MANILDRA SOLAR FARM

CONSTRUCTION ENVIRONMENTAL MANAGEMENT PLAN

PREPARED FOR:

RCR INFRASTRUCTURE

PREPARED BY:

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TABLE OF CONTENTS

INTRODUCTION 1

1.1 APPROVED PROJECT 1
1.2 PROPONENT 1
1.3 FUNCTION 2
1.4 EPC CONTRACTOR 3
1.5 GEOLYSE 3
1.6 STRUCTURE 4
1.7 AMENDMENTS 5
1.8 AVAILABILITY 5

CONSTRUCTION ACTIVITY 6

2.1 REQUIREMENT 6
2.2 CONSTRUCTION ACTIVITIES 6
2.3 CONSTRUCTION STAGING 6
2.4 SCHEDULING 7
2.5 SCOPE 7

CUMULATIVE IMPACTS 8

3.1 REQUIREMENT 8
3.2 POTENTIAL IMPACT 8
3.3 MANAGEMENT MEASURES 8

SITE COMPOUND 9

4.1 REQUIREMENT 9
4.2 CONSTRUCTION COMPOUNDS 9
4.2.1 LAYDOWN AREA 9
4.2.2 SITE OFFICE 9
4.2.3 SATELLITE CRIB ROOM 9
4.3 REHABILITATION PROTOCOL 10

OBLIGATIONS 11

5.1 REQUIREMENT 11
5.2 DEVELOPMENT CONSENT 11
5.3 APPROVALS 11
5.4 COMMITMENTS 12
5.5 BIODIVERSITY OFFSET STRATEGY 12
5.6 AGREEMENTS 13
5.7 DIRECTOR GENERAL REQUESTS 13
5.8 HOT WORKS EXEMPTION 13
5.9 LEGISLATION 13
5.10 GUIDELINES AND POLICIES 14

AGENCY CONSULTATION 15

6.1 REQUIREMENT 15
6.2 PUBLIC AUTHORITIES 15
6.3 EVIDENCE 16

ROLES AND RESPONSIBILITIES 18

7.1 REQUIREMENT 18
7.2 RESPONSIBILITIES 18
7.3 ROLES 19
7.3.1 MANILDRA SOLAR FARM PTY LTD 19
7.3.2 RCR INFRASTRUCTURE 19
7.4 TRAINING AND INDUCTION 21
7.4.1 ENVIRONMENTAL DUE DILIGENCE 21
7.4.2 COMPETENCY REGISTER 21

ENVIRONMENTAL PERFORMANCE 22

8.1 REQUIREMENT 22
8.2 COMPLIANCE TRACKING PROGRAM 22
8.2.1 REQUIREMENT 22
8.2.2 RESPONSIBILITY 22
8.2.3 COMMITMENT 22
8.3 PERFORMANCE MONITORING 23
8.3.1 WEEKLY ENVIRONMENTAL INSPECTIONS 23
8.3.2 MONTHLY COMPLIANCE MEETINGS 23
8.3.3 PROPONENT 23
8.3.4 ENVIRONMENTAL AUDITING 23
8.4 CORRECTIVE ACTIONS 24
8.5 IMPROVEMENT NOTICE 24
8.6 CEMP AMENDMENT 24

STATEMENT OF COMMITMENTS 25

9.1 REQUIREMENT 25
9.2 COMPLIANCE 25

CONDITIONS OF APPROVAL 38

10.1 REQUIREMENT 38
10.2 COMPLIANCE 38

COMMUNITY INVOLVEMENT 53

11.1 REQUIREMENT 53
11.2 COMMUNITY ENGAGEMENT PLAN 53
11.3 COMMITMENT 53

COMPLAINTS HANDLING PROCEDURES 54

12.1 REQUIREMENT 54
12.2 RESPONSIBILITIES 54
12.2.1 MSFPL 54
12.2.2 RCRI 54
12.3 PROCEDURE 55
12.3.1 FROM MSFPL 55
12.3.2 OTHER SOURCES 55
12.4 COMPLAINTS REGISTER 55
12.5 COMPLAINT RESOLUTION 56
12.6 ADDITIONAL INFORMATION 56

INCIDENT MANAGEMENT 57

13.1 INTERNAL REPORTING 57
13.2 IMMEDIATE RESPONSE 57
13.3 EXTERNAL NOTIFICATIONS 57

13.3.1 MATERIAL HARM 57
13.3.2 EPA NOTIFICATION 58
13.3.3 NO MATERIAL HARM 58

13.4 INCIDENT INVESTIGATION 58

13.4.1 AVOID RECURRENCE 58
13.4.2 RESTORATION 58

13.5 INCIDENT REPORTING 59

13.5.1 DOCUMENTATION 59
13.5.2 DISSEMINATION 59

WORK METHOD STATEMENTS 60

14.1 REQUIREMENT 60
14.2 APPROACH 60
14.3 ENVIRONMENTAL RISK 61

14.3.1 PRINCIPLE 61
14.3.2 BIODIVERSITY RELATED RISKS 61
14.3.3 OTHER ENVIRONMENTAL RISKS 62

HISTORIC HERITAGE 64

15.1 CONTEXT 64
15.2 AVOIDING IMPACT 64
15.3 PROTECTION OF STONE COTTAGE RUIN 65
15.4 UNEXPECTED FINDS 65
15.5 HERITAGE INDUCTION 65

IMPACT MINIMISATION 66

16.1 REQUIREMENT 66
16.2 MAPS 66

ABORIGINAL HERITAGE 68

17.1 MANAGEMENT OF KNOWN OBJECT LOCALES 68
17.2 UNANTICIPATED FINDS PROTOCOL 68
17.3 POTENTIAL HUMAN REMAINS 68
17.4 ABORIGINAL CULTURAL HERITAGE INDUCTION 69

SOIL AND WATER IMPACTS 70

18.1 REQUIREMENT 70
18.2 MANAGEMENT MEASURES 70

18.2.1 SOIL AND WATER MANAGEMENT PLAN 70
18.2.2 BEST PRACTICE 70
18.2.3 MONITORING EFFECTIVENESS OF CONTROLS 71
18.2.4 HAZARDOUS GOODS STORAGE 71
18.2.5 RE-FUELLING STATIONS 72
18.2.6 SPILL RESPONSE 72
18.2.7 PLANT MAINTENANCE 72

18.3 GROUNDWATER INTERFERENCE 73

18.3.1 DEWATERING 73
18.3.2 EFFLUENT DISPOSAL 73

FLOOD MANAGEMENT 74

19.1 REQUIREMENT 74
19.2 FLOOD RISK 74
19.3 CONTINGENCY MEASURES 74

DUST SUPPRESSION 75

20.1 REQUIREMENT 75
20.2 PUBLIC ROADS 75
20.3 INTERNAL ACCESS TRACKS 75
20.4 BEST PRACTICE 75
20.5 PERFORMANCE CRITERIA 75
20.6 MONITORING 76
20.7 WATER SOURCES 76

BUSH FIRE RISK 77

21.1 REQUIREMENT 77
21.2 OBJECTIVE 77
21.3 MANILDRA RFS BRIGADE 77
21.4 FIRE AND RESCUE NSW 78
21.5 WATER SUPPLY 78
21.6 FUEL REDUCTION 78
21.7 WORK PRACTICES 78

WASTE MANAGEMENT 80

22.1 WASTE TYPES 80
22.2 WASTE CLASSIFICATION 80
22.3 NO BURNING/BURIAL 81
22.4 STORAGE 81
22.5 DISPOSAL 81
22.6 RECYCLING 81
22.7 WASTE TRACKING 81

RECORDS 82

23.1 DOCUMENTATION 82
23.2 REGISTERS 82
23.3 FORMS 82

REFERENCES 83

TABLES

Table 5.1 – Approvals 11
Table 6.1 – Authority/Stakeholder Consultation 15
Table 6.2 – Evidence of Consultation 16
Table 6.3 – Addressing Agency Issues 17
Table 9.1 – Statement of Commitments 26
Table 10.1 – Conditions of Approval 39
Table 14.1 – Risk Matrix 61
Table 14.2 – Biodiversity Risk Definitions 61
Table 14.3 – Risk Analysis of Biodiversity Related Issues 61
Table 14.4 –Risk Definitions 62
Table 14.5 – Environmental Risk Analysis 63
Table 18.1 – Hazardous Substances List 71
Table 22.1 – Waste Classifications 80
Table 23.1 – CEMP Registers 82
Table 23.2 – CEMP Forms 82

FIGURES

Figure 1: Approved Layout 1
Figure 2: RCRI's Environmental Policy 3
Figure 3: Roles and Responsibilities 18
Figure 4: South East elevation of ruin 64
Figure 5: Location of ruin in relation to access road 64
Figure 6: Flora and Fauna Management Plan(Source: nghenvironmental, 20 April 2016) 66
Figure 7: Offset Plan (Source: nghenvironmental, 2 February 2017) 67

REGISTERS

MSF_CEMP_R01 Due Diligence Induction Register
MSF_CEMP_R02 Corrective Action Register
MSF_CEMP_R03 Improvement Notice Register
MSF_CEMP_R04 Complaints Register
MSF_CEMP_R05 Environmental Incidents Register
MSF_CEMP_R06 Waste Register

FORMS

MSF_CEMP_F01 Inspection Checklist
MSF_CEMP_F02 Compliance Audit
MSF_CEMP_F03 Corrective Action
MSF_CEMP_F04 Improvement Notice
MSF_CEMP_F05 Complaint Record
MSF_CEMP_F06 Environmental Incident Record

SCHEDULE OF DRAWINGS

General Arrangement

APPENDICES

APPENDIX A
Construction Noise Management Plan

APPENDIX B
Traffic Management Plan

APPENDIX C
Flora and Fauna Management Plan

APPENDIX D
Groundcover Management Plan

APPENDIX E
Landscape Plan

APPENDIX F
Offset Strategy

APPENDIX G
Offset Plan

APPENDIX H
Soil and Water Management Plan

APPENDIX I
Emergency Response Plan

APPENDIX J
Evidence of Agency Consultation

APPENDIX K
Construction Schedule

APPENDIX L
Community Engagement Plan

Abbreviations

AEP	Annual Exceedance Probability
APZ	Asset Protection Zone
ARI	Average Recurrence Interval
CC	Cabonne Council
CEMP	Construction Environmental Management Plan
CNMP	Construction Noise Management Plan
CoA	Condition of Approval
DCP	Dry Chemical Powder
DMP	Decommissioning Management Plan
DPE	Department of Planning and Environment
DPI	Department of Primary Industries
EA	Environmental Assessment
EEC	Endangered Ecological Community
EMS	Environmental Management System
EPA	Environment Protection Authority
EPC	Engineering, Procurement and Construction
EPL	Environment Protection Licence
ER	Environmental Representative
ERP	Emergency Response Plan
ETL	Electricity Transmission Line
ESCP	Erosion and Sediment Control Plan
FFMP	Flora and Fauna Management Plan
GCMP	Groundcover Management Plan
kL	Kilolitre
kV	Kilovolt
MSF	Manildra Solar Farm
MSFPL	Manildra Solar Farm Pty Ltd
MW	Megawatt
NOW	NSW Office of Water
OEH	Office of Environment and Heritage
OEMP	Operational Environmental Management Plan
OOHW	Out-of-Hours Work
RAV	Restricted Access Vehicle
RAP	Registered Aboriginal Parties
RCRI	RCRI
RFS	Rural Fire Service
RMS	Roads and Maritime Services
SCECO	Site Construction and Environment Compliance Officer
SoC	Statement of Commitments
SDS	Safety Data Sheets
SWMP	Soil and Water Management Plan
SWMS	Safe Work Method Statements
TMP	Traffic Management Plan
VIVR	Visual Impact Verification Report
WIRES	NSW Wildlife Information, Rescue and Education Service

Introduction

1.1 APPROVED PROJECT

The Manildra Solar Farm (MSF) was initially granted development consent on 3 March 2011 and subsequently modified by Minister's approval on 25 March 2015 and again 31 August 2015.

The approved project allows the development of a 50 megawatt (MW) solar farm and associated infrastructure. The approved General Layout is shown below.

Figure 1: Approved Layout

Source: Project Approval Application MP10_0122

1.2 PROPONENT

The development proponent is Manildra Solar Farm Pty Ltd (MSFPL).

1.3 FUNCTION

This Construction Environmental Management Plan (CEMP) has been prepared to satisfy a Condition of Approval (CoA). Specifically, CoA C13 requires the proponent to prepare and implement a CEMP to outline environmental management practices and procedures to be followed during construction.

This condition requires that the CEMP be submitted for the approval of the Secretary of the Department of Planning and Environment (DPE), or nominee, no later than one month prior to commencement of any relevant construction works associated with the project, or within such period otherwise agreed by the Secretary, or nominee. Construction works cannot commence until written approval has been received from the Secretary, or nominee.

For clarification, pursuant to definition in the DPE;s Project Approval (MP10_0122):

- ***construction*** is defined as:

  All pre-operation activities associated with the project other than survey, acquisitions, fencing, investigative drilling or excavation, building/road dilapidation surveys or other activities determined by the Environmental Representative to have minimal environmental impact such as minor access roads, commissioning activities, minor adjustments to services / utilities, establishing temporary construction sites, or minor clearing (except where threatened species, populations or ecological communities would be affected).

- ***operation*** is defined as:

  Any activity which results in the production of electricity for contribution to the electricity grid, but does not include commissioning.

CoA E2 requires an Operational Environmental Management Plan (OEMP) be submitted for the approval of DPE no later than one month prior to commencement of operation of the MSF, or within such period otherwise agreed by the Secretary or nominee.

1.4 EPC CONTRACTOR

RCRI (RCRI) is the Engineering, Procurement and Construction Contractor with the responsibility to build the MSF.

RCRI's Environmental Policy is provided below.

RCR Limited
Tomlinson

ENVIRONMENTAL POLICY

RCR has a goal to undertake all business activities in an environmentally sustainable and responsible manner. RCR respects our relationship with the natural environment and aims to manage the potential impacts of our operations in a manner that minimises harm and maintains optimal state of the ecosystem and its biodiversity.

Our commitment:

- Drive continual improvement and maintain an effective and efficient Management System, that is compliant with the requirements of the AS/NZS ISO 14001;
- Manage our operations in compliance with or exceeding the applicable Commonwealth and State environmental legislative requirements and provide resources necessary to meet these obligations;
- Identify and effectively manage our environmental aspects and impacts;
- Develop and actively promote initiatives to improve environmental performance through continuous research and integration of best practice processes;
- Review environmental performance, monitor against key performance indicators and designated objectives and targets on a regular basis;
- Establish direct and effective ways of communication with our employees, customers, suppliers, contractors, and the community in regards to environmental obligations, performance and compliance in order to achieve shared and lasting outcomes;
- Demonstrate good governance by incorporating sustainability principles into all RCR activities and decision making and actively promote use of eco-friendly materials and equipment;
- Report and record environmental incidents and potential environmental hazards to initiate corrective actions and eliminate or minimise impact, improve performance and prevent incident recurrent.

All RCR personnel, contractors and visitors are responsible for the implementation of and compliance to this Policy.

This policy applies to all activities undertaken or controlled by RCR.

Dr Paul Dalgleish
Chief Executive Officer

Figure 2: RCRI's Environmental Policy

1.5 GEOLYSE

Geolyse has been engaged by RCRI to prepare this CEMP.

1.6 STRUCTURE

The CEMP specification is detailed in CoA C13. To facilitate the assessment of compliance against this specification the structure, format and scope of this CEMP has been prepared against this specification (see below).

Construction Environmental Management Plan

C13 The Proponent shall prepare and implement a Construction Environmental Management Plan (CEMP) to outline environmental management practices and procedures to be followed during construction of the project. The Plan shall be prepared in consultation with NOW[1] and Cabonne Shire Council [sic] and be consistent with the Guideline for the Preparation of Environmental Management Plans (DIPNR, 2004 or its latest revision) and shall include, but not necessarily be limited to:

a) a description of all relevant activities to be undertaken on the site during construction including an indication of stages of construction, where relevant;

b) identification of the potential for cumulative impacts with other construction activities occurring in the vicinity and how such impacts would be managed;

c) details of any construction sites and mitigation, monitoring, management and rehabilitation measures specific to the site compound(s) that would be implemented;

d) statutory and other obligations that the Proponent is required to fulfil during construction including all relevant approvals, consultations and agreements required from authorities and other stakeholders, and key legislation and policies;

e) evidence of consultation with relevant public authorities required under this condition and how issues raised by the agencies have been addressed in the plan;

f) a description of the roles and responsibilities for all relevant employees involved in the construction of the project including relevant training and induction provisions for ensuring that all employees, contractors and sub-contractors are aware of their environmental and compliance obligations under these conditions of approval;

g) details of how the environmental performance of construction will be monitored, and what actions will be taken to address identified potential adverse environmental impacts;

h) specific consideration of relevant measures to address any requirements identified in the EA;

i) the additional requirements of this approval;

j) a complaints handling procedure during construction;

k) maps or plans clearly indicating where the project area has been reduced to minimise impacts to Endangered Ecological Community (EEC)and native grasses in good condition;

l) a matrix of construction work method statements (or similar) to be prepared and the anticipated level of risk associated with each to be determined;

m) measures to monitor and manage soil and water impacts in consultation with NOW including: control measures for works close to waterways (including rehabilitation measures following disturbance and monitoring measures and completion criteria to determine rehabilitation success), identification of construction activities that are likely to pose a risk of groundwater interference, and procedures for managing groundwater impacts should they occur (including to groundwater dependent species and to registered groundwater users);

n) measures to monitor and manage flood impacts in consultation with NOW and shall include contingency measures for the site during potential floods;

o) measures to monitor and manage dust emissions including dust generated by traffic on unsealed public roads and unsealed internal access tracks; and

p) emergency management measures including measures to control bushfires.

[1] NSW Office of Water (NOW) is now part of the Department of Primary Industries (DPI).

1.7 AMENDMENTS

The CEMP is a 'live' document and will be reviewed and updated as required during construction.

Triggers for amendments to the CEMP will include:

- When there is a need to improve performance in an area of environmental impact;
- As a result of changes in environmental legislation applicable and relevant to the project;
- Where the outcomes from auditing establish a need for change;
- Where Safe Work Method Statements (SWMS) identify changes to a construction methodology to address an environmental risk; and
- As a result of an incident or complaint occurring that necessitates an amendment.

Modifications to the CEMP will involve the following process.

- RCRI's Site Construction and Environmental Compliance Officer (SCECO) will prepare a case to amend the CEMP and submit this (and the proposed CEMP change) to the Environmental Representative (ER) [Note]; and
- Subject to securing approval from the Environmental Representative the CEMP will be updated and a digital copy issued to relevant stakeholders. Relevant stakeholders will include all individuals and/or organisations that have been previously provided a copy of the CEMP. This will include the:
  - Department of Planning and Environment,
  - Department of Primary Industries,
  - Rural Fire Service,
  - Fire and Rescue NSW and
  - Cabonne Shire Council.

Note: The ER has advised that it can approve 'minor' amendments of the CEMP. Where changes to the CEMP are considered, by the ER, as more than minor, approval must be sought from the Department of Planning and Environment. RCRI will, in preparing a case for any amendment provide sufficient information to enable the ER to make its judgement as to whether the amendment is or is not 'minor'.

1.8 AVAILABILITY

A copy of the approved CEMP, inclusive of all sub-plans will, consistent with CoA C6, be provided to MSFPL for posting on its dedicated MSF website.

RCRI will, on request, also make publicly available a digital copy of this CEMP and have a copy of this CEMP available within its site construction office.

Construction Activity

2.1 REQUIREMENT

CoA C13(a) states the CEMP shall include:

> *a description of all relevant activities to be undertaken on site during construction including an indication of stages of construction, where relevant.*

2.2 CONSTRUCTION ACTIVITIES

Construction will be divided into discrete phases:

- Site mobilisation and preparatory civil works;
- Installation of arrays and associated electrical infrastructure;
- Installation of operations room;
- Grid connection;
- Commissioning; and
- Restoration and demobilisation.

2.3 CONSTRUCTION STAGING

The construction works program and the proposed staging of specific construction activities will include the following sequential activities:

- Road access improvements;
- Installation of perimeter fencing around the site;
- Site preparation, including locating temporary construction offices and compound facilities, parking areas and laydown areas;
- Earthworks, involving grading and trimming, construction of internal site access tracks and installation of on-site erosion and sediment controls;
- Delivery of PV modules, trackers, electrical conduits and balance of equipment;
- Installation of piles for the structural support of the individual trackers;
- Fixing of modules and trackers;
- Positioning of junction boxes, inverters and transformers;
- Connection of required cabling;
- Installation of the Operations and Maintenance Building;
- Grid connection and commissioning;
- Restoration works; and
- Demobilisation.

2.4 SCHEDULING

Construction, inclusive of commissioning and the subsequent removal of all temporary construction infrastructure is scheduled for completion by April 2018.

Construction is scheduled to commence in late June 2017: representing a 10 month construction period.

RCRI will notify Cabonne Council (CC) in the event that the scheduling of the project should change.

A breakdown of construction activities and the program for completion is provided in **Appendix K**.

2.5 SCOPE

This CEMP and the procedures and commitments contained herein will apply equally to each and every aspect of the MSF construction effort.

Requirements related to design and the operation of the MSF fall outside the scope of this CEMP: noting that an OEMP must be prepared and approved prior to the MSF commencing operations.

Cumulative Impacts

3.1 REQUIREMENT

CoA C13(b) states the CEMP shall include:

> *identification of the potential for cumulative impacts with other construction activities occurring in the vicinity and how such impacts would be managed.*

3.2 POTENTIAL IMPACT

There is no known other construction activity likely to occur in the locality that has the potential to cause a cumulative impact.

3.3 MANAGEMENT MEASURES

RCRI will maintain regular liaison with Cabonne Council (CC) during the construction program so that the potential for any cumulative impact can be monitored.

In the event that any other major construction activity is to occur in the locality, RCRI will work collaboratively with CC and the third party to ensure that significant cumulative impacts are avoided.

Site Compound

4.1 REQUIREMENT

CoA C13(c) states the CEMP shall include:

> *details of any construction sites and mitigation, monitoring, management and rehabilitation measures specific to the site compound(s) that would be implemented.*

4.2 CONSTRUCTION COMPOUNDS

4.2.1 LAYDOWN AREA

The location of the laydown area, for most of the construction effort, will be located in the north west corner of the approved development envelope (refer **Schedule of Drawings – General Arrangement**). This area will also provide toilet facilities.

As works near completion and arrays are to be erected within this area, the laydown area will be relocated to either elsewhere on-site or to a facility in Manildra. If the latter is required, the selection and use of this off-site laydown location will be undertaken in consultation with Cabonne Council.

4.2.2 SITE OFFICE

The main construction compound will include:

- construction offices;
- first aid room (including male and female emergency shower);
- 2 x 10kL water supply tanks for potable supply and bushfire fighting purposes;
- dedicated refuelling station;
- crib rooms;
- generator;
- waste and recyclable receptacles; and
- parking areas.

The location of the construction compound is shown on the **Schedule of Drawings – General Arrangement**.

4.2.3 SATELLITE CRIB ROOM

A crib room will also be established in the north east corner of the site. This will be 40 foot shipping container providing basic amenities (toilet, fridge, cold water sink and auto-boil) powered by a self bunded generator. Domestic grade effluent will be treated by a proprietary NSW Department of Health accredited Aerated Wastewater Treatment Systems (AWTS). No change room or shower facilities are proposed.

4.3 REHABILITATION PROTOCOL

The satellite crib rooms are areas that will be disturbed temporarily during construction. The rehabilitation techniques for these areas is covered in the *Groundcover Management Plan* (GCMP) (refer **Appendix D**).The GCMP's Rehabilitation Protocol objective is to successfully rehabilitate all areas disturbed by construction and will be implemented to maximise the success of rehabilitation in areas that are temporarily disturbed such as the laydown area and temporary access routes.

The objective of this protocol is to rapidly re-establish stable surfaces resistant to erosion and weed ingress and to ultimately return disturbed areas to their undisturbed state.

Obligations

5.1 REQUIREMENT

CoA C13(d) states the CEMP shall include:

> *statutory and other obligations that the Proponent is required to fulfil during construction including all relevant approvals, consultations and agreements required from authorities and other stakeholders, and key legislation and policies;*

In addition to the above:

CoA A6 states that:

> *The Proponent shall ensure that all licences, permits and approvals are obtained and maintained as required throughout the life of the project. No condition of this approval removes the obligation of the Proponent to obtain, renew or comply with such licences, permits or approvals. The Proponent shall ensure that a copy of this approval and all relevant environmental approvals are available on the site at all times during the project.*

5.2 DEVELOPMENT CONSENT

The Minister's Project Approval MP10_0122 as modified August 2015 is the overarching approval which RCRI is required to satisfy.

5.3 APPROVALS

The following statutory approvals/licences/permits/consents/authorisations are required.

Table 5.1 – Approvals

Approval	Act	Comment
s.138 Permit	*Roads Act 1993*	Prior to undertaking site access treatment works on Packham Drive. The *Provision of Private Access Application* has been lodged with Cabonne Council.
s.68 Approval	*Local Government Act 1993*	Prior to carrying out a sewerage work (i.e. the installation of Aerated Wastewater Treatment Systems).
Construction and Occupation Certificates	*Environmental Planning and Assessment Act 1979*	For proposed building works.
s.45 Notice of Proposal	*Electricity Supply Act 1995*	Work carried out by a network operator and comprising the erection, installation, extension or alteration of electricity works on any land is exempt from the requirement for an approval under the Local Government Act 1993, except in relation to buildings, however, no such work (other than routine repairs or maintenance work) may be carried out unless: notice of the proposal to carry out the work has been given to the local council, and the local council has been given a reasonable opportunity (being not less than 40 days from the date on which the notice was given) to make submissions to the network operator in relation to the proposal, and the network operator has given due consideration to any submissions so made.

5.4 COMMITMENTS

Development approval for the MSF was granted contingent on compliance with consent conditions. CoA A1 states:

> *The Proponent shall carry out the project generally in accordance with the:*
>
> *(a) EA; and*
>
> *(b) conditions of this approval.*

EA (Environmental Assessment) includes:

- The Environmental Assessment titled *Environmental Assessment Manildra Solar Farm* dated October 2010 and associated response to submissions titled *Manildra Solar Farm Submissions Report* dated December 2010;
- The application to modify the project approval (Modification 1) dated 5 December 2014 and supplementary visual impact assessment titled *Manildra Solar Farm – Modification (MP 10_0122 MOD 1)* dated 22 January 2015; and
- Modification application MP 10_0122 MOD 2 and associated letter supporting the application dated 27 July 2015.

Commitments made in the EA are referred to as Statements of Commitment (SoC).

Section 9 of this CEMP provides a summary of all SoC, including comment on their applicability to the construction phase of the MSF and the section within this CEMP where these SoC are addressed.

5.5 BIODIVERSITY OFFSET STRATEGY

CoA C9 states:

> *The Proponent shall prepare a biodiversity offset strategy, in consultation with OEH and the landholder to the satisfaction of the Secretary, to guide the development of the offset package required in condition E3. The offset strategy is to be prepared by an ecologist and submitted for approval prior to the commencement of construction and include:*
>
> *(a) consideration of all native vegetation losses and the adequacy of the proposed offset;*
>
> *(b) demonstration of how the offset will 'improve or maintain' biodiversity values;*
>
> *(c) the proposed offset ratios and connectivity improvements;*
>
> *(d) proposed management actions;*
>
> *(e) demonstration of how the strategy was prepared in accordance with OEH's Principles for the Use of Biodiversity Offsets in NSW; and*
>
> *(f) measures to ensure in-perpetuity the conservation commitment.*

MSFPL has prepared the *Biodiversity Offset Strategy* (refer **Appendix F**) to the satisfaction of the Department and emanating from this, has an approved *Offset Plan* (nghenvironmental, 2 February 2017).

RCRI will ensure construction does not compromise or conflict with any of the requirements of the *Offset Plan* (refer **Appendix G**).

5.6 AGREEMENTS

CoA A9 states:

> *Prior to the commencement of construction, the Proponent shall provide written evidence to the satisfaction of the Secretary that the lease agreements with the site landowners have adequate provisions to require that decommissioning occurs in accordance with this approval.*

It is understood this CoA has been executed by the MSFPL.

5.7 DIRECTOR GENERAL REQUESTS

RCRI will comply with any reasonable requirements of the Secretary arising from the DPE's assessment of:

- any reports, plans or correspondence that are submitted in accordance with the development approval (MP 10_0122) and relevant to the scope and function of this CEMP; and
- the implementation of any actions or measures contained in these reports, plans or correspondence relevant tot eh construction of the MSF.

5.8 HOT WORKS EXEMPTION

If proposed, prior to conducting any Hot Works in a Total Fire Ban an exemption must be obtained from the Commissioner of the NSW Rural Fire Service (RFS) pursuant to s.99 of the *Rural Fires Act 1997*.

5.9 LEGISLATION

As it relates to the construction of the MSF, RCRI has a legal obligation to comply with the following legislation:

- *Protection of the Environment Operations Act 1997;*
- *Environmental Planning and Assessment Act 1979;*
- *Fisheries Management Act 1994;*
- *National Parks and Wildlife Act 1974;*
- *Threatened Species Conservation Act 1995;*
- *Native Vegetation Act 2003;*
- *Water Management Act 2000;*
- *Waste Avoidance and Resource Recovery Act 2001;*
- *Rural Fires Act 1997;*
- *Noxious Weeds Act 1993;*
- *Local Government Act 1993;*
- *Roads Act 1993;* and
- *Electricity Supply Act.*

5.10 GUIDELINES AND POLICIES

As it relates to the construction of the MSF the following guidelines and policies are applicable.

- *Waste Classification Guidelines* (2014) EPA, 2014)
- *Interim Construction Noise Guideline* ((DECC 2009);
- *NSW Environmental Criteria for Road Traffic Noise* (ECRTN) (EPA 1999);
- *NSW Industrial Noise Policy* (EPA 2000);
- *Road Noise Policy* (EPA 2011);
- *RTA Environmental Noise Management Manual* (RTA 2001);
- *Environmental Noise Management Assessing Vibration: A Technical Guideline* (DEC, 2006);
- *AS 2436-2010 Guide to Noise and Vibration Control on Construction, Demolition and Maintenance Sites*,
- *Guidelines for watercourse crossings on waterfront land* (DPI-Water, 2012)
- *Managing Urban Stormwater: Soils and Conservation* (Landcom, 2004)
- *Managing Stormwater: Urban Soils and Construction 2A Installation of Services* (DECC, 2008)
- *Managing Stormwater: Urban Soils and Construction Vol 2C Unsealed Roads* (DECC 2008)

Agency Consultation

6.1 REQUIREMENT

CoA C13(e) states the CEMP shall include:

> *evidence of consultation with relevant public authorities required under this condition and how issues raised by the agencies have been addressed in the plan;*

In addition to the above, CoA C14 states that consultation is also required with public authorities and stakeholders in the preparation of the various sub-plans that must be included in this CEMP. These sub-plans include the:

- *Flora and Fauna Management Plan;*
- *Ground Cover Management Plan;*
- *Landscape Plan;*
- *Construction Noise Management Plan; and*
- *Traffic Management Plan.*

6.2 PUBLIC AUTHORITIES

The specific consultation requirements in CoA C13 and C14 and SoC are detailed in **Table 6.1**.

Table 6.1 – Authority/Stakeholder Consultation

Authority/Stakeholder	CoA/SoC	Requirement
Cabonne Council (CC)	CoA C13	Preparation of the Construction Environmental Management Plan
	CoA C14(e)	Traffic Management Plan
NSW Office of Water - *now* Department of Primary Industries (DPI)	CoA C13	Preparation of the Construction Environmental Management Plan
	CoA C13(m	Measures to monitor and manage soil and water impacts.
	CoA C13(n))	Measures to monitor and manage flood impacts
	SoC 65	Review of soil and water management measures in CEMP
Office of Environment and Heritage (OEH)	CoA C14(a)	Flora and Fauna Management Plan
	CoA C14(b)	Groundcover Management Plan
	CoA C2	Biodiversity Offset Strategy
Registered Aboriginal Stakeholders	SoC 35	As it relates to the CEMP, consultation will be triggered in the event that there is an unanticipated find.
NSW Fire Brigade – *now* Fire and Rescue NSW	SoC 95	Bushfire Management Plan
Rural Fire Service	SoC95	Bushfire Management Plan
Roads and Maritime Services (RMS)	CoA C14(e)	Traffic Management Plan

6.3 EVIDENCE

Evidence of this consultation can be found as follows:

Table 6.2 – Evidence of Consultation

Agency	Evidence
Cabonne Council	**Appendix J** – Evidence of Agency Consultation **Appendix B** – Traffic Management Plan
Roads and Maritime Service	**Appendix B** – Traffic Management Plan
Department of Primary Industries	**Appendix J**– Evidence of Agency Consultation
Rural Fire Service	**Appendix J** – Evidence of Agency Consultation
Fire and Rescue NSW	**Appendix J** – Evidence of Agency Consultation
Office of Environment and Heritage	**Appendix C** – Flora and Fauna Management Plan **Appendix D** – Groundcover Management Plan
Registered Aboriginal Parties	No consultation has been undertaken in the preparation of this CEMP. As detailed in **Section 17.2** – it will be if there is an unanticipated find.

How issues raised by the agencies have been addressed in the CEMP is summarised below.

Table 6.3 – Addressing Agency Issues

Agency	How Issues Raised Have Been Addressed
Cabonne Council	CEMP – No issues raised by Council. TMP –No issues raised by Council.
Roads and Maritime Service	TMP – No issues raised by RMS.
Department of Primary Industries	DPI required confirmation of monitoring arrangements post rainfall events and detail on the road crossings. The CEMP and SWMP were expanded to include the below commitments and this information was provided to DPI. <u>*Implementation of a monitoring program following rain events.*</u> Site inspection and monitoring will be undertaken to ensure the objectives of the Soil and Water Management Plan are met and the control measures perform effectively. The following monitoring program will be implemented: • Weather forecasts will be monitored daily. • Erosion and sedimentation control measures will be inspected: – weekly; – at least 24 hours prior to predicted rainfall; – daily when rainfall is occurring; and – after the rainfall event has finished. • Discharge points will be inspected weekly and prior to and post any rain event. If the discharge points are not stable then the downstream offsite dam will be inspected for evidence of sedimentation on the dam apron (with photographic evidence taken). If there is evidence of off-site sedimentation, a Corrective Action will be raised and the Soil and Water Management Plan reviewed accordingly. It is noted that this inspection regime will also specifically cover the area where the dry creek emerges into the site in the north-east corner of the site, to observe if runoff emerging upstream of the site would or would not accentuate sediment transport at the Manildra Solar Farm site. • Every inspection relating to the effectiveness of the erosion and sediment controls will be documented on the ***Inspection Checklist*** (refer *MSF_CEMP_F01*). • The health of revegetation will be inspected weekly and additional revegetation undertaken where 70% cover has not been achieved. <u>*Road crossings over the waterway should be designed to facilitate flow and detail provided on managing erosion on the downstream side.*</u> • Road crossings of the drainage depressions (intermittent watercourses) will be constructed of a compacted road base causeway shaped to match the bed profile of the depressions, with scour protection be installed on the upstream and downstream side of the crossing to mitigate erosion, and a silt fence/hay bales located downstream to suit the crossing. This crossing type is not inconsistent with DPI's *Guidelines for watercourse crossings on waterfront land*. • The rock check dams will be constructed of coarse rockfill and will not be designed to hold water.
Rural Fire Service	No issues raised.
Fire and Rescue	Fire and Rescue requested that a copy of the approved CEMP be issues to the Station Officers and the Captain and Deputy Captain at Molong. **Section 21.4** identifies who these recipients are within Fire and Rescue and confirms that a copy of the approved CEMP will be sent to these stakeholders.
Office of Environment and Heritage	The *Flora and Fauna Management Plan*, *Groundcover Management Plan* and *Biodiversity Offset Plan* (prepared by NGH) detail the consultation undertaken with OEH.
Registered Aboriginal Parties	As it relates to construction, the trigger for any consultation with the RAPs is an unanticipated find. **Section 17.2** confirms this consultation will occur.

Roles and Responsibilities

7.1 REQUIREMENT

CoA C13(f) states the CEMP shall include, but not necessarily be limited to:

> *a description of the roles and responsibilities for all relevant employees involved in the construction of the project including relevant training and induction provisions for ensuring that all employees, contractors and sub-contractors are aware of their environmental and compliance obligations under these conditions of approval*

7.2 RESPONSIBILITIES

The Proponent referenced in the CoA is Manildra Solar Farm Pty Ltd (MSFPL). The Proponent has ultimate responsibility to ensure all CoA are satisfied.

RCRI is the EPC Contractor that is building the MSF. It is doing so under an EPC Contract within which certain responsibilities for acting on specific CoA are shared between MSFPL and RCRI.

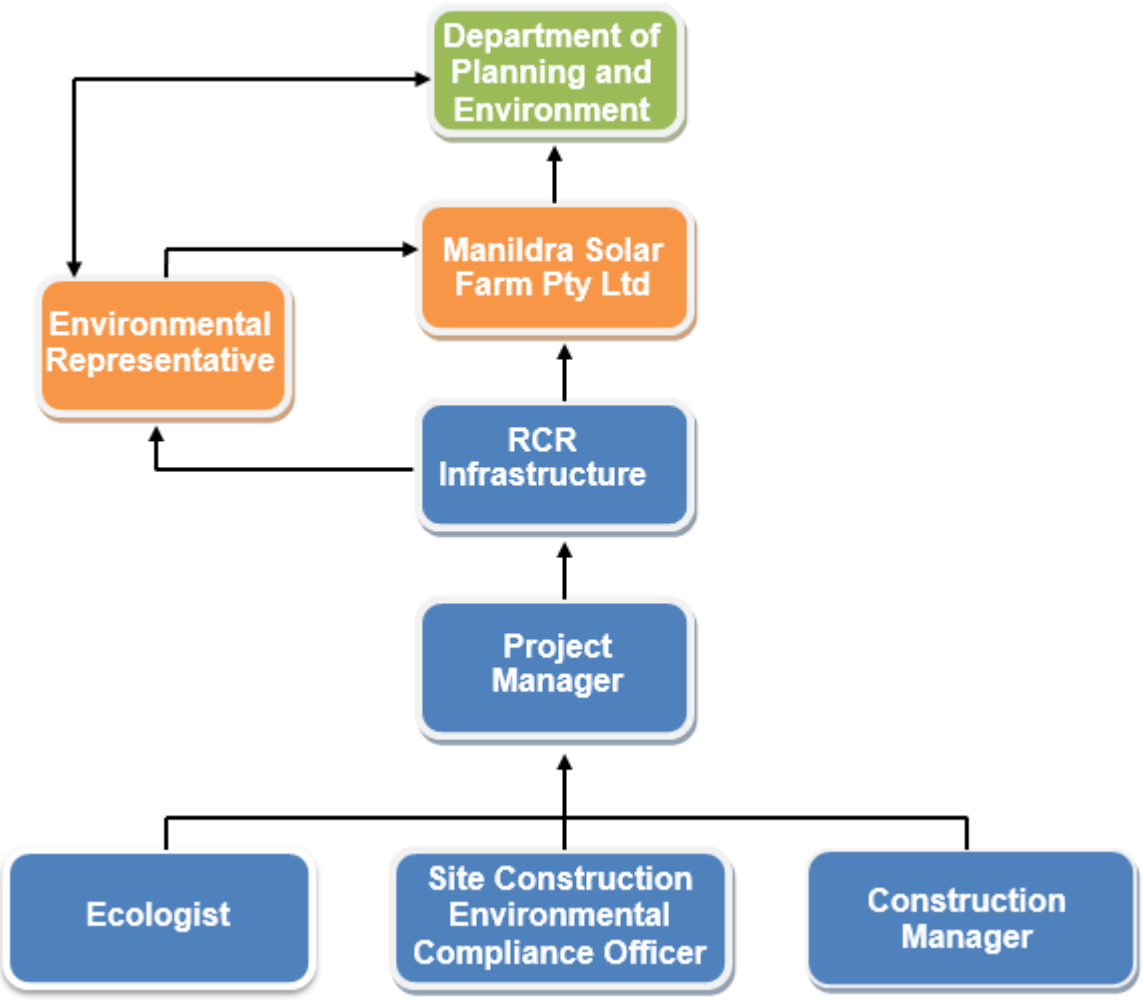


Figure 3: Roles and Responsibilities

7.3 ROLES

7.3.1 MANILDRA SOLAR FARM PTY LTD

7.3.1.1 Project Manager

The MSFPL Project Manager will have responsibility to ensure that RCRI execute their contractual obligations in full compliance with the CoA.

7.3.1.2 Environmental Representative

CoA C12 states:

> *Prior to the commencement of any construction or operational activities, the Proponent shall nominate for the approval of the Secretary a suitably qualified and experienced Environmental Representative(s) independent of the design, construction and operation personnel. The Proponent shall engage the Environmental Representative(s) prior to construction until at least six months after commencement of operation, or as otherwise agreed by the Secretary. The Environmental Representative(s) shall:*
>
> *(a) monitor the implementation of all environmental management plans and monitoring programs required under this approval;*
>
> *(b) monitor the outcome of all environmental management plans and advise the Proponent upon the achievement of all project environmental outcomes;*
>
> *(c) have responsibility for considering and advising the Proponent on matters specified in the conditions of this approval, and all other licences and approvals related to the environmental performance and impacts of the project;*
>
> *(d) ensure that environmental auditing is undertaken in accordance with the requirements of Condition C11 and the project Environmental Management System(s);*
>
> *(e) be consulted in responding to the community concerning the environmental performance of the project; and*
>
> *(f) have the authority and independence to recommend to the Proponent reasonable steps to be taken to avoid or minimise unintended or adverse environmental impacts, and, failing the effectiveness of such steps, to recommend to the Proponent that relevant activities are to be ceased as soon as reasonably practicable if there is a significant risk that an adverse impact on the environment will be likely to occur, until reasonable steps are implemented to avoid such impact.*

The nominated Environmental Representative (ER) is GHD.

7.3.2 RCR INFRASTRUCTURE

7.3.2.1 Construction Manager

The Construction Manager is responsible for ensuring that:

- All requisite environmental performance reporting is provided to MSFPL;
- Undertaking monthly internal compliance audits on the implementation and effectiveness of the CEMP; aand
- Co-operating with the nominated ER.

7.3.2.2 Site Construction and Environmental Compliance Officer

The Site Construction and Environmental Compliance Officer (SCECO) is responsible for ensuring that:

- The CEMP is communicated to all RCR personnel and subcontractors working at the site;
- The procedures and requirements of this CEMP are implemented to ensure environmental impacts are managed;
- Monitoring and conducting audits/inspections to measure the effectiveness of the CEMP;
- Reporting all incidents, complaints and other work related environmental issues; and
- Co-operating with the ER and Ecologist.

7.3.2.3 Ecologist

The approved *Flora and Fauna Management Plan* (refer **Appendix C**) and *Groundcover Management Plan* (refer **Appendix D**) allocate responsibilities to an Ecologist. As specified in these plans the roles and responsibilities of this Ecologist are summarised below.

Flora and Fauna Management Plan

- The Ecologist is responsible for providing on-site ecological services, where required by this plan (e.g. pre-clearance surveys of hollow bearing trees) and will have the authority to require actions to be undertaken in relation to ecological issues;
- Input from the ecologist will be sought at a minimum of once per month immediately before and during clearing, following the monthly compliance meetings (or as required). The ecologist will be updated as to the on-ground results of protocols. The need for on-site inspection and change to any protocols will be determined by the ecologist and RCRI's SCECO. The advice will be documented and provided to the MSFPL Project Manager;
- Additionally, the SCECO will request input from the ecologist at other times, depending on the works progress;
- The Ecologist will provide input to the updating the vegetation impact table consistent with *Protocol 3 – Vegetation Clearing*, to verify offsets are adequate;
- The Ecologist will determine the number of nest boxes required and their size, based on the hollow-bearing trees to be removed, as well as selecting the trees for mounting the boxes and providing advice on mounting aspect, fixings, height etc, consistent with *Protocol 6 – Fauna Habitat Restoration*;
- The Ecologist will provide input to clearly mark all trees containing hollows which are to be removed and undertaking the pre-clearance check, consistent with *Protocol 7 – Hollow Bearing Tree Removal Guidelines*;
- Ecologist input will be sought at a minimum of once per month, immediately before and during clearing, at or following monthly compliance meetings by the RCRI Construction Manager and SCECO, MSFPL Project Manager and ER (or as required);
- The ecologist will be updated as to the on ground results of the above protocols and will evaluate the need for onsite inspection and change to any protocols to improve the on ground results; and
- Documented results of the evaluation will be provided within two weeks of each contact with the Ecologist to the MSFPL Project Manager, Environmental Representative and RCRI Construction Manager and SCECO consistent with *Protocol 8 – Monitor and Adapt Actions.*

Groundcover Management Plan

- The Ecologist will identify weedy areas where topsoil is not to be reused consistent with *Protocol 4.3 – Rehabilitation Protocol.*

7.3.2.4 Employees and Contractors

Employees and contractors are responsible for:

- Understanding and complying at all times with the requirements of this CEMP; and
- Reporting all incidents, complaints and other work related environmental issues to the SCECO.

7.4 TRAINING AND INDUCTION

7.4.1 ENVIRONMENTAL DUE DILIGENCE

Prior to any person undertaking construction activities on-site they will be required to attend an Environmental Due Diligence induction. This induction will include an overview of the requirements of this CEMP relevant to their respective activities.

7.4.2 COMPETENCY REGISTER

A ***Due Diligence Induction Register*** (refer *MSF_CEMP_R01*) will be maintained that requires sign-off by all attendees.

Environmental Performance

8.1 REQUIREMENT

CoA C13(g) states the CEMP shall include:

> *details of how the environmental performance of construction will be monitored, and what actions will be taken to address identified potential adverse environmental impacts.*

The implementation of the environmental procedures specified in this CEMP will be monitored, reviewed and audited throughout the construction phase as summarised below.

8.2 COMPLIANCE TRACKING PROGRAM

8.2.1 REQUIREMENT

CoA C11 states:

> *Prior to the commencement of construction, the Proponent shall develop and implement a Compliance Tracking Program, to track compliance with the requirements of this approval during the construction and operation of the project and shall include, but not necessarily be limited to:*
>
> *(a) provisions for periodic reporting of compliance status to the Secretary including at least prior to the commencement of construction of the project, prior to the commencement of operation of the project and within two years of operation commencement;*
>
> *(b) a program for independent environmental auditing in accordance with AS/NZ ISO 19011:2003 - Guidelines for Quality and/or Environmental Management Systems Auditing;*
>
> *(c) procedures for rectifying any non-compliance identified during environmental auditing or review of compliance;*
>
> *(d) mechanisms for recording environmental incidents and actions taken in response to those incidents;*
>
> *(e) provisions for reporting environmental incidents to the Secretary during construction and operation; and*
>
> *(f) provisions for ensuring all employees, contractors and sub-contractors are aware of, and comply with, the conditions of this approval relevant to their respective activities.*

8.2.2 RESPONSIBILITY

RCRI, pursuant to requirements under the EPC contract, must develop and implement a tracking program for the construction works. This program must:

- Provide for reporting to the MSFPL;
- Be consistent with the EPC Contract; and
- Otherwise satisfy CoA C11.

8.2.3 COMMITMENT

RCRI as the contractor responsible for construction of the project will provide the necessary information to MSFPL as is required to enable MSFPL to fully comply with CoA C11.

8.3 PERFORMANCE MONITORING

Environmental performance will be monitored, reviewed and audited throughout the construction phase as described below.

8.3.1 WEEKLY ENVIRONMENTAL INSPECTIONS

- Inspections will be conducted by the SCECO on a weekly basis using ***Inspection Checklist*** (refer *MSF_CEMP_F01*);

  Complementing the above, targeted inspections on the effectiveness of the erosion control and sedimentation measures will be completed prior to a forecast rain event, during any rainfall evenet and after any rainfall event.
- All work areas will be inspected to assess the adequacy and effectiveness of the on-ground environmental controls.

