with FBA section 10.3.1.2.**

3. **DPE should consider requiring the proponent to fund research into the performance/resilience of native (and potentially derived native) grassland under and adjoining solar panel arrays. This would be to the benefit of future project approval assessments for solar arrays and their future management.**

## 3.2 Ecosystem Credit Species

In undertaking their assessment, EPS did not remove any candidate ecosystem credit species from the FBA/BioBanking calculator assessment. The candidate ecosystem species are those species that are modelled (and assumed) to occur in accordance with the distribution of the PCTs they are associated with. It is currently difficult to extract such information from the OEH website and databases, as much of the FBA related data has been archived and is hard to access (as a result of the introduction of the BAM which supersedes FBA). However, **Table 3.1** below is believed to represent the ecosystem credit species that are associated with PCT 45 Plains Grass Grassland. It is suggested that OEH should check this table as they should be able to readily access the correct datasets.

**Table 3.1 Ecosystem Credit Species Associated with PCT 45 Plains Grass Grassland (MR 589)**

| Scientific Name | Common Name | $T_G$ Value |
|---|---|---|
| *Ardeotis australis* | Australian Bustard | 0.375 |
| *Stagonopleura guttata* | Diamond Firetail | 0.75 |
| *Hieraaetus morphnoides* | Little Eagle | 0.725 |
| *Circus assimilis* | Spotted Harrier | 0.725 |
| *Epthianura albifrons* | White-fronted Chat | 0.75 |
| *Artamus cyanopterus cyanopterus* | Dusky Woodswallow | 0.75 |
| *Haliaeetus leucogaster* | White-bellied Sea-Eagle | 0.475 |

In relation to $T_G$ values, the species with the lowest $T_G$ value (which is in effect the highest 'offset multiplier') is the one that is used in Equation 5 of the FBA to assist in determining the credit requirement for the subject PCT. It is there termed a "threatened species offset multiplier". In accordance with Sections 6.3.1.5-6.3.1.8 of the FBA, the Accredited Assessor can determine if any ecosystem credit species are not justifiably warranted to be assumed as being present on the site. If this is the case the Accredited Assessor must clearly explain their reasons in the BDAR. No Expert Report is required.

Evidence presented thus far in the BDAR and revised BDAR and RTS suggests that the following species that are typically associated with PCT 45 Plains Grass Grassland should be re-assessed to determine whether they should be removed from the calculator, and thus not inform Equation 5:

- Australian bustard
- White-bellied sea-eagle.

In the author's view Equation 5 should be informed by the little eagle and spotted harrier, both species that could reasonably occur in the Plains Grass Grassland on the subject sit, and both with a $T_G$ value of 0.725 (approximate threatened species multiplier of 1.4). There is an absence of evidence to suggest that the Australian bustard does or could occur on the subject site with any frequency other than possibly extremely rarely, at most. It is likely that a re-assessment would reduce the necessary PCT 45 Plains Grass Grassland credits by approximately 40-50%

**Recommendation:**

4. **The proponent should re-assess the predicted ecosystem credit species for their reasonable likelihood of presence on the subject site, particularly the Australian bustard, and subject to any changes re-calculate the credit requirement for PCT 45 Plains Grass Grassland. This should be reviewed by OEH.**

## 3.3 Preliminary Analysis of Credit Costs

Umwelt undertook an analysis of the likely credit costs for the PCTs and threatened species that are likely to require offsetting for this project. One avenue is for the proponent to pay into the Biodiversity Conservation Fund thereby discharging its credit obligations by transferring them (with payment) to the Biodiversity Conservation Trust. This approach is established under the *Biodiversity Conservation Act 2016*. In doing so, it must be noted that there is no straightforward approach to undertaking a conversion of credit types from biometric (FBA/BioBanking) credits to BAM credits, the latter of which is required to inform the Biodiversity Conservation Fund Payment Calculator. Currently the approved OEH approach to this issue is for the proponent to submit a "Application for Assessment of Reasonable Equivalence" to OEH, and then in accordance with a method or ruleset that has not been made public, OEH undertakes a credit conversion to advise the proponent of the number of BAM credits that their FBA/BioBanking credits are equivalent to. [It is noted here that it would assist the proponent if OEH committed to undertaking this process soon, and in a collaborative manner, rather than post project approval, which is understood to be OEH's current standard approach.]

In undertaking the BCF Payment Calculator assessment, Umwelt was informed by the fact that (as of 6 September 2018) there were no biometric credits available at registered BioBank/Stewardship sites for the three PCTs or the superb parrot.

