Environmental Assessment Report

Proposed Solar Power Station
Near Moree, NSW
(MOREE SOLAR FARM)

Appendix
General Environmental Risk Analysis

Prepared by
BP Solar & Walsh Consulting

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Background
The body of the Environmental Assessment Report identifies all significant environmental risks identified for the project, and proposed mitigation measures. While the proposed measures are intended to address the risks, this Appendix provides supplementary information on risk analysis to aid in significance assessment of residual environmental risks.

Risk Analysis
Risk analysis is concerned with:

- Identifying risks,
- analysing their likelihood and consequences
- assessing or evaluating the risks, aided by the above
- preparation of treatment strategies in response, including ongoing monitoring arrangements[1].

Environmental Risk Analysis in this Project
The Proponent has undertaken considerable general risk analysis with the Project, much of which is outside the scope of this EA. The Proponent's environmental risk assessment commenced in the early stages of project conception, as one of a number of integral elements to site selection.

The Preliminary Environmental Assessment (PAR) documentation lodged with the DoP in October 2010 was the first publicly documented outline of environmental risk management for the subject proposal. This work documented a set of core environmental risks associated with the project and set down the then intended response strategy.

[1] *Australian/New Zealand Standard Risk Management Principle and Guidelines AS/NZS ISO 31000:2009*, is the national standard outlining principles, and processes for risk management.

The work of the PAR gave initial direction to the formal environmental assessment which has been undertaken for the project and is documented in this Environmental Assessment Report. **Section 7** of the Environmental Assessment Report summarises the detailed analysis which has been undertaken in regard to the key matters of environmental risk. This work includes a set of draft commitments aimed at mitigating potential environmental impacts. Appendices to Environmental Assessment Report provide the specialist environmental reports which provide further detail on the environmental assessment processes which have been undertaken to date. The table below provides an overview of the significant environmental risks to the project.

Category	**Outline of Major Risk Areas**
Land	Inappropriate clearing drainage, excavation or earthworks on land which is subject to erosion or other degradation. Inappropriate fragmentation of productive land.
Biodiversity	Loss and fragmentation of habitat and ecological communities through clearing of native vegetation. Behaviours propagating plant diseases, weeds and feral animals.
Water	Inappropriate altering of hydrology, inappropriate management of chemicals, effluent, waste and by products. Inappropriate works in waterways. Overuse of water. Groundwater risks.
Cultural heritage	Disturbance and degradation of cultural heritage resources, in particular items of aboriginal cultural heritage significance.
Amenity	Noise and air pollution, reduced privacy, visual impacts. Amenity issues associated with large construction workforce.
Public infrastructure	Damage to public assets (roads, drainage and/or other infrastructure) in association with heavy vehicles and machinery on site and transporting to the site.
Hazards	Bushfire, flooding risks, increased traffic hazards.

Environmental Risk Assessment Practice and the Risk Matrix

The standard risk matrix process requires an assessment of the probability of events occurring and the consequences of this occurrence (likelihood × consequence = risk). Likelihood and consequences are usually scored between 1 and 5 in the risk matrix process. The tables overpage outline the scores and identifiers used in the matrix.

Likelihood

	Description	Score
Almost Certain	Is expected to occur in most circumstances	**5**
Likely	Will probably occur	**4**
Possible	Might occur at some time in the future	**3**
Unlikely	Could occur but doubtful	**2**
Rare	May occur but only in exceptional circumstances	**1**

Consequence

	Description	Score
Catastrophic	Critical impacts, and major consequent disruption, heavy costs	**5**
Major	Intense impacts, manageable but at considerable cost and some disruption	**4**
Moderate	Serious impacts occurring but with ready capacity to manage	**3**
Minor	Minor management action required	**2**
Insignificant	Impacts not requiring any treatment	**1**

In a land use and wider landscape context there is a need to introduce issues of land sensitivity. Sensitivity can be described as the degree of resilience to recovery from disturbance as a result of the threatening process. A similar scoring system can be applied (1 = Very Low Sensitivity, 3 = Moderate, 5 = Very High).[2]

A risk management methodology integrates the three scoring elements *likelihood, consequence* and *sensitivity* in defining *extreme, high, medium* and *low risks*. For example a set of scores in the 4s and 5s would make for an *Extreme Risk* – and require an extremely aggressive response strategy if residual impacts are to be avoided. Whereas *low risk* scores would be managed by routine procedures. *Medium* scores would require appropriate moderate interventions.