8.3.2 MONTHLY COMPLIANCE MEETINGS

- Monthly compliance meetings will be held with the involvement of:
  - RCRI's Construction Manager and SCECO;
  - MSFPL Project Manager; and
  - Environmental Representative.

8.3.3 PROPONENT

MSFPL and the ER will undertake inspections and reporting as part of performance monitoring of the project.

8.3.4 ENVIRONMENTAL AUDITING

8.3.4.1 Internal Audits

RCRI's Construction Manager will undertake monthly environmental compliance audits throughout the construction period. The timing of these audits will be at the discretion of the Construction Manager and will be influenced by considerations relating to:

- the particular stage of construction and the on-site activities being undertaken;
- weather (e.g. intense rainfall events or protracted wet weather); and/or
- complaints or incidents.

The internal compliance audits will focus on:

- Application of procedures and practices specified in this CEMP;
- Field inspection of environmental controls;
- Review of critical controls, including contractor and sub-contractor management, emergency response, hazardous substances, incident/complaints management and investigation;
- Methods for environmental risk identification and risk control;
- Document control and review;
- Incident reporting and closure;
- Management of contractors and sub-contractors; and
- Preparedness of critical emergency response equipment.

These monthly compliance audits will be documented (refer *MSF_CEMP_F02*).

8.3.4.2 External Audit

- A single external audit (third party) audit is proposed during construction. This audit will be conducted in accordance with *ISO 19011:2003 – Guidelines for Quality and/or Environmental Management Systems*.

8.4 CORRECTIVE ACTIONS

The need to implement a Corrective Action relating to non-compliance with this CEMP or where it is apparent that the safeguards as contained in the CEMP are not adequate to prevent adverse environmental impacts, could emanate from the:

- results of the weekly site inspections;
- monthly compliance meetings;
- monthly internal audits;
- the third party external audit;
- advice from the Ecologist, or
- instruction from the Environmental Representative.

If this circumstance arises RCRI will record it in the ***Corrective Action Register (***refer *MSF_CEMP_R02),* prepare a ***Corrective Action*** (refer *MSF_CEMP_F03*) and issue it to the ER for approval. The Corrective Action will identify the proposed changes to the CEMP and what actions are proposed to avoid recurrence.

8.5 IMPROVEMENT NOTICE

Improvement opportunities relating to environmental performance could also emanate from the same source of Corrective Actions. For example, in relation to the adaptation of protocols in response to on-ground results, and consistent with the *Flora and Fauna Management Plan* (refer **Appendix C**), input from the Ecologist will be sought at a minimum of once per month immediately before and during clearing, following the monthly compliance meetings (or as required).

The ecologist will be updated as to the on-ground results of protocols. The need for on-site inspection and change to any protocols will be determined by the Ecologist. This advice will be documented and provided to MSFPL Project Manager, RCRI's Construction Manager and SCECO and the ER. Any such advice from the Ecologist would be handled as an improvement opportunity.

In the event that any improvement opportunity is identified RCRI will record it in the ***Improvement Notice Register (***refer *MSF_CEMP_R03****)***, prepare an ***Improvement Notice*** (refer *MSF_CEMP_F04*) and issue it to the ER for approval. The Improvement Notice will identify the proposed changes to the CEMP.

8.6 CEMP AMENDMENT

ER approval of either a ***Corrective Action*** or ***Improvement Notice*** will result in the CEMP being updated (refer **Section 1.7**) accordingly and the changes required to the work activity in question being communicated to all employees/contractors engaged in that work.

Statement of Commitments

9.1 REQUIREMENT

CoA C13(h) states the CEMP shall include:

> *specific consideration of relevant measures to address any requirements identified in the EA.*

EA (Environmental Assessment) includes:

- The Environmental Assessment titled *Environmental Assessment Manildra Solar Farm* dated October 2010 and associated response to submissions titled *Manildra Solar Farm Submissions Report* dated December 2010;
- The application to modify the project approval (Modification 1) dated 5 December 2014 and supplementary visual impact assessment titled *Manildra Solar Farm – Modification (MP 10_0122 MOD 1)* dated 22 January 2015; and
- Modification application MP 10_0122 MOD 2 and associated letter supporting the application dated 27 July 2015.

Relevant measures in the above documents, as they relate to safeguards to be employed prior to, during and post construction, are identified as SoC.

9.2 COMPLIANCE

Table 9.1 below provides a summary of all SoC, including clarification on their relevance to the construction phase of the MSF, as well as identifying where (section and page number) within this CEMP these SoC are addressed.

Table 9.1 – Statement of Commitments

SoC	Issue	Commitment	Relevance to Construction	CEMP Reference
BIODIVERSITY				
1	Loss or modification of habitat	An Offset Plan will be prepared by an ecologist consistent with the 'Principles for the use of biodiversity offsets in NSW', as outlined in the Biodiversity Assessment, and submitted for approval prior to the commencement of works. The plan would be developed in consultation with the landowner and would offset the impact of the development for the period that the impact occurs.	Yes	Offset Strategy Offset Plan Flora and Fauna Management Plan
2	Infrastructure related biodiversity impacts	The PV array, site access tracks and other infrastructure should be sited to avoid constraints identified within the Biodiversity Assessment constraints mapping. These include: - The larger stands of Box-Gum Woodland across the site - Hollow bearing trees - Isolated shade trees where possible - Native grassland and associated rock outcrops in the Western Paddock - As far as possible rock outcrops across the proposal site together with a minimum 2.5 metre buffer to avoid shading.	Yes	Flora and Fauna Management Plan
3	Infrastructure related biodiversity impacts	Areas of high biodiversity value would be clearly identified throughout construction and protected from the direct and indirect impacts of the Proposal. Contractors and staff would be made aware of the significance and sensitivity of these areas.	Yes	Flora and Fauna Management Plan
4	Infrastructure related biodiversity impacts	The western paddock of the proposed solar farm site should be avoided if possible to minimise impacts to grassy groundcover flora comprising the Box-Gum Woodland EEC.	Yes	Flora and Fauna Management Plan
5	Construction Impacts	Where security concerns permit perimeter fences should not contain barbed wire, particularly the top strands. If a cycisolated mesh fence is to be used efforts should be made to increase the visibility to fast flying parrots.	Yes	Flora and Fauna Management Plan
6	Construction Impacts	If used, and where practicable, power poles and overhead powerlines will be bird-safe using flags or marker balls, large wire size and wire and conductor spacing.	Yes	Flora and Fauna Management Plan
7	Infrastructure related biodiversity impacts	If the removal of any hollow bearing trees was required this activity would be proceeded by a pre clearance check by a qualified ecologist including anabat survey and stag watching.	Yes	Flora and Fauna Management Plan
8	Infrastructure related biodiversity impacts	Works will avoid impacts to mature eucalypts wherever possible. Tree protection standards should comply with Australian standard AS4970-2009 Protection of trees on development sites (Standards Australia, 2009). Wherever practicable, excavations and vehicle/machinery movements will occur outside the canopy dripline of large eucalypts.	Yes	Flora and Fauna Management Plan
9	Construction Impacts	Existing farm tracks should be used wherever possible to minimise the number of new roads.	Yes	Flora and Fauna Management Plan
10	Construction Impacts	Where cement is included in cable trench backfill, at least 20 centimetres of cement-free topsoil will be replaced as the top layer in the backfill.	Yes	Groundcover Management Plan

Table 9.1 – Statement of Commitments

SoC	Issue	Commitment	Relevance to Construction	CEMP Reference
11	Construction Impacts	Where practicable, whole sods will be removed with an excavator where these areas are well-vegetated with dense root systems. Sods will be stored in moist, shaded conditions and replaced following the works. Sod storage time will be minimised and sods will be replaced in a manner that maximises the chances of re-establishment.	Yes	Flora and Fauna Management Plan
12	Construction Impacts	Where possible, as a precaution, works should be planned to avoid sensitive times for Superb Parrots - September to January.	Yes	Flora and Fauna Management Plan
13	Construction Impacts	Excavated topsoil, subsoil will be stored separately and replaced in a manner that replicates the original profile as closely as possible	Yes	Flora and Fauna Management Plan
14	Construction Impacts	Where practicable, grass surfaces and shrubs will be retained or restored on infrequently used vehicle routes	Yes	Groundcover Management Plan
15	Construction Impacts	Site stabilisation, rehabilitation and revegetation of all disturbed areas would be undertaken without delay.	Yes	Groundcover Management Plan
16	Construction Impacts	As a general rule, disturbed areas will be used preferentially for vehicle and machinery access, materials laydown, stockpiling of cleared vegetation and the deposition and retrieval of spoil whenever practicable.	Yes	Flora and Fauna Management Plan
17	Construction Impacts	Works will be avoided during, and immediately following heavy rainfall events to protect soils and vegetation at the site.	Yes	Groundcover Management Plan
18	Construction Impacts	Weed / pathogen controls will be implemented, including: - Machinery and vehicles used in construction works will be washed before and after site access to reduce the introduction and spread of weeds and pathogens. - Laydown sites for excavated spoil, equipment and construction materials will be weed-free or treated for weeds wherever practicable. - Weed monitoring will be carried out at all sites after the completion of construction works and ongoing weed control will occur where noxious or invasive species are recorded. In particular, monitoring will be undertaken during the following late spring/early summer, and remedial action taken as required. - Sediment control materials should be weed free (straw bales, geotextiles). - Imported materials such as sand and gravel will be sourced from sites which do not show evidence of noxious weeds or Phytophthora infection	Yes	Groundcover Management Plan
19	Construction Impacts	If dams are removed during site development works, alternative watering points should be established to compensate for their loss and maintain similar habitat resources for native fauna.	Yes	Flora and Fauna Management Plan
20	Construction Impacts	Any trench sections left open for greater than a day would be inspected daily, early in the morning and any trapped fauna removed. The use of ramps or ladders to facilitate trapped fauna escape is recommended.	Yes	Flora and Fauna Management Plan

Table 9.1 – Statement of Commitments

SoC	Issue	Commitment	Relevance to Construction	CEMP Reference
21	Construction Impacts	Rock and log habitat removed during the construction phase will be reinstated following the works.	Yes	Flora and Fauna Management Plan
22	Construction Impacts	Where tree hollows are required to be removed, these should be replaced by nest boxes of similar size in nearby trees.	Yes	Flora and Fauna Management Plan
23	Construction Impacts	Wherever possible small rock outcrops at the site should be excluded from the array, together with a minimum 2.5 metre buffer to avoid shading.	Yes	Groundcover Management Plan
24	Operational Impacts	A groundcover management plan would be developed that would include regular monitoring of vegetation cover and composition and allow for adaptive management. This would include: - Establishment of a shade tolerant perennial groundcover across the cropping and exotic dominated grazing paddocks prior to the installation of the PV arrays - Advice from an agronomist in relation to preferred species/varieties, establishment methods of alternative pastures and best practice management. - Where information is lacking, trials may be required onsite	Yes	Groundcover Management Plan
25	Operational Impacts	If localised erosion is detected, effective treatments would be applied without delay, such as hardening with mulch, reseeding and covering with an open weave jute matting, gypsum application to improve structure and infiltration, protection with geotextile fabric or localised flow dispersal and diversion structures.	Yes	Groundcover Management Plan
26	Operational Impacts	The space between the PV array rows should be maintained and kept clear to enable access by vehicles for ongoing weed control, and pasture renovation if required.	No	Groundcover Management Plan
27	Operational Impacts	Efforts should be made to minimise disturbance to the existing groundcover during construction. Construction and maintenance vehicles should not access the site when soils are very wet to minimise soil compaction and disturbance.	Yes	Groundcover Management Plan
28	Operational Impacts	Fencing along Molong Manildra Road should be maintained so as macropods and other large native fauna are not funnelled along the perimeter fence and onto the road creating a traffic hazard and collision risk to the animal.	No	Operational Environmental Management Plan
29	Operational Impacts	Monitoring of fauna site habitat usage pre and post construction is recommended but not considered essential	No	-
Visual Amenity				
30	Deterioration of visual amenity during construction	Measures to reduce visual impacts during construction, including but not limited to the following: - Dust reduction throughout the construction process - Restoration of any earthworks required for the construction - Clearing of existing vegetation would be kept to a minimum	Yes	Section 20 Flora and Fauna Management Plan Groundcover Management Plan

Table 9.1 – Statement of Commitments

SoC	Issue	Commitment	Relevance to Construction	CEMP Reference
31	Deterioration of visual amenity by solar panels and associated infrastructure	Measures include but are not limited to the following: - Colour of above ground infrastructure to be sympathetic to the landscape character - Underground cabling to be utilised if practical - The design and location of ancillary works are to incorporate measures which would reduce this visual impact	No	Design
32	Deterioration of visual amenity at surrounding residences and roads	- Visual screen planting is to be undertaken in the form of boundary planting around the solar farm, foreground planting at affected viewpoints and residential tree planting. - Screening vegetation would be planted along the northern, southern and western perimeters of the site. - Roadside planting along the eastern edge of Manildra Molong Road may be undertaken to ensure views from the road are fragmented - Tree planting would be undertaken in consultation with relevant landowners to achieve screening for homesteads with visual impacts to strategically block parts of the development. - Species typical of the area would be selected to enhance the existing landscape character.	No	Post construction
33	Creation of a visual Attraction	A designated viewing area may be provided where visitors would be able to safely view the solar farm and surrounding landscape.	No	
Archaeology & Aboriginal Heritage				
34	Disturbance to artefacts	Where possible, the artefact scatter comprising five stone artefacts would be avoided.	Yes	Section 17
35	Impact on local Aboriginal community	Ongoing consultation would be undertaken with Registered Aboriginal Parties	Yes	Section 17
Noise				
36	Noise impacts to sensitive receivers	Construction would be undertaken during standard working hours of: - Monday – Friday: 7 am to 6 pm - Saturday: 8 am to 1 pm - Sunday and public holidays: No work	Yes	Construction Noise Management Plan
37	Noise impacts to sensitive receivers	Construction staff would be made aware of noise sensitive receivers and would be made aware of noise reduction options.	Yes	Construction Noise Management Plan
38	Noise impacts to sensitive receivers	Periods of respite would be provided in the case of unavoidable maximum noise level events.	Yes	Construction Noise Management Plan
39	Noise impacts to sensitive receivers	Reasonable and feasible measures to reduce noise would be implemented and could include reducing the throttle setting and turning off equipment when not being used.	Yes	Construction Noise Management Plan

Table 9.1 – Statement of Commitments

SoC	Issue	Commitment	Relevance to Construction	CEMP Reference
40	Noise impacts to sensitive receivers	Equipment and plant would be maintained to reduce noise emissions.	Yes	Construction Noise Management Plan
41	Noise impacts to sensitive receivers	Mobile plant clustering near residences would be avoided.	Yes	Construction Noise Management Plan
42	Noise impacts to sensitive receivers	A 24 hour toll-free contact phone number for enquiries during the works would be provided.	Yes	Construction Noise Management Plan
43	Noise impacts to sensitive receivers	A documented complaints process would be implemented and would include an escalation procedure so that if a complainant is not satisfied there is a clear path to follow.	Yes	Construction Noise Management Plan
44	Noise impacts to sensitive receivers	Where complaints occur safeguards would be reviewed to determine if further safeguards are required or possible.	Yes	Construction Noise Management Plan
Traffic and Access				
45	Safety and asset Protection	The proponent would develop and implement a Traffic Management Plan (TMP) in consultation with roads authorities to facilitate appropriate management of potential traffic impacts. The TMP would include provisions for: - Scheduling of deliveries and managing timing of transport to minimise impacts on road and rail traffic - Limiting the number of trips per day - Undertaking community consultation before and during all haulage activities - Designing and implementing temporary modifications to intersections, roadside furniture, stock grids and gates - Managing the haulage process, including the erection of warning and/or advisory speed signage prior to isolated curves, crests, narrow bridges and change of road conditions - Designation of a speed limit would be placed on all of the roads that would be used primarily by construction traffic - Preparation of a Transport Code of Conduct to be made available to all contractors and staff - Identification of a procedure to monitor the traffic impacts during construction and work methods modified (where required) to reduce the impacts - Provide a contact phone number to enable any issues or concerns to be rapidly identified and addressed through appropriate procedures - Reinstatement of pre-existing conditions after temporary modifications to the roads and pavement along the route.	Yes	Traffic Management Plan
46	Safety and asset Protection	The proponent would use a licensed haulage contractor with experience in transporting similar loads, responsible for obtaining all required approvals and permits from the RTA and Councils and for complying with conditions specified in those approvals.	Yes	Traffic Management Plan

Table 9.1 – Statement of Commitments

SoC	Issue	Commitment	Relevance to Construction	CEMP Reference
47	Safety and asset Protection	The proponent would prepare road dilapidation reports covering pavement and drainage structures in consultation with roads authorities for the route prior to the commencement of construction and after construction is complete. This report would include consideration of the Old Orange Road rail crossing.	Yes	Traffic Management Plan
48	Safety and asset Protection	The proponent would repair any damage resulting from the construction traffic (except that resulting from normal wear and tear) as required during and after completion of construction at the proponent's cost or, alternately, negotiate an alternative for road damage with the relevant roads authority.	Yes	Traffic Management Plan
49	Safety and asset Protection	Route specific mitigation measures, which would be investigated and detailed further in the Traffic Management Plan, include accessing the site via Old Orange Road and using the existing access track within site boundaries.	Yes	Traffic Management Plan
Historic Heritage				
51	Impact to a potential heritage item (abandoned stone Cottage	Should direct impacts on the cottage ruin or part of its built fabric be required (including road upgrades or heavy vehicle vibration), impacts would be managed in accordance with the assessment of heritage significance recommendations, above, and in consultation with a noise and vibration specialist. This may include: - Traffic management measures, such as 'go slow' areas or vibration loggers - Fencing or demarcating the site - Clear identification of the feature on CEMP site maps and staff induction	Yes	Section 15
52	Disturbance to a potential historic relic	In the event of an item of heritage significance being uncovered at the proposal site after works commence, the NSW Heritage Branch (Department of Planning) should be contacted prior to further work being undertaken at the site.	Yes	Section 15
Soils and Landforms				
53	Soil loss and soil quality	Progressive Erosion and Sediment Control Plans would be prepared for the site, including controls at drainage lines and slopes.	Yes	Section 18
54	Soil loss or stability of landform loss	Access track construction and management would comply with guidelines set down in DLWC (1994), Landcom (2004) and DECC (2008b).	Yes	Section 18
55	Soil quality	Avoid compaction of soil resulting from vehicle access and laying of materials particularly during saturated soil conditions, and remediate as necessary.	Yes	Section 20.3 Groundcover Management Plan
56	Soil Quality	Where cement is included in cable trench backfill, at least 20 centimetres of cement-free topsoil would be replaced as the top layer in the backfill.	No	No cement will be used in trenches
57	Soil loss or stability of landform loss	Concrete wash would be deposited in an excavated area, below the level of the topsoil, or in an approved landfill site. Where possible, waste water and solids would be reused onsite.	No	No concrete wash will be generated.

Table 9.1 – Statement of Commitments

SoC	Issue	Commitment	Relevance to Construction	CEMP Reference
58	Soil loss or stability of landform loss	Access routes and tracks would be confined to already disturbed areas, where possible. All contractors would be advised to keep to established tracks.	Yes	Section 20.3 Flora and Fauna Management Plan
59	Soil quality	A spill response plan would be developed for all phases of the project. This would include trigger points of when to notify the DECCW	Yes	Section 18.2 Section 13
60	Soil loss or stability of landform loss	If concentrated rainsplash and runoff below the panel rows result in localised erosion, the affected soils at the site should be treated and protected without delay.	Yes	Weekly Checklist Form: (MSF_CEMP_F01)
61	Soil loss or stability of landform loss	The proponent would routinely monitor soil condition and vegetation cover below the array and liaise with the landowner regarding stock and vegetation management issues as required.	No	Operational Environmental Management Plan
62	Soil loss or stability of landform loss	Thick and continuous pasture cover should be established prior to the installation of the array, and maintained at all times, including during winter and drought periods if possible.	Yes	The site is currently under a thick and continuous pasture cover.
Hydrology and Water Quality				
63	Deterioration of water quality (Surface Water)	Infrastructure placement, including tracks, substations, control buildings, stockpiles, and site compounds and turnaround areas, would not be sited within 40 metres of a major drainage line or water course	Yes	Refer Soil and Water Mangement Plan
64	Deterioration of water quality (Surface Water)	The proponent would prepare a Erosion and Sediment Control Plan (ESCP) as a sub-plan of the Construction Environmental Management Plan. This plan would include the following provisions: - Sediment traps would be installed wherever there is potential for sediment to collect and enter waterways - Stockpiles generated as a result of construction activities would be bunded with silt fencing, (mulch bunds or similar) to reduce the potential for runoff from these areas - On the steeper slopes check banks or berms would be installed across the trenchline, as appropriate, following closure of the trench. These would discharge runoff to areas of stable vegetation - Stabilisation and site remediation would be undertaken as soon as practicable throughout and post construction - Soil and water management practices would be developed as set out in Soils and Construction Vol. 1 (Landcom 2004) - Monitoring of surface water quality would be undertaken following heavy rainfall events	Yes	Refer Soil and Water Management Plan
65	Deterioration of water quality (Surface Water)	The site CEMP and OEMP would be provided to the New South Wales Office of Water for review of soil and water management measures for construction and operation, prior to project commencement.	Yes	Refer Soil and Water Management Plan
66	Water supply	Undertake liaison with representatives of Cabonne Council regarding the potential supply of construction water	Yes	Section 20

Table 9.1 – Statement of Commitments

SoC	Issue	Commitment	Relevance to Construction	CEMP Reference
67	Deterioration of water quality (Surface Water)	All vehicles onsite would follow established trails and minimise onsite movements	Yes	Flora and Fauna Management Plan
68	Deterioration of water quality (Surface and Ground Water)	Machinery would be operated and maintained in a manner that minimises risk of hydrocarbon spills	Yes	Section 18
69	Deterioration of water quality (Surface and Ground Water)	Maintenance or re-fuelling of machinery would be carried out on hard-stand in accordance with industry standards for fuel transfer	Yes	Section 18
70	Deterioration of water quality (Surface and Ground Water)	Design of concrete batch plants would ensure concrete wash would not be subjected to uncontrolled release. Areas of the batching would be bunded to contain peak rainfall events and remediated after the completion of the construction phase. Waste sludge would be recovered from the settling pond and used in the production of road base manufactured onsite. The waste material would be taken from the batching plant to be blended in the road base elsewhere onsite.	No	No concrete batch plants are proposed.
71	Deterioration of water quality (Surface and Ground Water)	Carry out dust suppression as required through either watering or chemical means (environmentally friendly polymer based additives to water).	Yes	Section 20
72	Deterioration of water quality (Surface Water)	A Site Restoration Plan (SRP) would be prepared as part of the Construction Environmental Management Plan. This would set out protocols for restoration works including: - Site Preparation - Stabilisation - Revegetation - Monitoring	Yes	Groundcover Management Plan

Table 9.1 – Statement of Commitments

SoC	Issue	Commitment	Relevance to Construction	CEMP Reference
73	Deterioration of water quality (Surface and Ground Water)	A Spill Response Plan would be prepared as part of the CEMP and OEMP including: - Identify persons responsible for implementing the plan if a spill of a dangerous or hazardous chemical/waste would occur - Identify all chemicals required for the proposal, including physio-chemical properties, risks posed to water quality objectives and appropriate methods of storage of these chemicals. - Locate Material Safety Data Sheets (MSDS) for all chemical inventories at on site and readily available - Comply with manufacturers recommendations in relation to application and disposal where chemicals are used - Report any spill that occurs to the Construction Manager regardless of the size of the spill - Establish clearly defined works and refuelling areas - Spill protocols in this plan would dictate when the EPA would be notified - Chemical / fuel storage areas would be identified, and be bunded to prevent loss of any pollutants - Hydrocarbon spill kits would be stored at the site. A number of site staff are to be trained in the use of the spill kits	Yes	Section 18.2
74	Deterioration of water quality (Surface and Ground Water)	The proponent would notify the NSW DECC EPA in the event of any spill that had the potential to pollute waters	Yes	Section 13.3
75	Protection of ground Water	Undertake investigations, as part of the geotechnical investigation, to ensure that the project would have no material adverse effect on groundwater/aquifers as a result of blasting activities	No	No blasting is proposed
76	Deterioration of water quality (Surface and Ground Water)	Monitor bunded infrastructure to ensure that volume of oil could be fully contained in the event of leak	Yes	Section 18 Weekly Checklist Form: (MSF_CEMP_F01)
77	Deterioration of water quality (Surface and Ground Water)	Maintain septic systems, if installed, to meet appropriate Australian standards	Yes	Section 18.3.2
Air Quality and Climate				
78	Air quality	Dust levels at stockpile sites would be visually monitored. Dust suppression would be implemented if required. Stockpiles would be protected from prevailing weather conditions	Yes	Section 20
79	Air quality	Undertake ongoing visual dust monitoring and suppression (if required) during the construction phase. Monitoring would regularly assess the effectiveness of dust suppression activities. Monitoring would regularly assess the effectiveness of dust suppression activities.	Yes	Section 20
80	Air quality	Should a complaint relating to dust by a resident be received, dust monitoring would be undertaken. The proponent would assess the dust gauges and identify additional mitigation measures, where required.	Yes	Section 12

Table 9.1 – Statement of Commitments

SoC	Issue	Commitment	Relevance to Construction	CEMP Reference
81	Air quality	Vegetation cover would be maintained throughout operation	No	Operational Environmental Management Plan
Waste Management and Resource Use				
82	Waste generation	The proponent would prepare a Waste Management Plan to be included within the Construction Environmental Management Plan. It would include but not be limited to the following: - The scope for reuse and recycling would be evaluated - Provision for recycling would be made onsite - Wastes would be disposed of at appropriate facilities - Toilet facilities would be provided for onsite workers and sullage from contractor's pump out toilet facilities would be disposed at the local sewage treatment plants or other suitable facility agreed to by Council - Excavated material would be used in road base construction where possible. Surplus material would be disposed of in appropriate locations on site (on agreement with the landowner), finished with topsoil, and revegetated.	Yes	Section 22
83	Waste generation	PV modules would be recycled, where possible	No	Operational Environmental Management Plan
Socio-Economic and Community				
83	Impact on current land use	Develop, implement and monitor the effects of a Site Restoration Plan. The plan would aim to stabilise disturbed areas. The Plan would consider: - Appropriate stabilisation techniques across the precincts - Suitable species for re-seeding (native, locally occurring species would be given preference) in areas dominated by native cover - Monitoring for weed and erosion issues	Yes	Groundcover Management Plan
84	Impact on current land use	Liaison would be undertaken with neighbouring landowners to provide information about the timing and routes to be used during construction and decommissioning. This could be in the form of advertising and provision of a contact point for further inquiries. The aim would be to reduce the risk of interference with agricultural activities on affected roads and road verges	Yes	Section 11
85	Impact on local community	Liaise with local industry representatives to maximise the use of local contractors and manufacturing facilities in the construction and decommissioning phases of the project.	No	The project is listed on the Industry Capability Network (ICN) website and provides a mechanism for maximising opportunities for local business and contractors.
86	Impact on local community	Liaise with the local visitor information centres to ensure that construction and decommissioning timing and haulage routes are known well in advance of works and to the extent practical coordinated with local events, such as the Agricultural show.	Yes	Section 11

Table 9.1 – Statement of Commitments

SoC	Issue	Commitment	Relevance to Construction	CEMP Reference
87	Impact on local community	Make available employment opportunities and training for the ongoing operation of the solar farm to local residents where reasonable.	No	
88	Impact on local community	Dissemination of accessible and independent information on solar farm impacts.	Yes	Section 11
Land Use and Mineral Resources				
89	Impact on current land Use	A Site Restoration Plan would be developed to ensure stabilisation of disturbed areas as quickly as possible. The Plan would consider: - Appropriate stabilisation techniques across the precincts. - Suitable species for re-seeding (native, locally occurring species would be given preference) in areas dominated by native cover. - Monitoring for weed and erosion issues.	Yes	Groundcover Management Plan
90	Impact on Manildra Common Pit	The proponent would consult the Cabonne Council regarding any potential traffic issues during construction of the Solar Farm, for incorporation into the Traffic Management Plan.	Yes	Traffic Management Plan
91	Impact on current land Use	Liaison would be undertaken with neighbouring landowners and landowners adjoining access roads, to provide information about the timing and routes to be used during construction and decommissioning. This could be in the form of advertising and provision of a contact point for further inquiries. The aim would be to reduce the risk of interference with agricultural activities on affected roads and road verges	Yes	Section 11
92	Impact on current land Use	Grazing of sheep within the panel areas is likely to occur. The carrying capacity is likely to be reduced, however condition of the site would be considered in relation to stocking rates.	No	Operational Environmental Management Plan
Health and Safety				
93	Radiation exposure from EMFs	Adhere to standard industry approaches and policies with respect to EMF through maintenance of adequate easements around transmission lines.	No	Operations
94	Radiation exposure from EMFs	The substation upgrade and transmission lines would be located as far as practical from residences, farm sheds, and yards in order to reduce the potential for both chronic and acute exposure.	No	Design
Fire and Bushfire Issues and Impacts				

Table 9.1 – Statement of Commitments

SoC	Issue	Commitment	Relevance to Construction	CEMP Reference
95	Bushfire risk	The proponent would prepare a Bushfire Management Plan as part of the Construction Environmental Management Plan and Operation Environmental Management Plan. The Rural Fire Service and NSW Fire Brigade would be consulted in regard to its adequacy to manage bushfire risks during construction, operation and decommissioning. The plan would as a minimum include: - Hot-work procedures, asset protection zones, safety, communication, site access and response protocols in the event of a fire originating in the solar farm infrastructure, or in the event of an external wildfire threatening the solar farm or nearby persons or property. - Fire response planning would address any potential for dangerous gas emissions from the solar farm during a fire event to affect firefighters and neighbouring residents. - Flammable materials and ignition sources brought onto the site, such as hydrocarbons, would be handled and stored as per manufacturer's instructions. - During the construction phase, appropriate fire fighting equipment would be held onsite when the fire danger is very high to extreme, and a minimum of one person on site would be trained in its use. The equipment and level of training would be determined in consultation with the local RFS. - Asset protection zones (APZs), based on the NSW policy document Planning for Bushfire Protection, would be maintained around the site buildings and in the transmission line corridor. Workplace health and safety protocols would be developed to minimise the risk of fire for workers during construction and during maintenance in the control room and amenities. - Fire extinguishers would be stored onsite in each of the site buildings.	Yes	Section 21 Emergency Response Plan
96	Bushfire risk	If sowing of pasture grasses in the PV array area is required, low growing species should be selected.	Yes	Groundcover Management Plan
97	Bushfire risk	Pasture would be maintained at a low height (<100mm) below the PV array using sheep grazing or slashing	Yes	Groundcover Management Plan
98	Bushfire risk	Appropriate firefighting equipment would be maintained on the site during the operation of the solar farm, including protective clothing. Staff would be trained in its use.	No	Operations
99	Bushfire risk	A formal response procedure would be developed for operation staff at the solar farm, including procedures for notification of neighbouring and downwind landholders if required.	No	Operations

Source: nghenvironmental (December 2010) *Manildra Solar Farm: Submissions Report*

Conditions of Approval

10.1 REQUIREMENT

CoA C14(i) states the CEMP shall include:

> *the additional requirements of this approval.*

10.2 COMPLIANCE

Table 10.1 provides a summary of all Conditions of Approval (CoA), including clarification on their relevance to the construction component of the MSF, and the sections within this CEMP where these CoA are addressed.

Table 10.1 – Conditions of Approval

CoA	Description	Relevance to CEMP	CEMP Reference
Part A – Administrative Conditions			
A1	The Proponent shall carry out the project generally in accordance with the: (a) EA; and (b) conditions of this approval. Note: The general layout of the project is shown in Appendix 1.	Yes	Entire CEMP
A2	In the event of an inconsistency between the above documents, the most recent document shall prevail to the extent of any inconsistency. However, the conditions of this approval shall prevail to the extent of any inconsistency.	Yes	Entire CEMP
A3	The Proponent shall comply with any reasonable requirement(s) of the Secretary arising from the Department's assessment of: (a) any reports, plans or correspondence that are submitted in accordance with this approval; and (b) the implementation of any actions or measures contained in these reports, plans or correspondence.	Yes	Section 5.7
A4	For the purpose of section 75S(2)(b) of the Act, the relevant provisions, as defined in section 75S(1A) of the Act, apply to this approval.	No	-
A5	This project approval shall lapse on 3 March 2019, unless the works subject of this approval have been physically commenced before that date.	No	-
A6	The Proponent shall ensure that all licences, permits and approvals are obtained and maintained as required throughout the life of the project. No condition of this approval removes the obligation of the Proponent to obtain, renew or comply with such licences, permits or approvals. The Proponent shall ensure that a copy of this approval and all relevant environmental approvals are available on the site at all times during the project.	Yes	Section 5
A7	Within one year of decommissioning, the site shall be returned, as far as practicable, to its condition prior to the commencement of construction in consultation with relevant landowners. All solar panels and associated above ground structures including but not necessarily limited to, the substation, the control and facilities building and electrical infrastructure, including underground infrastructure to a depth of 300mm, shall be removed from the site unless otherwise agreed by the Secretary, except where the substation, control room or overhead electricity lines are transferred to or in the control of the local electricity network operator. All other elements associated with the project, including site roads, shall be removed unless otherwise agreed to by the Secretary.	No	Operational Environmental Management Plan
A8	If the solar farm is not used for the generation of electricity for a continuous period of 12 months, it shall be decommissioned by the Proponent, unless otherwise agreed by the Secretary. The Proponent shall keep independently-verified annual records of the use of the solar panels for electricity generation. Copies of these records shall be provided to the Secretary upon request. The solar panels and any associated infrastructure are to be dismantled and removed from the site by the Proponent within 18 months from the date that the solar panels were last used to generate electricity.	No	Operational Environmental Management Plan
A9	Prior to the commencement of construction, the Proponent shall provide written evidence to the satisfaction of the Secretary that the lease agreements with the site landowners have adequate provisions to require that decommissioning occurs in accordance with this approval.	Yes	MSFPL responsibility

Table 10.1 – Conditions of Approval

CoA	Description	Relevance to CEMP	CEMP Reference
A10	All staff and contractors are made aware of the stone cottage ruin adjacent to the access road. The site of the cottage should be clearly marked out, fenced, and referred to in the CEMP for the proposal.	Yes	Section 15
A11	Should widening of the access road that would decrease its distance to the cottage be proposed, then further assessment of the impacts on the Stone Cottage ruin shall be conducted. A Heritage Impact Statement must be prepared and submitted for the Secretary's approval prior to the commencement of any construction works of the access road.	Yes	Section 15
A12	Nothing in this approval permits the demolition or other direct impacts on the Stone Cottage ruin.	Yes	Section 15
Part B – General Conditions			
B1	The Proponent shall ensure that all project components on site are designed, constructed and operated to minimise ignition risks, provide for asset protection consistent with relevant RFS design guidelines (Planning for Bushfire Protection 2006 and Standards for Asset Protection Undated) and provide for necessary emergency management including appropriate fire-fighting equipment and water supplies on site to respond to a bush fire.	Yes	Section 21
B2	Throughout the operational life of the project, the Proponent shall regularly consult with the local RFS to ensure its familiarity with the project, including the construction timetable and the final location of all infrastructure on the site. The Proponent shall comply with any reasonable request of the local RFS to reduce the risk of bushfire and to enable fast access in emergencies.	Yes	Section 21
B3	The Proponent shall construct and operate the project in a manner that minimises dust generation from the site, including wind-blown and traffic-generated dust as far as practicable. All project related activities on the site shall be undertaken with the objective of preventing visible emissions of dust from the site. Should visible dust emissions attributable to the project occur during operation and construction, the Proponent shall identify and implement all practicable dust mitigation measures, including cessation of relevant works, as appropriate, such that emissions of visible dust cease.	Yes	Section 20
B4	Except as may be expressly provided by an Environment Protection Licence for the project, the Proponent shall comply with section 120 of the *Protection of the Environment Operations Act 1997* which prohibits the pollution of waters.	Yes	Section 18
B5	The Proponent shall not cause, permit or allow any waste generated outside the site to be received at the site for storage, treatment, processing, reprocessing, or disposal on the site, except as expressly permitted by a licence under the Protection of the Environment Operations Act 1997, if such a licence is required in relation to that waste.	Yes	Section 22
B6	The Proponent shall maximise the reuse and/or recycling of waste materials generated on site, to minimise the need for treatment or disposal of those materials outside the site.	Yes	Section 22
B7	The Proponent shall ensure that all liquid and/or non-liquid waste generated on the site is assessed and classified in accordance with Waste Classification Guidelines (DECC, 2008), or any future guideline that may supersede that document and where removed from the site is only directed to a waste management facility lawfully permitted to accept the materials.	Yes	Section 22
B8	The Proponent shall ensure that no green waste is burnt on site during the life of the project.	Yes	Section 22

Table 10.1 – Conditions of Approval

CoA	Description	Relevance to CEMP	CEMP Reference
B9	The Proponent shall store and handle all dangerous goods (as defined by the Australian Dangerous Goods Code), combustible liquids, and any other hazardous materials strictly in accordance with: (a) all relevant Australian Standards; (b) a minimum bund volume requirement of 110% of the volume of the largest single stored volume within the bund; and (c) Storing and Handling Liquids: Environmental Protection – Participants Manual (2007); and (d) Environmental Compliance Report: Liquid Chemical Storage, Handling and Spill Management – Part B Review of Best Practice and Regulation (2005). In the event of an inconsistency between requirements listed from a) to d) above, the most stringent requirement shall prevail to the extent of the inconsistency.	Yes	Section 18.2
Part C – Prior to Construction			
C1	The clearing of all native vegetation is to be limited to the minimal extent practicably required. Details regarding the procedures for clearing vegetation and minimising the extent of clearing shall be clearly included in the Flora and Fauna Management Plan required by in condition C14(a).	Yes	Flora and Fauna Management Plan
C2	The Proponent shall prepare a biodiversity offset strategy, in consultation with OEH and the landholder to the satisfaction of the Secretary, to guide the development of the offset package required in condition E3. The offset strategy is to be prepared by an ecologist and submitted for approval prior to the commencement of construction and include: (a) consideration of all native vegetation losses and the adequacy of the proposed offset; (b) demonstration of how the offset will 'improve or maintain' biodiversity values; (c) the proposed offset ratios and connectivity improvements; (d) proposed management actions; (e) demonstration of how the strategy was prepared in accordance with OEH's Principles for the Use of Biodiversity Offsets in NSW; and (f) measures to ensure in-perpetuity the conservation commitment.	Yes	Offset Strategy
C3	Deleted	-	-
C4	Prior to the commencement of construction of the project, the Proponent shall commission a suitably qualified expert to assess the condition of all public roads proposed to be traversed by construction traffic associated with the project (including over-mass or over-dimensional vehicles) in consultation with Council and the RMS, and identify any upgrade requirements to accommodate project traffic for the duration of construction (including culvert, bridge and drainage design; intersection treatments; vehicle turning requirements; and site access) considering final traffic volumes. The road dilapidation report shall be submitted to the Secretary prior to the commencement of construction clearly identifying recommendations made by the Council and the RMS and how these have been addressed. The Proponent shall ensure that all upgrade measures identified in the report are implemented to the satisfaction of Council and the RMS, prior to the commencement of construction.	Yes	Traffic Management Plan
C5	Subject to reasonable confidentiality requirements, the Proponent shall make all documents required under this approval available for public inspection on request.	Yes	Section 11

Table 10.1 – Conditions of Approval

CoA	Description	Relevance to CEMP	CEMP Reference
C6	Prior to the commencement of construction, the Proponent shall establish a dedicated website or maintain dedicated pages within its existing website for the provision of electronic information associated with the project. The Proponent shall publish and maintain up-to-date information on this website or dedicated pages including, but not necessarily limited to: (a) the status of the project; (b) a copy of this approval and any future modification to this approval; (c) a copy of each relevant environmental approval, licence or permit required and obtained in relation to the project; (d) a copy of each plan, report, or monitoring program required by this approval; and (e) details of the outcomes of compliance reviews and audits of the project.	Yes	http://www.firstsolar.com/en-AU/Resources/Projects/Manildra-Solar-Farm Section 11
C7	Prior to the commencement of construction, the Proponent shall prepare and implement a Community Information Plan which sets out the community communication and consultation processes to be implemented during construction and operation of the project. The Plan shall include but not be limited to: (a) procedures to inform the local community of planned investigations and construction activities, including blasting works (if any); (b) procedures to inform the relevant community of construction traffic routes and any potential disruptions to traffic flows and amenity impacts; (c) procedures to consult with local landowners with regard to construction traffic to ensure the safety of livestock and to limit disruption to livestock movements; (d) procedures to inform the community where work outside the construction hours specified in Condition PART CD1 in particular noisy activities, has been approved; and (e) procedures to inform and consult with affected landowners to rehabilitate impacted land.	Yes	*Manildra Solar Farm Best Practice Community Engagement Plan* Section 11
C8	Prior to the commencement of construction, the Proponent shall ensure that the following are available for community complaints for the life of the project (including construction and operation) or as otherwise agreed by the Secretary: (a) a 24 hour telephone number on which complaints about construction and operational activities at the site may be registered; (b) a postal address to which written complaints may be sent; and (c) an email address to which electronic complaints may be transmitted. The telephone number, postal address and e-mail address shall be advertised in a newspaper circulating in the area on at least one occasion prior to the commencement of construction; and at six-monthly intervals during construction and for a period of two years following commencement of operation of the project. These details shall also be provided on the Proponent's internet site required by condition C6. The telephone number, the postal address and the email address shall be displayed on a sign near the entrance to the construction site(s), in a position that is clearly visible to the public.	Yes	Section 12

Table 10.1 – Conditions of Approval

CoA	Description	Relevance to CEMP	CEMP Reference
C9	The Proponent shall record details of all complaints received through the means listed in condition C8 of this approval in an up-to-date Complaints Register. The Register shall record, but not necessarily be limited to: (a) the date and time, of the complaint; (b) the means by which the complaint was made (telephone, mail or email); (c) any personal details of the complainant that were provided, or if no details were provided, a note to that effect; (d) the nature of the complaint; (e) any action(s) taken by the Proponent in relation to the complaint, including timeframes for implementing the action; and (f) if no action was taken by the Proponent in relation to the complaint, the reason(s) why no action was taken. The Complaints Register shall be made available for inspection by the Secretary upon request.	Yes	Section 12
C10	The Proponent shall provide an initial response to any complaints made in relation to the project during construction or operation within 48 hours of the complaint being made. The response and any subsequent action taken shall be recorded in accordance with condition C9. Any subsequent detailed response or action is to be provided within two weeks.	Yes	Section 12
C11	Prior to the commencement of construction, the Proponent shall develop and implement a Compliance Tracking Program, to track compliance with the requirements of this approval during the construction and operation of the project and shall include, but not necessarily be limited to: (a) provisions for periodic reporting of compliance status to the Secretary including at least prior to the commencement of construction of the project, prior to the commencement of operation of the project and within two years of operation commencement; (b) a program for independent environmental auditing in accordance with AS/NZ ISO 19011:2003 - Guidelines for Quality and/or Environmental Management Systems Auditing; (c) procedures for rectifying any non-compliance identified during environmental auditing or review of compliance; (d) mechanisms for recording environmental incidents and actions taken in response to those incidents; (e) provisions for reporting environmental incidents to the Secretary during construction and operation; and (f) provisions for ensuring all employees, contractors and sub-contractors are aware of, and comply with, the conditions of this approval relevant to their respective activities.	Yes	Section 8.2

Table 10.1 – Conditions of Approval

CoA	Description	Relevance to CEMP	CEMP Reference
C12	Prior to the commencement of any construction or operational activities, the Proponent shall nominate for the approval of the Secretary a suitably qualified and experienced Environmental Representative(s) independent of the design, construction and operation personnel. The Proponent shall engage the Environmental Representative(s) prior to construction until at least six months after commencement of operation, or as otherwise agreed by the Secretary. The Environmental Representative(s) shall: (a) monitor the implementation of all environmental management plans and monitoring programs required under this approval; (b) monitor the outcome of all environmental management plans and advise the Proponent upon the achievement of all project environmental outcomes; (c) have responsibility for considering and advising the Proponent on matters specified in the conditions of this approval, and all other licences and approvals related to the environmental performance and impacts of the project; (d) ensure that environmental auditing is undertaken in accordance with the requirements of Condition C11 and the project Environmental Management System(s); (e) be consulted in responding to the community concerning the environmental performance of the project; and (f) have the authority and independence to recommend to the Proponent reasonable steps to be taken to avoid or minimise unintended or adverse environmental impacts, and, failing the effectiveness of such steps, to recommend to the Proponent that relevant activities are to be ceased as soon as reasonably practicable if there is a significant risk that an adverse impact on the environment will be likely to occur, until reasonable steps are implemented to avoid such impact.	Yes	Section 7.3
C13	The Proponent shall prepare and implement a Construction Environmental Management Plan (CEMP) to outline environmental management practices and procedures to be followed during construction of the project. The Plan shall be prepared in consultation with NOW and Cabonne Shire Council and be consistent with the Guideline for the Preparation of Environmental Management Plans (DIPNR, 2004 or its latest revision) and shall include, but not necessarily be limited to: The Construction Environmental Management Plan shall be submitted for the approval of the Secretary no later than one month prior to the commencement of any relevant construction works associated with the project, or within such period otherwise agreed by the Secretary. Construction works shall not commence until written approval has been received from the Secretary.		
(a)	a description of all relevant activities to be undertaken on the site during construction including an indication of stages of construction, where relevant;	Yes	Section 2
(b)	identification of the potential for cumulative impacts with other construction activities occurring in the vicinity and how such impacts would be managed;	Yes	Section 3
(c)	details of any construction sites and mitigation, monitoring, management and rehabilitation measures specific to the site compound(s) that would be implemented;	Yes	Section 4
(d)	statutory and other obligations that the Proponent is required to fulfil during construction including all relevant approvals, consultations and agreements required from authorities and other stakeholders, and key legislation and policies;	Yes	Section 5
(e)	evidence of consultation with relevant public authorities required under this condition and how issues raised by the agencies have been addressed in the plan;	Yes	Evidence of Agency Consultation

Table 10.1 – Conditions of Approval

CoA	Description	Relevance to CEMP	CEMP Reference
(f)	a description of the roles and responsibilities for all relevant employees involved in the construction of the project including relevant training and induction provisions for ensuring that all employees, contractors and sub-contractors are aware of their environmental and compliance obligations under these conditions of approval;	Yes	Section 7
(g)	details of how the environmental performance of construction will be monitored, and what actions will be taken to address identified potential adverse environmental impacts;	Yes	Section 8
(h)	specific consideration of relevant measures to address any requirements identified in the EA;	Yes	Entire CEMP
(i)	the additional requirements of this approval;	Yes	Entire CEMP
(j)	a complaints handling procedure during construction;	Yes	Section 12
(k)	maps or plans clearly indicating where the project area has been reduced to minimise impacts to EEC and native grasses in good condition;	Yes	Flora and Fauna Management Plan
(l)	a matrix of construction work method statements (or similar) to be prepared and the anticipated level of risk associated with each to be determined.	Yes	Section 14
(m)	measures to monitor and manage soil and water impacts in consultation with NOW including: control measures for works close to waterways (including rehabilitation measures following disturbance and monitoring measures and completion criteria to determine rehabilitation success), identification of construction activities that are likely to pose a risk of groundwater interference, and procedures for managing groundwater impacts should they occur (including to groundwater dependent species and to registered groundwater users);	Yes	Section 18
(n)	measures to monitor and manage flood impacts in consultation with NOW and shall include contingency measures for the site during potential floods;	Yes	Section 19
(o)	measures to monitor and manage dust emissions including dust generated by traffic on unsealed public roads and unsealed internal access tracks; and	Yes	Section 20
(p)	emergency management measures including measures to control bushfires.	Yes	Section 21 Emergency Response Plan
C14	As part of the Construction Environmental Management Plan required under condition C13 of this approval, the Proponent shall prepare and implement the following:		