Umwelt made an assumption that BAM credits are worth around 60% of a biometric credit. This value is consistent with extensive testing that Umwelt has done (range 50-70%), as well as unofficial advice from OEH sources. The following likely credit estimates and costs result from this approach:

- PCT 75 Yellow Box – White Cypress Pine Grassy Woodland: estimate 5 credits @ $2,409.58/credit - $12,047.89 ex GST
- PCT 16 Black Box Grassy Woodland: estimate 176 credits @ $2,409.58/credit - $424,085.70 ex GST
- PCT 45 Plains Grass Grassland: estimate 2482 credits @ $2,409.58/credit - $5,980,572.14 ex GST
- Superb parrot: estimate 36 credits @ $816.33/credit - $36,241.43

Under this assessment, using the BCF calculator (setting BAM credits at 60% of biometric credits), and including GST, a total offset liability of $7,098,241.54 is calculated. The total number of credits required (listed above) is based on a 60% conversion of the credit calculations presented in Table 8.1 (pp 142-143) in the V07 BDAR (contained in the RTS). Any credit changes (reductions or increases) resulting from the application of recommendations in this report have not been incorporated here. However, based on the analyses undertaken in this report, particularly Recommendation 4, it is possible that the credit load and costs could be reduced by around 40%.

Note that these calculations were made on 9 October 2018. The BCF Payment Calculator is subject to price changes that will be gazetted on 31 October 2018 (and every quarter thereafter). A re-analysis undertaken after that time could result in a different pricing scenario.

**Recommendations:**

5. **OEH should assist the proponent to understand potential credit retirement cost obligations through the use of the BCF Payment Calculator by working collaboratively with the proponent to understand the credit equivalencies, prior to potential project approval – this would assist the proponent to understand potential maximum offset cost obligations.**

6. **The proponent should continue to investigate if biometric (FBA/BioBanking) credits are available on the market or if suitable EOIs for credit generation are available.**

7. **The proponent should investigate their own proponent-owned or proponent-sponsored land-based biodiversity offset options that could generate relatively high loads of credits per hectare for relatively low management cost inputs, the extracting a higher yield per unit area over time and reducing unit costs.**

## 3.4 Threatened Ecological Communities

OEH have indicated that PCT 75 Yellow Box – White Cypress Pine Grassy Woodland has not been assessed against the Sandhill Pine Woodland Endangered Ecological Community listed under the BC Act. This report's author also cannot locate an assessment of PCT 75 against this EEC. It is not possible to discern from the format of the data presented in the EPS report for this author to form a view on whether or not the EEC could be present in PCT 75. While there is a distinct possibility, the likely substantial presence of yellow box (*Eucalyptus melliodora*) could be a confounding influence, although factors such as groundcover native species are likely to be of more relevance.

OEH has also noted that a number of Red Flag issues need to be reported. While this is necessary for the appropriate application of the FBA methodology, it is not expected to affect any project outcomes.

**Recommendation**:

8. **The proponent should undertake a transparent assessment of the potential for PCT 75 Yellow Box – White Cypress Pine Grassy Woodland to correspond with the Sandhill Pine Woodland Endangered Ecological Community, and also finalise any Red Flag reporting requirements.**

# 4.0 Recommended Actions

## 4.1 Steps in Accordance with FBA

The following actions should be considered to improve the rigour and accuracy of the FBA assessment:

- Provide a map of management zones.
- Proponent to reconsider future site values for PCT 45 Plains Grass Grassland in the panel and non-panel management zones. This is to ensure that the predicted values are as rigorous as they can reasonably be. Ideally this would be undertaken in a collaborative manner with OEH.
- Proponent should reassess the ecosystem credit species predicted to occur as part of PCT 45 Plains Grass Grassland and modify the FBA assessment accordingly. This should be put to OEH for their review.
- Proponent should complete an assessment of PCT 75 against the Sandhill Pine Woodland EEC and also finalise any FBA reporting obligations in relation to Red Flags.

It is anticipated that some of the above steps, subject to what is or is not suitable, could lead to a substantial reduction in ecosystem credit requirements whilst improving the rigour (and the transparency and reliability) of the FBA assessment.

## 4.2 Steps Not Strictly in Accordance with FBA

The proponent righty refers to the latitude that was intended to be maintained when using the FBA methodology within the meaning of the NSW Biodiversity Offsets Policy for Major Projects. On pages 29-30 of the RTS, the proponent correctly indicates that the Policy states (on p. 5) the following [bold text is the emphasis of this report's author]:

> ***During the transitional implementation period, application of the policy will be compulsory but a more flexible approach will be permitted to appropriately deal with any technical issues, practical implementation issues or potential perverse outcomes that may arise****. During the transitional implementation period, all new environmental assessment requirements for major projects (issued pursuant to Part 2 of Schedule 2 of the Environmental Planning and Assessment Regulation 2000) will include a requirement to assess the biodiversity impacts and determine associated offsets arising from a proposal in accordance with the NSW Biodiversity Offsets Policy for Major Projects. However,* ***if application of the policy or its underlying tool, the Framework for Biodiversity Assessment (FBA), results in perverse outcomes that do not reflect the intentions of the policy, the consent authority may vary the application of the policy or FBA to address this.***