Identifying and Analysing the Project's Environmental Risks

The table below provides an environmental risk matrix for significant project risk elements. It also references individual Sections within the Environmental Assessment Report where the particular environmental issue is addressed specifically.

It is emphasised that it is this Environmental Assessment Report itself which provides the foundation of the environmental assessment of the Project to date. The matrix below is not intended to provide a precise quantitative analysis of the project's environmental risks. It would be a concern to place over-reliance on the numerical scores provided. Indeed it is a common criticism of the quantitative risk assessment methodology that use of statistical analysis can misdirect the full environmental assessment process, for example in the subjective nature of scoring and in the under-emphasis of the qualitative differences between risk factors.

[2] See for example: Department of Primary Industries Victoria, Land Use Impact Model (LUIM), 2007
on http://www.dpi.vic.gov.au

Here the methodology is used as a safety net element: as a test to ensure that the Proponent's draft commitments are well directed and that the higher risk elements are appropriately covered.

The scoring system outlined in the table below assumes that the draft environmental mitigation commitments indicated in the body of the report are in place. Note this analysis does not consider the positive environmental factors associated with the project, including those related to the direct project goal of increasing the availability of clean energy.

Report Ref. (Section)	Item	Consequence of Occurrence	Likelihood of Occurrence	Land Sensitivity	Overall Risk Score
7.9	**Land:** Inappropriate clearing, drainage, excavation or earthworks results in major erosion.	3	2	3	18
7.9	**Land:** Poor management of chemicals results in contamination	2	2	3	12
6.1.2	**Land:** Loss of productive land.	2	4	2	16
7.3	**Biodiversity:** Loss and fragmentation of habitat and ecological communities through clearing of native vegetation.	3	2	3	18
7.3	**Biodiversity:** Propagating plant diseases, weeds and feral animals.	3	2	3	18
7.9	**Water:** Inappropriate altering of hydrology,	2	2	3	12
7.9	**Water:** Inappropriate management of chemicals, effluent, waste and by products.	2	2	3	12
7.9	**Water:** Inappropriate, polluting works in waterways.	2	2	3	12
7.8	**Water:** Overuse of water.	2	2	3	12
7.8	**Water:** Groundwater risks	2	1	3	6
7.4	**Cultural heritage:** Disturbance or degradation of key cultural resources and loss of cultural heritage	3	2	3	18
7.2	**Amenity:** Noise pollution during construction	3	3	2	18
7.9	**Amenity:** Air pollution during construction	3	2	2	12
7.1	**Amenity:** Reduced privacy	3	2	2	12
7.1	**Amenity:** Visual impacts.	3	3	2	18
7.7.3	**Amenity:** Amenity issues associated with large construction workforce in Moree.	3	2	3	18
7.9	**Public infrastructure:** Damage to public assets (roads, drainage and/or other infrastructure) in association with heavy vehicles and machinery on site and transporting to the site.	2	3	3	18
7.6, 7.10 6.1.2	**Hazards:** Bushfire, flooding risks, EMF, increased traffic hazards.	2	3	3	18

With respect to the matrix scoring, items with average scores of 4s and 5s (or total scores of over 50) represent a high environmental risk and items with average scores of 3 (or total of over 27) represent a moderate level of risk. As can be seen from the matrix results all of the overall risk scores are well below the moderate level of risk and therefore represent either a minor or insignificant risk.

Notwithstanding this analysis, the Project assessment process will continue to address the detailed assessment of issues when determining the proposed response strategies to confirm that the proposed commitments are appropriate and satisfactory.

In summary the diligent implementation, monitoring and follow-up of environmental mitigation commitments, represents the best means of minimising the potential for residual environmental effects. The risk analysis will assist the Proponent in ensuring that the project commitments are well directed and that the associated impacts are identified and appropriately managed.