Table 10.1 – Conditions of Approval

CoA	Description	Relevance to CEMP	CEMP Reference
(a)	a Flora and Fauna Management Plan, developed in consultation with OEH, to outline measures to protect and minimise loss of native vegetation and native fauna habitat as a result of construction of the project. The Plan shall include, but not necessarily be limited to: (i) plans showing terrestrial vegetation communities; important flora and fauna habitat areas; locations where EECs, native grasses are to be cleared. The plans shall also identify vegetation adjoining the site where this contains important habitat areas and/or threatened species, populations or ecological communities; (ii) methods to manage impacts on flora and fauna species and their habitat which may be directly or indirectly affected by the project, such as location of fencing, procedures for vegetation clearing or soil removal/stockpiling and procedures for re-locating hollows or installing nesting boxes and managing weeds; (iii) procedures to accurately determine the total area, type and condition of vegetation community to be cleared; (iv) reference to the Ground Cover Management Plan required in condition C14(b); and (v) a procedure to review management methods where they are found to be ineffective.	Yes	Flora and Fauna Management Plan
(b)	a Ground Cover Management Plan, developed in consultation with OEH, to outline measures to ensure adequate vegetation cover and composition beneath the solar PV array. The Plan shall include, but not necessarily be limited to: (i) procedures to minimise disturbance to ground cover not impacted by the project particularly in the area of the native grasses in good condition; (ii) procedures for the stabilisation, rehabilitation and revegetation of disturbed ground cover including reference to field trials where required; (iii) weed management measures to control and prevent the spread of noxious weeds; (iv) monitoring methods to assess the impact of the project on the ground cover vegetation; and (v) a procedure to review management methods where they are found to be ineffective.	Yes	Groundcover Management Plan
(c)	a Landscape Plan for the approval of the Secretary. In preparing the Plan, the Proponent shall consult with Council. The Plan shall include, but not necessarily be limited to: (i) identification of landscaping objectives and standards based on visual impacts and local environmental values; (ii) details of species used to enhance, mitigate and/or augment landscaping to minimise the visual impact of the project, particularly with respect to the impacts on nearby residences; (iii) implementation, management and monitoring strategies to ensure the establishment and ongoing maintenance of landscaped areas; (iv) a consultation strategy to seek feedback from affected residents and the interested community on the proposed landscape measures.	Yes	Landscape Plan

Table 10.1 – Conditions of Approval

CoA	Description	Relevance to CEMP	CEMP Reference
(d)	a Construction Noise Management Plan to manage noise impacts during construction and to identify all feasible and reasonable noise mitigation measures. The Plan shall include, but not necessarily be limited to: (i) details of construction activities and an indicative schedule for construction works; (ii) identification of construction activities that have the potential to generate noise impacts on surrounding land uses, particularly residential areas; (iii) detail the requirements for Noise Impact Statement(s) for discrete work areas, including construction site compounds; (iv) detail what reasonable and feasible actions and measures would be implemented to minimise noise impacts; (v) procedures for notifying sensitive receivers of construction activities that are likely to affect their noise amenity, as well as procedures for dealing with and responding to noise complaints; (vi) an out-of-hours work (OOHW) protocol for the assessment, management and approval of works outside of standard construction hours as defined in condition D1 of this approval, including a risk assessment process under which the Environmental Representative may approve out-of-hour construction activities deemed to be of low environmental risk and refer high risk works for the Secretary's approval. The OOHW protocol shall detail standard assessment, mitigation and notification requirements for high and low risk out-of-hour works, and detail a standard protocol for referring applications to the Secretary; and (vii) a description of how the effectiveness of these actions and measures would be monitored during the proposed works, clearly indicating how often this monitoring would be conducted, the locations where monitoring would take place, how the results of this monitoring would be recorded and reported; and, if any exceedance is detected how any non-compliance would be rectified.	Yes	Construction Noise Management Plan
(e)	a Traffic Management Plan to manage traffic conflicts that may be generated during construction. The Plan shall address the requirements of the relevant road authority and shall include, but not necessarily be limited to: (i) details of how construction of the project will be managed in proximity to local and regional roads; (ii) details of traffic routes for heavy vehicles, including any necessary route or timing restriction for oversized loads; (iii) demonstration that all statutory responsibilities with regard to road traffic impacts have been complied with; (iv) details of measures to minimise interactions between the project and other users of the roads such as the use of fencing, lights, barriers, traffic diversions etc; (v) procedures for informing the public where any road access will be restricted as a result of the project; (vi) procedures to manage construction traffic to ensure the safety of livestock and to minimise disruption to livestock; (vii) speed limits to be observed along routes to and from the site and within the site; and (viii) details of the expected behavioural requirements for vehicle drivers travelling to and from the site and within the site.	Yes	Traffic Management Plan
Part D – During Construction			
D1	The Proponent shall only undertake construction activities associated with the project that would generate an audible noise at any sensitive receptor during the following hours: (a) 7:00 am to 6:00 pm, Mondays to Fridays, inclusive; (b) 8:00 am to 1:00 pm on Saturdays; and (c) at no time on Sundays or public holidays. This condition does not apply in the event of a direction from police or other relevant authority for safety reasons, or emergency work to avoid the loss of lives, property and/or to prevent environmental harm.	Yes	Construction Noise Management Plan

Table 10.1 – Conditions of Approval

CoA	Description	Relevance to CEMP	CEMP Reference
D2	Construction outside of these hours specified in condition D1 may be varied for works as approved through the out-of-hours work protocol outlined in condition C14(d) of this approval. Any request to alter the hours of construction shall: (a) be considered on a case-by-case basis; (b) be accompanied by details of the nature and need for activities to be conducted during the varied construction hours and any other information necessary to reasonably determine that activities undertaken during the varied construction hours will not adversely impact on the acoustic amenity of receptors in the vicinity of the site; and (c) require that affected residential receivers are informed of the timing and duration of any construction activities approved under this condition at least 48 hours before that work commences.	Yes	Construction Noise Management Plan
D3	Any work generating high noise levels that have impulsive, intermittent, low frequency or tonal characteristics, including jack hammering, line drilling, pile driving, rock hammering, rock breaking, saw cutting, sheet piling, vibratory rolling but excluding blasting, which exceeds 42dBA at any sensitive receiver, must only be undertaken: (a) between the hours of 8:00am and 6:00pm Monday to Friday; (b) between the hours of 8:00am and 1:00pm Saturday; and (c) in continuous blocks of no more than three hours, with at least a one hour respite between each block of work generating high noise impact, where the location of the work is likely to impact the same receivers; except as otherwise approved by the Secretary. For the purposes of this Condition 'continuous' includes any period during which there is less than a one hour respite between ceasing and recommencing any of the work the subject of this Condition.	Yes	Construction Noise Management Plan
D4	The Proponent shall implement all reasonable and feasible measures to minimise noise generation from the construction of the project consistent with the requirements of the Interim Construction Noise Guideline (DECC, July 2009) including noise generated by heavy vehicle haulage and other construction traffic associated with the project.	Yes	Construction Noise Management Plan
D5	The proponent should implement mitigation measures as recommended in the Noise Monitoring & Assessment Report prepared by Heggies, including: (a) sensitive receivers being advised in advance of periods of sustained noise emissions which exceed noise targets; (b) periods of respite would be provided in the case of unavoidable maximum noise level events; (c) reasonable and feasible measures to reduce noise such as temporary barriers along the western boundary of the construction area, minimising the duration of activities and the number of items of plant equipment operating concurrently; carrying out extremely noisy activities during weather conditions that do not favour the propagation of sound to noise sensitive locations; and (d) a documented complaints process. The above mitigation measures shall be detailed in the CNMP.	Yes	Construction Noise Management Plan
D6	If during the course of construction the Proponent becomes aware of any previously unidentified Aboriginal object(s), all work likely to affect the object(s) shall cease immediately and the OEH informed in accordance with the National Parks and Wildlife Act 1974. In addition, registered Aboriginal stakeholders shall be informed of the finds. Works shall not recommence until an appropriate strategy for managing the objects has been determined in consultation with OEH and the registered Aboriginal stakeholders and written authorisation from OEH is received by the Proponent.	Yes	Section 17

Table 10.1 – Conditions of Approval

CoA	Description	Relevance to CEMP	CEMP Reference
D7	If during the course of construction the Proponent becomes aware of any unexpected historical relic(s), all work likely to affect the relic(s) shall cease immediately and the Heritage Office notified in accordance with the Heritage Act 1977. Works shall not recommence until the Proponent receives written authorisation from the Heritage Office.	Yes	Section 15
D8	Soil and water management controls shall be employed to minimise soil erosion and the discharge of sediment and other pollutants to lands and/or waters during construction activities, in accordance with: (a) Managing Urban Stormwater: Soils and Conservation (Landcom, 2004); (b) Managing Stormwater: Urban Soils and Construction 2A Installation of Services (DECC 2008); and (c) Managing Stormwater: Urban Soils and Construction Vol 2C Unsealed Roads (DECC 2008).	Yes	Section 18
Part E – Prior to Operations			
E1	Prior to the commencement of operation of the project, the Proponent shall commission a suitably qualified expert to assess the condition of all public roads traversed by construction traffic associated with the project (including over-mass or over-dimensional vehicles) in consultation with Council and the RMS. Should the preoperational dilapidation survey report identify any damage to roads attributable to construction traffic associated with the project, the Proponent shall repair the roads consistent with the recommendations of the pre-operational dilapidation survey report, within such time as agreed to with the Council and the RMS. The pre-operation road dilapidation report shall be submitted to the Secretary prior to the commencement of operation, clearly identifying recommendations made by the Council and the RMS and how these have been addressed.	No	Traffic Management Plan

Table 10.1 – Conditions of Approval

CoA	Description	Relevance to CEMP	CEMP Reference
E2	The Proponent shall prepare and implement an Operational Environmental Management Plan in accordance with the Guideline for the Preparation of Environmental Management Plans (DUAP, 2004) or its latest revision. The Plan is to be prepared in consultation with the NOW and Cabonne Council as relevant. The Plan shall include but not necessarily be limited to: (a) identification of all statutory and other obligations that the Proponent is required to fulfil in relation to the operation of the development, including all consents, licences, approvals and consultations; (b) a management organisational chart identifying the roles and responsibilities for all relevant employees involved in the operation of the project; (c) overall environmental policies to be applied to the operation of the project; (d) standards and performance measures to be applied to the project, and means by which environmental performance can be periodically monitored, reviewed and improved, (where appropriate) and what actions would be taken in the case that non-compliance with the requirements of this approval are identified. In particular the following environmental performance issues shall be addressed: (i) bushfire hazard and risk management; (ii) management and maintenance of offsets; and (iii) management measures for easement areas, including management of vegetation, soil erosion, weed control and landholder liaison. (e) the environmental monitoring requirements outlined under this approval; (f) complaints handling procedures as identified in conditions C8 to C10; (g) specific consideration of relevant measures to address any requirements identified in the EA; and (h) management policies to ensure that environmental performance goals are met and do comply with the conditions of this approval. The Plan shall be submitted for the approval of the Secretary no later than one month prior to the commencement of Operation of the project or within such period as otherwise agreed by the Secretary. Operation shall not commence until written approval has been received from the Secretary. Upon receipt of the Secretary's approval, the Proponent shall make the Plan publicly available as soon as practicable.	No	Operational Environmental Management Plan
E3	Details of the offset 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 have 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.	No	Offset Plan Offset Strategy

Table 10.1 – Conditions of Approval

CoA	Description	Relevance to CEMP	CEMP Reference
F1	During operations, the Proponent shall ensure that the noise generated by the project does not exceed 35dB(A)(LAeq15min) at any residence on privately-owned land. Noise generated by the project is to be measured in accordance with relevant requirements of the NSW Industrial Noise Policy (as may be updated from time to time). This limit does not apply if the Proponent has entered into a written agreement with the relevant landowner to exceed the limits, and the Proponent has advised the Department in writing of the terms of this agreement.	No	Operational Environmental Management Plan
F2	The Proponent shall prepare a noise compliance report within 3 months of commissioning of the project. The noise compliance report must: (a) be prepared by a suitably qualified noise expert; (b) demonstrate that the project is complying with the noise criteria in condition F1; and (c) be submitted to the Department and EPA within one month of receiving the report, to the satisfaction of the Secretary.	No	Operational Environmental Management Plan
F3	Deleted	-	-
F4	Within six months of the commissioning of the project, the Proponent shall prepare and submit a Visual Impact Verification Report for the Secretary's approval. Unless otherwise agreed to by the Secretary, the Visual Impact Verification Report shall confirm the visual impacts at each of the receptors and roadways identified in the Environmental Assessment as having the potential to be at least 'moderately impacted', considering the final model and layout of generating components on site as well as site specific mitigating factors at the receptors and roadways (such as receptor orientation and intervening screening factors). The Visual Impact Verification Report shall identify all reasonable and feasible screening and landscape planting options available at each receptor and roadways at which potential impacts have been verified including demonstration that these measures have been determined in consultation with affected receptors and relevant road authorities. Within 18 months of the approval of the Visual Impact Verification Report by the Secretary (or as otherwise agreed to by the Secretary), the Proponent shall ensure that the measures identified in the Report are implemented at affected receptors and roadways as identified in the Report in consultation with relevant landowners and road authorities	No	Landscape Plan
F5	The Proponent shall ensure that any permanent buildings are designed and constructed to minimise visual intrusion to nearest sensitive receptors as far as reasonable and feasible, including appropriate external finishes and landscape planting to screen views.	No	Design
F6	The Proponent shall implement a revegetation and rehabilitation program for all areas of the development footprint which are disturbed during the construction of the project, but which are not required for the ongoing operation of the project including temporary construction facility sites and sections of construction access roads. The Proponent shall ensure that all revegetation measures are implemented progressively where possible and in all cases within six months of the cessation of construction activities at the relevant area. Unless otherwise agreed to by the Secretary, the Proponent shall monitor and maintain the health of all revegetated areas until such time that the plantings have been verified by an independent and suitably qualified expert (whose appointment has been agreed to by the Secretary) as being well established, in good health and self sustaining.	Yes	Groundcover Management Plan
Part G – Decommissioning / Post Operations			

Table 10.1 – Conditions of Approval

CoA	Description	Relevance to CEMP	CEMP Reference
G1	No later than one month prior to the decommissioning of the project, or as otherwise agreed by the Secretary, the Proponent is to prepare a Decommissioning Management Plan for the approval of the Secretary. The Plan is to include but not necessarily be limited to: (a) identification of structures to be removed and how they will be removed; (b) measures to reduce impacts on the environment and surrounding sensitive land uses; (c) details of components to be recycled; (d) details of rehabilitation and revegetation with reference to the biodiversity offset required under condition E3.	No	Operational Environmental Management Plan

Source: NSW Government Department of Planning Project Approval MP10_0122

Community Involvement

11.1 REQUIREMENT

As the development proponent and owner of the MSF, and in accordance with its contractual arrangements with RCRI as the EPC contractor, MSFPL will assume responsibility to deliver on CoA relating to Community Information, Consultation and Involvement; specifically CoA C5 – C8.

These conditions state:

C5 - Subject to reasonable confidentiality requirements, the Proponent shall make all documents required under this approval available for public inspection on request.

C6 - Establishing a dedicated website or maintaining dedicated pages within its existing website for the provision of electronic information associated with the project. This includes publishing and maintaining up-to-date information including, but not necessarily limited to:

- *(a) the status of the project;*
- *(b) a copy of this approval and any future modification to this approval;*
- *(c) a copy of each relevant environmental approval, licence or permit required and obtained in relation to the project;*
- *(d) a copy of each plan, report, or monitoring program required by this approval; and*
- *(e) details of the outcomes of compliance reviews and audits of the project.*

C7 – Prior to the commencement of construction, preparing and implementing a Community Information Plan which sets out the community communication and consultation processes to be implemented during construction and operation of the project. The Plan shall include but not be limited to:

- *(a) procedures to inform the local community of planned investigations and construction activities, including blasting works (if any);*
- *(b) procedures to inform the relevant community of construction traffic routes and any potential disruptions to traffic flows and amenity impacts;*
- *(c) procedures to consult with local landowners with regard to construction traffic to ensure the safety of livestock and to limit disruption to livestock movements;*
- *(d) procedures to inform the community where work outside the construction hours specified in Condition D1 in particular noisy activities, has been approved; and*
- *(e) procedures to inform and consult with affected landowners to rehabilitate impacted land.*

11.2 COMMUNITY ENGAGEMENT PLAN

MSFPL has prepared a Community Engagement Plan (CEP) which fulfills the requirements of CoA C7 and has been endorsed by ARENA. A copy of this CEP is provided in **Appendix L**.

11.3 COMMITMENT

RCRI will provide relevant timely updates to allow the MSFPL to meet these obligations.

Complaints Handling Procedures

12.1 REQUIREMENT

CoA C13(j) states the CEMP shall include:

> *a complaints handling procedure during construction.*

CoA C8 requires

> *Prior to the commencement of construction, the Proponent shall ensure that the following are available for community complaints for the life of the project (including construction and operation) or as otherwise agreed by the Secretary:*
>
> *(a) a 24 hour telephone number on which complaints about construction and operational activities at the site may be registered;*
>
> *(b) a postal address to which written complaints may be sent; and*
>
> *(c) an email address to which electronic complaints may be transmitted.*
>
> *The telephone number, postal address and e-mail address shall be advertised in a newspaper circulating in the area on at least one occasion prior to the commencement of construction; and at six-monthly intervals during construction and for a period of two years following commencement of operation of the project. These details shall also be provided on the Proponent's internet site required by condition C6. The telephone number, the postal address and the email address shall be displayed on a sign near the entrance to the construction site(s), in a position that is clearly visible to the public.*

12.2 RESPONSIBILITIES

12.2.1 MSFPL

Under the contract with RCRI, MSFPL has responsibility to ensure the following are available prior to the commencement of construction, for community complaints, for the life of the project.

- a postal address to which written complaints may be sent;
- an email address to which electronic complaints may be transmitted; and
- advertising the telephone number, postal address and e-mail address in a newspaper circulating in the area, at six-monthly intervals for a period of two years following commencement of operation of the project; and providing these details on the MSFPL internet site required by condition CoA C6.

12.2.2 RCRI

Under the contract with MSFPL, RCRI has responsibility to ensure the following are available prior to the commencement of construction, for community complaints, for the life of the project.

- a 24 hour telephone number on which complaints about construction and operational activities at the site may be registered; and
- advertising the telephone number, postal address and e-mail address in a newspaper circulating in the area on at least one occasion prior to the commencement of construction; and at six-monthly intervals during construction; and displaying these details on a sign near the entrance to the construction site in a position that is clearly visible to the public.

12.3 PROCEDURE

12.3.1 FROM MSFPL

RCR will, upon notification and details of any written or electronic complaint received by MSFPL, immediately investigate the cause of the complaint and identify actions required to avoid a recurrence.

This investigation and reporting back to MSFPL will be completed within 48 hours of the notification and will be fully documented.

Documentation will include RCR updating its ***Complaints Register*** (refer *MSF_CEMP_R04*) and completing an internal ***Complaint Record*** (refer *MSF_CEMP_F05*). A copy of these will be provided to MSFPL with 48 hours of RCRI being advised of the complaint.

The complaint investigation and documentation will be the responsibility of RCRI's SCECO.

RCRI will exercise this responsibility to cover any and all complaints that arise from the conduct of construction activity by any of its sub-contractors.

12.3.2 OTHER SOURCES

It is possible that RCRI will receive complaints through other means than notification from MSFPL. That is, complaints may be made direct to RCRI through the telephone contact number, or one of its contractors, and not come through the MSFPL's community complaints system.

In this circumstance, the SCECO will immediately notify MSFPL of the complaint.

RCRI will then implement the same procedure for the investigation and documentation of the complaint. Specifically, the SCECO will:

- update its ***Complaints Register*** (refer *MSF_CEMP_R04*);
- complete an internal ***Complaint Record*** (refer *MSF_CEMP_F05*); and
- provide a copy of these to MSFPL with 48 hours of RCRI receiving the complaint.

12.4 COMPLAINTS REGISTER

Any complaint received through either of the above means will be recorded on an updated ***Complaints Register*** (refer *MSF_CEMP_R04*) and the details recorded in a ***Complaint Record*** (refer *MSF_CEMP_F05*).

The ***Complaints Record*** will record:

- the date and time of the complaint;
- the means by which the complaint was made (telephone, mail or email);
- any personal details of the complainant that were provided, or if no details were provided, a note to that effect;
- the nature of the complaint;
- any actions taken in relation to the complaint, including timeframes for implementing the action; and
- if no action was undertaken in relation to the complaint, the reasons why no action was taken.

A copy of the updated ***Complaints Register*** and specific ***Complaints Record*** will be provided to MSFPL for any complaint received and made available for inspection by DPE and Cabonne Council upon request.

12.5 COMPLAINT RESOLUTION

The timeframe for providing an initial response to any complaint is within 48 hours of RCRI being made aware of a complaint.

12.6 ADDITIONAL INFORMATION

If and as required, RCRI will prepare and submit any detailed response or action to MSFPL within two weeks of the complaint being received.

Incident Management

13.1 INTERNAL REPORTING

Any incident that occurs with the potential to cause an environmental impact will be reported immediately to the (SCECO).

The Environmental Due Diligence induction will emphasise this obligation to all contractors and personnel working on-site.

This procedures details the protocols to be followed in the event of an environmental incident, as distinct from an emergency situation. An emergency is a situation where the safety of life is a possibility. In these circumstances the protocols and procedures specified in the *Emergency Response Plan* apply (refer **Appendix I**).

13.2 IMMEDIATE RESPONSE

Upon receiving notification of an incident with the potential to cause an environmental impact, but not constituting an emergency, the SCECO will immediately attend the incident. The SCECO will then:

- Isolate the area affected by the incident;
- Stop works around the area;
- Implement containment measures to prevent the impact of the incident spreading; and
- Make a determination as to the significance of the potential environmental impact and, as appropriate, undertake appropriate external notifications.

13.3 EXTERNAL NOTIFICATIONS

13.3.1 MATERIAL HARM

EPA notification is required where a pollution incident occurs in the course of an activity such that material harm to the environment is caused or threatened.

Material harm to the environment is defined in s.147 of the *Protection of the Environment Operations Act 1997* as follows:

> *(a) harm to the environment is material if:*
>
> *i) it involves actual or potential harm to the health or safety of human beings or to ecosystems that is not trivial, or*
>
> *ii) it results in actual or potential loss or property damage of an amount, or amounts in aggregate, exceeding $10,000 (or such other amount as is prescribed by the regulations), and*
>
> *(b) loss includes the reasonable costs and expenses that would be incurred in taking all reasonable and practicable measures to prevent, mitigate or make good harm to the environment."*

The SCECO, as soon as the immediate response actions have been implemented, will make a determination as to whether material harm has been caused or is threatened.

13.3.2 EPA NOTIFICATION

If the SCECO determines material harm exists the EPA be immediately notified and provided the following relevant information.

- the time, date, nature, duration and location of the incident;
- the location of the place where pollution is occurring or is likely to occur;
- the nature, the estimated quantity or volume and the concentration of any pollutants involved, if known;
- the circumstances in which the incident occurred (including the cause of the incident, if known); and
- the action taken or proposed to be taken to deal with the incident and any resulting pollution or threatened pollution, if known.

Following EPA notification, the SCECO would also then inform Cabonne Council and the Environmental Representative of the situation. This initial notification to these stakeholders would be for information purposes alone, and RCR would continue to concentrate on responding to any instruction or request from the EPA.

13.3.3 NO MATERIAL HARM

Where an incident has occurred that has not resulted in material harm, the SCECO will immediately notify Cabonne Council and the Environmental Representative and provide the following relevant information.

- the time, date, nature, duration and location of the incident;
- the location of the place where pollution is occurring or is likely to occur;
- the nature, the estimated quantity or volume and the concentration of any pollutants involved, if known;
- the circumstances in which the incident occurred (including the cause of the incident, if known); and
- the action taken or proposed to be taken to deal with the incident and any resulting pollution or threatened pollution, if known.

13.4 INCIDENT INVESTIGATION

13.4.1 AVOID RECURRENCE

As soon as the incident has been contained and external notifications undertaken the SECO will then undertake an incident investigation. One purpose of the investigation will be to identify and understand the cause of the incident with a view to modifying procedures to avoid the potential for a recurrence. The types of preventative actions taken could include revision to a Construction Work Method Statement or undertaking targeted Environmental Due Diligence sessions at tool box meetings prior to works re-commencing.

13.4.2 RESTORATION

The other purpose of the incident investigation will be to define the appropriate remediation work required in order to address any bio-physical impact of the incident. The appropriate remediation work (if required) would be determined by the specific circumstances of the incident.

13.5 INCIDENT REPORTING

13.5.1 DOCUMENTATION

Any environmental incident will be recorded on an ***Environmental Incident Report*** (refer *MSF_CEMP_F06*) and an updated ***Environmental Incidents Register*** (refer *MSF_CEMP_R05*) will be maintained throughout the construction period.

Each ***Environmental Incident Report*** will include details on:

- the date, time and duration of the incident;
- clarify whether there was material harm to the environment;
- detail the nature of the incident;
- climatic conditions;
- the location of the incident;
- pollutants involved;
- circumstances in which the incident occurred; and
- corrective action taken; external notification (EPA).

13.5.2 DISSEMINATION

For any environmental incident for which there is no material harm, the SCECO will provide a copy of the ***Environmental Incident Report*** to both Cabonne Council and the Environmental Representative within 72 hours of the incident occurring.

For an incident in which material harm has or could have resulted and the EPA has been notified, the SCECO will provide reporting to the EPA as may be instructed, in accordance with the timeframes that may be so specified by the EPA.

Copies of any EPA reporting associated with an environmental incident would also be provided to the Department of Planning and Environment, Cabonne Council and the Environmental Representative.

Work Method Statements

14.1 REQUIREMENT

CoA C13(l) states the CEMP shall include:

> *a matrix of construction work method statements (or similar) to be prepared and the anticipated level of risk associated with each determined.*

14.2 APPROACH

Consistent with requirements of NSW *Work Health and Safety Regulation 2011* RCRI will prepare Safe Work Method Statements (SWMS) for individual construction activities. Examples of the types of construction activities for which SWMS will be prepared will include, but not necessarily be restricted to, the following:

- Clearing and grubbing;
- Excavation of tracks and laydown areas;
- Operation of machinery and plant;
- Refuelling;
- Driving array posts into the ground;
- Trenching works; and
- Fencing.

WHS legislation mandates that SWMS are developed in consultation with the work crew undertaking the activity. As such, these are not prescribed now as 'instructions', but to be developed with the work crew who will be actually undertaking the works, prior to those works commencing.

The intent, consistent with best practice, is to incorporate 'environmental' risk into the development of the each and every SWMS.

The process for doing this will be as follows.

- A discrete work activity will be identified and scheduled;
- Detail on this activity will be provided to the SCECO. This detail will include information relating to what the activity entails, where it is to be undertaken on-site, and when it will be undertaken;

  The SCECO will cross check the proposed activity against a potential for environmental risk; and
- As appropriate, the relevant mitigations measures specified in this CEMP for managing that particular risk will be incorporated into the SWMS in consultation with the personnel who will undertake the activity.

The SCECO will sign-off on every SWMS prepared.

A copy of all approved SWMS will be kept in hard copy at the site office.

14.3 ENVIRONMENTAL RISK

14.3.1 PRINCIPLE

Consistent with the methodology for classifying environmental risk in the approved *Flora and Fauna Management Plan*, activities with potential to cause environmental impacts will be managed through developing tailored SWMS that target the potential environmental risk associated with the specific construction activity for which a SWMS will be prepared.

Risk will be rated low to high dependent on the likelihood of the activity harming the environment and the consequence if that harm was to occur. The range of risk ratings are shown in **Table 14-1**.

Table 14.1 – Risk Matrix

Likelihood	Consequence		
	Major	Moderate	Low
Certain	High	High	Moderate
Possible	High	Moderate	Moderate
Remote	Moderate	Moderate	Low

14.3.2 BIODIVERSITY RELATED RISKS

The definitions used in this risk matrix, as they relate to biodiversity impacts, are provided below.

Table 14.2 – Biodiversity Risk Definitions

Rating	Description
Likelihood	
Certain	It is very probable that this risk could occur in any year (>95%)
Possible	It is equally probably that this risk could occur in any year (50%)
Remote	It is improbable that this risk could occur in any year (<5%)
Consequence	
Major	Major loss in numbers or habitat leading to a substantive adverse impact on local or regional population viability.
Moderate	Moderate loss in numbers or habitat may have a minor adverse impact on local or regional population viability
Low	Repeated small impacts would not cause a substantive adverse impact on flora and fauna; no impact on local or regional population viability.

Construction activities that may have an adverse impact on flora and fauna and their associated risk ratings are summarised in **Table 14.3**.

Table 14.3 – Risk Analysis of Biodiversity Related Issues

Construction Activity	Potential Impact	Likelihood	Consequence	Risk
Clearing and grubbing	Habitat removal (native vegetation and hollow bearing trees)	Certain	Low	Moderate
	Habitat Modification	Certain	Low	Moderate
	Degradation of adjacent areas of habitat	Possible	Low	Moderate
	Habitat removal (rock outcrops)	Remote	Low	Low

Table 14.3 – Risk Analysis of Biodiversity Related Issues

Construction Activity	Potential Impact	Likelihood	Consequence	Risk
Excavation of tracks, lay down areas	Habitat modification	Possible	Low	Moderate
	Erosion of disturbed areas and stockpiles	Possible	Low	Moderate
Install solar array infrastructure	Habitat alienation	Certain	Moderate	Moderate
Operation of machinery and plant	Collisions with wildlife	Possible	Low	Moderate
	Habitat alienation	Certain	Low	Moderate
Pole and overhead transmission line installation	Erosion of disturbed areas	Possible	Low	Moderate
	Erosion of stockpiles	Possible	Low	Moderate
	Reduced air quality (dust)	Possible	Low	Moderate
Trenching for underground transmission line installation	Habitat removal	Certain	Low	Moderate
	Habitat modification	Certain	Low	Moderate
	Erosion of disturbed areas and stockpiles	Possible	Low	Moderate
	Pollution (sedimentation or spill risk) to local waterways	Remote	Low	Low
	Trap hazard to fauna	Possible	Moderate	Moderate

Source: Flora and Fauna Management Plan

14.3.3 OTHER ENVIRONMENTAL RISKS

Using the risk assessment methodology above, the definitions to be used in the risk matrix for all other potential impacts (e.g. water quality and amenity values) are provided below.

Table 14.4 –Risk Definitions

Rating	Description
Likelihood	
Certain	It is very probable that this risk could occur during construction.
Possible	It is equally probably that this risk could occur during construction.
Remote	It is improbable that this risk could occur during construction.
Consequence	
Major	High numbers and ongoing complaints. Material harm to the environment, that is: - it involves actual or potential harm to the health or safety of human beings or to ecosystems that is not trivial, or - it results in actual or potential loss or property damage of an amount, or amounts in aggregate, exceeding $10,000, and - loss includes the reasonable costs and expenses that would be incurred in taking all reasonable and practicable measures to prevent, mitigate or make good harm to the environment.
Moderate	Isolated complaints that can be effectively managed to avoid recurrence. Does not entail material harm to the environment.
Low	No complaint. Impact is localised and contained within the site.

Construction activities that may have an adverse impact on the environment (apart from biodiversity impacts) are summarised in **Table 14.5**.

Table 14.5 – Environmental Risk Analysis

Construction Activity	Potential Impact	Likelihood	Consequence	Risk
Earthworks	Erosion and sedimentation	Possible	Moderate	Moderate
	Disturbance to Aboriginal heritage artefacts	Remote	Low	Low
	Noise complaints	Possible	Low	Moderate
Vehicle movements	Dragging mud onto Packham Drive	Remote	Low	Low
Refuelling	Pollution	Remote	Moderate	Moderate
Hotworks	Ignition risk for bushfire	Remote	Major	Moderate
Post driving for arrays tables	Noise complaints	Possible	Moderate	Moderate
	Pollution (burst hydraulic hose)	Remote	Low	Low
Waste management	Unlawful disposal of waste	Remote	Moderate	Moderate
	Missed recycling opportunity	Remote	Low	Low
Equipment deliveries	Complaints	Possible	Moderate	Moderate
	Damage to heritage cottage ruin	Remote	Moderate	Moderate

Historic Heritage

15.1 CONTEXT

An abandoned stone cottage ruin is located adjacent to the existing track that is used as part of the landowner's farming enterprise and for Essential Energy to access the existing substation. The location of this ruin is mapped on the **Schedule of Drawings – General Arrangement**.

The cottage has been the subject of a heritage assessment (nghenvironmental, December 2010). The cottage, which is not heritage listed, is a former farm house that has been in existence since the early settlement days of the Manildra area, and has been assessed as being of historical heritage significance to the Manildra area.

Figure 4: South East elevation of ruin

Figure 5: Location of ruin in relation to access road

15.2 AVOIDING IMPACT

The potential for impact on the cottage ruin emanated from an assumption that haulage routes associated with the construction effort would pass approximately 40 m from the ruin. By extension, it was assumed that due to the transport of heavy vehicles along the existing substation access road there was potential for some indirect impact on the remaining fabric of the ruin from dust and vibration.

As design has progressed, and logistics and the construction plan evolved, these potential impacts can now be avoided. Access to the site for construction is proposed off Packham Drive to the west.

The only exception to this is the installation of the operations building. This will be a pre-fabricated structure and will be installed as one of the last activities associated with construction of the farm. The vehicle movements associated with this activity will be restricted to two trucks fitted with side loaders and and several light vehicles. An assessment of the existing access road alignment confirms that there would be no requirement to widen the access road that would decrease its distance to the cottage.

15.3 PROTECTION OF STONE COTTAGE RUIN

- Signage will be erected on Old Orange Road advising "No Construction Traffic"'
- The site of the cottage will be clearly marked out and fenced prior to construction commencing;
- Nothing in the approval permits the demolition or other direct impacts on this ruin; and
- While it is not proposed, nor anticipated, any plan to widen the access road that would decrease its distance to the cottage would be reported to the SCECO prior to these works being undertaken.

The SCECO would then consult with Cabonne Council and commission a Heritage Impact Statement (HIS). The HIS would then be submitted for Cabonne Council comment and DPE approval prior to the commencement of any construction works of the access road.

15.4 UNEXPECTED FINDS

If during the course of construction any worker becomes aware of any unexpected historical relic, all work likely to affect the relic will cease immediately and the Heritage Office and Cabonne Council will be notified in accordance with the *Heritage Act 1977*.

The SCECO will notify the Heritage Office and Cabonne Council of unexpected finds.

Works will not recommence until written authorisation from the Heritage Office and/or Cabonne Council is received.

15.5 HERITAGE INDUCTION

All construction personnel will be required to undertake an Environmental Due Diligence induction prior to commencing works on site. This Environmental Due Diligence induction will incorporate a specific component relating to historic heritage.

This component will cover the following:

- The obligation to immediately stop work and notify the SCECO in the event any suspected historic relic is uncovered;
- Specific discussion on the location of the Stone Cottage Ruin, the function of the temporary protective fencing in creating a "no-go zone" around this ruin, and clear instruction that workers must not undertake any activity within this protective buffer; and
- The emphasis will be to stop works and immediately report the presence of any material that may be a historical relic. The key message will be to exercise caution and stop work and report if uncertain.

Impact Minimisation

16.1 REQUIREMENT

CoA C13(k) states the CEMP shall include:

> *maps or plans clearly indicating where the project area has been reduced to minimise impacts to EEC and native grasses in good condition*

16.2 MAPS

The *Flora and Fauna Management Plan* required under CoA C14(a) provided in **Appendix C** of this CEMP, and developed in consultation with OEH, provides this map and is reproduced below.

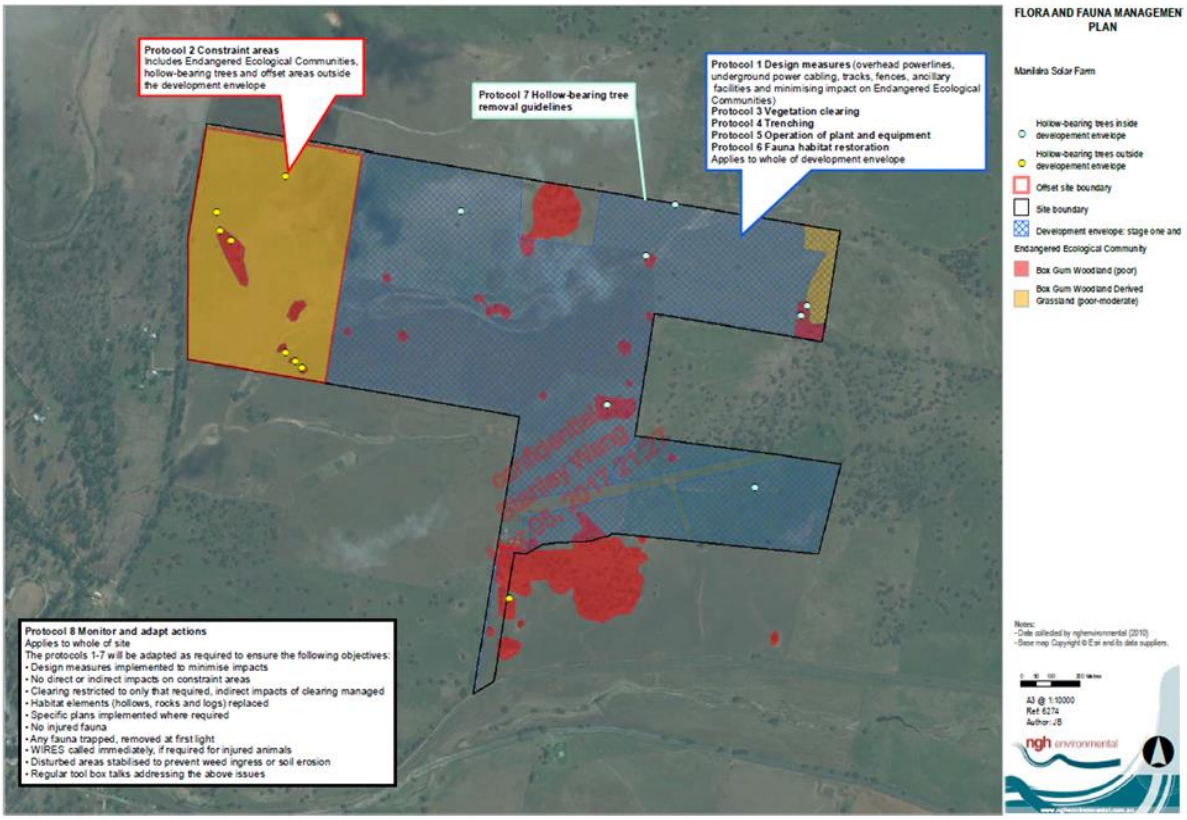


Figure 6: Flora and Fauna Management Plan(Source: nghenvironmental, 20 April 2016)

Further to the above, the Offset Plan emanating from the *Offset Strategy* required under CoA C2 provided in **Appendix F** of this CEMP, and developed in consultation with OEH, provides an updated map showing the proposed offset area and how it has been avoided.

Figure 7: Offset Plan (Source: nghenvironmental, 2 February 2017)

Aboriginal Heritage

17.1 MANAGEMENT OF KNOWN OBJECT LOCALES

The Archaeological and Cultural Heritage Assessment (NSW Archaeology Pty Ltd, September 2010) identified strategies for the mitigation and management of impacts to the two recorded Aboriginal object locales.

- SU5/L1 is comprised of five stone artefacts and is located well away from proposed construction impact areas. The local is located with the land dedicated for biodiversity offset and, consistent with the Offset Strategy (nghenvironmental, February 2016) and Offset Plan (nghenvironmental, February 2017) can not, and will not, be impacted during construction; and
- SU9/L1 is comprised of a single stone artefact located very close to the northern boundary fence (660720e 6328571n GDA). This archaeological resource was assessed as not surpassing significance thresholds which would warrant any form of impact mitigation, and the DPE approval for the project was issued on this basis.

  The location of this artefact is mapped on the **Schedule of Drawings – General Arrangement**.

The consulting archaeologist noted that while avoidance of impacts is always desirable if at all possible, given the nature and artefact density of this locale, if impacts are proposed, unmitigated impact is appropriate and a strategy of impact avoidance is not warranted in regard to this locale.

Notwithstanding, RCRI has flagged the locale in the field and will avoid impacts.

The locale have been mapped and protective fencing will be installed creating “no-go zones” around these sites.

17.2 UNANTICIPATED FINDS PROTOCOL

If during the course of construction any worker becomes aware of any previously unidentified Aboriginal object(s), all work likely to affect the object(s) will cease immediately and the SCECO will be informed.

The SCECO will fence off the area and contact OEH in accordance with the *National Parks and Wildlife Act 1974* and MSFPL. In addition, a representative of the Registered Aboriginal Parties (RAP) will be informed of the finds.

Works will not recommence until an appropriate strategy for managing the objects has been determined in consultation with OEH and the RAP representative and written authorisation from OEH is received.

17.3 POTENTIAL HUMAN REMAINS

If any suspected human remains are encountered, the following process will be adhered to:

- No further disturbance will occur and the remains will not be moved;
- All work in the vicinity will immediately cease and the area will be cordoned off;
- The NSW Police will be notified;
- The OEH’s Environment Line on 131555 will be notified as soon as practicable and provided available details of the remains and their location; and
- Works will not re-commence in the area unless authorised in writing by OEH.

17.4 ABORIGINAL CULTURAL HERITAGE INDUCTION

All construction personnel will be required to undertake an Environmental Due Diligence induction prior to commencing works on site. This Environmental Due Diligence induction will incorporate a specific component relating to Aboriginal heritage.

This component will cover the following:

- The legal obligation not to disturb Aboriginal sites and offences of harm prescribed under the *National Parks and Wildlife Act 1974*;
- It will be emphasised that it is illegal to knowingly (or otherwise) disturb Aboriginal heritage sites.
- Specific discussion on the location of the known Aboriginal locales, the function of the temporary protective fencing in creating “no-go zones” around these sites, and clear instruction that workers must not undertake any activity within these protective buffer areas;
- A detailed explanation of the protocols to be followed in the event that unidentified objects or suspected human remains are uncovered;
- The emphasis will be to stop works and immediately report the presence of any material that may be an Aboriginal object or site to the SCECO. The key message will be to exercise caution and stop work and report if uncertain; and
- Workers attending the induction will sign a register indicating their understanding of the cultural heritage importance and legislative requirements to protect Aboriginal sites.

Soil and Water Impacts

18.1 REQUIREMENT

CoA C13(m) states the CEMP shall include:

> *measures to monitor and manage soil and water impacts in consultation with NOW including: control measures for works close to waterways (including rehabilitation measures following disturbance and monitoring measures and completion criteria to determine rehabilitation success), identification of construction activities that are likely to pose a risk of groundwater interference, and procedures for managing groundwater impacts should they occur (including to groundwater dependent species and to registered groundwater users);*

18.2 MANAGEMENT MEASURES

18.2.1 SOIL AND WATER MANAGEMENT PLAN

A Soil and Water Management Plan (SWMP) has been prepared and is provided in **Appendix H**. The SWMP specifies soil and water management controls that will be installed to minimise soil erosion and the discharge of sediment or other pollutants to lands and/or waters during construction activities. The controls included in this SWMP have been prepared in accordance with:

- *Managing Urban Stormwater: Soils and Conservation (Landcom, 2004);*
- *Managing Stormwater: Urban Soils and Construction 2A Installation of Services (DECC 2008);* and
- *Managing Stormwater: Urban Soils and Construction Vol 2C Unsealed Roads (DECC 2008)*.

The effectiveness of the controls specified in the ESCP will be monitored by the SCECO undertaking weekly site inspections, complemented by inspections prior to,during and after any rainfall event.

All inspections will be recorded on the ***Inspection Checklist*** (refer *MSF_CEMP_F01*).

18.2.2 BEST PRACTICE

The following procedures will also be implemented to minimise erosion and sedimentation risks. Refer **Appendix H** for the Erosion and Sediment Control Plan. .

- A minimum area of land will be exposed to the risk of erosion for the shortest period of time;
- No stockpiles of spoil, fill or erodible material will be placed on land that would be inundated in the 100yr ARI;
- Road crossings of the drainage depressions (intermittent watercourses) will be constructed of a compacted road base causeway shaped to match the bed profile of the depressions, with scour protection be installed on the upstream and downstream side of the crossing to mitigate erosion, and a silt fence/hay bales located downstream to suit the crossing. This crossing type is not inconsistent with DPI's *Guidelines for watercourse crossings on waterfront land*.
- Following any rainfall event access tracks will be inspected to ensure that they can be used without causing erosion or sedimentation, and that erosion control structures remain functional.
- The site generally drains to the dry creek bed. At specific locations within the dry creek bed, rock check dams or silt fences are to be installed to reduce flow velocities and control sediment transport. Being constructed of coarse rockfill they are not designed to hold water.

- A small portion of the site at the south drains to the south western boundaries of the site. Along these boundaries a mulch berm will be utilised to construct control sediment.
- Works will not be undertaken immediately prior to or during periods of high rainfall.

18.2.3 MONITORING EFFECTIVENESS OF CONTROLS

Site inspection and monitoring will be undertaken to ensure the objectives of the Soil and Water Management Plan are met and the control measures perform effectively. The following monitoring program will be implemented:

- Weather forecasts will be monitored daily.
- Erosion and sedimentation control measures will be inspected:
  - weekly;
  - at least 24 hours prior to predicted rainfall;
  - daily when rainfall is occurring; and
  - after the rainfall event has finished.
- Discharge points will be inspected weekly and prior to and post any rain event. If the discharge points are not stable then the downstream offsite dam will be inspected for evidence of sedimentation on the dam apron (with photographic evidence taken). If there is evidence of off-site sedimentation, a Corrective Action will be raised and the Soil and Water Management Plan reviewed accordingly.

  It is noted that this inspection regime will also specifically cover the area where the dry creek emerges into the site in the north-east corner of the site, to observe if runoff emerging upstream of the site would or would not accentuate sediment transport at the Manildra Solar Farm site.
- Every inspection relating to the effectiveness of the erosion and sediment controls will be documented on the ***Inspection Checklist*** (refer *MSF_CEMP_F01*).
- The health of revegetation will be inspected weekly and additional revegetation undertaken where 70% cover has not been achieved.

18.2.4 HAZARDOUS GOODS STORAGE

Minor quantities of potentially hazardous materials will be stored and used on-site. Detail of these and the maximum quantity of each stored is provided in **Table 18.1**.

Table 18.1 – Hazardous Substances List

Substance	Maximum Quantity Stored On-Site
Diesel	3,000 L
PVC Priming Fluid	20 L
Unleaded petrol	120 L
PVC Pipe Cement	20 L
Gold Galvanising Paint	5 L
Marking Paint	5 L
Jointing Compound	5 KG

All hazardous substances will be stored in secure containers/pallet bunds, with appropriate signage. The location of these storage areas will be clearly marked on a site plan and copies of Safety Data Sheets (SDS) will be held on-site.

Hazardous goods and combustible liquids will be stored and handled in accordance with:

- all relevant Australian Standards;
- a minimum bund volume requirement of 110% of the volume of the largest single stored volume within the bud; and
- the EPA's *Environment Protection Manual Technical Bulletin Bunding and Spill Management*.

18.2.5 RE-FUELLING STATIONS

- All refuelling of plant will be undertaken in the designated purpose built fuelling stations. These stations will be located outside land that could be inundated in a 100yr ARI; and
- The refuelling stations will be a bunded area, with topsoil stripped, overlain with heavy plastic sheeting and material placed and compacted on top.
- Fuel storage will be restricted to three (3) 1kL pallet bunds of diesel stored in the refuelling station located at the site compound.

18.2.6 SPILL RESPONSE

18.2.6.1 Spill Response Kits

An appropriately sized spill kit will be provided at the refuelling station and on a utility (in the event of hydraulic hose fracture on plant).

18.2.6.2 Spill Response Procedure

In the event of a spill the following procedures would be followed.