Since the commencement of the *Biodiversity Conservation Act 2016* on 25 August 2017, underpinned by the BAM, it is reasonable to treat the duration of the implementation of the FBA as the 'transitional implementation period' identified above. It is clear that the response of a native grassland, or even a derived native grassland, that is in 'moderate-good' condition, to subsequent altered environmental conditions and management is an area of knowledge that is currently lacking. The FBA operates on predicting the 'future site score value' for the ten biometric attributes that underpin the generation of credits. The FBA depends on a step-wise approach to assessing current and future site value, with simple scores between 0 and 3 being generated to represent the variance between the current (or future) site value and the benchmark value for that attribute.

This is a very coarse and simplistic approach, which also used benchmarks that were set by expert panels and not modified over time, nor was the process documented in a transparent manner. Often benchmarks were set at 'class level' (above PCT) and therefore were even more coarse and generalised in their applicability. The FBA's replacement, the BAM, is underpinned by a much more complex, and realistic, linear scoring approach, where slight alterations in the recorded or predicted values compared to the benchmark conditions (themselves based on actual plot data albeit still at the class level) are reflected by the sensitivity of the algorithms used.

As a result of the above, it is suitable to recommend that DPE consider both accepting lower-end credit estimates as well as conditioning certain aspects of offset-related requirements. These could include:

- Accepting lower-end credit calculations, such as taking a less cautious approach on the potential (and relatively poorly known) impacts of the solar array on PCT 45 Plains Grass Grassland in areas beneath, and between and adjoining panels.

- Conditioning the funding of research into the impacts of solar arrays on native (and derived native) grasslands to benefit future impact-offset assessments.

- Enabling the proponent to defer a component of the potential offset requirements to be realised later if the monitoring of native grassland impacts over a number of years prove either its necessity or otherwise.

The final point above would see a portion of the credit obligation being deferred for perhaps 2-3 years subject to the outcomes of rigorous independent ecological monitoring. A robust and fit for purpose monitoring program would need to be prepared, with OEH's comments taken into consideration, and if the monitoring results proved a lower than anticipated impact, the additional credit requirement would be waived or at least not fully realised.

**Recommendation**:

**9. DPE could consider accepting lower-end credit estimates (provided they are reasonable case) and consider conditioning certain aspects of offset-related requirements, such as conditioning future research and enabling the proponent to defer a component of the credit obligation subject to improved biodiversity outcomes being determined in future through ecological monitoring results.**

## 4.3 Summary of Recommendations

The following list is a replication of all recommendations presented in this report.

1. **The proponent should provide a map of management zones and indication of how future site score values have been apportioned across vegetation zones.**

2. **The proponent to provide more detail, if it is available, to allow for a more thorough assessment of future site value scores in PCT 45 Plains Grass Grassland in Management Zones 6 and 7 (under and between the panel arrays). Ideally this would be done in a collaborative manner with OEH. The retention of native species richness future site value scores at 3 should be considered, as well as a reduction of the exotic plant cover scores from 3 to 2. The removal of certain 'non-woody' multipliers should be considered in accordance with FBA section 10.3.1.2.**

3. **DPE should consider requiring the proponent to fund research into the performance/resilience of native (and potentially derived native) grassland under and adjoining solar panel arrays. This would be to the benefit of future project approval assessments for solar arrays and their future management.**

4. **The proponent should re-assess the predicted ecosystem credit species for their reasonable likelihood of presence on the subject site, particularly the Australian bustard, and subject to any changes re-calculate the credit requirement for PCT 45 Plains Grass Grassland. This should be reviewed by OEH.**

5. **OEH should assist the proponent to understand potential credit retirement cost obligations through the use of the BCF Payment Calculator by working collaboratively with the proponent to understand the credit equivalencies, prior to potential project approval – this would assist the proponent to understand potential maximum offset cost obligations.**

6. **The proponent should continue to investigate if biometric (FBA/BioBanking) credits are available on the market or if suitable EOIs for credit generation are available.**

7. **The proponent should investigate their own proponent-owned or proponent-sponsored land-based biodiversity offset options that could generate relatively high loads of credits per hectare for relatively low management cost inputs, the extracting a higher yield per unit area over time and reducing unit costs.**

8. **The proponent should undertake a transparent assessment of the potential for PCT 75 Yellow Box – White Cypress Pine Grassy Woodland to correspond with the Sandhill Pine Woodland Endangered Ecological Community, and also finalise any Red Flag reporting requirements.**

9. **DPE could consider accepting lower-end credit estimates (provided they are reasonable case) and conditioning certain aspects of offset-related requirements, such as future research and enabling the proponent to defer a component of the credit obligation subject to improved biodiversity outcomes being determined in future through ecological monitoring results.**


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