- Immediate notification to the SCECO;
- The spill will be contained utilising the spill kit;
- Impacted soil will be scraped to a depth where there is no visible contamination staining, and material placed in a secure covered receptacle;
- The SCECO will have samples analysed to establish the waste classification; and
- The material will be transported and disposed of at a waste facility legally permitted to accept the material.
- An ***Environmental Incident Report*** (refer *MSF_CEMP_F06*) will be completed for any spill occurrence.

18.2.7 PLANT MAINTENANCE

- Apart from routine daily maintenance checks, no higher risk maintenance works (e.g. oil changes) of plant and equipment would be undertaken on-site.

18.3 GROUNDWATER INTERFERENCE

18.3.1 DEWATERING

There are no construction activities proposed that are likely to pose a risk of groundwater interference. The only activities requiring sub-surface works include shallow excavation for the piers for the Control Building, trenching for cabling and driving the steel supports for the PV modules to a depth not exceeding 2 m.

In the unlikely event that groundwater is intercepted and any dewatering was required, the following criteria would be applied.

Discharge of water to the environment would be undertaken in a manner that avoids any of the following environmental impacts:

- Erosion at the discharge location or in receiving environment;
- Sediment build-up in drainage lines; and
- Energy dissipation will be provided at the surface of any dewatering discharge outlet.

18.3.2 EFFLUENT DISPOSAL

Proprietary NSW Department of Health accredited Aerated Wastewater Treatment Systems (AWTS) will be provided at the construction compound and satellite crib rooms. Effluent loadings will be minor, with only basic amenities (toilet and cold water sink). No change room or shower facilities are proposed.

Each AWTS will have a hydraulic loading of 1,500 L/day with treatment performance meeting:

- BOD <10 mg/L;
- SS <10 mg/L and
- E.coli <10cfu/100ml.

Treated effluent will be irrigated on adjoining land. No AWTS (or effluent irrigation area) will be located within land that could be inundated under the 100 yr/ARI rainfall event.

The units will be decommissioned and removed following construction.

Installation and operation of each system will be in accordance with a s.68 approval under the *Local Government Act 1993* to be issued by Cabonne Council.

Flood Management

19.1 REQUIREMENT

CoA C13(n) states the CEMP shall include:

> *measures to monitor and manage flood impacts in consultation with NOW and shall include contingency measures for the site during potential floods;*

19.2 FLOOD RISK

The Soil and Water Management Plan (SWMP) (refer **Appendix H**) incorporates methods of sedimentation and erosion control into the design that will control water flow through the site.

The site topography is gently undulating with typical ground gradients of 5 to 10%. Generally the site falls from the east to the west with levels varying from 505 m (AHD) to 450 m (AHD). The site is approximately 160 0m wide from east to west and 1100 m wide from north to south. The majority of the site diverts overland flow to the west. There are no creeks present on the site, however, there is a dry creek bed that forms the main drainage feature across the site. This is the primary stormwater overland flow path and as such, site drainage is predominantly in a northeast to southwest direction. As the dry creek bed forms the main site drainage path, this is the ideal location to facilitate primary erosion and sedimentation control features.

Even in substantial storm events the flow depth remains shallow. Flood modelling undertaken indicates that for a 1 in 100 year storm event, at most locations, flow depths less than 500 mm and flow velocities less than 2 m/s can be expected. In a 1 in 2 year storm the depths and velocities will be significantly less. There is however one localised region where the dry creek bed becomes deep. Its depth increases to approximately 2.5 m. In this localised region, flows would not spread overland and as a result, flow velocities would increase. Flood modelling indicates that for a 1 in 100 year storm event, flows in this small section of the creek would be constricted and flow velocities would increase to approximately 4m/s. From site observations this deep region appears to be man-made.

Erosion control measures will be undertaken at this location in order to return the dry creek bed to its original form. In its original form during the design storm event, the shallow creek banks are breached and the stormwater flow becomes a wide overland flow. Flood modelling indicates flow widths up to 100 m wide and depths of 500 mm are likely. Under the 1 in 100 year flood modelling, in the natural portions of the creek, flow velocities are expected to remain at or below 2 m/s. At such velocities, erosion potential is low across the grassed creek bed and the adjoining banks.

An engineered solution is proposed for the manmade excavated channel for the control of erosion and sediment transport. It is proposed to repair this portion of the creek using engineered fill and a method of stabilisation using geotextile materials on the finished ground surface. The resulting flattening of this area of the dry creek bed will provide a wider section for the water flow and associated reduction of flow velocities, leading to better control of soil erosion. This provides risk mitigation of erosion and sedimentation during construction as well as the operation phases of the solar farm.

19.3 CONTINGENCY MEASURES

- The construction compound and all crib rooms will be located outside land inundated in the 100yr ARI.
- No plant will be left overnight on land that would be inundated in the 100 yr ARI.

Dust Suppression

20.1 REQUIREMENT

CoA C13(o) states the CEMP shall include:

> *measures to monitor and manage dust emissions including dust generated by traffic on unsealed public roads and unsealed internal access tracks.*

20.2 PUBLIC ROADS

Construction will not generate traffic movements on any unsealed public roads.

20.3 INTERNAL ACCESS TRACKS

- Restrict vehicle movements off internal access tracks to a minimum.
- Enforcement of low speed (<25 km/hour) restrictions on all vehicle movements within the work sites.
- Consideration (if required) of a proprietary dust stabilization compound (i.e. Dustex).

20.4 BEST PRACTICE

- Strategic watering as required.
- In extreme adverse conditions (dry and windy) consideration will be given to a temporary cessation of construction activity that generates excessive dust emissions.
- Areas of soil disturbance will be kept to a minimum for construction purposes.
- Loads of material with the potential to generate particulates delivered to or transported from the site will be suitably covered during transport.
- No burning of vegetation or waste material will take place.
- Topsoil stripped as part of preparatory civil earthworks to be used to facilitate rehabilitation of disturbed areas post construction will be stockpiled (no higher than 1 metre) and a silt fence will be installed around the toe of the stockpile batters. Contingent on the season, it can be expected that the stockpile will naturally and quickly establish a vegetative cover. Only if required would this stockpile be seeded. The SCECO will monitor the cover of the stockpile as part of the weekly inspection and the need for seeding will be checked as part of this process.
- Vehicles leaving the construction site will pass over a stabilised site access to minimise the potential for soil/dust to be deposited on Packham Drive. If and as required a Work Method Statement will be prepared for road cleaning if construction traffic does inadvertently drag anything onto Packham Drive.

20.5 PERFORMANCE CRITERIA

CoA B5 states:

> *The Proponent shall construct and operate the project in a manner that minimises dust generation from the site, including wind-blown and traffic-generated dust as far as practicable. All project related activities on the site shall be undertaken with the objective of preventing visible emissions of dust from the site. Should visible dust emissions attributable to the project occur during operation and construction, the Proponent shall identify and implement all practicable dust mitigation measures, including cessation of relevant works, as appropriate, such that emissions of visible dust cease.*

20.6 MONITORING

The SCECO will undertake visual daily inspections at selected off-site locations to monitor whether dust emissions attributable to construction activity are visible.

If dust emissions are visible the SCECO will immediately meet with the relevant work crew to identify and implement practicable dust mitigation measures such that visible off-site emissions of dust cease.

As a last resort the SCECO will have the authority to temporarily stop works.

20.7 WATER SOURCES

Water used for dust suppression will be sourced as follows.

1. The primary source will be the farm dams located within the development site.
2. If and as required this source would be complemented from the 2 x 10 kL water tanks in the main construction compound.

The water supply for these storage tanks will be potable quality, purchased from Cabonne Council and sourced from Council's commercial standpipe located at its Molong Works Depot.

RCR Infrastructure are, however, in consultation with Council looking at the feasibility of sourcing either raw or potable water from the closest supply line at Manildra. Contingent on the results of these investigations water may be sourced from these pipeline connection points.

Bush Fire Risk

21.1 REQUIREMENT

CoA C13(p) states the CEMP shall include:

> *emergency management measures including measures to control bushfires*

This section of the CEMP focusses on measures to prevent and control bushfires.

Procedures for responding to emergency situations are provided in the *Emergency Response Plan* (refer **Appendix I**).

CoA B1 and B2 also state:

> *B1: The Proponent shall ensure that all project components on site are designed, constructed and operated to minimise ignition risks, provide for asset protection consistent with relevant RFS design guidelines (Planning for Bushfire Protection 2006 and Standards for Asset Protection Undated) and provide for necessary emergency management including appropriate fire-fighting equipment and water supplies on site to respond to a bush fire.*
>
> *B2: Throughout the operational life of the project, the Proponent shall regularly consult with the local RFS to ensure its familiarity with the project, including the construction timetable and the final location of all infrastructure on the site. The Proponent shall comply with any reasonable request of the local RFS to reduce the risk of bushfire and to enable fast access in emergencies.*

21.2 OBJECTIVE

As it relates to construction the objectives relating to bush fire management are:

- to minimise ignition risks and prevent construction activity sparking a bush fire;
- to provide appropriate fire-fighting equipment and water supplies on site;
- to regularly consult with the Manildra RFS Brigade so it knows the construction timetable and access arrangements; and
- to comply with any reasonable request of the Manildra RFS Brigade.

21.3 MANILDRA RFS BRIGADE

The protocols and procedures for minimising bush fire risk have been developed in consultation with the RFS Manildra Brigade. Specifically, a site inspection was undertaken with the Manildra Brigade captain on 18 April 2017.

Manildra Brigade Captain

Mr Andrew Gosper

Mobile: 0428 816 902

21.4 FIRE AND RESCUE NSW

Fire and Rescue NSW has advised that the first point of call for the MSF in relation to bushfire management is the Rural Fire Service as the construction site is within their Fire District.

Notwithstanding, it has been agreed that RCRI will provide Fire and Rescue NSW Station Officers and the Captain and Deputy Captain at Molong with details of this bushfire management plan and construction site details (location and access) for their information and use should they need to respond.

Specifically, this information will be provided to the following officers within Fire and Rescue:

Matthew.Jeffery@fire.nsw.gov.au

Thomas.Fenlon@fire.nsw.gov.au

Bradley.Monico@fire.nsw.gov.au

Neil.Hughes@fire.nsw.gov.au

Andrew.Henderson@fire.nsw.gov.au

Leonard.Punch@fire.nsw.gov.au

Brenden.Wood@fire.nsw.gov.au

21.5 WATER SUPPLY

The 2 x 10 kL water supply tanks at the main compound will be fitted with coupling connections compatible with Manildra's Brigades fire tanker.

21.6 FUEL REDUCTION

The fuel load over the construction site will be monitored weekly over the bush fire season and reduction measures will be implemented as required. These measures will be restricted to mechanical slashing.

21.7 WORK PRACTICES

- No burning of vegetation or any waste material will take place on the construction site.
- Fire extinguishers will be available in all vehicles and at all site locations with the potential for fire risk (eg. chemical storage and refuelling locations).
- All vehicle and plant movements beyond formed roads and trafficable hard stand areas will be restricted to diesel, not petrol vehicles.
- During the bushfire season the fire danger status would be monitored daily (through the RFS website http://www.rfs.nsw.gov.au) and communicated to personnel;
- Total Fire Ban rules will be adhered to. That is, RCRI will not:
  - (in any grass, crop or stubble land) drive or use any motorised machine unless the machine is constructed so that any heated areas will not come into contact with combustible matter;
  - carry out Hot Works (e.g. welding operations or use an angle grinder or any other implement that is likely to generate sparks), unless RCRI has the necessary exemption from the NSW RFS Commissioner and complies with all requirements specified in the exemption.
- Smoking and disposal of cigarette butts: Dedicated smoking area designated to compound areas with appropriate resources (DCP fire extinguishers/bare ground).
- Refuelling of Plant and Equipment: Refuelling points mapped on site, plastic lined with spill response kits.

- Hot work such as welding and grinding: Gravelled workshop with spill response, Dry Chemical Powder (DCP) fire extinguishers and fire blanket.
- Management of vegetation fuel loads on site: Advice from local RFS on managing vegetation fuel load reduction will be undertaken when required.
- Petrol Powered vehicles and equipment: RCRI minimise the use of petrol equipment as far as possible.
- All water trucks that are used on site will have a remote controlled water cannon as a required fixture. All vehicles and mobile plant will be equipped with DCP fire extinguishers or auto deluge systems.
- All vehicle and mobile plant undergo a pre start inspection each morning prior to shift to assess if there are any deficiencies that would make them unsafe to use for the operator or the environment.

Waste Management

22.1 WASTE TYPES

Building the MSF will generate a range of wastes. The range of liquid and non-liquid wastes generated during construction is detailed below in **Table 22.1**. Information is provided on the source and waste classification. The waste classification is as defined in Schedule 1 of the *Protection of the Environment Operations Act 1997*.

Table 22.1 – Waste Classifications

Source	Waste	Classification
Packaging	5 – 6 tonne cling wrap plastic	General Solid Waste (Non-putrescible)
Packaging	80 – 100 soft wood Note 1	General Solid Waste (Non-putrescible)
Packaging	350 – 400 tonne hard wood Note 1	General Solid Waste (Non-putrescible)
Packaging	150 tonne cardboard	General Solid Waste (Non-putrescible)
Packaging	Containers (previously containing dangerous goods)	DrumMuster
Offcuts	8 – 12 tonne insulated copper cabling	N/A (To Be Recycled)
Earthworks	Virgin Excavated Natural Material Note 2	General Solid Waste (Non-putrescible)
Clearing	Vegetation	General Solid Waste (Non-putrescible)
Personnel	Food scraps and contents of litter bins	General Solid Waste (Putrescible)
Amenities	Effluent	Liquid
Survey marking	Spray cans	General Solid Waste (Non-putrescible)
Spill	Hydrocarbon contaminated soil	Subject to testing.

Note 1: means sawdust, timber offcuts, wooden crates, wooden packaging, wooden pallets, wood shavings and similar materials, and includes any mixture of those materials, but does not include wood treated with chemicals such as copper chrome arsenate (CCA), high temperature creosote (HTC), pigmented emulsified creosote (PEC) and light organic solvent preservative (LOSP).

Note 2: VENM means natural material (such as clay, gravel, sand, soil or rock fines) that has been excavated from areas that are not contaminated with manufactured chemicals, or with process residues, as a result of industrial, commercial, mining or agricultural activities, and does not contain any sulfidic ores or soils or any other waste.

It is noted that construction will not generate building and demolition waste as this waste type must comprise, amongst other things, unsegregated material. Waste segregation to maximise recycling opportunities will be undertaken.

No waste will be received at the site.

22.2 WASTE CLASSIFICATION

No quantities of hazardous waste are expected to be generated from the construction. Conceivable problematic waste would be restricted to quantities of hydrocarbon contaminated soil that results from a spill or burst hydraulic hose.

In the event that this circumstance occurs a check will be made that it hasn't been pre-classified by the EPA and if not, it will be chemically assessed to determine whether it is hazardous, restricted solid or general solid waste (putrescible or non-putrescible). This assessment process will be undertaken in accordance with the NSW EPA (2014) *Waste Classification Guidelines*.

22.3 NO BURNING/BURIAL

No burning of any waste type, including vegetation will be undertaken on-site. No burial of any waste materials will be undertaken on site.

22.4 STORAGE

Wastes containing putrescible material (generated from the amenities office and including food scraps, lunch wrappings, etc.) will be stored in secure covered bins.

22.5 DISPOSAL

The Manildra Waste Management Facility (WMF) is operated by Cabonne Council and located 3 kms south of Manildra at 368 Yellowbox Road. It provides recycling and landfilling facilities and is open Wednesday and Sunday from 10 am to 1 pm and 2 pm to 5 pm.

The Manildra landfill can accept all of the waste types likely to be generated by construction.

The Manildra landfill can accept commercial waste, demolition waste, waste, scrap metal, green waste, recyclables (paper, cardboard, glass, steel and aluminum cans and plastic bottles) and provides a DrumMuster service.

The Manildra landfill cannot accept liquid wastes or hazardous waste.

22.6 RECYCLING

The construction effort will generate a range of material types that are recyclable. Skips and storage bays will be provided in the compound area that permits waste separation to maximise recycling opportunities.

Materials generated from the construction phase that would be recycled include glass, metal, paper, wood and vegetation.

22.7 WASTE TRACKING

All wastes, including recyclable materials, from this project will be tracked using ***Waste Register*** (refer *MSF_CEMP_R06*). All waste/recyclable material transported off-site will be recorded.

This register will record the following information:

- Date the load departed site;
- A description of the waste/recyclable material in the load.
- Clarification whether the material is to be recycled or whether it is a waste to be disposed off.
- If a waste for disposal, the waste classification.
- The quantity of material (either tonnage or volume).
- Its destination.
- The freight company transporting the material.

Records

23.1 DOCUMENTATION

Documentation and maintenance of records forms a key component of this CEMP and will be maintained to ensure (and demonstrate) construction activities are comply with the project approval.

23.2 REGISTERS

Table 23.1 – CEMP Registers

Reference	Name	Function
MSF_CEMP_R01	Due Diligence Induction Register	Central log validating any and all employees/subcontractors working on site have attended a Due Diligence Induction.
MSF_CEMP_R02	Corrective Action Register	Central record recording all Corrective Actions raised during construction, cross referenced to individual Corrective Actions.
MSF_CEMP_R03	Improvement Notice Register	Central record recording all Improvement Notices raised during construction, cross referenced to individual Improvement Notices.
MSF_CEMP_R04	Complaints Register	Central record recording any and all complaints received during construction, cross referenced to individual Complaint Record
MSF_CEMP_R05	Environmental Incidents Register	Central record recording any and all environmental incident arising during construction, cross referenced to individual Environmental Incident Record
MSF_CEMP_R06	Waste Register	Central record recording all wastes transported off site, including waste type and destination.

23.3 FORMS

Table 23.2 – CEMP Forms

Reference	Name	Function
MSF_CEMP_F01	Weekly Inspection Checklist	To be completed weekly.
MSF_CEMP_F02	Compliance Audit	To be completed when conducting the monthly compliance audit.
MSF_CEMP_F03	Corrective Action	To be completed for any Corrective Action raised.
MSF_CEMP_F04	Improvement Notice	To be completed for any Improvement Notice raised.
MSF_CEMP_F05	Complaint Record	To be completed for any complaint received.
MSF_CEMP_F06	Environmental Incident Record	To be completed in the event of any environmental incident.

References

ISO 14001:2015(E) *Environmental management systems – requirements with guidance for use*
DIPNR (2004) *Guidelines for the Preparation of Environmental Management Plans*
Footprint (undated) *Proposed Manildra Solar Farm – Preliminary Hydrological and Hydraulic Assessment*
Heggies (October 2010) *Manildra Solar Farm Noise Monitoring and Assessment*
Essential Energy (March 2012) Operational Procedure: Vegetation Clearing Guidelines for New Power Lines
NSW Rural Fire Service (undated) Bushfire Survival Plan
ngh environmental (December 2010) *Manildra Solar Farm Submissions Report*
ngh environmental (February 2017) *Manildra Solar Farm Offset Plan*
ngh environmental (October 2010) *Environmental Assessment Manildra Solar Farm*
ngh environmental (February 2016) *Manildra Solar Farm Landscape Plan*
ngh environmental (February 2016) *Manildra Solar Farm Groundcover Management Plan*
ngh environmental (April 2016) *Manildra Solar Farm Flora and Fauna Management Plan*
ngh environmental (February 2016) *Manildra Solar Farm Offset Strategy*
ngh heritage (December 2010) *Manildra Solar Farm Heritage Assessment – Stone Cottage Ruin*
ngh environmental (December 2010) ***Manildra Solar Farm Submissions Report***
ngh environmental (December 2010) *Manildra Solar Farm Submissions Report – Biodiversity Assessment Addendum*
New South Wales Archaeology (September 2010) *Archaeological and Cultural Heritage Assessment*
First Solar (undated) *Manildra Solar Farm Best Practice Community Engagement Plan*

Registers

DUE DILIGENCE INDUCTION REGISTER

*By signing this form I confirm I have attended the induction and understand my environmental responsibilities.

Date	Name	Company	Signed *

CORRECTIVE ACTION REGISTER

REF #	Date	Raised By (Name)	Circumstances/Details

IMPROVEMENT NOTICE REGISTER

REF #	Date	Raised By (Name)	Circumstances/Details

COMPLAINTS REGISTER

REF #	Date	Nature of Complaint	Complaint

ENVIRONMENTAL INCIDENTS REGISTER

REF #	Date	Nature of Incident

WASTE REGISTER

DATE	WASTE DESCRIPTION	WASTE CLASSIFICATION	QUANTITY (CHOOSE ONE)		END USE (TICK ONE)		DESTINATION	TRANSPORT COMPANY
			Weight (kg)	Volume (m^3)	Recycled	Disposal		

Forms

INSPECTION CHECKLIST

Date:	____ / ____ / ____	Weather:	

INSPECTION TIMES	IMPLEMENTED	
	YES	NO
Air Quality		
Is the construction site watered to minimize dust generated?		
Are stockpiles of dusty material covered or watered?		
Is dust being released past the site boundary?		
Is plant and equipment well maintained (any black smoke observed)?		
Are plant and vehicle movements restricted to the designated internal routes?		
Are speed control measures being adhered to?		
COMMENTS:		
Sedimentation and Erosion Control/Water Quality Protection		
Are there any signs of erosion or localised scouring?		
Are all sediment traps functioning?		
Are sedimentation traps free of silt and sediment?		
Are discharge points stable? (If no inspect downstream dam).		
Downstream Dam – is there evidence of sedimentation on dam apron? If yes, attach photographs and raise Corrective Action.		
Were any actions taken since the last inspection adequate and effective?		
Are the AWTS being properly maintained?		
Is the public road around the site entrance clean and free of silt?		
COMMENTS:		
Noise Minimisation and Management		
Are works undertaken in accordance with the Construction Noise Management Plan?		
Is idle plant/equipment turned off or throttled down?		
Any noise mitigation measures adopted (eg use noise barrier/enclosure)?		
Are attenuation devices fitted to equipment where possible?		
COMMENTS:		
Waste Management		
Is the work area clean and tidy (eg litter free, good housekeeping)?		
Are all waste storage bins/containers clearly labelled?		

Are construction wastes/recyclable wastes being removed off site regularly?		
Is the Waste Register being maintained?		
COMMENTS:		
Hazardous Materials Storage		
Are SDS available for all chemicals on site?		
Does storage of DG comply with legislative storage requirements?		
Is the refuelling station functioning to requirement?		
Are spill kits accessible?		
COMMENTS:		
Protection of Flora, Fauna and Heritage		
Are areas not to be disturbed clearly marked and being adhered to?		
Are progressive rehabilitation works underway?		
COMMENTS:		
Emergency Preparedness and Response		
Are fire extinguishers/fighting facilities properly maintained?		
Are all evacuation points/routes free of obstruction?		
COMMENTS:		

Have the changes required as a result of any Corrective Action or Improvement Notice issued since the last inspection been implemented	☐ **No** ☐ **Yes** ☐ **N/A**
Have the changes been effective in terms of improving environmental outcomes?	☐ **No** ☐ **Yes** ☐ **N/A**
Is there a need to raise a Corrective Action?	☐ **No** ☐ **Yes: If Yes, CA Ref No:** _____
Is there a need to raise an Improvement Notice?	☐ **No** ☐ **Yes: If Yes, IN Ref No:** _____

Inspection Checklist Close-off		
Name	**Signature**	**Date**

COMPLIANCE AUDIT

Date	_____ / _____ /_____	Audit No.	
Weather Conditions:			

Audit Observations:
Assessment of Compliance:

Requirement of Corrective Action	☐ Yes ☐ No
Opportunity for Improvement Notice	☐ Yes ☐ No

Actions Required

Compliance Audit Close-off: CONSTRUCTION MANAGER		
Name	Signature	Date

CORRECTIVE ACTION

REF #	Date	Who Raised the Corrective Action?

What was the reason for this Corrective Action?

What Corrective Action was taken?

Have relevant employees/contractors been advised of required changes to work practices?	☐ Yes ☐ No ☐ N/A
If works were stopped, can they resume?	☐ Yes ☐ No ☐ N/A

Corrective Action Close-Off		
Name	Signature	Date

IMPROVEMENT NOTICE

REF #	Date	Who Raised the Improvement Notice?

What was the reason for this Improvement Notice?

What Improvement Action was taken?

Have relevant employees/contractors been advised of required changes to work practices?	☐ Yes ☐ No ☐ N/A
If works were stopped, can they resume?	☐ Yes ☐ No ☐ N/A

Improvement Action Close-Off		
Name	Signature	Date

COMPLAINT RECORD

REF #		Date	
How was the complaint received?		☐ Phone ☐ Email ☐ Post ☐ Verbal	
When was the complaint received?		Date: ____ / _____ / _____ Time: _____:____ am/pm	
Weather Conditions:		Rain in last 24 hours:	_____ mm

Complaint Details

Name:	
Address:	
Email:	
Phone:	
Preferred method of contact:	

Complaint Details

What was the nature of the complaint:
What was the cause of the complaint:

COMPLAINT RECORD

What actions will be taken:	
When will the actions be implemented?	
Corrective Action	☐ Yes ☐ No
Improvement Notice	☐ Yes ☐ No
Has follow-up contact been made with the complaint?	
☐ Yes: If so, when?	
☐ No: If so, why not?	
Has the complaint been resolved to the satisfaction of the complainant?	☐ Yes ☐ No
If works were stopped, can they resume?	☐ Yes ☐ No ☐ N/A

Complaint Record Close-off		
Name	Signature	Date

ENVIRONMENTAL INCIDENT REPORT

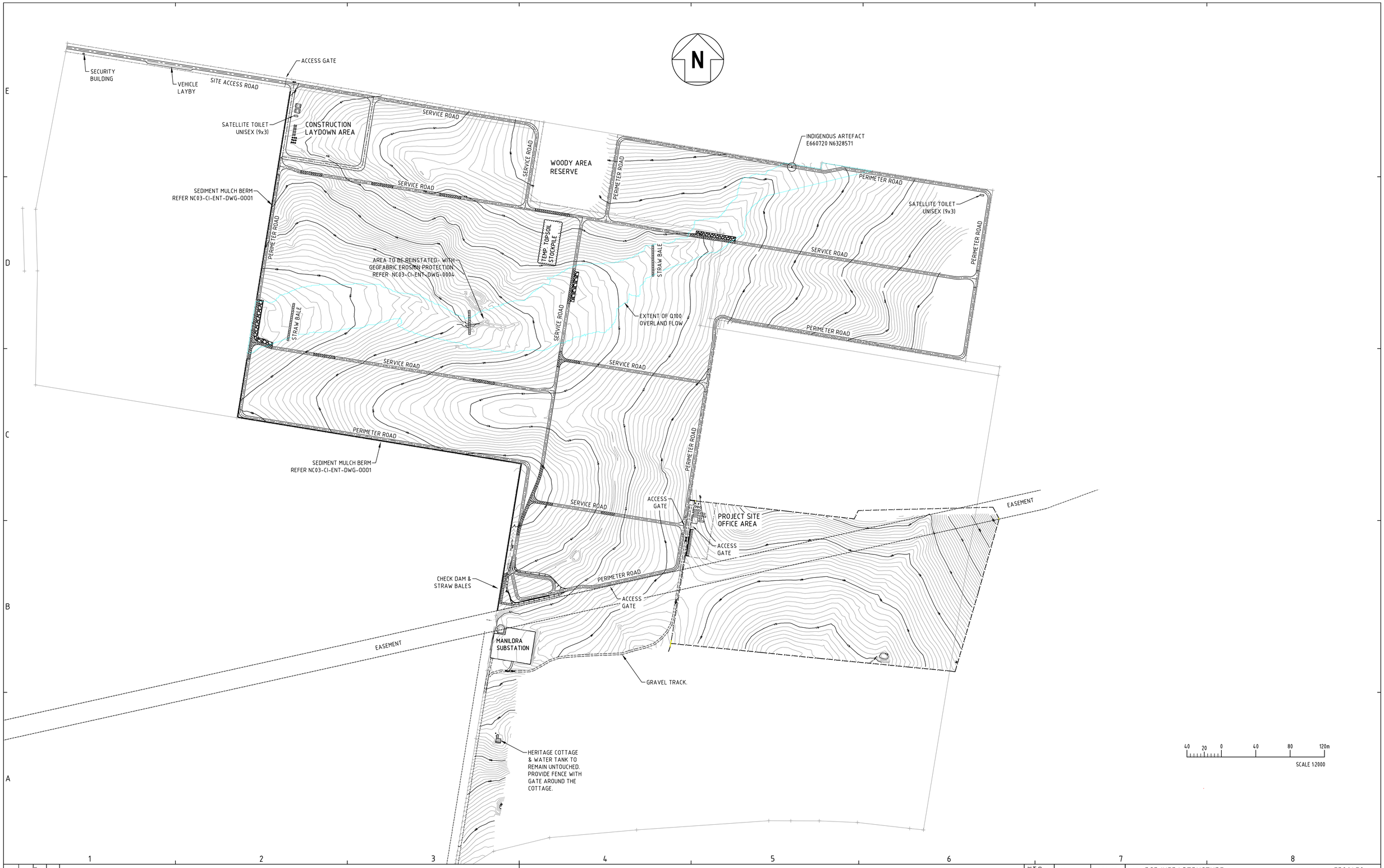
REF #		Date of the incident:	_____ /_____ /_____
Time of the incident:	_____:_____ am/pm	Duration of incident:	
Weather Conditions:			
Rain in last 24 hours:	_____ ml		
Risk of material hard to the environment?	☐ No ☐ Yes		
Nature of the incident:			
Where the incident occurred:			
The cause of the incident:			

The nature and estimated quantity/volume of any pollutants involved:
What contaminate/clean-up actions were taken, and when?
What action has been taken to avoid recurrence?

Corrective Action	☐ No ☐ Yes If yes, Ref # _____
Improvement Notice	☐ No ☐ Yes If yes, Ref # _____
Has the EPA been notified?	☐ No ☐ Yes If yes, date: ____ / ____ /_____
Has Cabonne Council notified?	☐ No ☐ Yes If yes, date: ____ / ____ /_____
Has Environmental Rep been notified?	☐ No ☐ Yes If yes, date: ____ / ____ /_____
If works were stopped, can they resume?	☐ No ☐ Yes ☐ N/A

Environmental Incident Close-Off		

Schedule of Drawings



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ALTERATIONS			
ORIGINAL ISSUE	BY: A	DRAW: P.T	CHKD	ENTURA APPD / DATE	CLIENT APPROVED / DATE

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CHECKED	AA
APPROVED	
DATE	
CLIENT APP'D	
DATE	

CLIENT: RCR INFRASTRUCTURE — ENGAGEMENT No: E306470

TITLE: MANILDRA SOLAR FARM
48.5 MW CAPACITY
CONSTRUCTION LAYDOWN AREAS
HERITAGE COTTAGE & INDIGENOUS ARTEFACT

SCALE: 1:4000

SIZE: A1

ORG No.: NC03 - CI - ENT - DWG - 0105

REV.: A

FILENAME: P:\PROJECT\CONSULTDM\E306XXX\E3064XX\E306470\CIVIL\DRAWINGS\NC03-CI-ENT-DWG-0105.DWG

Appendix A

CONSTRUCTION NOISE MANAGEMENT PLAN

amg

Assured Monitoring Group

MANILDRA SOLAR FARM – CONSTRUCTION NOISE MANAGEMENT PLAN – APRIL 2017

GEOLYSE PTY LTD

Project ID. 10673

R_2

DATE OF RELEASE: 23/06/2017

ABN: 87 604 851 078

Unit 7, 142Tennyson Memorial Avenue – Tennyson – Queensland - 4105

Table 1: Document approval

	Name	Position Title	Signature	Date
Author	Michelle Clifton	Senior Consultant		23.06.2017
Reviewer	Craig Beyers	Consulting Services Manager		23.06.2017
Approver	Craig Beyers	Consulting Services Manager		23.06.2017

Table 2: Revision register

Revision	Date	Name	Issued to	Comment
R_0	27.04.2017	C. Beyers	A. Brownlow	Formal report release
R_1	13.06.2017	C. Beyers	A. Brownlow	Minor revision – ER comments
R_2	23.06.2017	M. Clifton	A. Brownlow	Boundary outline on figures

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Where site inspections, testing or fieldwork have taken place, the report is based on the information made available by the client or their nominees during the visit, visual observations and any subsequent discussions with regulatory authorities. The validity and comprehensiveness of supplied information has not been independently verified and, for the purposes of this report, it is assumed that the information provided to Assured Monitoring Group is both complete and accurate. It is further assumed that normal activities were being undertaken at the site on the day of the site visit(s), unless explicitly stated otherwise.

TABLE OF CONTENTS

1 INTRODUCTION 5

1.1 SCOPE OF ASSESSMENT 5
1.2 THIS REPORT 5

2 LEGAL AND OTHER REQUIREMENTS 6

2.1 LEGISLATION 6
2.2 GUIDELINES AND STANDARDS 6
2.3 CONDITIONS OF APPROVAL 6
2.3.1 Hours of Construction 6
2.3.2 CNMP Requirements 7

3 EXISTING ENVIRONMENT 9

3.1 MSF SITE 9
3.2 NEARBY SENSITIVE RECEPTORS 9

4 CONSTRUCTION ACTIVITIES 11

4.1 METHODS OF CONSTRUCTION 11
4.2 WORK AREAS 11
4.3 CONSTRUCTION SCHEDULE 13
4.3.1 Timing of Works 13
4.3.2 Hours of Construction 13
4.3.3 Approval Sought for OOHW 14
4.3.4 Activities 14
4.4 CONSTRUCTION NOISE SOURCES 15

5 RISK ASSESSMENT METHODOLOGY 16

5.1 APPROACH TO RISK ASSESSMENT 16
5.2 CONSTRUCTION NOISE CRITERIA FOR ACCEPTABLE ACOUSTIC AMENITY 16
5.3 RISK CLASSIFICATION 17
5.4 NOISE MODELLING METHODOLOGY 19

6 RISK ASSESSMENT 20

6.1 PREDICTED NOISE LEVELS 20
6.2 NOISE AMELIORATION REQUIREMENTS 23
6.2.1 All Activities 23
6.2.2 Low Risk Controls 24
6.2.3 High Risk Controls 24

7 NOISE ENVIRONMENTAL MANAGEMENT 26

7.1 NOISE MANAGEMENT CONTROLS 26

8 COMPLIANCE MANAGEMENT 28

8.1 ROLES AND RESPONSIBILITIES 28
8.2 TRAINING AND AWARENESS 28
8.3 NON-CONFORMANCES 29
8.4 COMPLAINTS MANAGEMENT 29
8.5 MONITORING AND REPORTING 29

APPENDIX A: GLOSSARY OF TERMS **30**
APPENDIX B: CONSTRUCTION SCHEDULE **31**
APPENDIX C: OUT-OF-HOURS WORK PROTOCOL **32**

LIST OF TABLES

TABLE 1: DOCUMENT APPROVAL 2
TABLE 2: REVISION REGISTER 2
TABLE 3: CONDITIONS OF APPROVAL RELEVANT TO THIS CNMP 8
TABLE 4: NEARBY SENSITIVE RECEPTORS 9
TABLE 5: RATED BACKGROUND NOISE LEVELS 10
TABLE 6: CONSTRUCTION STAGES, ACTIVITIES AND DATES 11
TABLE 7: EQUIPMENT SWLS AND EXPECTED DURATION 15
TABLE 8: NSW EPA CONSTRUCTION NOISE CRITERIA – RESIDENTIAL RECEIVERS 16
TABLE 9: CONSTRUCTION NOISE CRITERIA FOR SENSITIVE RECEPTORS 17
TABLE 10: PREDICTED L_{AEQ} RECEPTOR NOISE LEVELS, DB(A) DURING MONTH 4 20
TABLE 11: ENVIRONMENTAL MANAGEMENT CONTROLS 26
TABLE 12: ROLES AND RESPONSIBILITIES 28

LIST OF FIGURES

FIGURE 1: SITE LOCATION AND CLOSEST SENSITIVE RECEPTORS 9
FIGURE 2: SITE LAYOUT AND THE PILING SCHEDULE 12
FIGURE 3: RISK ASSESSMENT METHODOLOGY OVERVIEW 16
FIGURE 4: RISK CLASSIFICATION FLOW CHART 18
FIGURE 5: PREDICTED L_{AEQ} NOISE LEVELS DURING MONTH 4 CONSTRUCTION ACTIVITIES 22
FIGURE 6: PREDICTED L_{AEQ} NOISE LEVELS DURING MONTH 5 CONSTRUCTION ACTIVITIES 22
FIGURE 7: PREDICTED L_{AEQ} NOISE LEVELS DURING MONTH 6 CONSTRUCTION ACTIVITIES 23
FIGURE 8: NOISE BARRIER LOCATION 24

1 INTRODUCTION

1.1 Scope of Assessment

The Assured Monitoring Group (AMG) was appointed by Geolyse Pty Ltd on behalf of RCR Infrastructure Pty Ltd to develop a Construction Noise Management Plan (CNMP) for the Manildra Solar Farm (MSF) project. The CNMP describes how MSF construction team will minimise and manage noise impacts during construction of the project in accordance with the Conditions of Approval for the development.

In addition, this report also provides an assessment of the risk associated with a proposal by RCR Infrastructure to undertake construction works during Out-of-Hours Work (OOHW) periods as described by the Conditions of Approval. Specifically, the assessment considers potential risks and recommended acoustic controls to minimise such risks where construction is allowed during the following OOHW periods:

- 07:00 – 08:00 on Saturdays;
- 13:00 – 18:00 on Saturdays; and
- 07:00 – 18:00 on Sundays

1.2 This Report

This CNMP has been prepared in accordance with the Conditions of Approval (CoA) C14(d) and to provide an assessment of risks associated with specific OOHW activities.

A glossary of terms is presented in Appendix A to assist the reader.

2 LEGAL AND OTHER REQUIREMENTS

2.1 Legislation

Legislation relevant to the management of construction noise impacts associated with the solar farm includes:

- Protection of the Environment Operations Act 1997 (POEO Act); and
- Protection of the Environment Operations (Noise Control) Regulation 2008.

2.2 Guidelines and Standards

The main guidelines, standards and policy documents relevant to this CNMP include:

- Interim Construction Noise Guideline (ICNG) (DECC 2009);
- NSW Environmental Criteria for Road Traffic Noise (ECRTN) (EPA 1999);
- NSW Industrial Noise Policy (INP) (EPA 2000);
- Road Noise Policy (RNP) (EPA 2011);
- RTA Environmental Noise Management Manual (ENMM) (RTA 2001a);
- Environmental Noise Management Assessing Vibration: A Technical Guideline (DEC, 2006);
- Construction Noise Strategy Transport Construction Authority, 2011; and
- AS 2436-2010 Guide to Noise and Vibration Control on Construction, Demolition and Maintenance Sites, and

2.3 Conditions of Approval

2.3.1 Hours of Construction

CoA clause D1 of the requires that the Proponent only undertake construction activities associated with the project that would generate an audible noise at any sensitive receptor during the following hours:

a) 7:00 am to – 6:00 pm, Monday to Friday;
b) 8:00 am – 1:00 pm on Saturdays; and
c) at no time on Sundays or public holidays.

Condition D2 states that "construction outside of these hours may be varied for works as approved through the out-of-hours work protocol outlined in condition C14(d)". Furthermore, any request to alter the hours of construction is required to:

(a) be considered on a case-by-case basis;
(b) be accompanied by details of the nature and need for activities to be conducted during the varied construction hours and any other information necessary to reasonably determine that activities undertaken during the varied construction hours will not adversely impact on the acoustic amenity of receptors in the vicinity of the site; and
(c) require that affected residential receivers are informed of the timing and duration of any construction activities approved under this condition at least 48 hours before that work commences.

For work generating high noise impacts[a], Condition D3 requires that these activities only be undertaken:

(a) between the hours of 8:00am and 6:00pm Monday to Friday;
(b) between the hours of 8:00am and 1:00pm Saturday; and
(c) in continuous blocks of no more than three hours, with at least a one hour respite between each block of work generating high noise impact, where the location of the work is likely to impact the same receivers;
except as otherwise approved by the Secretary. For the purposes of this Condition 'continuous' includes any period during which there is less than a one hour respite between ceasing and recommencing any of the work the subject of this Condition.

2.3.2 CNMP Requirements

Condition C14(d) of the Conditions of Approval for the MSF places specific requirements on the CNMP. For ease of reference, Table 3 provides each of these specific requirements along with a reference to the section of this document where the requirement is addressed.

[a] "impulsive, intermittent, low frequency or tonal characteristics, including jack hammering, line drilling, pile driving, rock hammering, rock breaking, saw cutting, sheet piling, vibratory rolling but excluding blasting which exceeds 42dBA at any sensitive receiver"

Table 3: Conditions of Approval Relevant to this CNMP

CoA No.	Condition Requirements	Document Reference
C14 (d)	A Construction Noise Management Plan to manage noise impacts during construction and to identify all feasible and reasonable noise mitigation measures. The Plan shall include, but not necessarily be limited to:	
	(i) details of construction activities and an indicative schedule for construction works;	Section 4
	(ii) identification of construction activities that have the potential to generate noise impacts on surrounding land uses, particularly residential areas;	Section 4
	(iii) detail the requirements for Noise Impact Statement(s) for discrete work areas, including construction site compounds;	Section 6
	(iv) detail what reasonable and feasible actions and measures would be implemented to minimise noise impacts;	Sections 6 & 7
	(v) procedures for notifying sensitive receivers of construction activities that are likely to affect their noise amenity, as well as procedures for dealing with and responding to noise complaints;	Section 7
	(vi) an out-of-hours work (OOHW) protocol for the assessment, management and approval of works outside of standard construction hours including a risk assessment process under which the Environmental Representative may approve out-of-hour construction activities deemed to be of low environmental risk and refer high risk works for the Secretary's approval. The OOHW protocol shall detail standard assessment, mitigation and notification requirements for high and low risk out-of-hour works, and detail a standard protocol for referring applications to the Secretary; and	Appendix C
	(vii) a description of how the effectiveness of these actions and measures would be monitored during the proposed works, clearly indicating how often this monitoring would be conducted, the locations where monitoring would take place, how the results of this monitoring would be recorded and reported; and, if any exceedance is detected how any non-compliance would be rectified.	Section 8

3 EXISTING ENVIRONMENT

3.1 MSF Site

The subject site is located approximately 1.6 km north east of Manildra in central New South Wales. Figure 1 presents the location of the site.

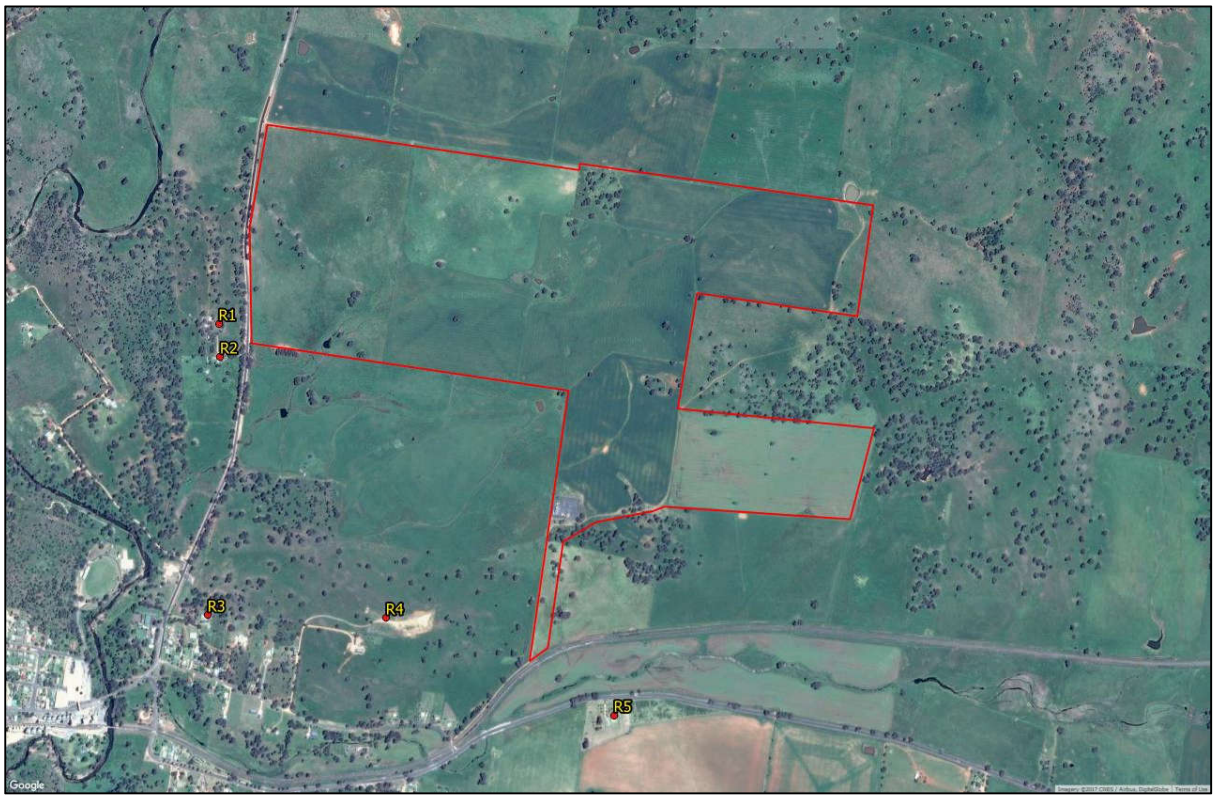


Figure 1: Site Location and Closest Sensitive Receptors

3.2 Nearby Sensitive Receptors

The nearest off-site residential receptors to the MSF subject site include five single existing dwellings located within 1 km of the Solar Farm.

Table 4 and Figure 1 below provide a summary of the nearest sensitive uses to the proposed Manildra Solar Farm development.

Table 4: Nearby Sensitive Receptors

Receptor ID	Description	Distance to Proposed Development Site
R1	Existing Dwelling	120 m
R2	Existing Dwelling	140 m
R3	Existing Dwelling	960 m
R4	Existing Dwelling	610 m
R5	Existing Dwelling	300 m

Previous baseline noise monitoring was undertaken by SLR in 2010 and the SLR report[b] was submitted as part of the approved Environmental Assessment. Specifically, SLR undertook background noise monitoring at two receptors, R2 and R5 listed in Table 4, from 10 September to 16 September 2010. The calculated Rating Background Levels (RBLs) as provided in this report are presented in Table 5.

Table 5: Rated Background Noise Levels

Receptor	Parameter	Day Time Period	Evening Period	Night Time Period
R2	RBL	34	30	30
R5	RBL	31	32	26 (30) [a)]

a) The minimum RBL to be adopted for assessments in NSW is 30 dB(A).

[b] SLR (2010) "Solar Farm, Manildra, NSW – Noise Monitoring & Assessment"

4 CONSTRUCTION ACTIVITIES

4.1 Methods of Construction

The main noise generating activities associated with the construction of the MSF are summarised in Table 6. Of these, the noisiest construction activities are expected to relate to site clearing, construction of access roads, trenching, piling, installing tables and other infrastructure.

Table 6: Construction Stages, Activities and Dates

Stage	Activities	Dates
Road Access and Fencing	Site clearing Relocating overhead lines Build access road Drainage Site fencing / entry gate Hard-standing	20 July 2017 – 14 Sept 17
Main Plant Construction	Trenching, cabling and backfill Piling and install tables Install PV modules Install connections Install inverters Install PVCS01 and PVCS02 Construct office building Install CCTV and security/ weather stations Final layer for site access road	13 July 2017 – 13-Feb 2018
Substation	Substation connection works Commissioning Online testing	2 Nov 2017 – 20 Dec 2017
Testing & Verifications	Inverter commissioning Cable reviews Installation checks	24 Nov 2017 – 29 Jan 2018

4.2 Work Areas

Figure 2 illustrates the layout of the site. Discussions with the team responsible for the construction works have identified that site works will begin at the north-eastern corner and progress south to the substation site before proceeding west.

During the works, the laydown area will be located adjacent to the north-western extent of the solar array installation. Vehicle access to the facility will be via Packham Drive from Henry Parkes Way.

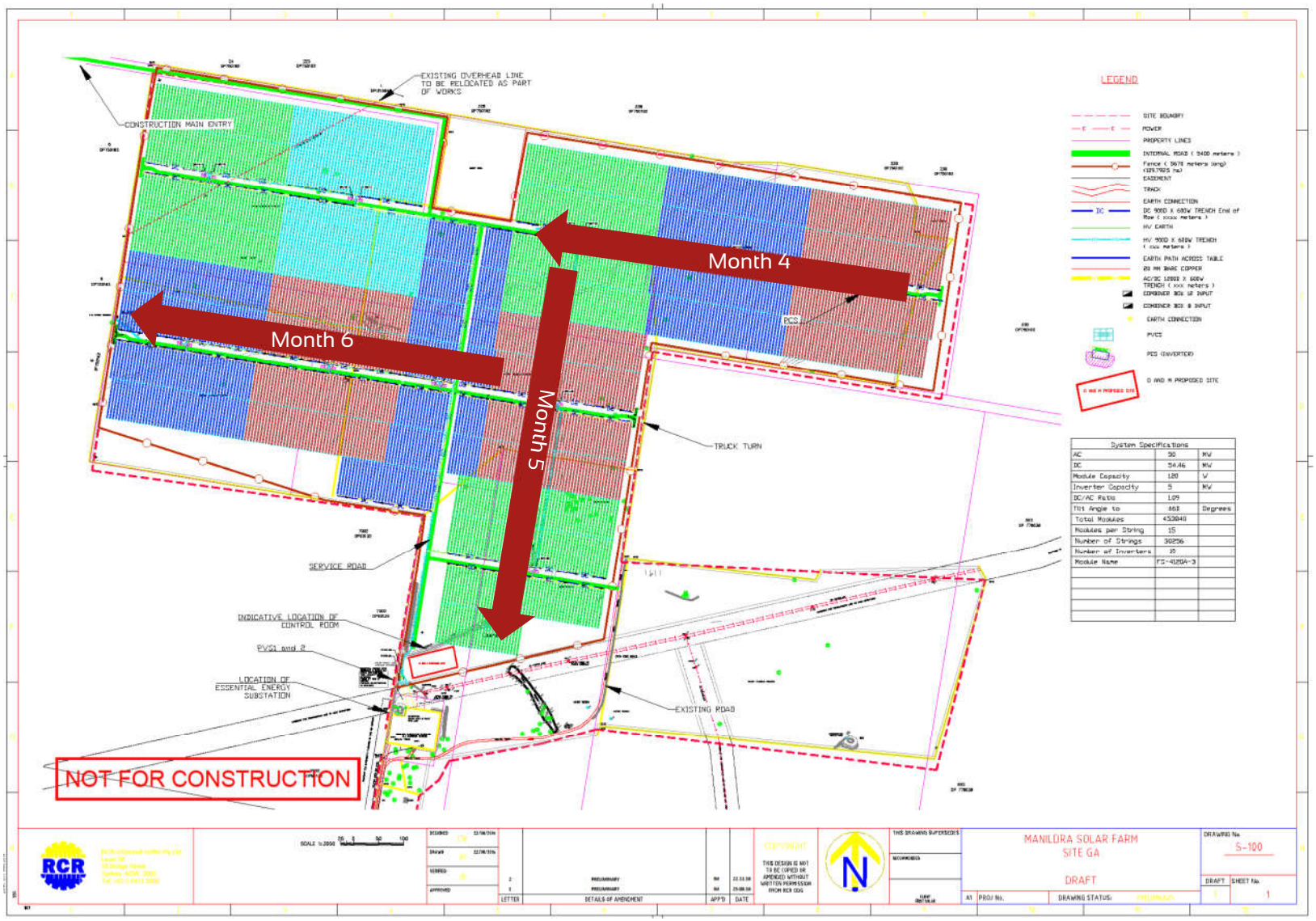


Figure 2: Site Layout and the Piling Schedule

4.3 Construction Schedule

4.3.1 Timing of Works

The site mobilisation is scheduled to commence in late June 2017. The start and finish dates for the main activities are summarised in Table 6. The noisiest construction activities are scheduled to occur over a period of eight months.

It is noted that the sequencing of construction works is well understood at this stage as it is being driven by requirements contained in a signed agreement to commence feed of electricity into the National Grid.

4.3.2 Hours of Construction

CoA clause D1 of the requires that the Proponent only undertake construction activities associated with the project that would generate an audible noise at any sensitive receptor during the following hours:

a) 7:00 am – 6:00 pm, Monday to Friday;
b) 8:00 am – 1:00 pm on Saturdays; and
c) At no stage on Sundays or public holidays.

Condition D2 states that "construction outside of these hours may be varied for works as approved through the out-of-hours work protocol outlined in condition C14(d)". Furthermore, any request to alter the hours of construction is required to:

(a) be considered on a case-by-case basis;
(b) be accompanied by details of the nature and need for activities to be conducted during the varied construction hours and any other information necessary to reasonably determine that activities undertaken during the varied construction hours will not adversely impact on the acoustic amenity of receptors in the vicinity of the site; and
(c) require that affected residential receivers are informed of the timing and duration of any construction activities approved under this condition at least 48 hours before that work commences.

Assessment and approval of OOHW construction activities to be undertaken in accordance with a project specific Out-of-Hours-Work Protocol. Specifically, C14(d) requires that the OOHW Protocol be developed "including a risk assessment process under which the Environmental Representative may approve out-of-hour construction activities deemed to be of low environmental risk and refer high risk works for the Secretary's approval. The OOHW protocol shall detail standard assessment, mitigation and notification requirements for high and low risk out-of-hour works, and detail a standard protocol for referring applications to the Secretary".

Appendix C provides the OOHW Protocol developed for the MSF project. The protocol provides specific methodologies for the assessment of risk associated with undertaking OOHW construction and has been developed to consider both the expected noise generated during construction and the duration and timing of these works such that the potential adverse amenity impacts can be minimised.

4.3.3 Approval Sought for OOHW

Following a review of the proposed construction scheduling, the project team has identified a preference to undertaken construction during limited out-of-hours periods. The assessment of these OOHW activities as sought by the project team is provided in Section 6 of this CNMP in accordance with the requirements of the OOHW Protocol developed for the project and provided in Appendix C of this document.

Specifically, the approval sought, seeks to allow specific low risk OOHW activities during the following hours:

- 7:00 am to 8:00 am on Saturdays;
- 1:00 pm to 6:00 pm on Saturdays; and
- 7:00 am to 6:00 pm on Sundays.

In seeking this approval, it is recognised that the environment surrounding the MSF site is comprised predominantly of rural and rural residential landholdings. As such, it is considered likely that a range of agricultural related activities could occur at any stage during day-light hours. Furthermore, the small number of relatively distant noise sensitive uses in the area surrounding the subject site provides opportunities for reduction of the total duration of the construction works (including deliveries to and from the site which are required to pass by the local school) without resulting in adverse amenity impacts. It is noted that the potential impacts on the school also form part of the traffic management plan for the construction works such that deliveries to site will not occur during school pick-up (7:30 am to 9:00 am) and drop-off (2:00 pm to 4:00 pm) hours.

Thus, through the approval sought to provide for construction from 7 am to 6 pm Monday to Sunday, an overall reduction in the duration of construction works in the order of 25% is expected to be achieved.

It should be noted that this would represent a specific approval in accordance with Condition D2. Further, where other OOHW activities are considered by MSF, these activities would be need to be assessed in accordance with the OOHW Protocol with further approval sought as relevant depending on the risk of adverse impact.

4.3.4 Activities

The 12-month construction stage scheduled was provided by RCR Infrastructure based on construction being approved from 7 am to 6 pm Monday to Sunday. The full construction schedule is presented in Appendix B. Piling activities, the noisiest single activity to be undertaken, is only to be undertaken during months 4, 5 and 6. For the purposes of this assessment, the following three scenarios have been modelled:

- Month 4 – This is when most equipment will be utilised. Whilst the equipment schedule states that the piling activities are to be undertaken in the north-eastern corner of the site during this month, for the purposes of this scenario, the piling activities have been modelled closest to the western boundary in order to provide the worst-case assessment for the nearest noise sensitive receptors to the site;
- Month 5 – Piling activities undertaken closest to the southern receptors of the development; and

- Month 6 – Piling activities undertaken closest to the western receptors of the development.

In considering the potential for adverse amenity impacts resulting from the above three scenarios, the assessment has considered the worst-case in terms of noise generating activities. For the remainder of the construction works, noise levels experienced by noise sensitive receptors near to the site would be lower.

4.4 Construction Noise Sources

Table 7 presents the equipment required to complete the on-site construction works. The sound power levels presented have been sourced from published noise emission datasets and the library of source noise levels maintained by Assured Monitoring Group. For piling activities, the source noise levels are based on monitoring undertaken by Assured Monitoring Group of the actual plant and piling methods to be used by the MSF team.

Table 7: Equipment SWLs and Expected Duration

Plant Item	Sound Power Level, dB(A)	Acoustical Usage Factor, %
Backhoe	104	40
Bulldozer (D8)	108	40
Compactor	113	20
Concrete Pump	108	20
Concrete Truck	109	20
Excavator	107	40
Front End Loader	113	40
Generator	99	50
Grader	110	40
Mobile Crane (Franna)	104	16
Post Pounding Machine [a)]	124	20
Skid steer / bobcat	97	40
Telehandler	106	20
Vibrating Roller	108	20
Water Cart	107	20
Trencher	97	40
Forklift	81	16

[a)] Piling activities were measured at site in April 2017. Includes correction for tonality.

5 RISK ASSESSMENT METHODOLOGY

5.1 Approach to Risk Assessment

Figure 3 provides an overview of the risk assessment methodology.

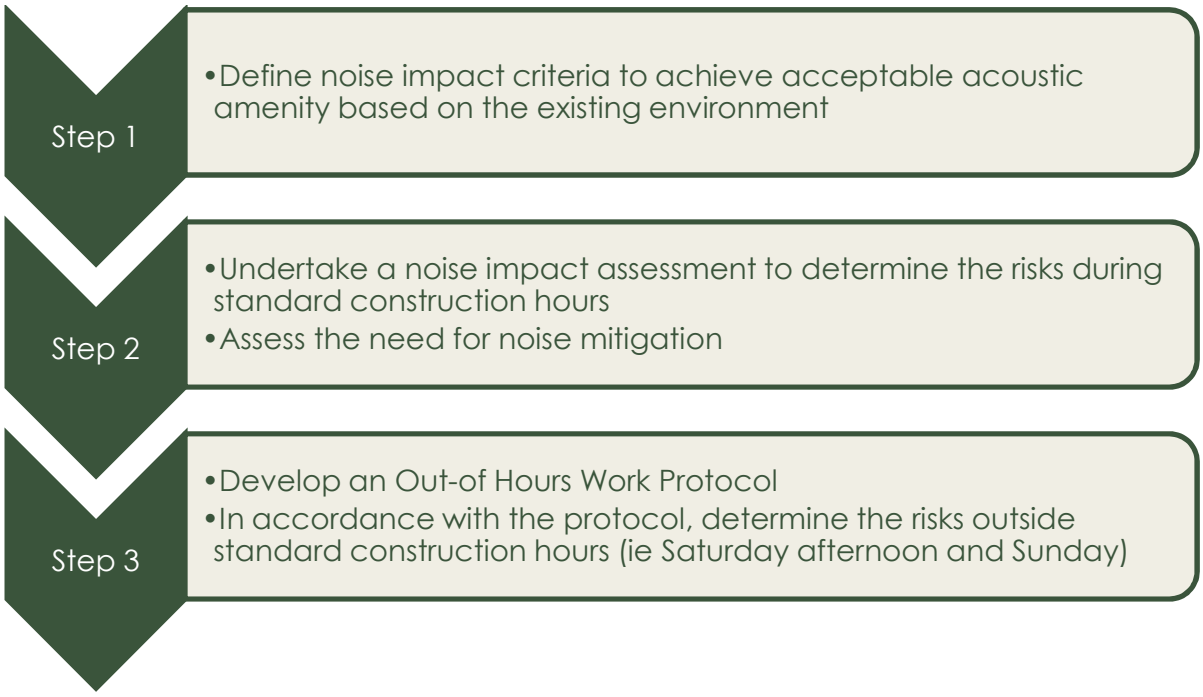


Figure 3: Risk Assessment Methodology Overview

5.2 Construction Noise Criteria for Acceptable Acoustic Amenity

Guidance on the assessment and management of construction noise in NSW is provided in the Interim Construction Noise Guideline 2009 (ICNG) published by the NSW EPA, as summarised in Table 8.

Table 8: NSW EPA Construction Noise Criteria – Residential Receivers

Time of Day	Management Level (Free-field)
Recommended standard hours: Monday to Friday - 7 am to 6 pm	Noise affected RBL + 10 dB
Saturday - 8 am to 1 pm No work on Sundays or public holidays	Highly noise affected 75 dB(A)
Outside recommended standard hours	Noise affected RBL + 5 dB

The proposed OOHW (Saturday and Sunday) are classified as out "outside of standard hours", therefore the criteria for this assessment is based on the RBL +5 dB(A) during the day time period. The calculated Rating Background Levels (RBLs) and the construction noise criteria are presented in Table 9.

Table 9: Construction Noise Criteria for Sensitive Receptors

Receptor	Parameter	Day Time Period 07:00 – 18:00	Evening Period 18:00 – 22:00	Night Time Period 22:00 – 07:00
R2	RBL	34	30	30
	ICNG Criteria Allowance	+10 (standard) +5 (OOHW)	+5	+5
	Assessment Criteria	44 (standard) 39 (OOHW)	35	35
R5	RBL	31	32	30
	ICNG Criteria Allowance	+10 (standard) +5 (OOHW)	+5	+5
	Assessment Criteria	41 (standard) 36 (OOHW)	37	35

Table 9 identifies that during the OOHW day time periods (7:00 am to 8:00 am on Saturdays and 7:00 am to 6:00 pm on Sundays), the assessment criteria is 39 dB(A) at receptor R2 and 36 dB(A) at receptor R5. A review of the locations of the surrounding receptors has determined that R1 and R2 are in a similar location whilst R3, R4 and R5 are similar in terms of existing background noise levels.

5.3 Risk Classification

Figure 4 presents the flow chart for classifying risks based on the predicted noise levels as detailed in Section 6.1. The risk classification flow chart has been developed with recognition of the range of landuses in the surrounding area and the understanding that activities with the potential to result in sleep disturbance are, by their nature, of higher risk.

In order to determine the potential for low and/or high risk noise impacts during the planned construction of the MSF, a noise impact assessment has been undertaken as discussed in Section 5. The noise impact assessment has taken into consideration the construction schedule (Appendix B) and construction equipment (Table 7) provided by RCR Infrastructure to be generate predicted worst-case noise impacts at each sensitive receptor based on expected construction activities.

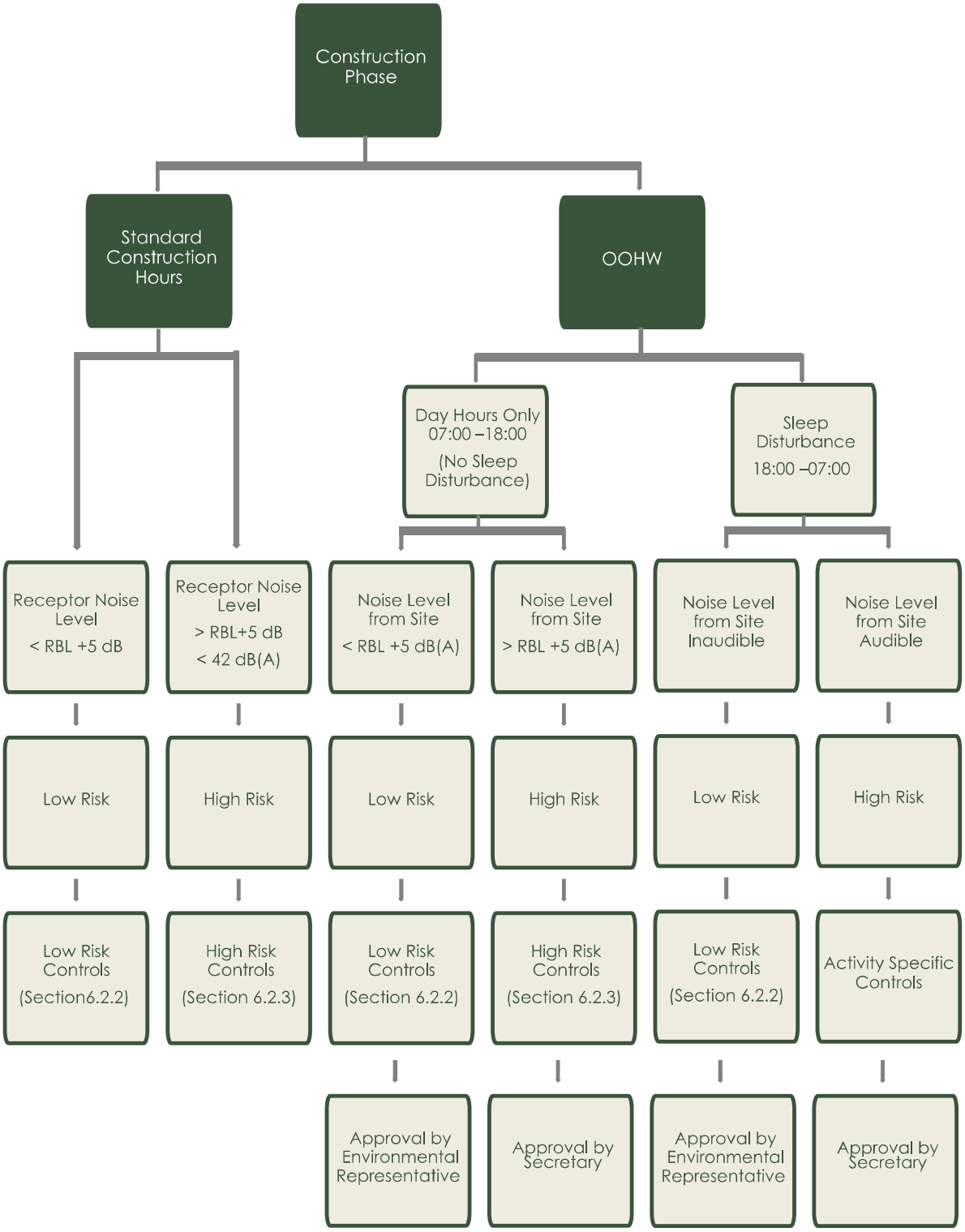


Figure 4: Risk Classification Flow Chart

5.4 Noise Modelling Methodology

For the purposes of predicting impacts associated with noise emissions from the development site on nearby sensitive receptors, noise modelling of the sources was completed using the proprietary software Cadna (version 2017 build 157.4702) developed by DataKustik. Cadna incorporates the influence of meteorology, terrain, ground type and air absorption in addition to source characteristics to predict noise impacts at receptor locations. All predictions have been undertaken in accordance with ISO Standard 9613 (1996) "Acoustics - Attenuation of sound during propagation outdoors".

The model is utilised to assess the potential noise emissions from the site under a range of operating scenarios and meteorological conditions. Where appropriate, the noise modelling also allows investigation of the benefits of possible noise management solutions such that their reasonableness can be assessed.

6 RISK ASSESSMENT

6.1 Predicted Noise Levels

Construction works that generate the highest noise levels will occur during months 4 - 6 as detailed in Appendix B. During this time, piling will be the noisiest activity as specified in Table 7.

Table 10 presents the predicted L_{Aeq} outdoor receptor noise levels at nearby sensitive receptors. For the purposes of this assessment an acoustic fence was included in the modelling as shown in Section 6.2.

Table 10: Predicted L_{Aeq} Receptor Noise Levels, dB(A) during Month 4

Scenario	Receptor	Predicted Outdoor Noise Levels, L_{Aeq},	Low Risk Noise Criteria	High Risk Noise Criteria	Exceedence
Month 4	R1	37	<39	> 42 (standard) > 39 (OOHW)	-
	R2	38	<39	> 42 (standard) > 39 (OOHW)	-
	R3	30	<36	> 42 (standard) > 36 (OOHW)	-
	R4	34	<36	> 42 (standard) > 36 (OOHW)	-
	R5	33	<36	> 42 (standard) > 36 (OOHW)	-
Month 5	R1	34	<39	> 42 (standard) > 39 (OOHW)	-
	R2	34	<39	> 42 (standard) > 39 (OOHW)	-
	R3	28	<36	> 42 (standard) > 36 (OOHW)	-
	R4	32	<36	> 42 (standard) > 36 (OOHW)	-
	R5	31	<36	> 42 (standard) > 36 (OOHW)	-
Month 6	R1	36	<39	> 42 (standard) > 39 (OOHW)	-
	R2	37	<39	> 42 (standard) > 39 (OOHW)	-
	R3	28	<36	> 42 (standard) > 36 (OOHW)	-
	R4	33	<36	> 42 (standard) > 36 (OOHW)	-

Scenario	Receptor	Predicted Outdoor Noise Levels, $L_{Aeq,}$	Low Risk Noise Criteria	High Risk Noise Criteria	Exceedence
	R5	30	<36	> 42 (standard) > 36 (OOHW)	-

a) Receptor noise levels > 42 dB(A) during standard construction hours are considered Very High Risk and should be avoided.

The noise predictions have determined that during the noisiest three months of construction activities, the highest noise level of 38 dB(A) will occur at R2 during Month 4 when the most number of equipment will be on site and the piling activities are, at the worst case to the western boundary of the site. It is noted that in reality, these piling activities are likely to be located further away from this receptor during this period. Hence, these predicted noise levels are considered to represent a conservative assessment of potential amenity risk.

Review of the predicted worst-case noise levels at nearby noise sensitive receptors confirms that construction of the MSF during the hours of 7:00 am to 6:00 pm Monday to Sunday is considered to be low risk. As such, it is recommended that approval for construction during these periods is provided subject to the specific acoustic controls and management measures presented in Section 6.2 of this CNMP.

Given the low risk presented by these activities, it is considered reasonable to for RCR Infrastructure to seek approval for the proposed OOHW activities through the project Environmental Representative in accordance with the requirements of Condition C14(d)(vi).

The prediction contours are presented in Figure 5 to Figure 7 for each of the worst-case scenarios considered.

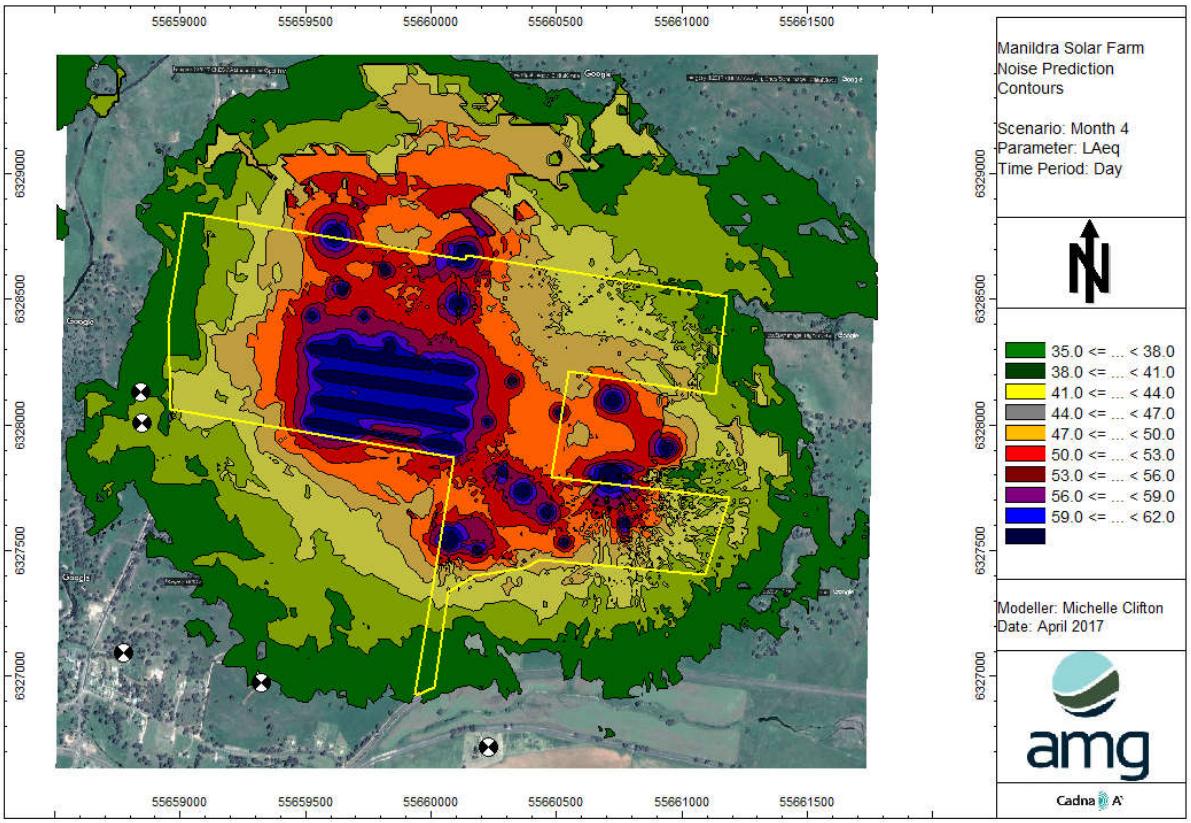


Figure 5: Predicted L_{Aeq} noise levels during month 4 construction activities

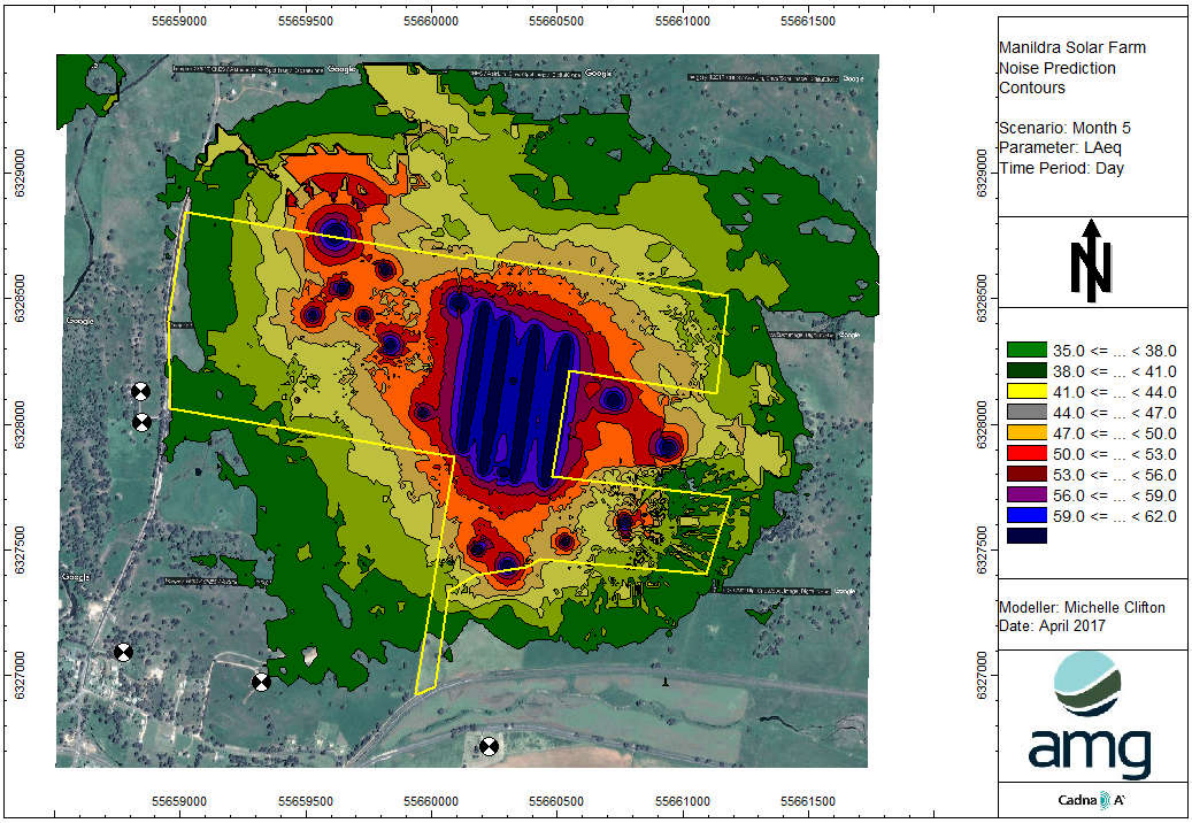


Figure 6: Predicted L_{Aeq} noise levels during month 5 construction activities

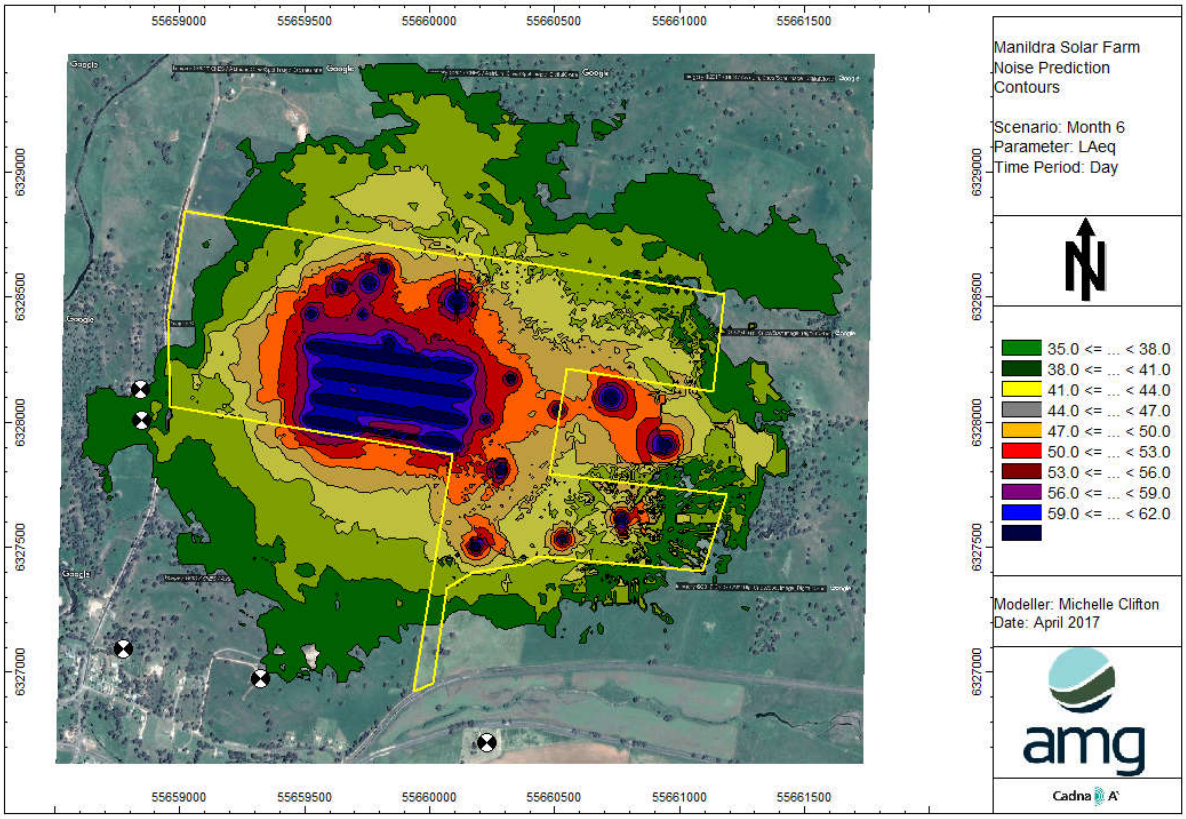


Figure 7: Predicted L_{Aeq} noise levels during month 6 construction activities

6.2 Noise Amelioration Requirements

6.2.1 All Activities

Construct a 2.4 m high temporary acoustic barrier along the western edge of the site following as shown in Figure 8. The length of the acoustic barrier required is 230 m and should be constructed in a manner that meets the following requirements:

- reflective type noise fence panels must have a minimum surface density at air dry moisture content (excluding structural components) of 20 kg/m²;
- the barrier must be complete and free from gaps along its length and at ground level; and
- acoustic sealing is required between posts.

It should be noted that the acoustic barrier could also comprise either an earth berm or a combination of earth berm and noise barrier providing the final height and design specifications detailed above are achieved.

Figure 8: Noise Barrier Location

6.2.2 Low Risk Controls

In addition to the controls provided in Section 6.2.1 above, the following controls are recommended to be implemented to minimise the risk of adverse amenity impacts during low risk construction works:

- Regularly train workers and contractors (such as at toolbox talks) to use equipment in ways to minimise noise;
- Ensure site managers periodically check the site and nearby residences and other sensitive land uses for noise problems so that solutions can be quickly applied;
- Include in tenders, employment contracts, subcontractor agreements and work method statements clauses that require minimisation of noise and compliance with directions from management to minimise noise;
- Avoid shouting, and minimise talking loudly and slamming vehicle doors;
- Keep truck drivers informed of designated vehicle routes, parking locations, acceptable delivery hours or other relevant practices (for example, minimising the use of engine brakes, and no extended periods of engine idling); and
- Develop a one-page slide summary of approval or consent conditions that relate to relevant work practices, and insert into the site specific induction.

6.2.3 High Risk Controls

While no high risk activities are expected during construction of the MSF, any activities that are identified as being high risk (or for which the risk is undetermined due to their having

not been considered in this CNMP) the following additional high risk controls are recommended:

- Avoid the use of equipment which generates impulsive noise;
- Ensure all alarms in use on vehicles are broadband reversing alarms ("quackers");
- Avoid dropping materials from a height;
- Minimise metal-to-metal contact on equipment; and
- Ensure periods of respite are provided in the case of unavoidable maximum noise level events. As required by the Conditions of Approval, high risk activities shall only be undertaken:

  a) between the hours of 8:00 am to 5:00 pm Monday to Friday;
  b) between the hours of 8:00 am to 1:00 pm Saturday; and
  c) in continuous blocks not exceeding three hours each with a minimum respite from those activities and works of not less than 1 hr between each block.

7 NOISE ENVIRONMENTAL MANAGEMENT

7.1 Noise Management Controls

The controls to be implemented during the construction of the project are provided in Table 11. Table 12 provides further detail with respect to timing and responsibility for each control, as well as monitoring and reporting requirements.

Table 11: Environmental Management Controls

Subject	Control Ref	Environmental Management Controls	Responsibility
Complaints	NV1	All potentially affected residences as identified in Figure 1 will be informed of the construction works including working hours to be adhered to, and the level and duration of noise to expect during construction at least 48 hours prior to the noise event.	Site Construction & Environmental Compliance Officer (SCECO)
	NV2	All potentially affected residences as identified in Figure 1 will be kept informed of any significant changes to construction activities or if out of hours of work is required.	SCECO
	NV3	Any complaints received related to noise or vibration will be dealt with in accordance with Section 8.4.	SCECO
	NV4	All site personnel will be instructed during a general induction as to their responsibilities in minimising noise and adhering to the noise minimisation measures.	SCECO / Foreman
Timing	NV5	Low risk works as described in this CNMP are to be undertaken during the hours of: a) 7:00am to 6:00pm, Mondays to Fridays, inclusive; b) 8:00am to 1:00pm on Saturday; and c) at no time on Sundays or public holidays. Any works outside of these hours shall be governed by the approved Out of Hours Work Protocol detailed in Appendix B.	SCECO
	NV6	For high risk works, or works having not been assessed in accordance with this CNMP, activities resulting in impulsive or tonal noise emission (such as rock blasting, pile driving) shall only be undertaken: a) between the hours of 8:00 am to 5:00 pm Monday to Friday; b) between the hours of 8:00 am to 1:00 pm Saturday; and c) in continuous blocks not exceeding three hours each with a minimum respite from those activities and works of not less than 1 hr between each block.	SCECO

Subject	Control Ref	Environmental Management Controls	Responsibility
Equipment	NV7	The noise levels of plant and equipment must have operating Sound Power or Sound Pressure Levels compliant with the criteria in Table 7.	SCECO
	NV8	Equipment operators are to report any faulty equipment.	Foreman
	NV9	Construction equipment will be fitted with adequate noise control equipment where possible. Measures include earth moving equipment fitted with residential class mufflers, and acoustic enclosures for any diesel generators and/or air compressors.	SCECO
	NV10	Any equipment not in use for extended periods during construction work will be switched off.	All site personnel
	NV11	All vehicles and equipment will be regularly serviced, as per manufactures instructions and maintained in proper working order.	SCECO
	NV12	Ensure deliveries are within the standard hours of 7:00 am to 6:00 pm.	SCECO / Foreman
	NV13	Simultaneous operation of noisy plant will be avoided wherever practicable.	Foreman
	NV14	Wherever practicable, noisy equipment will be: a) Positioned behind structures that act as barriers to identified receptors. b) Positioned at the greatest distance from identified receptors. c) Oriented to directed noise emissions away from identified receptors.	SCECO
	NV15	"Quiet" practices will be employed wherever practicable when operating equipment. Examples of quiet practices include (but are not limited to) avoiding unnecessary revving of engines, preventing forklift tines or excavator buckets from impacting on the ground, minimising the use of horns and/or tannoys where possible.	Foreman
	NV16	Any noisy construction activities will be completed in the shortest time possible.	All site personnel
	NV17	There will be no dropping of materials from heights, throwing of metal items, or slamming of doors.	All site personnel

8 COMPLIANCE MANAGEMENT

8.1 Roles and Responsibilities

The roles and responsibilities relevant for the CNMP are outlined in Table 12.

Table 12: Roles and Responsibilities

Role	Responsibility
Construction Manager	▪ Overall implementation of the Construction Noise Management Plan ▪ Authorise and confirm the implementation of mitigation measures
SCECO	▪ Implement methodology for avoiding excessive noise emissions ▪ Coordinate monitoring and compile reports ▪ Maintain internal records of monitoring ▪ Collate and maintain records of complaints, respond to complainant ▪ Identify non-conformances ▪ Review and update the Construction Noise Management Plan as required
Environmental Representative	▪ monitor the implementation of the CNMP; ▪ monitor the outcome of the CNMP and advise the Proponent upon the achievement of all project environmental outcomes; ▪ be consulted in responding to the community concerning the environmental performance of the project; and ▪ approve out-of-hour construction activities deemed to be low environment risk and refer high risk works for the Secretary's approval.

8.2 Training and Awareness

All Project personnel, subcontractors, consultants and visitors will receive inductions prior to commencing on site. Project induction and training will fall under the following categories:

- General project induction; and
- Visitor induction.

Information specific to construction noise and vibration will be included in the general project induction and will include:

- Relevant approval conditions;
- Relevant legislation;
- All relevant project specific and standard noise and vibration mitigation measures;
- Location of nearest sensitive receptors;
- Designated loading/unloading areas and procedures;
- Standard construction hours (including deliveries);
- The process for seeking approval for Out of Hours work, including consultation with the ER and sensitive receivers; and
- Environmental incident and complaint procedures.

All inductions will be recorded in the training register held by the SCECO.

8.3 Non-Conformances

Non-conformances will be dealt with and documented in accordance with Section 8.4 of this CNMP.

8.4 Complaints Management

Any complaints received from the community regarding noise shall be addressed in accordance with the Complaints Handling Procedures provided in the project Construction Environmental Management Plan.

8.5 Monitoring and Reporting

Where a complaint is unable to be resolved to the satisfaction of the complainant, noise monitoring shall be undertaken to determine the contribution of noise from construction activities at the complainant's premises.

The noise monitoring will be undertaken by competent personnel who have received training in environmental noise monitoring. The measurements will be conducted in accordance with the procedures outlines in Australian Standard AS 1055 "Acoustics – Description and measurement of environmental noise" and the NSW Industrial Noise Policy (INP). The following points should be followed when conducting noise monitoring:

- A field calibration should be conducted before and after measurements;
- The sound level meter must be set to an A-weighting and Fast;
- The sound level meter sample period should be set to 15-minutes;
- The following descriptors should be measured as a minimum: L_{A1}, L_{Aeq} and L_{A90}; and
- Measurements should be conducted a minimum of three metres from the nearest façade and/or solid fence/wall. If it is not possible to do this, corrections for façade reflection should be applied to the measurement results.

The results of the noise monitoring shall quantify the contribution of noise from construction works at complainant premises and assist in determining what corrective actions, if any, are required to address the complaint.

APPENDIX A: GLOSSARY OF TERMS

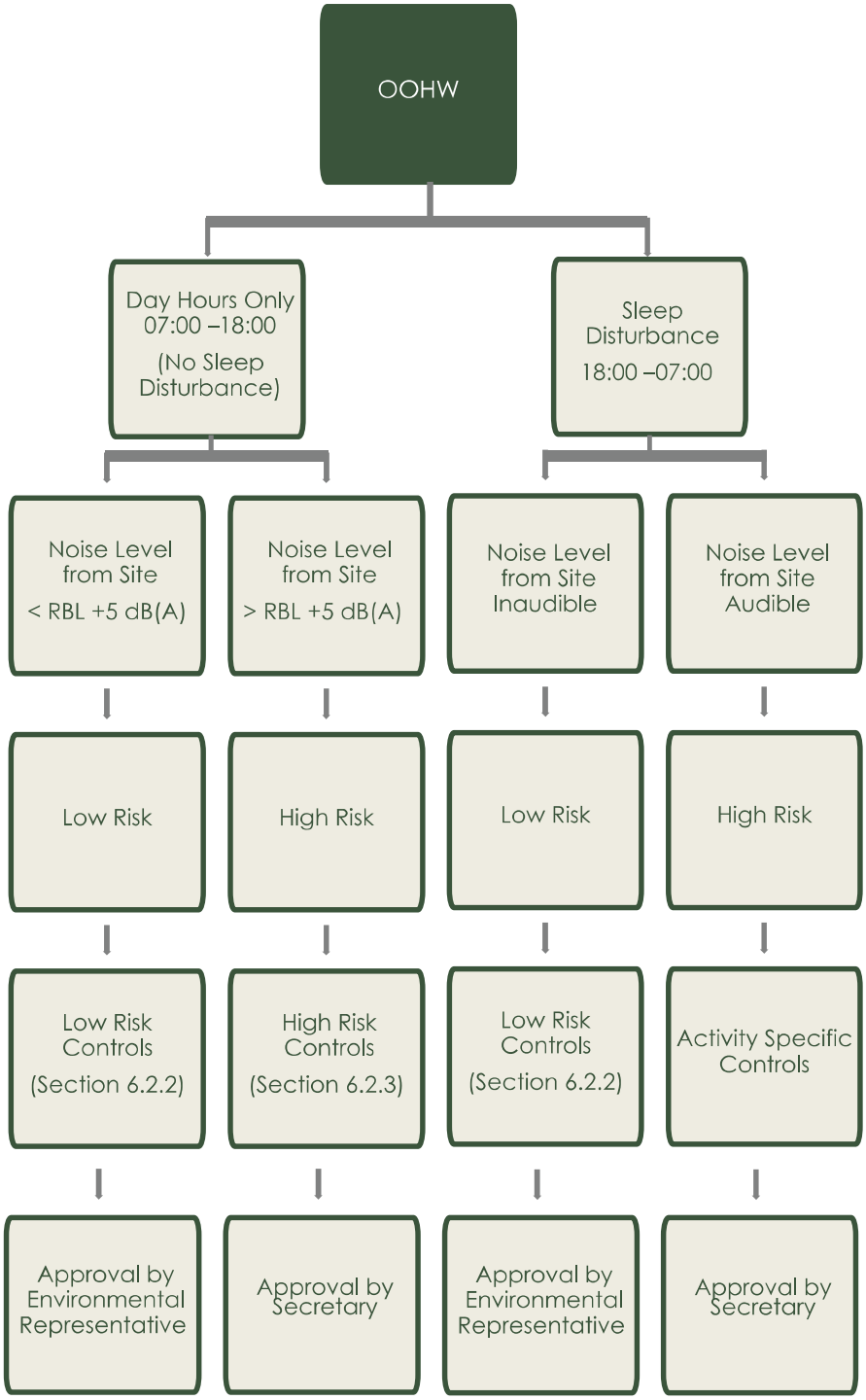
A-Weighting	A response provided by an electronic circuit which modifies sound in such a way that the resulting level is similar to that perceived by the human ear.
dB (decibel)	This is the scale on which sound pressure level is expressed. It is defined as 20 times the logarithm of the ratio between the root-mean-square pressure of the sound field and the reference pressure (0.00002 N/m^2).
dB(A) or dBA	This is a measure of the overall noise level of sound across the audible spectrum with a frequency weighting (i.e. 'A' weighting) to compensate for the varying sensitivity of the human ear to sound at different frequencies.
Free-field	Refers to a sound pressure level determined at a point away from reflective surfaces other than the ground with no significant contribution due to sound from other reflective surfaces; generally, as measured outside and away from buildings.
L_{Aeq}	This is the equivalent steady sound level in dB(A) containing the same acoustic energy as the actual fluctuating sound level over the given period. Noise levels often fluctuate over a wide range with time. Therefore, when a noise varies over time, the L_{Aeq} is the equivalent continuous sound which would contain the same sound energy as the time varying sound. Many studies show that human reaction to level-varying sounds tends to relate closer to the L_{Aeq} noise level than any other descriptor.

APPENDIX B: CONSTRUCTION SCHEDULE

Equipment Type	Month 1 June17		Month 2 July 17		Month 3 Aug 17		Month 4 Sept 17		Month 5 Oct 17		Month 6 Nov 17		Month 7 Dec 17		Month 8 Jan 18		Month 9 Feb 18		Month 10 March 18		Month 11 April 18		Month 12 May 18	
	Area	Qty	Area	Qty	Area	Qty	Area	Qty	Area	Qty	Area	Qty	Area	Qty	Area	Qty	Area	Qty	Area	Qty	Area	Qty	Area	Qty
Backhoe	NW	1	NW	1	WS	1	WS	1	WS	1	WS	1	WS	1	WS	1	WS	1	WS	1				
Bulldozer (D8)			C	1	C	1	C	1																
Compactor					NW	1	NE	1																
Trenching Machine							NE	1	NE/S	1	S/ NW	1												
Concrete Truck			NW	1	WS	1	WS	1																
Excavator			NW	2	NE	2	WS	2	WS	2	WS	2												
Front End Loader			NW	1	C	1	C	1																
Generator	NW	1	NW	2	WS	4	WS	6	WS	6	WS	6	WS	6	WS	4	WS	4	NW	2	NW	1	NW	1
Grader	NW	1	NW	1	N	1	NE	1	NE	1														
Mobile Crane (Franna)	NW	1	NW	1	NW	1	NW	1	NW	1	NW	1	NW	1	NW	1	NW	1	NW	1				
Post Pounding Machine							NE	4	S	4	NW	4												
Skid steer / bobcat	NW	1	NE	1	NE	1	NE/S WS	3	NE/S WS	3	NE/S WS	3	NE/S WS	3	NE/S WS	3	WS	1	WS	1				
Fork Lift					NW	2	NW	2	NW	2	WS	2	WS	2	WS	2								
Telehandler			NW	1	NW	1	NW	1	NW	1	NW	1	NW	1	NW	1	NW	1						
Vibrating Roller			NW	1																				
Water Cart	NW	2	NW	2	NW/ NE	2	NE/ C	2	NE/S WS	2	C/S NW	2	WS	2	WS	2	WS	2						
W (West), C (Central), NW (North West), WS (Whole Site), NE (North East), S (South)																								

APPENDIX C: OUT-OF-HOURS WORK PROTOCOL

Introduction	This work procedure has been developed to assist with compliance of environmental legislation, project obligations and to effectively manage potential environmental impacts associated with noise during in the course of construction of the Project.
Objectives	This procedure outlines the project requirements for construction working hours and documents a process to be implemented when work outside of standard hours is required. The key objective of the procedure is to ensure that impacts to the local community are avoided and minimised and the requirements of the CNMP and CoA are met.
	Specific objectives include: ▪ Minimising potential adverse noise impacts to the community; ▪ Ensure appropriate noise control measures are implemented during construction activities; ▪ Ensure appropriate measures are implemented to comply with all relevant legislation and other requirements as described in the CNMP.
Conditions of Approval	The following Conditions of Approval (CoA) are applicable to the assessment and approval of OOHW activities: D1. The Proponent shall only undertake construction activities associated with the project that would generate an audible noise at any sensitive receptor during the following hours: (a) 7:00 am to 6:00 pm, Mondays to Fridays, inclusive; (b) 8:00 am to 1:00 pm on Saturdays; and (c) at no time on Sundays or public holidays. This condition does not apply in the event of a direction from police or other relevant authority for safety reasons, or emergency work to avoid the loss of lives, property and/or to prevent environmental harm. D2. Construction outside of these hours specified in condition D1 may be varied for works as approved through the out-of-hours work protocol outlined in condition C14(d) of this approval. Any request to alter the hours of construction shall: (a) be considered on a case-by-case basis; (b) be accompanied by details of the nature and need for activities to be conducted during the varied construction hours and any other information necessary to reasonably determine that activities undertaken during the varied construction hours will not adversely impact on the acoustic amenity of receptors in the vicinity of the site; and

	(c) require that affected residential receivers are informed of the timing and duration of any construction activities approved under this condition at least 48 hours before that work commences
Assessment Methodology	Where OOHW activities are proposed, a quantitative noise assessment is to be undertaken by the proponent. The level of risk associated with the proposed OOHW the following flow chart is to be derived based on the following flow chart. 

Procedure for Approval – Low Risk Activities	Where the impact assessment and risk classification detailed above determines the proposed OOHW activities to be low risk, approval is to be sought by the Environmental Representative.
Procedure for Approval – High Risk Activities	In situations where the Risk Assessment or Environmental Representative determine activities to be High Risk, the request for approval for these OOHW activities is to be provided to the Secretary for consideration.
Mitigation Requirements – Low Risk Activities	The following minimum controls are to be implemented to minimise the risk of adverse amenity impacts during low risk OOHW construction works: ▪ Regularly train workers and contractors (such as at toolbox talks) to use equipment in ways to minimise noise; ▪ Ensure site managers periodically check the site and nearby residences and other sensitive land uses for noise problems so that solutions can be quickly applied; ▪ Include in tenders, employment contracts, subcontractor agreements and work method statements clauses that require minimisation of noise and compliance with directions from management to minimise noise; ▪ Avoid shouting, and minimise talking loudly and slamming vehicle doors; ▪ Keep truck drivers informed of designated vehicle routes, parking locations, acceptable delivery hours or other relevant practices (for example, minimising the use of engine brakes, and no extended periods of engine idling); and ▪ Develop a one-page summary of approval or consent conditions that relate to relevant work practices, and pin it to a noticeboard so that all site operators can quickly reference noise information.
Mitigation Requirements – High Risk Activities	Any activities that are identified as being high risk are to incorporate all reasonable and feasible noise amelioration measures in addition to the following management controls: ▪ Avoid the use of equipment which generates impulsive noise except in exceptional circumstances where unavoidable due to a requirement to minimise traffic and/or other safety risks; ▪ Minimise the need for reversing or movement alarms; ▪ Avoid dropping materials from a height; ▪ Avoid metal-to-metal contact on equipment; and ▪ Ensure periods of respite are provided in the case of unavoidable maximum noise level events.
Notification Requirements	All affected residential receivers are to be informed of the timing and duration of any approved OOHW construction activities at least 48 hours before that work commences.

	In the case of OOHW classified as high risk, the notification is to be undertaken in person by the SCECO to provide an opportunity for feedback by affected residents to be addressed where practicable.

Appendix B

TRAFFIC MANAGEMENT PLAN

GEOLYSE

TRAFFIC MANAGEMENT PLAN
MANILDRA SOLAR FARM

PREPARED FOR
RCR INFRASTRUCTURE

JUNE 2017

• Civil, Environmental & Structural Engineering • Surveying • Environmental • Planning • Architecture

TRAFFIC MANAGEMENT PLAN

MANILDRA SOLAR FARM

PREPARED FOR:

RCR INFRASTRUCTURE

JUNE 2017

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Report Title:	*Traffic Management Plan*
Project:	*Manildra Solar Farm*
Client:	*RCR Infrastructure*
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Geolyse Pty Ltd and the authors responsible for the preparation and compilation of this report declare that we do not have, nor expect to have a beneficial interest in the study area of this project and will not benefit from any of the recommendations outlined in this report.

The preparation of this report has been in accordance with the project brief provided by the client and has relied upon the information, data and results provided or collected from the sources and under the conditions outlined in the report.

All information contained within this report is prepared for the exclusive use of RCR Infrastructure to accompany this report for the land described herein and are not to be used for any other purpose or by any other person or entity. No reliance should be placed on the information contained in this report for any purposes apart from those stated therein.

Geolyse Pty Ltd accepts no responsibility for any loss, damage suffered or inconveniences arising from, any person or entity using the plans or information in this study for purposes other than those stated above.

TABLE OF CONTENTS

INTRODUCTION 1

1.1 BACKGROUND 1
1.2 PROPONENT 1
1.3 EPC CONTRACTOR 1
1.4 GEOLYSE 1
1.5 FUNCTION 2
1.6 STRUCTURE 2
1.7 CONSULTATION 3

CONSTRUCTION TRAFFIC 4

2.1 VEHICLE TYPE 4
2.2 TRAFFIC VOLUMES 4

2.2.1 TOTAL VEHICLE MOVEMENTS 4
2.2.2 AVERAGE DAILY VEHICLE MOVEMENTS 5
2.2.3 PEAK HOURLY VEHICLE MOVEMENTS 5

2.3 RAW DATA 6

HAULAGE ROUTE 7

3.1 HAULAGE ROUTE 7
3.2 BUS ROUTE 7

MANAGEMENT MEASURES 9

4.1 INTRODUCTION 9
4.2 ACCESS UPGRADE WORKS 9
4.3 SITE ACCESS 9
4.4 SCHOOL ZONE HOURS 10
4.5 SCHOOL BUS RUNS 10
4.6 LOGISTICS MANAGEMENT 10
4.7 ON-SITE PARKING AND ACCESS SET BACK 10
4.8 CONSTRUCTION PERSONNEL 10
4.9 COMMUNITY CONSULTATION 11
4.10 ENFORCING DRIVER BEHAVIOURAL CODES 11
4.11 SIGNAGE 11
4.12 HARVEST TRAFFIC 12
4.13 LIVESTOCK SAFETY 12
4.14 STATUTORY RESPONSIBILITIES 12

ADDITIONAL REQUIREMENTS 13

5.1 POST CONSTRUCTION 13

FIGURES

Figure 1: Approved layout 1
Figure 2: Total Vehicle Movements 4
Figure 3: Average Daily Vehicle Movements 5
Figure 4: Peak Hour Vehicle Movements 5
Figure 5: Route from Parkes to Manildra Solar Farm Site 7
Figure 6: Bus Route from Orange 8

APPENDICES

APPENDIX A
Traffic Data

APPENDIX B
Road Authority Consultation

APPENDIX C
Road Dilapidation Report

APPENDIX D
Provision for Private Access

APPENDIX E
Condition C4 Compliance

Introduction

1.1 BACKGROUND

The Manildra Solar Farm (MSF) was initially granted development consent on 3 March 2011 and subsequently modified by Minister's approval on 25 March 2015 and again 31 August 2015.

The approved project allows the development of a 50 megawatt (MW) solar farm and associated infrastructure. The approved General Layout is shown below.

Figure 1: Approved layout

Source: Project Approval Application MP10_0122

1.2 PROPONENT

The development proponent is Manildra Solar Farm Pty Ltd.

1.3 EPC CONTRACTOR

RCR Infrastructure is the Engineering, Procurement and Construction Contractor with the responsibility to build the MSF.

1.4 GEOLYSE

Geolyse has been engaged by RCR Infrastructure to prepare this TMP.

1.5 FUNCTION

This Traffic Management Plan (TMP) has been prepared to satisfy a Condition of Approval (CoA). Specifically, CoA C14(e) requires that a TMP be prepared as part of broader a Construction Environmental Management Plan (CEMP) to manage traffic conflicts that may be generated during construction. Specifically, CoA 14(e) states:

> *The Plan shall address the requirements of the relevant road authority and shall include, but not necessarily be limited to:*
>
> *(i) details of how construction of the project will be managed in proximity to local and regional roads;*
>
> *(ii) details of traffic routes for heavy vehicles, including any necessary route or timing restriction for oversized loads;*
>
> *(iii) demonstration that all statutory responsibilities with regard to road traffic impacts have been complied with;*
>
> *(iv) details of measures to minimise interactions between the project and other users of the roads such as the use of fencing, lights, barriers, traffic diversions etc;*
>
> *(v) procedures for informing the public where any road access will be restricted as a result of the project;*
>
> *(vi) procedures to manage construction traffic to ensure the safety of livestock and to minimise disruption to livestock;*
>
> *(vii) speed limits to be observed along routes to and from the site and within the site; and*
>
> *(viii) details of the expected behavioural requirements for vehicle drivers travelling to and from the site and within the site.*

1.6 STRUCTURE

Table 1.1 – Condition of Approval Reference

Condition of Approval C14(e)	Section Reference
(i) details of how construction of the project will be managed in proximity to local and regional roads;	Appendix C; Sect 4
(ii) details of traffic routes for heavy vehicles, including any necessary route or timing restriction for oversized loads;	Sect 2.1; 3.1; 3.2; 4.3
(iii) demonstration that all statutory responsibilities with regard to road traffic impacts have been complied with;	Appendix C & Sect 4.14
(iv) details of measures to minimise interactions between the project and other users of the roads such as the use of fencing, lights, barriers, traffic diversions etc;	Sect 4
(v) procedures for informing the public where any road access will be restricted as a result of the project;	Sect 4.2 & 4.9
(vi) procedures to manage construction traffic to ensure the safety of livestock and to minimise disruption to livestock;	Sect 4.13
(vii) speed limits to be observed along routes to and from the site and within the site; and	Sect 4.10
(viii) details of the expected behavioural requirements for vehicle drivers travelling to and from the site and within the site.	Sect 4.10

1.7 CONSULTATION

This TMP has been prepared in consultation with the relevant road authorities; being Roads and Maritime Service and Cabonne Council. CoA 13(e) requires that the CEMP (and by extension the TMP) include:

> *evidence of consultation with relevant public authorities required under this condition and how issues raised by the agencies have been addressed in the plan.*

Evidence of this consultation is provided in **Appendix B**.

An inspection of the local road network and site access was undertaken with RMS 6 April 2017 and Cabonne Council on 7 April 2-017. Issues discussed during this inspection are summarised below.

- The preferred site access is off Packham Drive, as proposed.
- No heavy vehicle construction traffic in the Manildra Public School zone in School Zone Hours (0800 – 0930 and 1430 – 1600 hrs), as proposed.
- Providing a coach and bus shuttle service from Orange as proposed is commendable.
- Access onto Packham Drive for west bound heavy vehicles would not be feasible without significant works to this current intersection.
- The access treatment off Packhams Drive into the site should be a BAR treatment, noting that the width will accommodate articulated vehicles and the culvert to be in accordance with Council's requirement for a 600 mm sizing.
- While outside the scope of the CEMP, RMS would prefer to have operational vehicle access not cross the rail line (via Old Orange Road).

RMS and Council noted that notwithstanding sign-off on this Traffic Management Plan, there will remain a requirement for the RMS and Council to sign-off on any road upgrade requirements, pursuant to CoA C4 (as reproduced below).

> *Traffic and Transport Impacts*
>
> *C4 Prior to the commencement of construction of the project, the Proponent shall commission a suitably qualified expert to assess the condition of all public roads proposed to be traversed by construction traffic associated with the project (including over-mass or over-dimensional vehicles) in consultation with Council and the RMS, and identify any upgrade requirements to accommodate project traffic for the duration of construction (including culvert, bridge and drainage design; intersection treatments; vehicle turning requirements; and site access) considering final traffic volumes. The road dilapidation report shall be submitted to the Secretary prior to the commencement of construction clearly identifying recommendations made by the Council and the RMS and how these have been addressed. The Proponent shall ensure that all upgrade measures identified in the report are implemented to the satisfaction of Council and the RMS, prior to the commencement of construction.*

Following sign-off on this TMP RCR Infrastructure undertook the Road Dilapidation Report. A copy of this report is provided in **Appendix C**. Consistent with C4, this report:

- identified the road upgrade requirement (ie. access of Packhams Drive);
- secured Council and RMS sign-off on the Road Dilapidation Report and upgrade design; and
- was submitted to the Secretary (refer **Appendix E**).

Evidence of the above is provided in **Appendix C**.

Construction Traffic

2.1 VEHICLE TYPE

Construction traffic will entail site access by:

- Standard semi-trailers
- Bus coaches
- Rigid trucks
- Light vehicles (cars and utilities).

Construction traffic will not require site access by:

- B-double access
- Restricted Access Vehicles (oversize or overmass).

2.2 TRAFFIC VOLUMES

2.2.1 TOTAL VEHICLE MOVEMENTS

A breakdown of total vehicle movements (heavy and light) by month, for the construction program is provided in **Figure 2.1**.

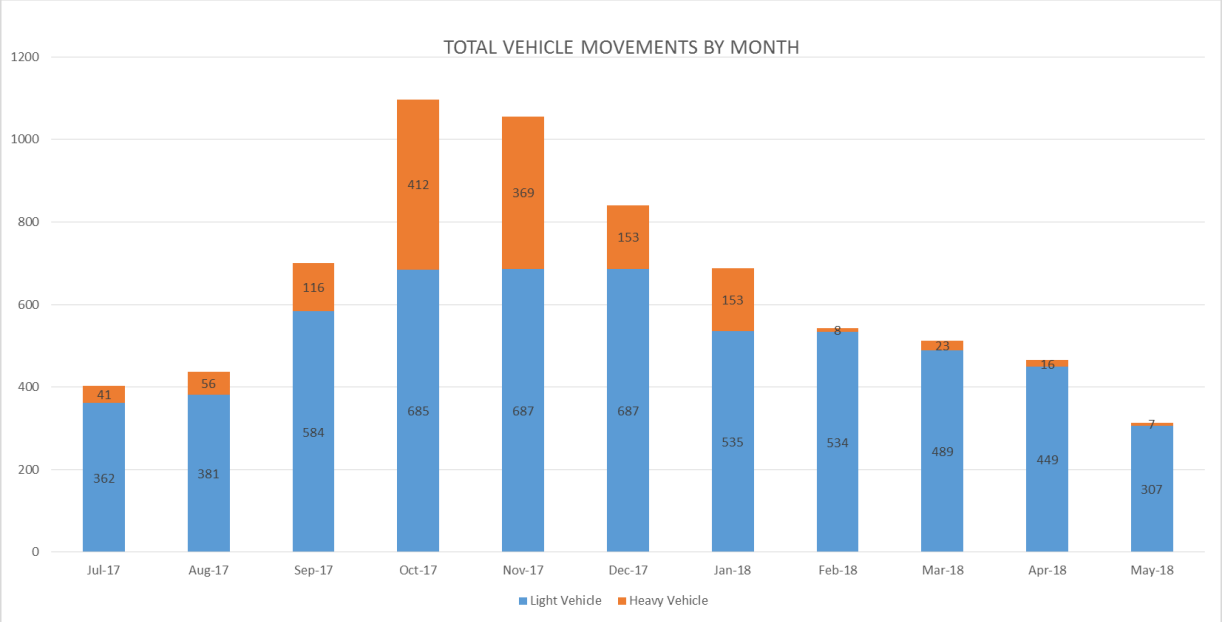

Figure 2: Total Vehicle Movements

2.2.2 AVERAGE DAILY VEHICLE MOVEMENTS

A breakdown of average daily vehicle movements (heavy and light) by month, for the construction program is provided in **Figure 2.2**.

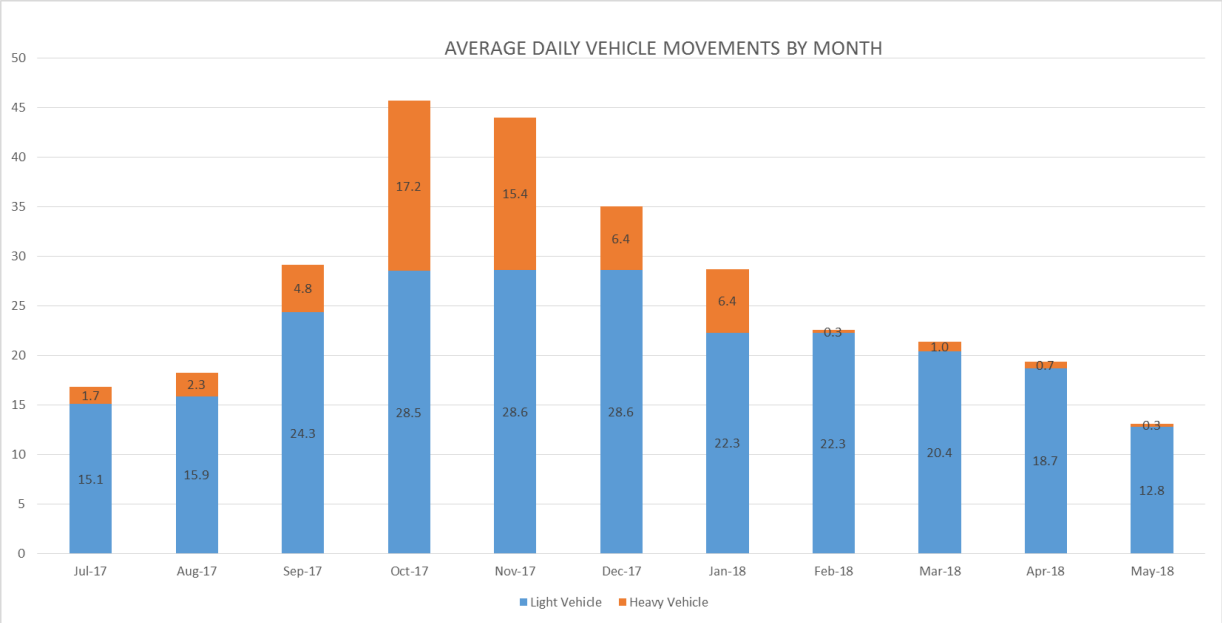

Figure 3: Average Daily Vehicle Movements

2.2.3 PEAK HOURLY VEHICLE MOVEMENTS

A breakdown of peak hourly vehicle movements by month for the construction program is provided in **Figure 2.3**.

Peak hour movements will occur between 6.00 am – 7.00 am and 5.00 pm to 6.00 pm

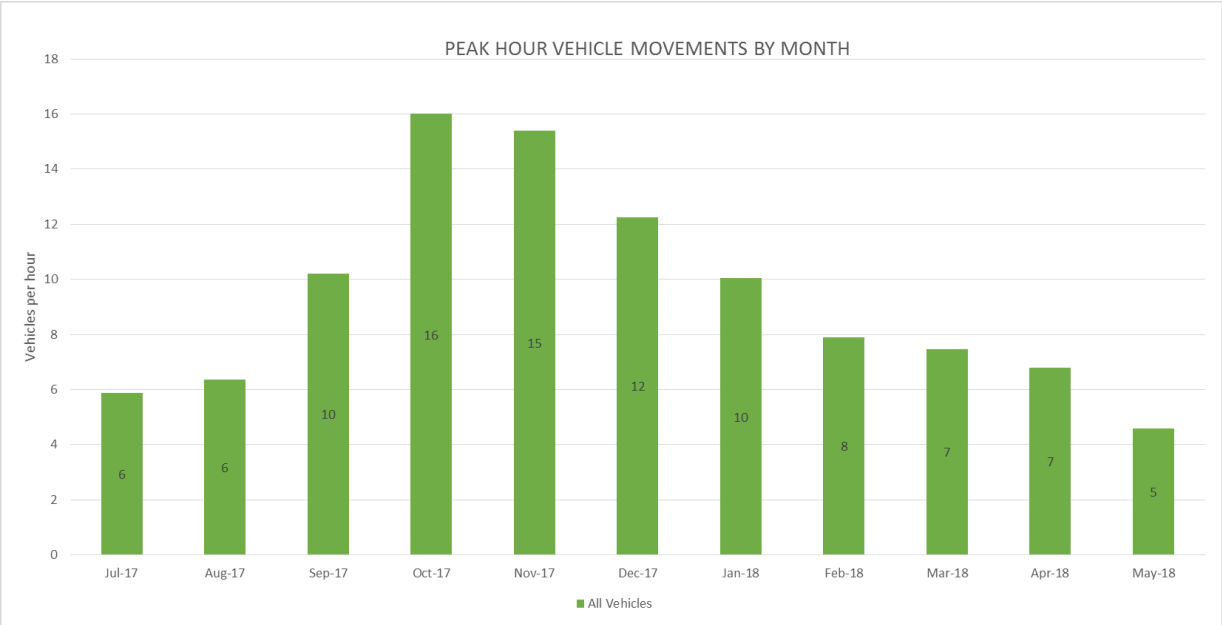

Figure 4: Peak Hour Vehicle Movements

2.3 RAW DATA

Appendix A provides a complete breakdown of the raw data behind the above profiles. This data includes:

- a description of the item delivery generating the traffic;
- total vehicle numbers associated with the item delivery;
- its timing during the build;
- the targeted start and end date of the activity;
- the duration (in days);
- the vehicle type; and
- supporting/explanatory notes.

Haulage Route

3.1 HAULAGE ROUTE

RCR Infrastructure preferred haulage route for material and solar farm plant is ex-Parkes. These materials will be transported by rail to Parkes. Materials will then be delivered to Manildra from the west.

The route from Parkes would be via Henry Parkes Way with a left turn onto Packham Drive.

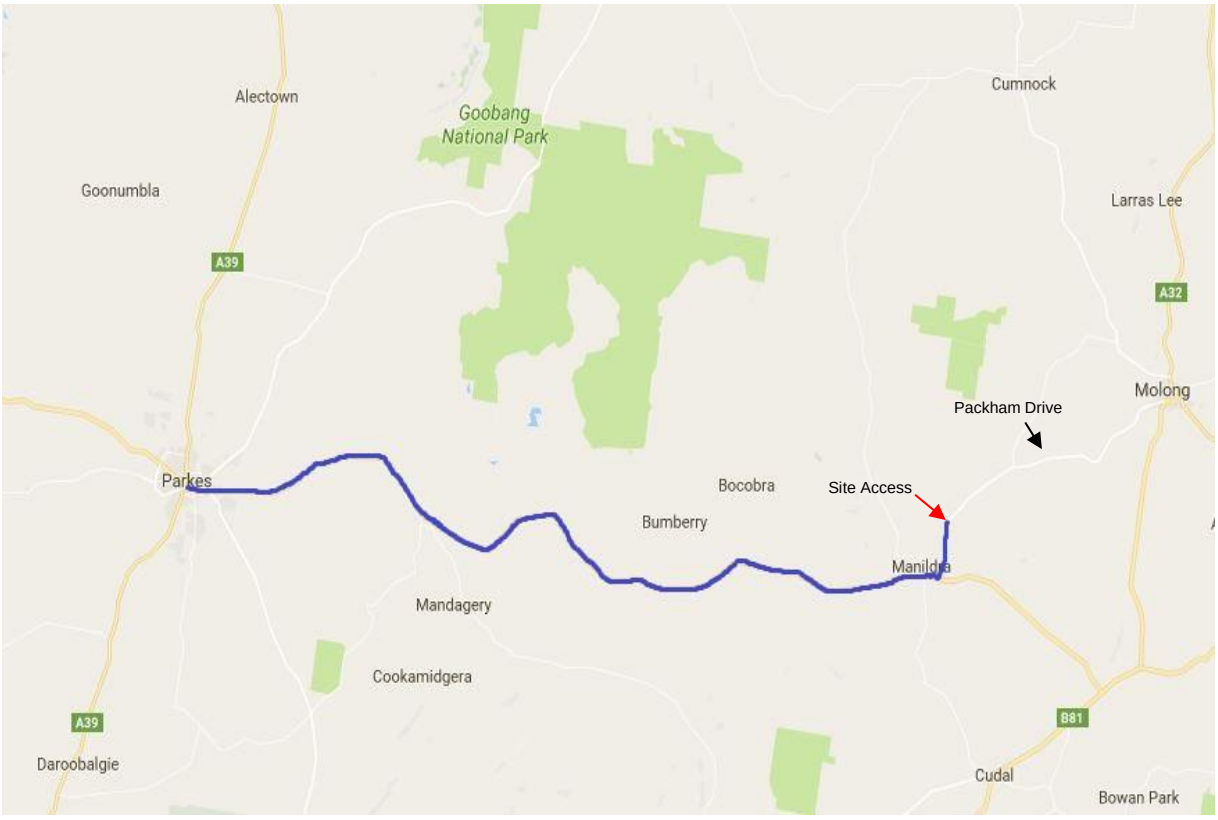

Figure 5: Route from Parkes to Manildra Solar Farm Site

3.2 BUS ROUTE

As detailed in **Section 4.7** RCR Infrastructure will run a coach/bus (2 x 50 seat coaches and 2 x 22 seat buses) service from Orange daily. There will be no provision for RCR personnel or key sub-contractor crews to access the site by private vehicle.

The route these buses will take to access the site ex-Orange will be via Old Orange Road – thereby negating the need for a right turn onto Packham Drive from Henry Parkes Way. Noting that the use of Old Orange Road will be restricted to these bus movements only. School buses currently utilise this public road – again noting that the solar farm bus arrivals/departures will not coincide with school bus runs or garbage collection service times.

This route has been specified following consultation with both the RMS and Council.

No other construction traffic will utilise Old Orange Road.

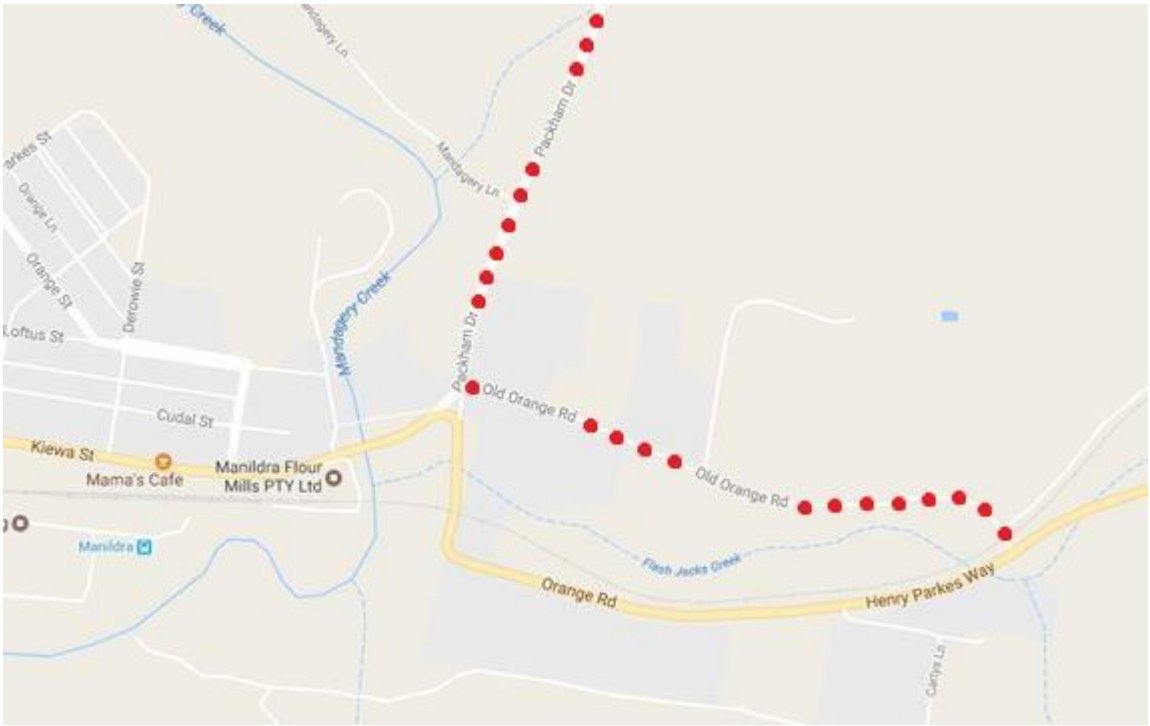

Figure 6: Bus Route from Orange

Management Measures

4.1 INTRODUCTION

This section of the Traffic Management Plan details the management measures that will be implemented by RCR Infrastructure during construction.

4.2 ACCESS UPGRADE WORKS

As detailed in **Appendix C** the site access off Packhams Drive will be upgraded prior to construction commencing.

Temporary impacts to users of Packhams Drive during the access upgrade will be managed through implementation of a standard Traffic Control Plan and in accordance with the *Provision of Private Access Application* lodged with Council (refer **Appendix D**).

RCR Infrastructure will ensure that the site access is upgraded to the satisfaction of Council and the RMS prior to the commencement of construction.

Consistent with **Section 4.9**, prior to commencement of the access upgrade works RCR Infrastructure will ensure that the following contacts are available for the community:

- a 24 hour telephone number on which complaints about construction activities at the site may be registered;
- a postal address to which written complaints may be sent; and
- an email address to which electronic complaints may be transmitted.

The telephone number, postal address and e-mail address will be advertised in a newspaper circulating in the area on at least one occasion prior to the commencement of construction.

The telephone number, the postal address and the email address will also be displayed on a sign near the entrance to the construction site in a position that is clearly visible to the public.

In addition to the above RCR Infrastructure will make available detailed and constantly updated information about the progress and scheduling of works to feed into MSPL's *Community Engagement Plan*.

After the access treatment is completed there will be no further impact to users of Packhams Drive for the duration of the solar farm build.

4.3 SITE ACCESS

All construction traffic will access the site off Packham Drive. Old Orange Road will not be used.

The only exception to this will be two heavy vehicle movements associated with the delivery of the Operations and Maintenance Building. This is scheduled as one of the very last activities associated with the build. The Operations and Maintenance Building will be a pre-fabricated structure and delivered via Old Orange Road. This is the road used at present by Essential Energy and TransGrid to service and maintain the substation and existing 132 kV overhead power lines. RCR Infrastructure will schedule these two heavy vehicle movements to be undertaken outside of rail line scheduling, and not when either TransGrid or Essential Energy are using this access.

With the single exception noted above, all other heavy vehicle construction traffic, at all times, will access and leave the construction site via Packham Drive.

4.4 SCHOOL ZONE HOURS

RCR Infrastructure will make all practicable efforts to ensure that every driver of a heavy vehicle knows there are to be no (zero) truck movements on Packham Drive in the School Zone in School Zone Hours.

That is no heavy vehicle movements between the hours:

- 0800 – 0930 and
- 1430 – 1600 hrs.

This will be enforced through RCR stationing an employee at the Henry Parkes Way/Packham Road intersection during school hours to prevent this from happening.

4.5 SCHOOL BUS RUNS

RCR will employ a Logistics Manager who, amongst other responsibilities, will maintain liaison with school bus operators for the duration of the construction program.

4.6 LOGISTICS MANAGEMENT

Responsibility for scheduling and co-ordination of heavy vehicle movements will rest with a dedicated Logistics Manager. The Logistics Manager will be responsible for liaising with the sub-contracted haulage companies on a daily basis and will monitor and manage the program and delivery schedules.

4.7 ON-SITE PARKING AND ACCESS SET BACK

A site compound to be established on the site will incorporate adequate parking provision to ensure there is no need for any vehicle parking on any public road.

Further, the controls on access to the site will provide for sufficient set back such that four (4) semi-trailers can enter the site to the controlled access point without their rear protruding onto Packham Road.

4.8 CONSTRUCTION PERSONNEL

RCR Infrastructure will run a coach/bus (2 x 50 seat coaches and 2 x 22 seat buses) service from Orange daily. There will be no provision for RCR personnel or key sub-contractor crews to access the site by private vehicle.

RCR Infrastructure will ensure that these bus movements leave Orange on **at least 10 minute staggered intervals**.

This would negate any potential issue associated with multiple bus access arriving at Old Orange Road at the same time, the rail line being in use, and traffic on Henry Parkes Way being disrupted.

The only light vehicles that will be allowed to drive to the site will be those miscellaneous visitations, including, but not restricted to:

- Representatives from MSFPL, the Environmental Representative or Council
- Deliveries of ancillary supplies such as stationary and potable water
- Cleaning staff (for the crib rooms)
- Specialist contractors (eg. electrical technicians engaged to do specific testing work).

4.9 COMMUNITY CONSULTATION

Prior to the commencement of construction RCR Infrastructure will ensure that the following contacts are available for the community:

- a 24 hour telephone number on which complaints about construction activities at the site may be registered;
- a postal address to which written complaints may be sent; and
- an email address to which electronic complaints may be transmitted.

The telephone number, postal address and e-mail address will be advertised in a newspaper circulating in the area on at least one occasion prior to the commencement of construction and at six-monthly intervals during construction.

The telephone number, the postal address and the email address will also be displayed on a sign near the entrance to the construction site in a position that is clearly visible to the public.

In addition to the above RCR Infrastructure will make available detailed and constantly updated information about the progress and scheduling of works to feed into MSPL's *Community Engagement Plan*.

4.10 ENFORCING DRIVER BEHAVIOURAL CODES

RCR will engage the services of a specialist freight contractor to deliver the bulk of plant infrastructure to the site.

In awarding these contracts RCR intends to engage local operators where possible, and in any circumstance, ensure that the principals of the freight company are fully aware of the requirements of this Traffic Management Plan and commit in writing to ensuring all their drivers comply with the spirit and intent of the controls, limitations and management measures as specified in this Traffic Management Plan.

RCR will insist that contracted freight companies commit to ensuring all sub-contracted drivers comply with the *NSW Code of Practice for Long Haul Drivers* and meet all legislative requirements with respect to log book entries, verification of licenses, speed limits, etc.

Full compliance with this Traffic Management Plan will be a fundamental requirement in awarding contracts to any freight company RCR Infrastructure engages. The behaviour expected of all drivers will be clearly communicated to freight companies. This communication will emphasise the need for freight companies to ensure all drivers commit to full compliance with this Traffic Management Plan.

Non-compliance will be a trigger for dismissal and/or contract termination.

4.11 SIGNAGE

Prior to the commencement of construction the following advance warning signage will be provided. Size C Gateway 'Traffic Turning' (W5-25) with 300 metre distance plates shall be provided adjacent to Packham Drive either side of the site access.

The signs will be erected in consultation with Cabonne Council and be visible for the duration of construction works.

4.12 HARVEST TRAFFIC

Grain trucks and harvest equipment will increase heavy vehicle movements during the harvest. As detailed in **Section 2.2** the construction traffic peak will be finished by December and drops off significantly from January onwards.

4.13 LIVESTOCK SAFETY

The access routes to the project site are within fenced public roads. No active Travelling Stock Reserve (TSR) will be traversed. Use of public roads, by licenced drivers, driving in accordance with road regulations will not create an interaction between construction vehicles and livestock.

Notwithstanding, the development site is located in a rural environment and as such escapee stock is a possibility. All drivers, including sub-contractors will be reminded of this possibility.

4.14 STATUTORY RESPONSIBILITIES

Section 138 of the *Roads Act 1993* states that a person must not:

a) erect a structure or carry out a work in, on or over a public road, or

b) dig up or disturb the surface of a public road, or

c) remove or interfere with a structure, work or tree on a public road, or

d) pump water into a public road from any land adjoining the road, or

e) connect a road (whether public or private) to a classified road, otherwise than with the consent of the appropriate roads authority.

Pursuant to the above the access treatment to the MSF site off Packham Drive will trigger the requirement for RCR Infrastructure to obtain a s.138 permit prior to these works being undertaken.

These works required consent from Cabonne Council and the concurrence of RMS (refer **Appendix C)**.

Additional Requirements

5.1 POST CONSTRUCTION

Whilst outside the scope of the CEMP, it is relevant to note it is the responsibility of RCR Infrastructure to comply with CoA E3 which requires that:

> *Prior to the commencement of operation of the project, the Proponent shall commission a suitably qualified expert to assess the condition of all public roads traversed by construction traffic associated with the project (including over-mass or over-dimensional vehicles) in consultation with Council and the RMS. Should the preoperational dilapidation survey report identify any damage to roads attributable to construction traffic associated with the project, the Proponent shall repair the roads consistent with the recommendations of the pre-operational dilapidation survey report, within such time as agreed to with the Council and the RMS. The pre-operation road dilapidation report shall be submitted to the Secretary prior to the commencement of operation, clearly identifying recommendations made by the Council and the RMS and how these have been addressed.*

Appendix A

TRAFFIC DATA

Item	Total No. of vehicles/ loads	Total No. of Vehicle Movements	Average Vehicle Movements per day	Timing during build	Start Date	End Date	Jul-17	Aug-17	Sep-17	Oct-17	Nov-17	Dec-17	Jan-18	Feb-18	Mar-18	Apr-18	May-18	Duration (Days)	Vehicle	Notes
PV Modules	290	580	6.6	Mid	20/10/2017	17/01/2018				145	145	145	145					89	15.4m Articulated	32 modules boxes (50 Modules per box) 40Ft container
Tracking System, Framework	160	320	10.7	Early	2/10/2017	1/11/2017				160	160							30	15.4m Articulated	This is calculated from the nextracker data the logistics team sent across
Post Pounding Units and Piles.	45	90	1.2	Early	3/09/2017	18/11/2017			35	35	20							76	15.4m Articulated	Includes delivery of approx. 21,000 posts and mob and demob of post pounding units
Cabling	40	80	11.5	Mid	25/09/2017	2/10/2017			40	40								7	15.4m Articulated	HV AC / DC cabling, Raw Earth Cable, Whips and Harnesses
PCS,PVIS	12	24	0.8	Late	26/10/2017	25/11/2017				6	18							30	15.4m Articulated	Delivered as individual units
Civils and Earthworks	30	60	0.5	Start & Mid Build	31/07/2017	4/12/2017	10	10	10	10	10							126	15.4m Articulated, 10m Rigid	Access road construction at the start of the build plus general earthworks, trenching for underground services
Fencing Contractor	15	30	0.9	Early / Mid	14/08/2017	18/09/2017		15	15									35	8tn Rigid truck, Concrete agi	Delivery of Fence Mesh, Posts, Gates, Concrete
Compound Setup / Site Facilities Remote Cribs and toilets	30	60	0.2	Start & End	3/07/2017	14/05/2018	15	15							15	8	7	315	15.4m articulated	Assuming that compound is constructed in one go, deconstructed in one go
Waste Collection	40	80	0.3	Duration of build	3/07/2017	12/04/2018	8	8	8	8	8	8	8	8	8	8		283	18tn 8 Rigid	Contracters in area have a truck that can empty 3-4mt skip bins and 200lt sulo bins with the same front lifttruck
Dust suppression	40	80	0.7	As required	31/07/2017	4/12/2017	8	8	8	8	8							126	Water Trucks may need to access council water fill point, prior to site fill facility being established	Main dust creating activities are likely to be access track construction and delivery of materials around site, water trucks to be used if necessary to suppress any dust generated
Small equipment, materials and supplies, service vehicles for plant & equipment	50	100	0.4	Duration of build	4/07/2017	12/04/2018	7	6	9	10	12	12	10	9	9	9	7	282	Light vehicles to 8 TN flatbed trucks	Provision for extras and small materials, compound supplies and cleaners
Office Staff and Field Personnel	2800	5600	17.9	Duration of build	4/07/2017	14/05/2018	355	375	575	675	675	675	525	525	480	440	300	314	Light vehicles - 50 seat coach x 2, 22 seat bus x 2	Site personnel / Sub Contractors, up to a max of approx. 150 staff at peak, less at other times. Management instruction to Bus all persons to site.
Total heavy vehicle movements/month	-						41	56	116	412	369	153	153	8	23	16	7	-	-	-
Total light vehicle movements/month	-						362	381	584	685	687	687	535	534	489	449	307	-	-	-
Total average vehicle movements/day	-						17	18	29	46	44	35	29	23	21	19	13	-	-	-
Total average vehicle movements/hour	-						1.7	1.8	2.9	4.6	4.4	3.5	2.9	2.3	2.1	1.9	1.3	-	-	-
Peak vehicle movements/hour (6-7am and 5-6pm)	-						6	6	10	16	15	12	10	8	7	7	5	-	-	-

Appendix B

ROAD AUTHORITY CONSULTATION

CABONNE COUNCIL

Phone: (02) 6392 3247
Fax: (02) 6392 3260
Contact: Brett Gilmour

THE GENERAL MANAGER
POST OFFICE BOX 17
MOLONG 2866
Website: www.cabonne.nsw.gov.au
Email: council@cabonne.nsw.gov.au

Our Ref: MP10_0122
Doc ID: 837500
ABN: 41992 919 200

4 May 2017

Andrew Brownlow
Manager – Environmental / Director
C/- Geolyse Pty Ltd
PO Box 1963
ORANGE NSW 2800

Dear Sir,

Review of Transport Management Plan for Manildra Solar Farm (217136_TMP_003A)

Council acknowledges receipt of your emails dated 19 April 2017 and 3 May 2017 seeking Council's review of the above mentioned Transport Management Plan (TMP) for the proposed Manildra Solar Farm Project (MP10_0122).

Council has completed a review of the final TMP dated May 2017 and wish to advise that there is no objection to the control measures outlined in the TMP.

Prior to the construction of the proposed access off Packham Drive, Manildra, the applicant will be required to submit a *"Provision of Private Access"* application to Council for approval accompanied with the following documents,

- Detailed (BAR treatment) access design plan incorporating the use of a 600mm diameter concrete culvert.
- Civil Contractor details
- Proof of the civil contractors public liability insurance cover to the minimum cover of $20 million and have Cabonne Council noted as an interested party.
- Traffic Management Plan prepared by a suitable qualified person providing necessary direction to traffic past the work site.

Should you have any further questions please contact Council's Development Engineer on 6392 3271.

Yours faithfully,

HJ Nicholls
DIRECTOR ENVIRONMENTAL SERVICES

Transport Roads & Maritime Services

3 May 2017

SF2017/083711; WST17/00064/01

Mr Andrew Brownlow
Manager – Environmental/Director
Geolypse Pty Ltd
PO Box 1963
Orange NSW 2800

Dear Mr Brownlow

MP10_0122; Manildra Solar Farm; Review of Transport Management Plan

Thank you for your email dated 19 April 2017 referring the draft Transport Management Plan (TMP) for the Manildra Solar Farm project to Roads and Maritime Services for comment.

The draft TMP has been reviewed. Roads and Maritime notes that the TMP includes:

- An assessment of the impact of traffic generated by the development on the road network.
- Details of the transport routes to be used for development related traffic, including, a commitment for solar panels and construction components to be railed to Parkes and transported by road to the solar farm site.
- Details of types and volumes of development related traffic.
- A procedure to monitor compliance with the TMP.
- Buses to be used for the transport of workers to and from the construction site and Orange, with a 10 minute interval to avoid vehicles queuing back onto Henry Parkes Way (MR61) at the Old Orange Road railway crossing.

Roads and Maritime does not object to the draft TMP and makes no further comment.

Should you require further information please contact the undersigned on (02) 6861 1453.

Yours faithfully

Andrew McIntyre
Manager Land Use Assessment
Western

Appendix C

ROAD DILAPIDATION REPORT

GEOLYSE

ROAD DILAPIDATION REPORT
MANILDRA SOLAR FARM

PREPARED FOR

RCR INFRASTRUCTURE

MAY 2017

• Civil, Environmental & Structural Engineering • Surveying • Environmental • Planning • Architecture

ROAD DILAPIDATION REPORT

MANILDRA SOLAR FARM

PREPARED FOR:

RCR INFRASTRUCTURE

MAY 2017

GEOLYSE

POSTAL ADDRESS PO BOX 1963 ORANGE NSW 2800
LOCATION 154 PEISLEY STREET ORANGE NSW 2800
TELEPHONE 02 6393 5000 **FACSIMILE** 02 6393 5050
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Report Title:	*Road Dilapidation Report*
Project:	*Manildra Solar Farm*
Client:	*RCR Infrastructure*
Report Ref.:	*217136_RDR_001A*
Status:	*Final*
Issued:	*24 May 2017*

Geolyse Pty Ltd and the authors responsible for the preparation and compilation of this report declare that we do not have, nor expect to have a beneficial interest in the study area of this project and will not benefit from any of the recommendations outlined in this report.

The preparation of this report has been in accordance with the project brief provided by the client and has relied upon the information, data and results provided or collected from the sources and under the conditions outlined in the report.

All information contained within this report is prepared for the exclusive use of RCR Infrastructure to accompany this report for the land described herein and are not to be used for any other purpose or by any other person or entity. No reliance should be placed on the information contained in this report for any purposes apart from those stated therein.

Geolyse Pty Ltd accepts no responsibility for any loss, damage suffered or inconveniences arising from, any person or entity using the plans or information in this study for purposes other than those stated above.

TABLE OF CONTENTS

INTRODUCTION 1

1.1 BACKGROUND 1
1.2 PROPONENT 1
1.3 EPC CONTRACTOR 1
1.4 GEOLYSE 1

CONTEXT 2

2.1 REQUIREMENT 2
2.2 RELATIONSHIP WITH TRAFFIC MANAGEMENT PLAN 2
2.3 SCOPE 3
2.4 PRE-OPERATIONAL DILAPIDATION SURVEY REPORT 3

PRE-CONSTRUCTION CONDITION ASSESSMENT 4

3.1 SITE INSPECTION 4

3.1.1 HENRY PARKES WAY 4
3.1.2 PACKHAM DRIVE 5
3.1.3 OLD ORANGE ROAD 5

3.2 CONDITION ASSESSMENT 6

3.2.1 HENRY PARKES WAY 6
3.2.2 PACKHAM DRIVE 6
3.2.3 OLD ORANGE ROAD 6

UPGRADE REQUIREMENTS 7

4.1 REQUIREMENTS 7
4.2 ACCESS TREATMENT 7

FIGURES

Figure 1: Approved layout 1
Figure 2: Extents of Condition Inspection 4

APPENDICES

APPENDIX A
Traffic Management Plan

APPENDIX B
Inspection Photographs

APPENDIX C
Site Access Upgrade

APPENDIX D
RMS/Council Consultation

Introduction

1.1 BACKGROUND

The Manildra Solar Farm (MSF) was initially granted development consent on 3 March 2011 and subsequently modified by Minister's approval on 25 March 2015 and again 31 August 2015.

The approved project allows the development of a 50 megawatt (MW) solar farm and associated infrastructure. The approved General Layout is shown below.

Figure 1: Approved layout

Source: Project Approval Application MP10_0122

1.2 PROPONENT

The development proponent is Manildra Solar Farm Pty Ltd.

1.3 EPC CONTRACTOR

RCR Infrastructure is the Engineering, Procurement and Construction Contractor with the responsibility to build the MSF.

1.4 GEOLYSE

Geolyse has been engaged by RCR Infrastructure to prepare this Road Dilapidation Report.

Context

2.1 REQUIREMENT

This Road Dilapidation Report (RDR) has been prepared to satisfy a Condition of Approval (CoA) for the MSF. Specifically, CoA C4 requires:

> *C4 Prior to the commencement of construction of the project, the Proponent shall commission a suitably qualified expert to assess the condition of all public roads proposed to be traversed by construction traffic associated with the project (including over-mass or over-dimensional vehicles) in consultation with Council and the RMS, and identify any upgrade requirements to accommodate project traffic for the duration of construction (including culvert, bridge and drainage design; intersection treatments; vehicle turning requirements; and site access) considering final traffic volumes. The road dilapidation report shall be submitted to the Secretary prior to the commencement of construction clearly identifying recommendations made by the Council and the RMS and how these have been addressed. The Proponent shall ensure that all upgrade measures identified in the report are implemented to the satisfaction of Council and the RMS, prior to the commencement of construction.*

Consistent with the above requirement **Appendix D** provides evidence of the consultation with Council and the RMS in the preparation and approval of this Road Dilapidation Report, and compliance with CoA C4.

2.2 RELATIONSHIP WITH TRAFFIC MANAGEMENT PLAN

A Traffic Management Plan (TMP) has been prepared in consultation with and to the satisfaction of Cabonne Council (CC) and the Roads and Maritime Service (RMS). **Appendix A** provides a copy of this TMP, inclusive of evidence of this consultation with these road authorities.

Condition of Approval (CoA) C14(e) required that the TMP be prepared as part of broader a Construction Environmental Management Plan (CEMP) to manage traffic conflicts that may be generated during construction. Specifically, CoA 14(e) required:

> *The Plan shall address the requirements of the relevant road authority and shall include, but not necessarily be limited to:*
>
> > *(i) details of how construction of the project will be managed in proximity to local and regional roads;*
> >
> > *(ii) details of traffic routes for heavy vehicles, including any necessary route or timing restriction for oversized loads;*
> >
> > *(iii) demonstration that all statutory responsibilities with regard to road traffic impacts have been complied with;*
> >
> > *(iv) details of measures to minimise interactions between the project and other users of the roads such as the use of fencing, lights, barriers, traffic diversions etc;*
> >
> > *(v) procedures for informing the public where any road access will be restricted as a result of the project;*
> >
> > *(vi) procedures to manage construction traffic to ensure the safety of livestock and to minimise disruption to livestock;*
> >
> > *(vii) speed limits to be observed along routes to and from the site and within the site; and*
> >
> > *(viii) details of the expected behavioural requirements for vehicle drivers travelling to and from the site and within the site.*

Consultation with CC and RMS in the preparation and approval of established the following requirements relevant to this *Road Dilapidation Report*.

Specifically:

- The access treatment off Packham Drive into the site should be upgraded to provide a BAR treatment, noting that the width must accommodate articulated vehicles and the culvert to be in accordance with Council's requirement for a 600 mm sizing.
- The road dilapidation survey should extend from the posted 50 km/hr transition on the western side of Manildra, through to the proposed access off Packham Drive; and all Old Orange Road.

2.3 SCOPE

Consistent with CoA C4, this *Road Dilapidation Report*:

- assesses the condition of the public roads to be traversed by construction traffic in consultation with Council and the RMS;
- identifies (separate to the previously specified BAR treatment upgrade to access the site) any upgrade requirements to accommodate project traffic for the duration of construction; and
- clearly identifies the recommendations made by the Council and the RMS and how these have been addressed.

2.4 PRE-OPERATIONAL DILAPIDATION SURVEY REPORT

Whilst outside the scope of this *Road Dilapidation Report*, it is relevant to note it is the responsibility of RCR Infrastructure to comply with CoA E3 which requires that:

> *Prior to the commencement of operation of the project, the Proponent shall commission a suitably qualified expert to assess the condition of all public roads traversed by construction traffic associated with the project (including over-mass or over-dimensional vehicles) in consultation with Council and the RMS. Should the preoperational dilapidation survey report identify any damage to roads attributable to construction traffic associated with the project, the Proponent shall repair the roads consistent with the recommendations of the pre-operational dilapidation survey report, within such time as agreed to with the Council and the RMS. The pre-operation road dilapidation report shall be submitted to the Secretary prior to the commencement of operation, clearly identifying recommendations made by the Council and the RMS and how these have been addressed*

Pre-Construction Condition Assessment

3.1 SITE INSPECTION

The pre-construction road condition inspection was undertaken on the 9th May 2017. The weather during the inspection was clear and dry. The roads inspected were:

- Henry Parkes Way;
- Packham Drive; and
- Old Orange Road.

The location of photographs were recorded using a handheld GPS unit, all recorded GPS coordinates are in MGA55 format. The limit of works for the inspection can be seen below in **Figure 2**. Video was also taken of the area of inspection and will be provided digitally.

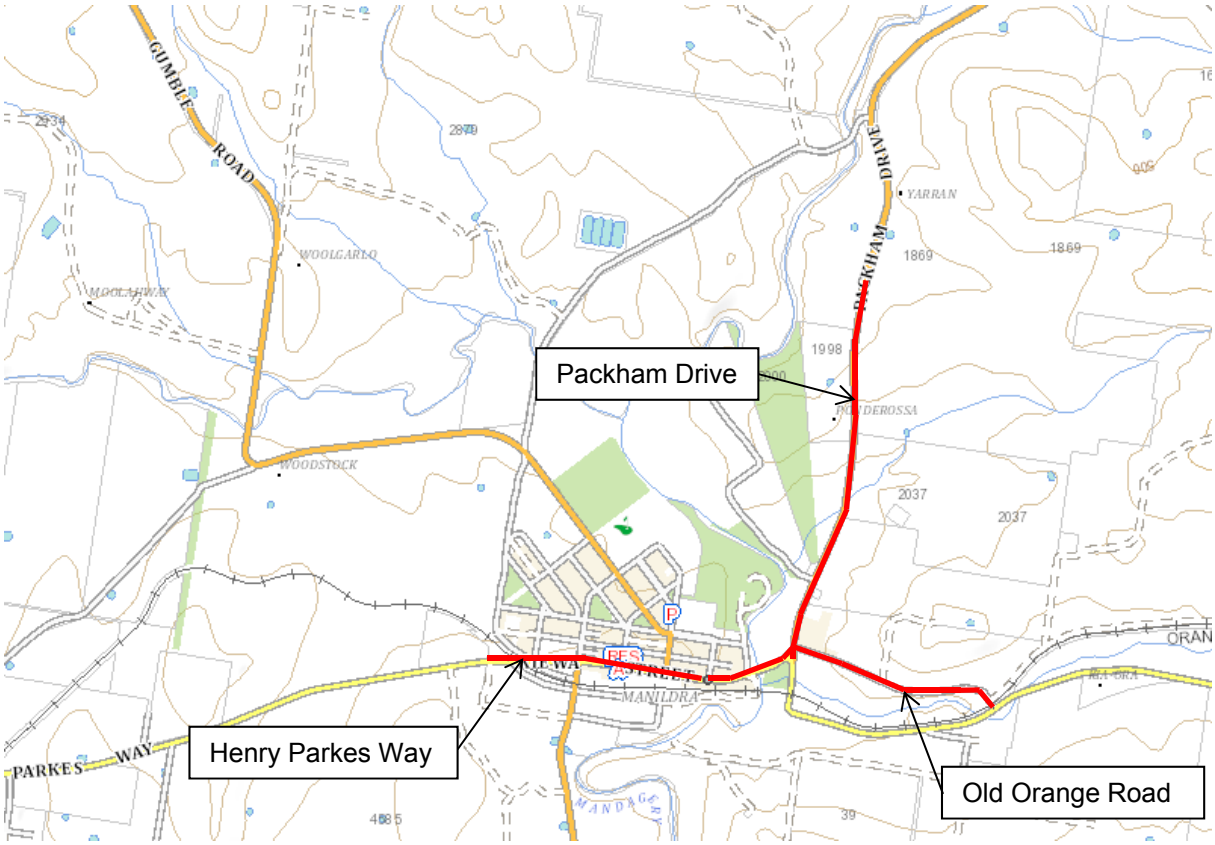


Figure 2: Extents of Condition Inspection

3.1.1 HENRY PARKES WAY

The inspection of Henry Parkes Way commenced at the start of the 50 km/hr speed zone on the western side of Manildra through to the intersection with Packham Drive.

The vehicle odometer was used to record distance, GPS coordinates were also recorded for each photograph taken. The details of photographs taken are provided below in **Table 3.1**. Photographs are included in **Appendix B**.

Table 3.1 – Henry Parkes Way Photographs

Plate Number	Vehicle Odometer	GPS Coordinate of Photograph (MGA55)	Comment
1	0.0	0656970,6326896	50km/hr speed zone commencement
2	0.1	0657125,6326897	Railway level crossing
3	0.4	0657385,6326891	Edge drop, unsealed shoulder adjacent to westbound lane
4	1.0	0658026,6326800	Pavement repair westbound lane
5	1.5	0658533,6326897	Pavement repair eastbound lane
6	1.5	0658533,6326897	Pavement failure eastbound lane

3.1.2 PACKHAM DRIVE

The inspection of Packham Drive commenced at the intersection with Henry Parkes Way through to the proposed construction access.

The vehicle odometer was used to record distance, GPS coordinates were also recorded for each photograph taken. The details of photographs taken are provided below in **Table 3.2**. Photographs are included in **Appendix B**.

Table 3.2 – Packham Drive Photographs

Plate Number	Vehicle Odometer	GPS Coordinate of Photograph (MGA55)	Comment
7	0.0	0658533,6326897	Henry Parkes Way/Packham Drive intersection
8	0.1	0658585,6326898	Pavement failure/repair southbound lane
9	0.1	0658585,6326898	Pavement failure/repair southbound lane
10	0.1	0658605,6326922	Packham Drive/Old Orange Rd intersection pavement failure/repair/potholes
11	0.1	0658615,6326954	Pavement failure/repair
12	0.1	0658615,6326954	Pavement failure/repair, shoulder reseal southbound lane
13	0.2	0658609,6326971	Pavement failure/repair northbound shoulder
14	0.2	0658611,6326992	Aggregate strip/repair northbound lane
15	0.2	0658629,6327005	Aggregate strip/repair southbound lane, shoulder reseal
16	0.3	0658627,6327073	Pavement failure/repair southbound lane, start of new seal
17	2.2	0659030,6328880	Proposed construction access
18	2.2	0659030,6328880	Proposed construction access
19	0.1	0658605,6326922	Slip Road pavement failure/repair
20	0.1	0658608,6326878	Slip Road Pavement failure/repair
21	0.1	0658608,6326878	Slip Road/Henry Parkes Way intersection

3.1.3 OLD ORANGE ROAD

The inspection of Old Orange Road commenced at the intersection with Packham Drive through to Henry Parkes Way.

The vehicle odometer was used to record distance, GPS coordinates were also recorded for each photograph taken. The details of photographs taken are provided below in **Table 3.3**. Photographs are included in **Appendix B**.

Table 3.3 – Old Orange Road Photographs

Plate Number	Vehicle Odometer	GPS Coordinate of Photograph (MGA55)	Comment
22	0.0	0658627,6326946	Pavement failure/potholing/repair
23	0.0	0658667,6326934	Edge drop/repair westbound lane
24	0.2	0658861,6326861	Edge drop/repair westbound lane
25	0.2	0658861,6326861	Edge drop/repair eastbound lane
26	0.2	0658861,6326861	Potholes/repair
27	0.3	0658994,6326802	Potholes/repair
28	0.4	0659054,6326769	Potholes/repair
29	0.4	0659054,6326769	Potholes/repair
30	0.6	0659211,6326709	Potholes/repair
31	1.0	0659643,6326664	Potholes/repair
32	1.1	0659654,6326643	Railway level crossing
33	1.1	0659654,6326643	Railway level crossing
34	1.2	06586086326878	Henry Parkes Way intersection
35	1.2	06586086326878	Henry Parkes Way intersection

3.2 CONDITION ASSESSMENT

3.2.1 HENRY PARKES WAY

Henry Parkes Way, through the area of inspection, is generally in good condition. Some areas of pavement failure and repair were evident and it was noted that some of the parking areas either side of the travel lanes were in poor condition with some areas unsealed. Monitoring of the road through the construction phase with reference to this report will be required to determine if any repairs are required.

3.2.2 PACKHAM DRIVE

Packham Drive in the vicinity of the intersection with Henry Parkes Way is in reasonable condition with significant areas of pavement repair. The remainder of Packham Drive, through the area of inspection, has recently been resealed and is in good condition. Monitoring of the road through the construction phase with reference to this report will be required to determine if any repairs are required.

3.2.3 OLD ORANGE ROAD

Old Orange Road is generally in good condition with some areas of edge drop, aggregate stripping, potholing and repairs. Monitoring of the road through the construction phase with reference to this report will be required to determine if any repairs are required.

Upgrade Requirements

4.1 REQUIREMENTS

Apart from the requirement to upgrade the site access to a BAR treatment, no other upgrades are required.

4.2 ACCESS TREATMENT

The access treatment design has been prepared and accepted by Cabonne Council (refer **Appendix C**) and a *Provision of Private Access Application* lodged.

RCR Infrastructure will ensure that the site access is upgraded to the satisfaction of Council and the RMS prior to the commencement of construction.

Appendix B

INSPECTION PHOTOGRAPHS

Plate 1

Plate 2

Plate 3

Plate 4

Plate 5

Plate 6

Plate 7

Plate 8

Plate 9

Plate 10

Plate 11

Plate 12

Plate 13

Plate 14

Plate 15

Plate 16

Plate 17

Plate 18

Plate 19

Plate 20

Plate 21

Plate 22

Plate 23

Plate 24

Plate 25

Plate 26

Plate 27

Plate 28

Plate 29

Plate 30

Plate 31

Plate 32

Plate 33

Plate 34

Plate 35

Appendix C

SITE ACCESS UPGRADE

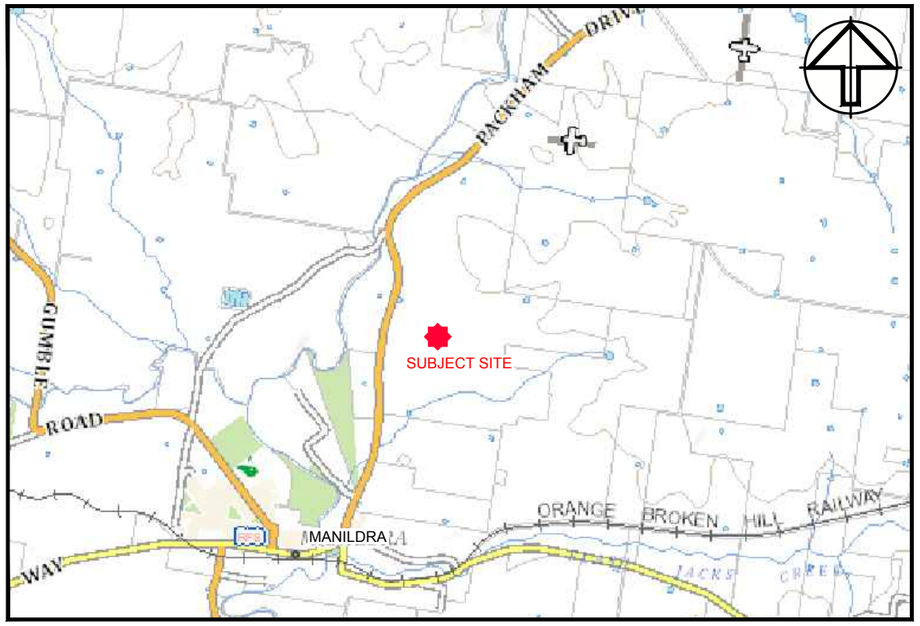
MANILDRA SOLAR FARM

PACKHAM DRIVE

RCR INFRASTRUCTURE

PROPOSED ROAD UPGRADE FOR CONSTRUCTION ACCESS

SCHEDULE OF DRAWINGS	
DRAWING	TITLE
C001	TITLE SHEET & LOCALITY MAP
C002	PROPOSED UPGRADE FOR CONSTRUCTION ACCESS
C003	EROSION & SEDIMENT CONTROL PLAN



SITE LOCALITY

NOT TO SCALE

ISSUED FOR CONSTRUCTION

REV.	DATE	DFTD.	APPD.	DETAILS
A	02/05/17	GT	AW	FOR REVIEW
B	03/05/17	GT	AW	FOR REVIEW
C	28/06/17	GT	AW	FOR CONSTRUCTION

	FILE	INITIALS	DATE
SURVEY	-	-	-
DESIGN	-	-	-
DRAINS/ HEC-RAS MODELLING	-	-	-
ENGINEERING/ SURVEYING APPROVAL		-	-

DRAWING SCALE

DO NOT SCALE FROM THESE DRAWINGS. ALL MEASUREMENTS SHALL BE CONFIRMED ON SITE AND WITH GEOLYSE PTY. LTD. PRIOR TO CONSTRUCTION

APPROVAL AUTHORITY: CABONNE COUNCIL

CLIENT: RCR INFRASTRUCTURE

PROJECT: MANILDRA SOLAR FARM PROPOSED ROAD UPGRADE FOR CONSTRUCTION USE

GEOLYSE
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ORANGE, NSW 2800
orange@geolyse.com
www.geolyse.com
Ph. (02) 6393 5000
Fx. (02) 6393 5050

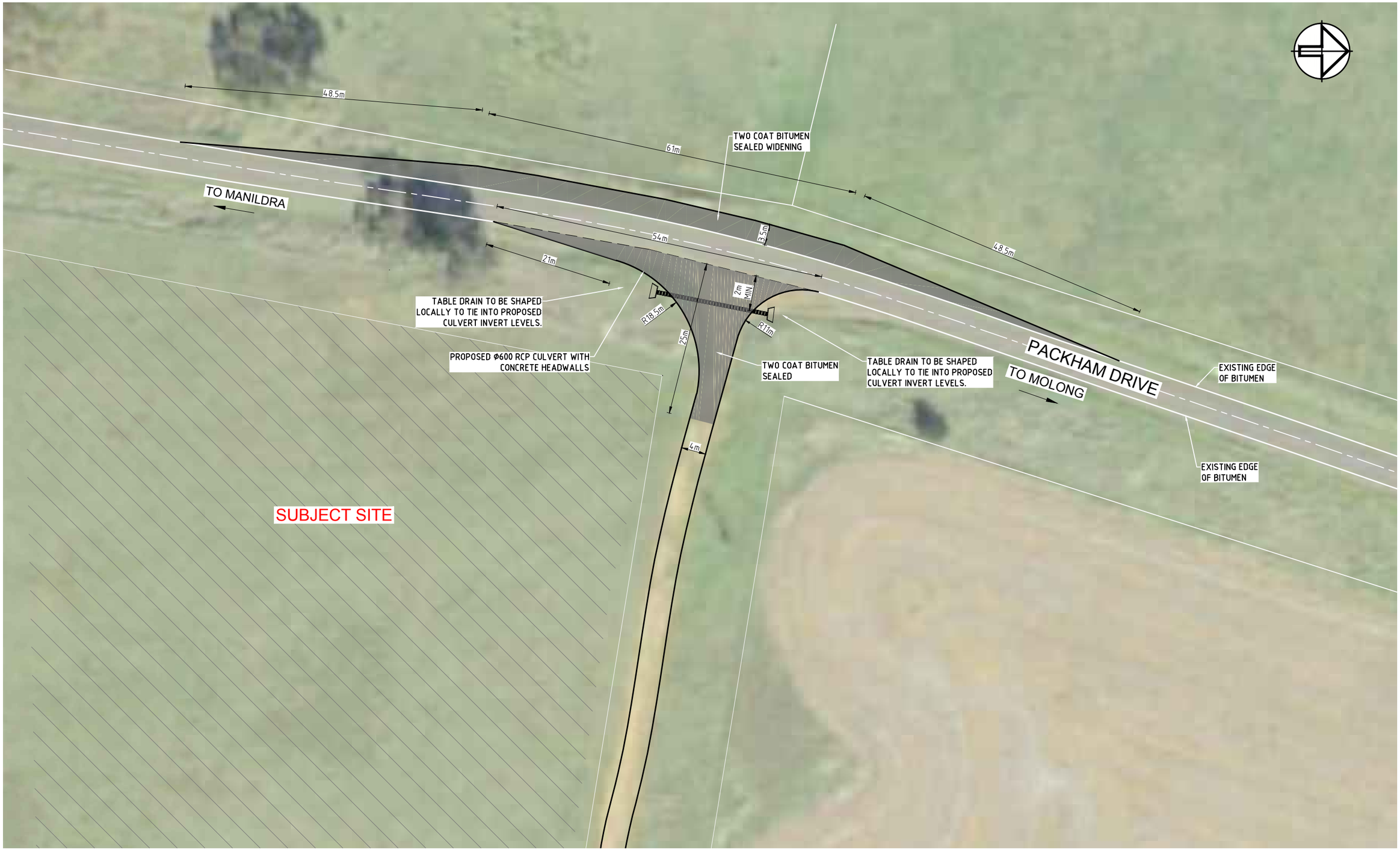
DRAWING: TITLE SHEET & LOCALITY MAP

PROJECT NUMBER 217136 | DRAWING FILE 217136_02C-C001-C003.dwg | ORIGINAL A1

SURVEY MARK - | R.L. - | DATUM A.H.D.

IMAGE SOURCE -

STATUS FOR CONSTRUCTION | SHEET C001 OF C03 | SET 02



ISSUED FOR CONSTRUCTION

REV.	DATE	DFTD.	APPD.	DETAILS
A	02/05/17	GT	AW	FOR REVIEW
B	03/05/17	GT	AW	FOR REVIEW
C	28/06/17	GT	AW	FOR CONSTRUCTION

	FILE	INITIALS	DATE
SURVEY	-	-	-
DESIGN	-	-	-
DRAINS/ HEC-RAS MODELLING	-	-	-
ENGINEERING/ SURVEYING APPROVAL		-	-

DRAWING SCALE

SCALE 1:300 (A1)

0 5 10 15 20 25 30

0 5 10 15 20 25 30

SCALE 1:600 (A3)

DO NOT SCALE FROM THESE DRAWINGS. ALL MEASUREMENTS SHALL BE CONFIRMED ON SITE AND WITH GEOLYSE PTY. LTD. PRIOR TO CONSTRUCTION

APPROVAL AUTHORITY: CABONNE COUNCIL

CLIENT: RCR INFRASTRUCTURE

PROJECT: MANILDRA SOLAR FARM PROPOSED ROAD UPGRADE FOR CONSTRUCTION USE

GEOLYSE
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P.O. BOX 1963
ORANGE, NSW 2800
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www.geolyse.com
Ph. (02) 6393 5000
Fx. (02) 6393 5050

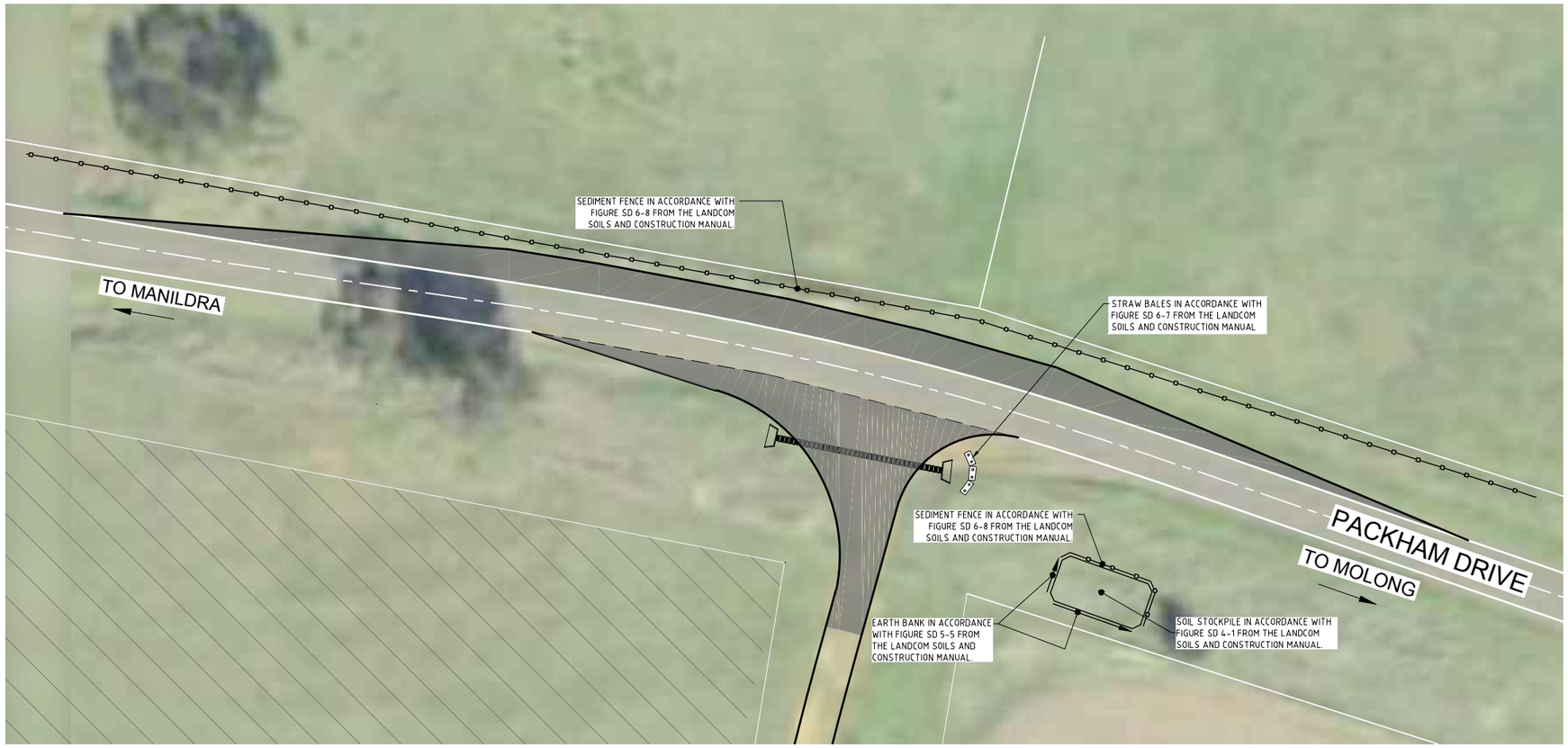
DRAWING: PROPOSED UPGRADE FOR CONSTRUCTION ACCESS

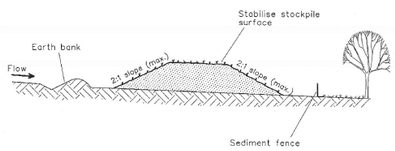
PROJECT NUMBER 217136 | DRAWING FILE 217136_02C-C001-C003.dwg | ORIGINAL A1

SURVEY MARK - | R.L. - | DATUM A.H.D.

IMAGE SOURCE -

STATUS FOR CONSTRUCTION | SHEET C002 OF C03 | SET 02

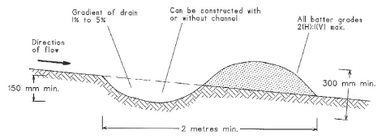




Construction Notes

1. Place stockpiles more than 2 (preferably 5) metres from existing vegetation, concentrated water flow, roads and hazard areas.
2. Construct on the contour as low, flat, elongated mounds.
3. Where there is sufficient area, topsoil stockpiles shall be less than 2 metres in height.
4. Where they are to be in place for more than 10 days, stabilise following the approved ESCP or SWMP to reduce the C-factor to less than 0.10.
5. Construct earth banks (Standard Drawing 5-5) on the upslope side to divert water around stockpiles and sediment fences (Standard Drawing 6-8) 1 to 2 metres downslope.

STOCKPILES — **SD 4-1**

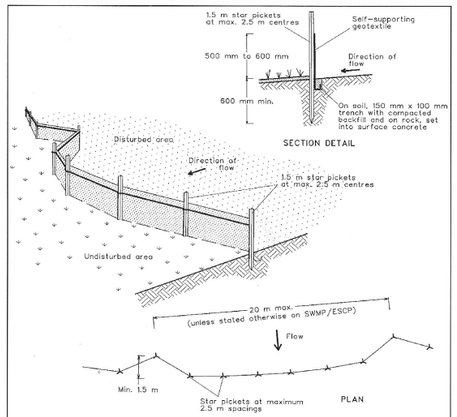


NOTE: Only to be used as temporary bank where maximum upslope length is 80 metres.

Construction Notes

1. Build with gradients between 1 percent and 5 percent.
2. Avoid removing trees and shrubs if possible - work around them.
3. Ensure the structures are free of projections or other irregularities that could impede water flow.
4. Build the drains with circular, parabolic or trapezoidal cross sections, not V shaped.
5. Ensure the banks are properly compacted to prevent failure.
6. Complete permanent or temporary stabilisation within 10 days of construction.

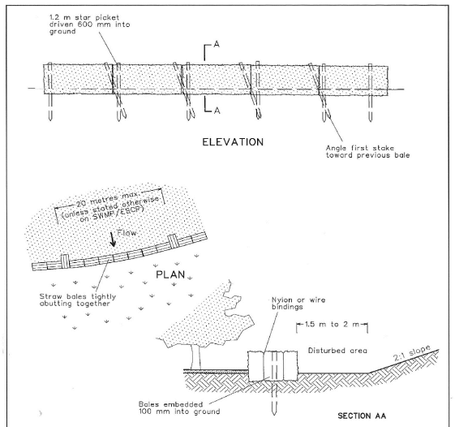
EARTH BANK (LOW FLOW) — **SD 5-5**



Construction Notes

1. Construct sediment fences as close as possible to being parallel to the contours of the site, but with small returns as shown in the drawing to limit the catchment area of any one section. The catchment area should be small enough to limit water flow if concentrated at one point to 50 litres per second in the design storm event, usually the 10-year event.
2. Cut a 150-mm deep trench along the upslope line of the fence for the bottom of the fabric to be entrenched.
3. Drive 1.5 metre long star pickets into ground at 2.5 metre intervals (max) at the downslope edge of the trench. Ensure any star pickets are fitted with safety caps.
4. Fix self-supporting geotextile to the upslope side of the posts ensuring it goes to the base of the trench. Fix the geotextile with wire ties or as recommended by the manufacturer. Only use geotextile specifically produced for sediment fencing. The use of shade cloth for this purpose is not satisfactory.
5. Join sections of fabric at a support post with a 150-mm overlap.
6. Backfill the trench over the base of the fabric and compact it thoroughly over the geotextile.

SEDIMENT FENCE — **SD 6-8**



Construction Notes

1. Construct the straw bale filter as close as possible to being parallel to the contours of the site.
2. Place bales lengthwise in a row with ends tightly abutting. Use straw to fill any gaps between bales. Straws are to be placed parallel to ground.
3. Ensure that the maximum height of the filter is one bale.
4. Embed each bale in the ground 75 mm to 100 mm and anchor with two 1.2 metre star pickets or stakes. Angle the first star picket or stake in each bale towards the previously laid bale. Drive them 600 mm into the ground and, if possible, flush with the top of the bales. Where star pickets are used and they protrude above the bales, ensure they are fitted with safety caps.
5. Where a straw bale filter is constructed downslope from a disturbed batter, ensure the bales are placed 1 to 2 metres downslope from the toe.
6. Establish a maintenance program that ensures the integrity of the bales is retained - they could require replacement each two to four months.

STRAW BALE FILTER — **SD 6-7**

ISSUED FOR CONSTRUCTION

REV.	DATE	DFTD.	APPD.	DETAILS
A	02/05/17	GT	AW	FOR REVIEW
B	03/05/17	GT	AW	FOR REVIEW
C	28/06/17	GT	AW	FOR CONSTRUCTION

	FILE	INITIALS	DATE
SURVEY	-	-	-
DESIGN	-	-	-
DRAINS/ HEC-RAS MODELLING	-	-	-
ENGINEERING/ SURVEYING APPROVAL		-	-

DRAWING SCALE

SCALE 1:300 (A1)

0 5 10 15 20 25 30

0 5 10 15 20 25 30

SCALE 1:600 (A3)

DO NOT SCALE FROM THESE DRAWINGS. ALL MEASUREMENTS SHALL BE CONFIRMED ON SITE AND WITH GEOLYSE PTY. LTD. PRIOR TO CONSTRUCTION

APPROVAL AUTHORITY: CABONNE COUNCIL

CLIENT: RCR INFRASTRUCTURE

PROJECT: MANILDRA SOLAR FARM PROPOSED ROAD UPGRADE FOR CONSTRUCTION USE

GEOLYSE
ORANGE
154 PEISLEY STREET
P.O. BOX 1963
ORANGE, NSW 2800
orange@geolyse.com
www.geolyse.com
Ph. (02) 6393 5000
Fx. (02) 6393 5050

DRAWING: EROSION & SEDIMENT CONTROL PLAN

PROJECT NUMBER 217136 | DRAWING FILE 217136_02C-C001-C003.dwg | ORIGINAL A1

SURVEY MARK - | R.L. - | DATUM A.H.D.

IMAGE SOURCE -

STATUS FOR CONSTRUCTION | SHEET C003 OF C03 | SET 02

Appendix D

RMS/COUNCIL CONSULTATION

24 May 2017

SF2017/083711; WST17/00064/02

Mr Andrew Brownlow
Geolyse Pty Ltd
PO Box 1963
ORANGE NSW 2800

Dear Mr Brownlow

MP10_0122; Manildra Solar Farm; Review of Road Dilapidation Report

Thank you for your email on 18 May 2017 forwarding the Road Dilapidation Report for the Manildra Solar Farm project to Roads and Maritime Services for comment.

The report has been reviewed. Roads and Maritime confirms that the Road Dilapidation Report adequately identifies works required on public roads to safely manage traffic during construction of the solar farm.

Should you require further information please contact the undersigned 02 6861 1453.

Yours faithfully

Andrew McIntyre
Manager Land Use Assessment
Western

From: Brett Gilmour [mailto:Brett.Gilmour@cabonne.nsw.gov.au]
Sent: Friday, 19 May 2017 2:12 PM
To: 'Andrew Brownlow' <abrownlow@geolyse.com>
Subject: RE: Road Dilapidation Report - Manildra Solar Farm

Andrew,

Council has reviewed the submitted Road Dilapidation Report (dated May 2017) in relation to the Manildra Solar Farm. Council is satisfied that this meets the requirement for a Road Dilapidation Report to be prepared for Packham Drive, Old Orange Road, and Henry Parkes Way, Manildra outlined in the approved Traffic Management Plan (dated May 2017).

Cheers Brett

Brett Gilmour
Development Engineer
Brett.Gilmour@cabonne.nsw.gov.au
0417 273 294

Cabonne Council
PO Box 17
Molong NSW 2866
Switch:(02) 6390 7100
Fax: (02) 6392 3260
Council@cabonne.nsw.gov.au
www.cabonne.nsw.gov.au

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From: Andrew Brownlow [mailto:abrownlow@geolyse.com]
Sent: Thursday, 18 May 2017 12:42 PM
To: 'MCINTYRE Andrew R' <Andrew.MCINTYRE@rms.nsw.gov.au>; Brett Gilmour <Brett.Gilmour@cabonne.nsw.gov.au>; 'SCARPELLINO Eliza J' <eliza.j.scarpellino@rms.nsw.gov.au>
Cc: 'Beresford Tuppin' <Beresford.Tuppin@rcrtom.com.au>; 'Alistair Whittle' <awhittle@geolyse.com>
Subject: Road Dilapidation Report - Manildra Solar Farm

Andrew/Brett/Eliza

Thanks for the assistance to date with Manildra Solar.
Please find attached the Road Dilapidation Report (RDR) prepared pursuant to condition of approval CoA C4 and completed by our Alistair Whittle.
Just so everything is collated into the one document, I have included the previously approved Traffic Management Plan as an Appendix.
CoA C4 requires that the RDR be submitted to DPE confirming that the recommendations of RMS and Council have been addressed. To this end, RCR confirms:

- it will ensure that the necessary upgrade measures (being the access treatment off Packhams Drive) will be implemented prior to the commencement of construction;
- it has lodged the *Provision of Private Access Application* with Council this week; and
- it understands that post construction it will be required to submit a *Pre-operational Dilapidation Survey Report* to identify any damage to roads attributable to construction traffic, consistent with CoA E3.

If you could confirm everything satisfies your requirements (return e-mail is suffice) this will enable RCR to submit the RDR with the Department asap.

With thanks

Andrew

Andrew Brownlow
Manager - Environmental / Director (CEnvP)
Geolyse Pty Ltd
154 Peisley St
PO Box 1963
Orange NSW 2800
Ph: 02 6393 5000
Fx: 02 6393 5050
Mob: 0417 210 253
Email: abrownlow@geolyse.com
Web: www.geolyse.com

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.....

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Appendix D

PROVISION FOR PRIVATE ACCESS

CABONNE COUNCIL

Provision of Private Access Application
CAB-003

Your reference no.: _____

Our reference no.: _____

Advice to Applicant

- This application is made under the Environmental Planning and Assessment Act 1979 Sections 109C (1)(b), 81A (2) and 81A (4)
- Please complete this form in ink using BLOCK LETTERS
- Application fee must accompany application – refer to Schedule of Fees and Charges for details
- An incomplete application may result in deferral of your application
- For application or lodgement advice please contact Council's Development Engineer on 02 63923271 (9:00am – 11:00am Monday to Friday)

PROPERTY DETAILS

You must complete all details in this section.

Street Address Packham Drive		
Suburb Manildra	Nearest Cross Street Windeyer Street	
Lot No. 2	Section	DP 1210642
DA No. (If applicable)	Date of Determination August 2015	

OWNER DETAILS

If the owner is a company, the ABN number and company seal must be provided. All owners must give consent. If insufficient space please provide separate sheet.

Name Manildra Solar P/L		ABN No. 30165431881
Postal Address Level 3 #16 Spring Street		
Suburb Sydney		Post Code 2000
Phone 02 9002 7708	Fax	Mobile 0419 096 884
Email bjorn.schultz@firstsolar.com	Owners Signature	

CONTRACTOR DETAILS

Please fill in if known at time of making this application.

Name RCR Infrastructure ODG		ABN No. 78003905093
Postal Address Level 21 Tower B, Zenith Building, 821 Pacific Highway		
Suburb Chatswood		Post Code 2067
Phone 02 9933 1013	Fax	Mobile 0411 259 210
Email Address Jeff.Drummond@rcrtom.com.au		

APPLICANT DETAILS

If the applicant is a company, the ABN number and company seal must be provided.

☒ Mr ☐ Mrs ☐ Ms ☐ Other _____

Name Jeff Drummond		ABN No.
Postal Address Level 21 Tower B, Zenith Building, 821 Pacific Highway		
Suburb Chatswood		Post Code 2067
Phone 02 9933 1013	Fax	Mobile 0411 259 210
Email Address Jeff.Drummond@rcrtom.com.au		
Applicant's Signature		Date 15/05/17

AN ACCESS CONSTRUCTION CERTIFICATE IS ISSUED SUBJECT TO THE FOLLOWING CONDITIONS

(Turn the page over to find more information)

1. An access Construction Certificate must be obtained prior to commencement of construction of any access or accesses to the property from the adjoining road.
2. A joint inspection with Council's Development Engineer is to be held prior to the issue of a Access Construction Certificate.
3. Council's Development Engineer will contact the applicant once application is receipted to arrange a suitable time for a joint inspection.
4. All work shall be carried out with a minimum of obstruction to pedestrian and/or vehicular traffic.
5. Before commencing work contact should be made with authorities responsible for public utility services to confirm the precise locations of all services by contacting Dial Before You Dig on 1100.
6. The applicant shall be responsible for any damage to public utilities, private services or other damage resulting from the proposed work.
7. The work must be carried out in accordance with all relevant safety regulations and Acts.

Privacy Information: The details provided in this form may contain information that is personal information, which identifies you etc., for the purposes of the Privacy and Personal Information Protection Act. The purpose of collecting this information is to enable the Council to consider matters under related legislation, issue related documentation where required and other associated matters as provided by law and will be utilised by Council officers in assessing the proposal and other associated activities. The information may also be made available to other persons where such access is in accordance with the relevant regulations and requirements in this regard. The submission of personal information in this case is required by law and if not provided (wholly or in part) may affect or prevent consideration of the matter by Council. The information will ultimately be stored in Council's records system.

HOW TO LODGE THIS APPLICATION

Courier or in person:	Cabonne Council (opening hours: 900am – 500pm Monday to Friday) 99-101 Bank Street, Molong
Mail:	PO Box 17, MOLONG, NSW, 2866
ABN:	41992 919 200
How to contact us:	Phone: (02) 6392 3200 Fax: (02) 6392 3260 Council@cabonne.nsw.gov.au www.cabonne.nsw.gov.au

Fees and Charges	Required	Cost ($)
Access Construction Certificate	YES	$155.60
Access Compliance Inspection	YES	$101.20
Access Compliance Certificate	YES	$101.20
	TOTAL	$358.00
RECEIPT NUMBER:		

CABONNE COUNCIL

OFFICIAL RECEIPT

ABN 41 992 919 200

No: 81678

DATE: 17/5 20 17

PAYMENT BY: CASH ☐ CHEQUE ☐ EFT ☑

Received from: RCR Tomlinson

The sum of Three hundred and fifty-eight dollars _____ cents

$ 358 . 00

Being for: Provision of Private Access.

General Manager

PER: [illegible]

When payment is made by cheque, this receipt is issued subject to cheque being cleared by financial institute.

CommonwealthBank

CABONNE COUNCIL
MOLONG NSW

TERMINAL 11037700
REFERENCE 007188

CUSTOMER COPY

CARD NO: 5950(1)
EXPIRY DATE:
Bankwest Credit
SAVINGS
PURCHASE $358.00
TOTAL AUD $358.00

APPROVED 00
17 MAY 2017 16:43
WITH THANKS

Appendix E

CONDITION C4 COMPLIANCE

Andrew Brownlow

From: Beresford Tuppin <Beresford.Tuppin@rcrtom.com.au>
Sent: Thursday, 29 June 2017 8:59 AM
To: abrownlow (abrownlow@geolyse.com)
Subject: FW: Manildra Solar Farm (Application Reference: MP 10_0122)

From: Diana Mitchell [mailto:Diana.Mitchell@planning.nsw.gov.au]
Sent: Thursday, 25 May 2017 12:25 PM
To: Beresford Tuppin <Beresford.Tuppin@rcrtom.com.au>
Cc: Clay Preshaw <Clay.Preshaw@planning.nsw.gov.au>
Subject: FW: Manildra Solar Farm (Application Reference: MP 10_0122)

Hi Baz,

Further to our discussion, I can acknowledge that the Department has received your road dilapidation report, for the purposes of condition C4 of the project approval.

As discussed, please keep me informed with the progress of the CEMP so that we can allocate resources in anticipation of its arrival.

Thank you.

Best Regards,

Diana Mitchell
Senior Planning Officer | Resource Assessments | Planning Services
320 Pitt Street | GPO Box 39 | Sydney NSW 2001 T 02 9274 6331

From: Clay Preshaw
Sent: Thursday, 25 May 2017 12:00 PM
To: Diana Mitchell <Diana.Mitchell@planning.nsw.gov.au<mailto:Diana.Mitchell@planning.nsw.gov.au>>
Subject: FW: Manildra Solar Farm (Application Reference: MP 10_0122)

From: Beresford Tuppin [mailto:Beresford.Tuppin@rcrtom.com.au]
Sent: Thursday, 25 May 2017 11:35 AM
To: Clay Preshaw <Clay.Preshaw@planning.nsw.gov.au<mailto:Clay.Preshaw@planning.nsw.gov.au>>
Subject: Manildra Solar Farm (Application Reference: MP 10_0122)

Good Morning Clay,
Please find attached the Road Dilapidation Report, Manildra Solar Farm.

This document is in reference to CoA: C4 Application No.: MP10_0122
Proponent: Manildra Solar Farm Pty Limited Approval Authority: Minister for Planning

Could you please acknowledge the lodgement of this document via return email

If you have any question or queries on any aspect of this correspondence please don't hesitate to contact me on the number supplied below

Kind Regards Baz Tuppin

Beresford Tuppin | HSE Manager - Manildra Solar RCR Infrastructure

A: Level 21, Tower B, Zenith Building, 821 Pacific Highway, Chatswood NSW 2067 Australia
M: +61 0459 894 601

Appendix C

FLORA AND FAUNA MANAGEMENT PLAN

Manildra Solar Farm

Flora and Fauna Management Plan

APRIL 2016

www.nghenvironmental.com.au

Document Verification

Project Title: Manildra Solar Farm CEMP

Project Number:	6274
Project File Name:	Manildra_FFMP_final v1 4_

Revision	Date	Prepared by (name)	Reviewed by (name)	Approved by (name)
Final v1.4	20/04/16	Jane Blomfield	Brooke Marshall	Brooke Marshall

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surry hills nsw 2010 (t 02 8202 8333)

Canberra - NSW SE & ACT
unit 17/27 yallourn st (po box 62)
fyshwick act 2609 (t 02 6280 5053

Wagga Wagga Riverina and Western NSW
suite 1, 39 fitzmaurice st (po box 5464)
wagga wagga nsw 2650 (t 02 6971 9696)

Newcastle – Hunter and North Coast
153 tudor st
hamilton nsw 2303 (m 0475 946 632)

Bega - ACT and South East NSW
suite 1, 216 carp st (po box 470)
bega nsw 2550 (t 02 6492 8333)

Bathurst - Central West and Orana
35 morrisset st (po box 434)
bathurst nsw 2795 (m 0448 820 748)

CONTENTS

1 INTRODUCTION 1

1.1 THE PROJECT 1

1.2 LEGISLATIVE CONTEXT AND SCOPE OF THIS PLAN 1

1.3 RELATIONSHIP TO OTHER ASSESSMENTS AND PLANS 2

1.3.1 Source documents 2

1.3.2 Associated environmental management plans 3

1.4 HOW TO USE THIS DOCUMENT 3

2 EXISTING ENVIRONMENT 4

2.1 GENERAL 4

2.2 THREATENED SPECIES AND COMMUNITIES 7

2.2.1 Survey methods and survey effort 8

2.2.2 Survey results 10

2.3 DISTURBANCE AND WEEDS 13

2.4 CLEARING REQUIREMENTS FOR CONSTRUCTION 13

2.4.1 Impact area assumed by the environmental assessment 13

2.4.2 Impact area required by the final construction footprint 14

2.4.3 Impact on habitat resources 14

3 MANAGEMENT FRAMEWORK 15

3.1 RESPONSIBILITIES 15

3.2 SUBCONTRACTOR MANAGEMENT 16

3.3 CONSULTATION REQUIREMENTS 17

3.4 ENVIRONMENTAL MONITORING, REPORTING AND COMPLIANCE 17

3.4.1 Environmental monitoring 17

3.4.2 Environmental auditing 17

3.4.3 Environmental reporting 18

3.4.4 Adaptation of protocols in response to on-ground results 18

4 ENVIRONMENTAL MANAGEMENT OF ACTIVITIES 19

4.1 ENVIRONMENTAL ACTIVITIES, IMPACTS AND RISKS 19

4.2 ENVIRONMENTAL PROTOCOLS 20

5 REFERENCES 30

APPENDIX A FLORA AND FAUNA SITE PLAN ..... A-I

APPENDIX B CONDITION CROSS REFERENCE ..... B-I

TABLES

Table 2-1 Survey effort ..... **Error! Bookmark not defined.**

Table 2-2 Noxious weeds at the subject site 13

Table 2-3 Calculated total area of impact for the development according to Biometric vegetation types .14

Table 2-4 Calculated area of impact excluding native vegetation remnants <0.25 ha.....14

Table 3-1: Personnel with specific flora and fauna responsibilities 15

Table 4-1: Risk matrix.....19

Table 4-2: Risk assessment for Manildra solar farm construction activities 19

Table 4-3: Flora and fauna management protocols for the Manildra Solar Farm 21

FIGURES

Figure 2-1 Cultivated paddocks to be occupied by the Solar Farm 5

Figure 2-2 Exotic dominated pasture to be occupied by the Solar Farm 5

Figure 2-3 Remnant White Box stand in cultivated paddock 5

Figure 2-4 Remnant Yellow Box stand in cultivated paddock.....5

Figure 2-5 Native grassland and exotic patches under trees in the western paddock.....5

Figure 2-6 Isolated White Box tree on thin outcrop of rock within a cultivated paddock 5

Figure 2-7 Vegetation communities at the Proposed Manildra Solar Farm site 6

Figure 2-8 Survey effort 9

Figure 2-9 Survey results.....12

ACRONYMS AND ABBREVIATIONS

BA	Biodiversity Assessment
BoP	Balance of Plant
MSFPL	Manildra Solar Farm Pty Ltd
CEMP	Construction Environmental Management Plan
DoPE	(NSW) Department of Planning and Environment
EA	Environmental Assessment
EEC	Endangered Ecological Community
EPC	Engineering, Procurement and Construction
ER	Environmental Representative
EWMS	Environmental Work Method Statement
FFMP	Flora and Fauna Management Plan
GCMP	Groundcover Management Plan
LLS	Local Land Services
MW	Megawatt
NSW	New South Wales
OEH	(NSW) Office of Environment and Heritage
OP	Offset Plan
PV	Photovoltaic
SCECO	Site Construction and Environmental Compliance Officers
SoC	Statement of Commitment
sp/spp	Species/multiple species
WIRES	NSW Wildlife Information, Rescue and Education Service

1 INTRODUCTION

1.1 THE PROJECT

The approved Manildra Solar Farm will be constructed in the central western area of NSW, on farmland adjacent to an existing substation, approximately 2 kilometres north-east of Manildra and 30 kilometres east of Parkes. The project encompasses the construction and operation of approximately 50MWac of photovoltaic (PV) arrays over an area of approximately 180 hectares. It includes associated electrical infrastructure, maintenance facilities, access tracks and minor upgrades to adjacent roads.

1.2 LEGISLATIVE CONTEXT AND SCOPE OF THIS PLAN

The Manildra Solar Farm project was approved by the NSW Department of Planning in March 2011, under Part 3A (Major Projects) of the NSW *Environmental Planning and Assessment Act 1979* (EP&A Act). In October 2014, a modification application was submitted to the NSW Department of Planning and Environment under Section 75W of the EP&A Act. The Modification 1 application sought to include the use of tracking panels that would have a 5 metre maximum height. This Modification was approved on 25 March 2015 by the delegate of the Minister for Planning, subject to conditions.

In July 2015, a second Modification application was submitted to the NSW Department of Planning and Environment under Section 75W of the EP&A Act. The modification 2 application sought to modify the Project's Approval, including: extending the lapse date of the approval by 3 years (i.e. to March 2019); allowing string inverters to be installed at the project; changing the noise monitoring requirements; and, updating the schedule of land for the project. The Modification 2 application was approved on 28 August 2015 by the Minister for Planning, subject to conditions.

The consolidated Conditions of Consent (August 2015) for the project (including the Conditions from the approved Project Modifications 1 and 2) outline specific requirements for flora and fauna management during construction and operation.

In addition, requirements have also been taken from the:

- Environmental Assessment, prepared by NGH Environmental October 2010
- Submissions Report, prepared by NGH Environmental December 2010

Items that must be addressed in this plan are identified in Appendix B. The key requirement is outlined in Condition of Consent 14:

> As part of the Construction Environmental Management Plan required under condition C13 of this approval, the proponent shall prepare and implement the following:
>
> a) a **Flora and Fauna Management Plan**, developed in consultation with OEH, to outline measures to protect and minimise loss of native vegetation and native fauna habitat as a result of construction of the project. The Plan shall include, but not necessarily limited to:
>
> (i) plans showing terrestrial vegetation communities; important flora and fauna habitat areas; location where EECs, native pasture; and areas to be cleared. The plans shall also identify vegetation adjoining the site where this contains important habitat areas and /or threatened species, populations or ecological communities;
>
> (ii) methods to manage impacts on flora and fauna species and their habitat which may be directly or indirectly affected by the project, such as location of fencing, procedures for vegetation clearing or soil removal/stockpiling and procedures for re-locating hollows or installing nesting boxes and managing weeds;
>
> (iii) procedures to accurately determine the total area, type, and condition of vegetation community to be cleared;
>
> (iv) reference to the Ground Cover Management Plan required in condition C14(b); and
>
> (v) a procedure to review management methods where they are found to be ineffective.

1.3 RELATIONSHIP TO OTHER ASSESSMENTS AND PLANS

1.3.1 Source documents

Specific to this project,

1. A Biodiversity Assessment (BA) (NGH Environmental 2010a) was completed in November 2010 as part of an Environmental Assessment for the project (NGH Environmental 2010b).

Supplementary surveys were also documented and summarised within the:

2. Biodiversity Addendum (NGH Environmental 2010c) and
3. Submissions Report (NGH Environmental 2010d)

Surveys associated with these assessments targeted:

- Reptiles (Pink-tailed Worm-lizard, Little Whip Snake) and associated habitat
- Threatened flora species (Spring survey and Winter surveys)
- Box-Woodland EEC (condition assessment)
- Hollow-bearing trees (Superb Parrot and other hollow-dependent fauna habitat)

These documents form source documents for the development of this Flora and Fauna Management Plan (FFMP).

1.3.2 Associated environmental management plans

Associated environmental management plans of relevance to this FFMP include:

Construction Environmental Management Plan	An overarching Construction Environmental Management Plan (CEMP) applies to this project. This FFMP is a sub-plan of the CEMP.
Offset Strategy	An Offset Strategy. The management of an offset site for biodiversity improvement ensures an overall 'maintain or improve' environmental outcome, as required for Major Projects. An Offset Plan would be developed to verify the impacted areas have been appropriately offset and would contain any management measures required for any offset lands.
Groundcover Management Plan	A Ground Cover Management Plan to monitor and manage: • Weeds • Site rehabilitation • Maintenance of ground cover (particularly beneath panels)

1.4 HOW TO USE THIS DOCUMENT

This document includes the following information:

Section 2	Sets out the environmental context of the project as it relates to flora and fauna impact management. Provides the 'limit of clearing' or estimated impact areas for the development.
Section 3	Sets out the management framework, roles and responsibilities, consultation requirements and monitoring, auditing and reporting requirements of the project.
Section 4	Identifies the key flora and fauna risks from the construction activities. Sets out management protocols to address these.
APPENDIX A	Provides annotated site plans locating areas of constraint and identifying where protocols apply on the ground.
APPENDIX B	Provides a reference table to verify all required conditions of consent are addressed by this plan.

2 EXISTING ENVIRONMENT

2.1 GENERAL

Land at the proposal site is gently undulating with rocky patches throughout. Elevation ranges from 450 m to 490 m. The site is at a higher elevation than the majority of the Manildra township which lies roughly 1.5 km to the south west. A small drainage line runs through a short section of the most western paddock. Mandagery Creek lies 1.5 km west of the site.

The proposal site is largely cleared of tree and shrub cover. The understorey is entirely exotic in cropped areas, and in grazed areas is dominated by exotic grasses or native grasses with exotic forbs. Native species diversity is generally low. Native vegetation at the site is likely to be derived from Box-Gum Woodland. Overstorey species are predominantly White Box and Yellow Box eucalypts. Most trees are mature although very few have formed hollows.

The site is privately owned grazing and cropping land carrying largely exotic pasture species which was originally derived from grasslands and woodland. Areas where infrastructure will be located are almost entirely cleared of trees. Figures 2-1 to 2-6 illustrate the general site features. The vegetation communities occurring onsite are listed below and mapped on Figure 2-7.

In summary, three vegetation communities were identified:

- Box-Gum Woodland remnants, mostly small remnant of tree cover, with exotic groundcover
- Box-Gum Woodland derived native grassland
- Exotic crop or pasture, making up the vast majority of the site

All native vegetation onsite would meet the Biometric definition of 'moderate to good' condition in accordance with this two class condition system. However, it is highly degraded and has been considered poor and poor to moderate, according to a more detailed five class condition system used by NGH Environmental.

Figure 2-1 Cultivated paddocks to be occupied by the Solar Farm

Figure 2-2 Exotic dominated pasture to be occupied by the Solar Farm

Figure 2-3 Remnant White Box stand in cultivated paddock

Figure 2-4 Remnant Yellow Box stand in cultivated paddock

Figure 2-5 Native grassland and exotic patches under trees in the western paddock

Figure 2-6 Isolated White Box tree on thin outcrop of rock within a cultivated paddock

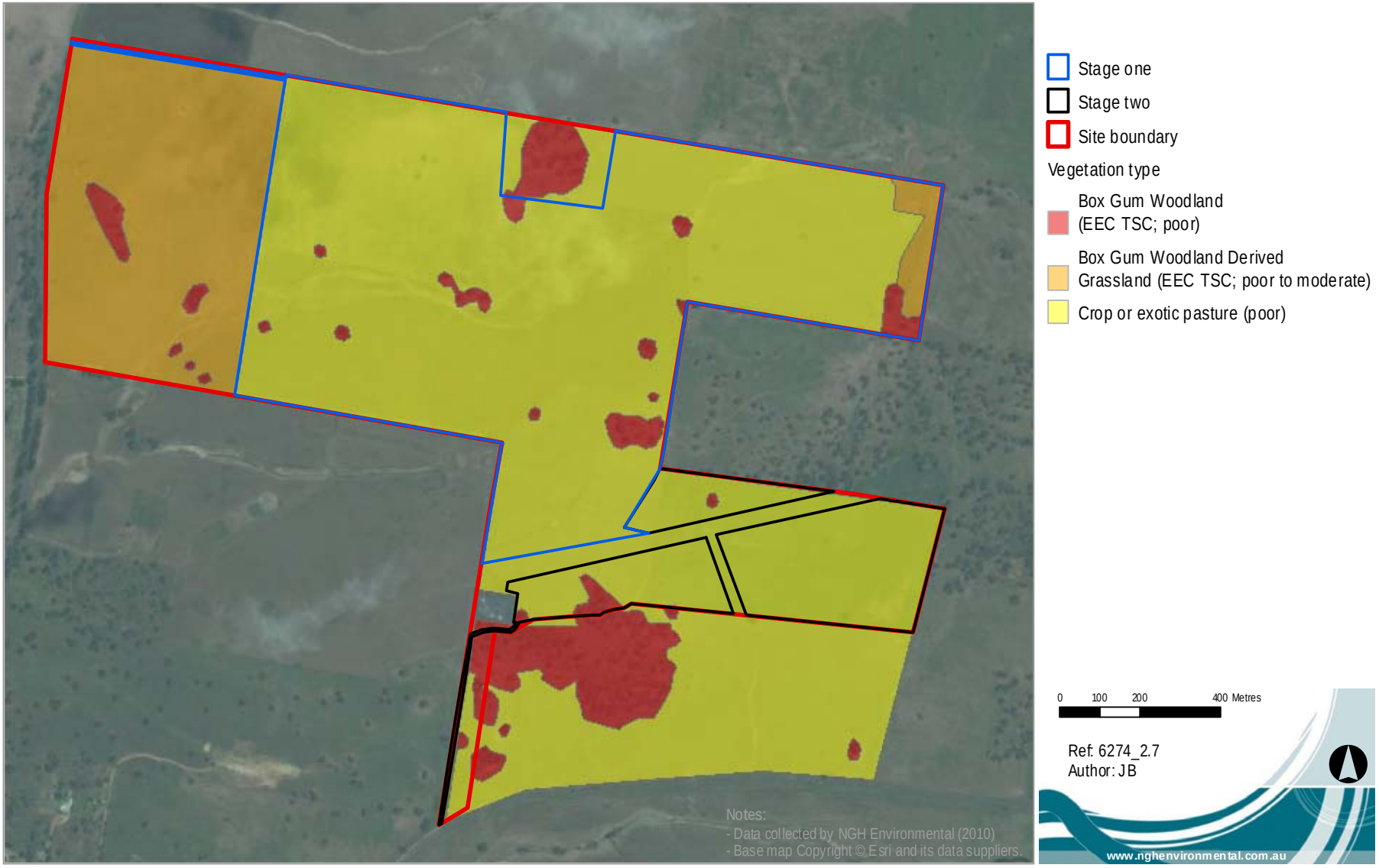


Figure 2-7 Vegetation communities at the Proposed Manildra Solar Farm site

Figure 2-8 Extrapolated vegetation communities surrounding the site and recorded threatened species within the locality.

Notes, Figure 2-8 identifies the potential vegetation types that are surrounding the site. The vegetation mapping was extrapolated from onsite data, using aerial imagery and undertaken on a precautionary basis. Tree cover was assumed to be Box Gum Woodland ECC and cleared areas with sparse tree coverage were mapped as Box Gum Woodland Derived Grassland ECC. A search of the OEH Wildlife Atlas Database identified three recorded threatened species within the locality of the site. A Flame Robin and Superb Parrot were recorded within the site by NGH Environmental during previous assessments for the proposal. A Superb Parrot has been recorded south of the proposal site. The potential for EEC and habitat for threatened species such as the Flame Robin and Superb Parrot nearby underscores the importance of defining constraint areas (Protocol 2, Section 4.2).

2.2 THREATENED SPECIES AND COMMUNITIES

2.2.1 Survey methods and survey effort

Ecological surveys were completed as part of the Biodiversity Assessment (NGH Environmental 2010a) and Biodiversity Addendum (NGH Environmental 2010c) , as summarised below:

Table 2-1 Survey effort

Source	Survey type	Survey effort
Biodiversity Assessment NGH Environmental 2010a	Habitat assessment	16 assessments
	Diurnal bird survey	5 surveys, 120 minutes in total
	Camera traps	3 camera nights
	Spotlight	1 foot transect, 1 vehicle transect
	Call playback	1 survey 35 minutes total
	Reptile search	3 surveys, 50 minutes total
Biodiversity Addendum NGH Environmental 2010c	Threatened flora linear transect surveys – foot based	5 hrs
	Additional habitat assessment	6 assessments

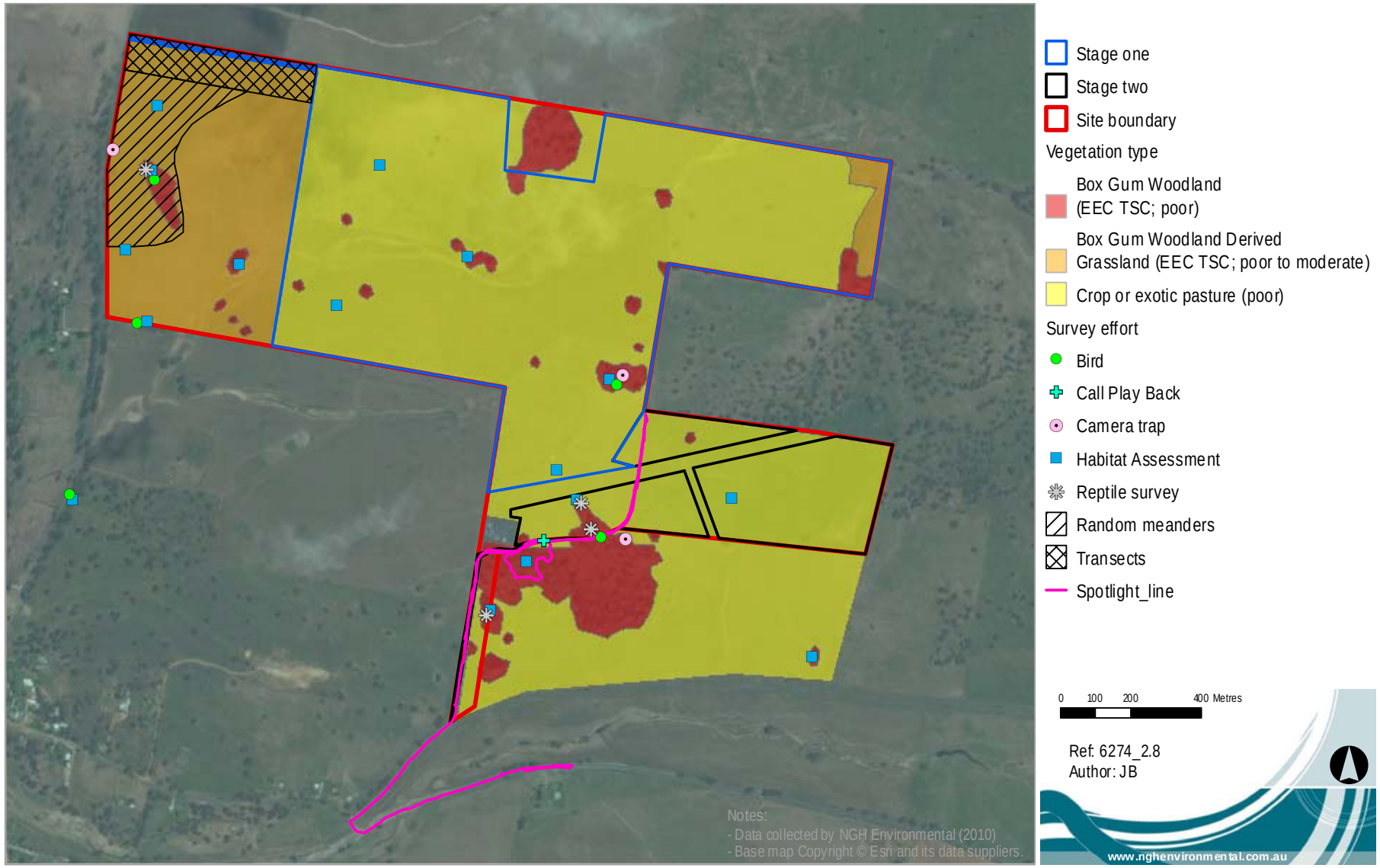


Figure 2-9 Survey effort

2.2.2 Survey results

Endangered Ecological Communities

The native vegetation onsite is derived from an endangered Ecological Community (EEC):

Box-Gum Woodland (Yellow Box – Blakely's Red Gum Grassy Woodland)	Listed as White Box-Yellow Box-Blakely's Red Gum Grassy Woodland and Derived Native Grassland Endangered Ecological Community (EEC) under the Commonwealth EPBC Act and NSW TSC Act. Grassland derived from this community also meets the EEC definition. Such areas are mapped in the western paddock and will be not be affected by proposed works.

The vegetation type and condition is mapped on the preceding figures.

Flora

No threatened flora species were recorded onsite during surveys for the Biodiversity Assessment or supplementary spring surveys. Low potential for impact to any threatened flora was concluded, a result of the poor condition of the vegetation onsite.

Fauna

Two threatened fauna species listed under the TSC Act were recorded onsite:

- Flame Robin (*Petroica phoenicea)*
- Superb Parrot (*Polytelis swainsonii)*

Flame Robins

Each year the Flame Robin migrates up to the highlands of south-eastern Australia to breed in alpine and subalpine woodlands and scrubby forest. In winter it moves to more open lowland habitats such as grassland with scattered trees and open woodland on the inland slopes and plains (Higgins and Peter 2002). Flame Robins are capable of foraging in modified farmland and the loss of foraging habitat is the major potential impact to these species from the Proposal.

Flame Robins were recorded along the southern boundary of the western paddock in the vicinity of the regeneration seeding trial plots. Seven birds were seen forging within the site and adjacent sown field. Open areas within the development envelope are used for foraging by this species however Flame Robins are unlikely to breed on site.

Superb Parrots

The district forms part of the South-West Slopes Important Bird Area (IBA), which protects the core breeding area for the Superb Parrot. The Superb Parrot occurs in Box-Gum grassy woodland and open forest, and also on the edges of these habitats. The Superb Parrot forages on the ground or in trees, feeding on lerp, mistletoe berries, eucalypt flowers and grass seed. This species is long lived with low fecundity and requires tree hollows for nesting. Superb Parrots utilise Box-Gum Woodland for foraging and breeding (summer), mostly nesting in dead trees, particularly Blakely's Red Gum. Even isolated paddock trees are important nesting habitat for this species.

Two pairs of Superb Parrots were seen on site; one in the remnant Box-Gum Woodland near the substation and another (possibly the same pair) flying over the site from south to north. Avoiding clearing during the breeding period for this species is an important protocol within this plan.

Habitat resources

Habitat resources occurring onsite include:

- Hollow bearing trees (eight trees inside the development area that are likely to be impacted)
- Mature eucalypts and isolated shade trees [1]
- Native grassland and associated rock outcrops in the western paddock
- Rock outcrops and log habitat

The location of the threatened fauna records and the habitat features, as mapped in the Biodiversity Assessment and Addendum (NGH Environmental 2010a and c) are mapped below.

[1] Shade trees were not mapped as part of the BA 2010a or c. Only hollow bearing trees are mapped.

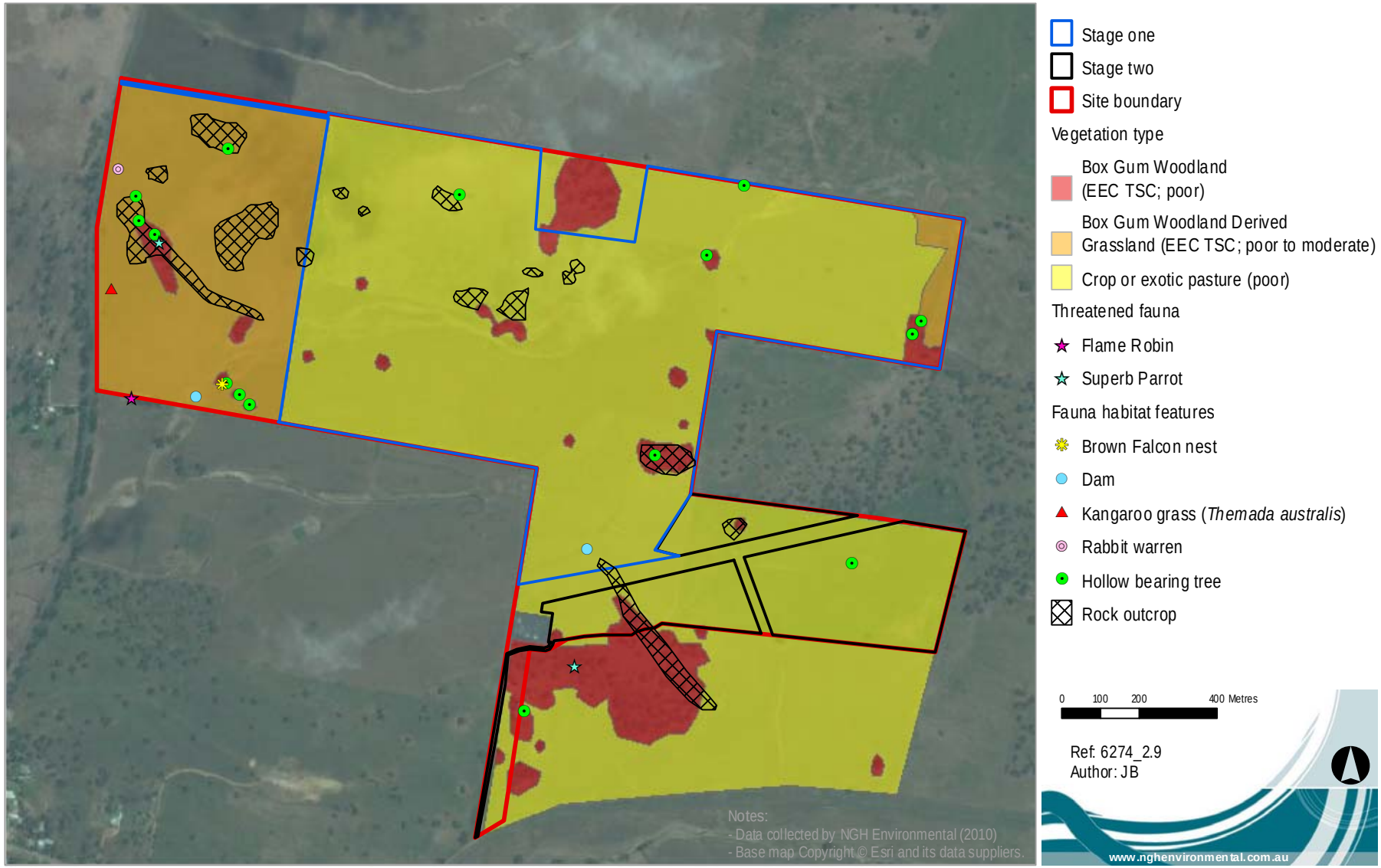


Figure 2-10 Survey results

2.3 DISTURBANCE AND WEEDS

The majority of the woodland vegetation at the site has been historically cleared and thinned to provide areas for cropping and pasture. Past clearing and agriculture has produced a range of direct and indirect impacts to flora habitats, including altered microclimate, loss of pollinator and dispersal fauna, erosion of soils, altered hydrological regimes and elevated soil nutrients. Minor gully erosion was evident in the drainage line in the south west of the western section of the site.

Agricultural activities have resulted in the majority of the site being planted with introduced crop species such as Wheat and Canola. The disturbance has led to the colonisation of a range of other introduced plant species. In areas not utilised for cropping, grazing is likely to have reduced or eliminated selectively grazed or grazing sensitive species, such as Kangaroo Grass (*Themeda australis*), terrestrial orchids, wattles and pea shrubs.

Minor pasture weed species were common across the majority of the study area. Three noxious weeds declared for the Cabonne Shire Council Area under the *Noxious Weeds Act 1993* were recorded at the subject site. The status and distribution of these weeds at the site are summarised in Table 2-1.

All of the recorded noxious weeds are listed as Class 4 weeds, meaning that the growth and spread of the plant must be controlled according to the measures specified in a management plan published by the local control authority.

Table 2-2 Noxious weeds at the subject site

Weed species	Status	Abundance and distribution
African boxthorn **Lycium ferocissimum*	Class 4	Few individuals in patch of White Box in southern section of the site (survey point 2)
Bathurst burr **Xanthium spinosum*	Class 4	One dead individual in the patch of White Box in the central northern section of the site (inspection point). Scattered individuals in B5 and the western paddock.
Scotch thistle **Onopordum acanthium*	Class 4	One individual detected in B3 (survey point 4) and removed by NGH Environmental.

Weeds have not been mapped due to the low number and expected changes in weed distribution over time.

2.4 CLEARING REQUIREMENTS FOR CONSTRUCTION

Ensuring that impacts on native vegetation are minimised is important to meet the consent conditions for this project.

2.4.1 Impact area assumed by the environmental assessment

In the Biodiversity Addendum (2010d) provided within the Submissions Report, 13.5 hectares of native vegetation was estimated to be impacted. This was assessed to be in poor condition and would qualify as EEC.

2.4.2 Impact area required by the final construction footprint

The final construction footprint was provided in September 2015 (BD-100-T-ALT 2 Rev A2 9-4-15). Using the outer envelope, not broken down into infrastructure components, this was overlaid on vegetation mapping for the site, to determine the amount of impact on native vegetation. Using the outer envelope is considered to provide the 'upper limit' / 'worst case' area of impact. The results are presented below and indicate less than 7.5 ha of native vegetation would now be impacted.

Table 2-3 Calculated total area of impact for the development according to Biometric vegetation types

Total area of impact	Stage one (ha)	Stage two (ha)	Total (ha)
Native vegetation	6.34	0.92	7.26
Box Gum Woodland Derived Grassland (EEC, TSC)	*2.92*	*0.00*	*2.92*
Box-Gum Woodland (EEC, TSC)	*3.42*	*0.92*	*4.34*
Crop or exotic pasture	105.97	23.53	129.50
Total:	**112.31**	**24.44**	**136.76**

It is noted that units smaller than 0.25ha are not required to be offset as they are not considered viable (in accordance with the Biobanking assessment methodology that applied at the time of project approval). As such, for the purposes of determining the offset requirement, the clearing estimate will be slightly smaller, as shown in Table 2-4.

Table 2-4 Calculated area of impact excluding native vegetation remnants <0.25 ha

Area of impact excluding native vegetation remnants <0.25ha	Stage one (ha)	Stage two (ha)	Total (ha)
Native vegetation	5.50	0.83	6.33
Box Gum Woodland Derived Grassland (EEC, TSC)	*2.92*	*0*	*2.92*
Box-Gum Woodland (EEC, TSC)	*2.58*	*0.83*	*3.41*
Crop or exotic pasture	105.97	23.53	129.50
Total:	**111.47**	**24.35**	**135.83**

These areas are mapped on Figure 2-7, by vegetation type and condition.

Note, all areas of native vegetation would qualify as 'moderate to good' condition under the Biometric definition.

2.4.3 Impact on habitat resources

In addition to the native vegetation area impact, the final construction footprint would also impact:

- Eight hollow bearing trees.
- Rock outcrops and log habitat.

These areas are mapped on Figure 2-9.

3 MANAGEMENT FRAMEWORK

3.1 RESPONSIBILITIES

Responsibilities specific to flora and fauna management are detailed below in Table 3-1.

Table 3-1: Personnel with specific flora and fauna responsibilities

Name	Organisation	Role	Responsibility	Authority
TBA	Manildra Solar Farm Pty Ltd (MSFPL)	Senior management and strategic control	Responsible for providing the required resources to complete the required tasks and to facilitate company corporate support. Responsible for ensuring the project complies with the Conditions of Approval and all statutory and other obligations.	Authority to limit or stop works.
TBA	Contractor	EPC Construction Manager	Determining sequence and interaction of processes. Ensure communications and reporting framework in place. Ensure the goals of the CEMP and sub-plans are achieved. Report incidents to ER and agencies as required. Ensure environmental management is appropriate and resourced. Review CEMP and sub-plans. Ensure timely delivery of corrective actions. Ensure requirements of the CEMP and sub-plans are communicated and implemented. Implement and comply with communications and reporting framework. Responsible for compliance with all applicable environmental legislation and contract obligations. Responsible for the implementation and maintenance of CEMP Implement and monitor corrective actions Comply with regulations within CEMP. Ensure training is delivered and appropriate	All aspects of the environmental performance of the project during construction. Authority to update and implement CEMP, upon ER endorsement and agency approval, where required. Authority to limit or stop works. Authority to require environmental actions to be undertaken. Reports to the Proponent.
TBA	TBA	Environmental Representative	The principal point of advice in relation to the environmental performance of the project. Oversee the implementation of all environmental management plans and monitoring programs required under the planning approval, and advise the Proponent upon the achievement of these plans/programs. Consider and advise the Proponent on its compliance obligations against all matters specified in the conditions of the planning approval and the Statement of Commitments and all other licences and approvals related to the environmental performance and impacts of the project.	Authority to require environmental actions to be undertaken.

Name	Organisation	Role	Responsibility	Authority
			Ensure environmental auditing is undertaken in accordance with all relevant project Environmental Management Systems. Be given the authority and independence to require reasonable steps be taken to avoid or minimise unintended or adverse environmental impacts, and failing the effectiveness of such steps, to direct that relevant actions be ceased immediately should an adverse impact on the environment be likely to occur.	
TBA	TBA	Site Construction and Environmental Compliance Officer (SCECO)	SCEOs are responsible for the day-to-day management of all on-site environmental aspects including field testing, site inspections and any monitoring requirements within their designated area(s). SCEOs play a key role as part of the construction team, and play a practical role in maintaining on-site environmental controls (e.g. erosion and sedimentation controls, incident response) and environmental data collection (e.g. waste tracking, auditing). This role can be performed a construction staff member or construction manager, if they are trained and experienced in the relevant subject areas (Sediment and erosion control).	Implementation of stop work orders. Reports to EPC manager.
All site personnel		Contractors and their staff	Ensure goals of CEMP and sub-plans are implemented upon instruction. Identify and proactively report incidents. Receive training.	Suggest Stop Work orders *(stop work permitted if action deemed unsafe).*
TBA	TBA	Ecologist (suitably qualified for the task)	Input from the ecologist will be sought at a minimum of once per month following monthly compliance meetings (or as required). The ecologist will be updated as to the on ground results of the protocols within this FFMP and will evaluate the need for onsite inspection and change to any protocols to improve the on ground results. The ecologist is responsible for providing on-site ecological services, where required by this plan e.g. pre-clearance surveys of hollow bearing trees. This role may be undertaken by suitably qualified MSFPL environmental staff or an external party.	Authority to require actions to be undertaken in relation to ecological issues.

3.2 SUBCONTRACTOR MANAGEMENT

Subcontractors are required to adopt this CEMP specific to their detailed activities. They are required to prepare activity related **Environmental Work Method Statements (EWMS).** They may elect to prepare their own CEMP framework document but if so it must comply with the requirements stipulated in this sub-plan, the CEMP and any other sub-plans.

CEMP and EWMS documentation is to be supplied to the EPC Contractor prior to works being undertaken. The EPC Contractor will be responsible for verifying whether the subcontractor documents:

1. Are consistent with the CEMP framework and sub-plans
2. Adequately address the environmental risks of the activity

Formal advice in this respect will be provided to the subcontractor before works can commence.

3.3 CONSULTATION REQUIREMENTS

This FFMP has been developed in consultation with OEH.

The draft document was forwarded to OEH for comment and now includes changes to address OEH comments regarding the risk matrix definitions in Section 4.1 and additional hollow-bearing tree offset requirements.

3.4 ENVIRONMENTAL MONITORING, REPORTING AND COMPLIANCE

The CEMP and all associated sub-plans (including this Flora and Fauna Management Sub-plan) will be implemented on site during the entire construction period. The implementation will be monitored, reviewed and audited throughout the construction phase as described in the CEMP and summarised below.

3.4.1 Environmental monitoring

Environmental inspections will be on going at regular intervals during the construction phase of the project. The proposed inspection schedule, including responsible personnel, reporting requirements and frequency, is detailed in the CEMP. It includes:

- Weekly inspections by the EPC Construction Manager / Environmental Site Officer
- Periodic inspections by the Environmental Representative, depending on works progress
- Monthly compliance meetings by the EPC Construction Manager, MSFPL Construction Manager, Environmental Site Officer and Environmental Representative
- Management reviews, as required

3.4.2 Environmental auditing

The project will be subject to ongoing auditing during the construction phase. The auditing will involve both internal and external audits. Internal audits would be undertaken over regular intervals throughout construction. A single external (third party e.g. the Environmental Representative) audit is proposed during construction. The proposed internal auditing regime is detailed in the CEMP.

Audits will be conducted in accordance with ISO 19011:2003 - Guidelines for Quality and/ or Environmental Management Systems.

Audits will focus on:

- Application of procedures and practices
- The CEMP
- Field inspection of environmental controls
- Review of critical controls, including contractor management, emergency response, hazardous substances, incident management and investigation
- Methods for hazard identification and risk control

- Document control and review
- Incident reporting and closure
- Management of contractors and subcontractors
- Preparedness of critical emergency response equipment

3.4.3 Environmental reporting

Environmental issues will be reported in a number of ways:

1. Recorded on the Environmental Actions Register
2. Identified during Audits as Corrective Action Requests, Observations of Concern or Opportunities
3. Identified during toolbox talks or routine observations

These are detailed in the CEMP.

3.4.4 Adaptation of protocols in response to on-ground results

The monthly compliance meetings between the EPC Construction Manager, MSFPL Construction Manager, Environmental Site Officer and Environmental Representative may identify a need to adapt the protocols to improve on-ground results. Input from the ecologist will be sought at a minimum of once per month immediately before and during clearing, following the monthly compliance meetings (or as required). The ecologist will be updated as to the on-ground results of protocols. The need for on-site inspection and change to any protocols will be determined by the ecologist and the site environment officer. The advice will be documented and provided to the MSFPL Project Manager.

Additionally, the site environment officer may request input from the ecologist at other times, depending on the works progress.

4 ENVIRONMENTAL MANAGEMENT OF ACTIVITIES

4.1 ENVIRONMENTAL ACTIVITIES, IMPACTS AND RISKS

This section identifies environmental risks of the project, to ensure activities with potential to harm the environment are managed commensurate to the risk they pose. Risk is rated low to high, dependent on the likelihood of the activity harming the environment, and the consequence, if the activity should the activity harm the environment. Refer to Table 4-1.

Table 4-1: Risk matrix

		Consequence		
Likelihood		1 Major	2 Moderate	3 Low
	1 Certain	High	High	Moderate
	2 Possible	High	Moderate	Moderate
	3 Remote	Moderate	Moderate	Low

Risk matrix definitions:

Likelihood	Description
Certain	It is very probable that this risk could occur in any year (>95%)
Possible	It is equally probably that this risk could occur in any year (50%)
Remote	It is improbable that this risk could occur in any year (<5%)
Consequence	**Description**
Major	Major loss in numbers or habitat leading to a substantive adverse impact on local or regional population viability.
Moderate	Moderate loss in numbers or habitat may have a minor adverse impact on local or regional population viability.
Low	Repeated small impacts would not cause a substantive adverse impact on flora and fauna; no impact on local or regional population viability.

Construction activities that may have an adverse impact on flora and fauna and their associated risk ratings are summarised in Table 4-2 (extracted from the Environmental Assessment: Manildra Solar Farm, Final V1, November 2010, NGH Environmental, 2010b). Note, the impacts below do not include the shading from panels, which is an operational impact of the project.

Table 4-2: Risk assessment for Manildra solar farm construction activities

Activity	Potential impact	Likelihood	Consequence	Risk
Clearing and grubbing	Habitat removal (native vegetation and hollow-bearing trees)	Certain	Low	Moderate
	Habitat modification	Certain	Low	Moderate
	Degradation of adjacent areas of habitat	Possible	Low	Moderate
Excavation (of tracks, lay down areas	Habitat removal (rock outcrops)	Remote	Low	Low
	Habitat modification	Possible	Low	Moderate
	Erosion of disturbed areas and stockpiles	Possible	Low	Moderate

Activity	Potential impact	Likelihood	Consequence	Risk
Install solar array infrastructure	Habitat alienation	Certain	Low	Moderate
Operation of machinery and plant	Collisions with wildlife	Possible	Moderate	Moderate
	Habitat alienation	Certain	Low	Moderate
Pole and overhead transmission line installation	Erosion of disturbed areas	Possible	Low	Moderate
	Erosion of stockpiles	Possible	Low	Moderate
	Reduced air quality (dust)	Possible	Low	Moderate
Trenching for underground transmission line installation	Habitat removal	Certain	Low	Moderate
	Habitat modification	Certain	Low	Moderate
	Erosion of disturbed areas and stockpiles	Possible	Low	Moderate
	Pollution (sedimentation or spill risk) to local waterways	Remote	Low	Low
	Trap hazard to fauna	Possible	Moderate	Moderate

Most activities are considered a moderate risk. Specific protocols have been developed to manage the impacts of these activities in Section 4.2.

PROTOCOL 1: Design measures	OBJECTIVE: Minimise harm to flora and fauna
PROTOCOL 2: Constraints areas	OBJECTIVE: Avoid / minimise impacts in sensitive areas
PROTOCOL 3: Vegetation clearing	OBJECTIVE: Minimise clearing extent
PROTOCOL 4: Trenching	OBJECTIVE: Minimise trap hazard
PROTOCOL 5: Operation of plant and equipment	OBJECTIVE: Minimise noise and other disturbance, minimise harm to resident fauna (including any stock)
PROTOCOL 6: Habitat restoration	OBJECTIVE: Restore habitat
PROTOCOL 7: Hollow-bearing tree removal guidelines	OBJECTIVE: Minimise harm to resident fauna
PROTOCOL 8: Monitor and adapt actions	OBJECTIVE: Improve management of flora and fauna / respond to on ground results

Additionally, the following issues are addressed by other management plans and are not discussed further by this plan:

Weed control and Rehabilitation of disturbed areas	Covered within the Groundcover Management Plan

4.2 ENVIRONMENTAL PROTOCOLS

The following eight (8) protocols detail the required management actions in specific areas in accordance with the project's conditions of approval.

Site Plans, illustrating where these protocols apply, are provided as Appendix A.

Table 4-3: Flora and fauna management protocols for the Manildra Solar Farm

PROTOCOL 1: Design measures	**OBJECTIVE: Minimise harm to flora and fauna**	**Responsibility**
Endangered Ecological Community (EEC) impacts	• Within the development envelope, impacts on EEC vegetation will be minimised (where practical). Most significantly, this includes two large remnants on the northern boundary of the development envelope and on the north eastern boundary of the development envelope. If impacted, these areas will require offsets (refer to Offset Strategy for this project). Smaller remnants within the development envelope that cannot be avoided will also be offset where larger than 0.25ha in area.	EPC Construction Manager
Overhead powerlines	• Power poles and overhead powerlines will be bird-safe using flags or marker balls, large wire size and wire and conductor spacing (where practical)	EPC Construction Manager
Underground power cabling	• Underground cable, in preference to an overhead transmission line, will be installed within the existing farm track to the substation, to minimise additional impacts (where practical)	EPC Construction Manager
Tracks	• Use of the existing track (rather than the creation of a new track) will be preferred to allow access to the site from the substation (where practical) • Tracks that will not be used during operation will be rehabilitated from 8m width to 5m width where practical, after works. This reduces the impact to only that required for the operation of the project, after construction is complete.	EPC Construction Manager
Fences	• Where security considerations permit, perimeter fencing will not contain barbed wire, particularly the top strands. • If a cyclone mesh fence is to be used efforts should be made to increase the visibility to fast flying parrots.	EPC Construction Manager
Ancillary facilities	• Construction site office and other ancillary facilities will be located to avoid the constraints areas identified in Appendix A. • Preference will be given to areas that area in poorest condition, such as areas of previous disturbance	EPC Construction Manager

PROTOCOL 2: Constraints areas	OBJECTIVE: Avoid / minimise impacts in sensitive areas	Responsibility
1. Define constraints area	With reference to the site plans in Appendix A**, outside of the development envelope**, the following areas will be fenced or otherwise clearly marked on the ground for avoidance: • Endangered Ecological Communities (EECs) • Mature trees (over >50cm diameter at breast height). The dripline of trees should be used to demarcate the constraint area • Hollow-bearing trees. The dripline of trees should be used to demarcate the constraint area • Rock outcrops (including a 2.5m buffer) should be fenced for avoidance, wherever possible. • Offset areas With reference to the site plans in Appendix A, **inside the development envelope**, impacts to the following areas will be minimised, where this is possible: o Endangered Ecological Community (EEC) understorey, where possible o Mature trees that can be retained (over >50cm diameter at breast height). The dripline of trees should be used to demarcate the constraint area o Hollow-bearing trees. The dripline of trees should be used to demarcate the constraint area o Rock outcrops (including a 2.5m buffer) should be fenced for avoidance, wherever possible.	EPC Construction Manager
2. Communicate about constraints areas	• The locations of all constraints areas will be made known to all on ground staff (annotated site plans to be displayed in lunch room or site office) • Specific management required near constraints areas will be discussed in tool box talks and environmental inductions	EPC Construction Manager
3. Activities in and near constraints areas	Excluding where works are required: • No works, including clearing, traffic, deposition of spoil, rubbish or materials laydown, are to be conducted in constraints areas • Indirect impacts (for example, potential for sediment laden runoff and weed ingress) will be managed by implementation of activity-based protocols (**Vegetation Clearing, Trenching**, Protocols 3 and 4)	EPC Construction Manager

PROTOCOL 3: **Vegetation clearing**	**OBJECTIVE:** **Minimise clearing extent**	**Responsibility**
1. Minimise clearing	• Clearing of vegetation (required for tracks, underground power and the array where it affects overstorey vegetation) will be limited to the minimal extent practicably required • Extents of clearing: o The limits of clearing will be clearly marked on the ground (flagging, stakes, fences etc.) and GPSed. The marked areas to be cleared will be overlaid on the vegetation map (Figure 2-7) to provide an updated impact area table and verify the actual areas of clearing. o All areas not marked for clearing will be treated as constraints – no direct impacts. According to Protocol 2 no works are to be conducted in constraint areas. o Tree pruning will be undertaken in favour of tree removal, where possible • Hollow bearing trees and mature trees (>50cm DBH) will be avoided to the maximum extent possible	EPC Construction Manager
2. Clearing dense native pasture	• Where practicable, whole sods will be removed with an excavator where these areas are well-vegetated with dense root systems. Sods will be stored in moist, shaded conditions and replaced following the works. Sod storage time will be minimised and sods will be replaced in a manner that maximises the chances of re-establishment.	EPC Construction Manager
3. Clearing of mature trees	• If the removal of mature trees (>50cm diameter at breast height) cannot be avoided: o Identify whether the trees are hollow-bearing according to the **hollow-bearing tree removal guidelines** (Protocol 7). If trees are not identified as hollow-bearing: o Fell trees into the most disturbed area possible, to avoid damaging adjacent vegetation o Do not push felled vegetation into constraints areas features	EPC Construction Manager
4. Clearing near large mature trees	• Where clearing near trees: o Excavations and vehicle/machinery movements will occur outside the canopy drip line of large eucalypts	EPC Construction Manager
5. After clearing: rehabilitation	• Rehabilitation will be conducted as outlined in the Groundcover Management Plan	EPC Construction Manager

PROTOCOL 3: **Vegetation clearing**	**OBJECTIVE:** **Minimise clearing extent**	**Responsibility**
6. After clearing: Verify offsets are adequate	After clearing, • The boundaries of all cleared areas will be mapped using hand held GPS • An updated vegetation impact table will be produced, with input from an ecologist (as per Table 3-1 of this FFMP) • The actual area of impact will be used to verify that the designated offsets for the project are adequate and in accordance with the Offset Plan for the project • If inadequate, additional offsets will be added in consultation with OEH. .	Site Construction Manager

PROTOCOL 4: **Trenching**	**OBJECTIVE:** **Minimise trap hazard**	**Responsibility**
1. Trenching	• Trenches should be backfilled as soon as possible to minimise the chance of fauna becoming trapped • Trenches left open overnight: o Will be sealed if possible o If they cannot be sealed, check trench at first light and remove trapped fauna - release into nearby vegetation outside of the project site o Where required, handle trapped animals safely, minimising stress and injury o Where required, frogs will only be handled using gloves • Excavated topsoil and subsoil will be stored separately and replaced in a manner that replicates the original profile as closely as possible, to assist natural revegetation. *Notes:* *Small mammals and reptiles are easily trapped by open trenches.* *Handling animals should be done with care.*	EPC Construction Manager

PROTOCOL 5: Operation of plant and equipment	**OBJECTIVE: Minimise noise and other disturbance**	**Responsibility**
1. Operation of equipment	• All reasonable and feasible noise control measures will be implemented prior to the commencement of construction works. This includes: o Construction plant will be maintained in good working order to minimise unnecessary emissions o Where practical, construction plant will not be left idling when not in use o The use of noisy plant / machinery simultaneously will be minimised as far as practicable	EPC Construction Manager
2. Potential for collisions / other disturbance	• Stock will be restricted from construction work areas in consultation with the landowners. • Heavy vehicles will be restricted to existing tracks and designated access ways which will be marked on site plans. Other vehicles (parking and access) will be rationalised to limit areas of impact, in accordance with the Traffic Management Plan. • Vehicle speed will be limited onsite • All staff will be made aware of high risk periods for vehicle collisions with wildlife, which are: o Early morning o Evening	EPC Construction Manager

PROTOCOL 6: **Fauna habitat restoration**	**OBJECTIVE:** **Restore fauna habitat**	**Responsibility**

1. Nest boxes:	• Nest boxes to offset hollow bearing trees must be installed within 3 months of the removal of the hollow bearing tree.
	• For each hollow bearing tree to be removed, mount nest boxes (or hollow tree sections) of similar size to the hollows removed (2 nest boxes per hollow bearing tree to be removed) in nearby trees.
	• The number of nest boxes required and their size would be determined by an ecologist, based on the hollow-bearing trees to be removed.
	• Trees for mounting the boxes in would be selected by an ecologist. They should not contain hollows. They should be of sufficient size to accommodate the nest box.
	• Advice on mounting aspect, fixings, height etc. would be detailed by the ecologist
	• The location of the selected trees would be mapped and retained as part of this FFMP and for ongoing monitoring.
	• Annual monitoring would be carried out for a period of five years:
	  o to establish occupancy rates and enable control of feral pest animal species, should these be occupying the boxes.
	  o To ensure the boxes remain securely attached and suitable for use. Faulty boxes would be replaced.
		Site Environmental Officer

2. Rocky outcrops:	Any rock habitat (rocks >20cm diameter) removed will be placed nearby immediately, outside the impact area.	Site Environmental Officer
3. Logs:	Any logs removed will be placed nearby immediately, outside the impact area.	Site Environmental Officer
4. Waterbodies/dams:	If dams are to be removed during site development works, alternative watering points should be established to compensate for their loss and maintain similar resources for native fauna. Installation of additional watering points may require approval for agencies.	Site Environmental Officer

PROTOCOL 7: Hollow-bearing tree removal guidelines	**OBJECTIVE: Minimise harm to resident fauna**	**Responsibility**
1. Prior to clearing	• With input from an ecologist, clearly mark all trees containing hollows which are to be removed. Features that are useful for identifying HBTs include: o Dead trees o Snapped off branches o Trunk spouts o Damage to trunk such as disease, areas of rot, etc. that have potential to develop into trunk or branch hollows o Depressions or cavities where hollows may form such as at trunk/branch joints or at the fork of the trunk above the bole • A pre-clearance check must be undertaken by a qualified ecologist. The pre-clearance check is to include stagwatching for a minimum of 20 minutes in the vicinity of each hollow-bearing tree to be removed to assist the identification of any resident fauna. • If pre-clearance surveys identify hollow bearing trees that are significant to the viability of local threatened species populations (for example a threatened microbat colonial roost tree) a management plan to minimise impacts to breeding and relocate the colony must be prepared and implemented.	EPC Construction Manager
2. Clearing hollow-bearing trees	• Removal of hollow bearing trees should be planned to occur outside of sensitive breeding times for Superb Parrots (September to January). • Clear surrounding native vegetation first and allow hollow-bearing trees to remain standing overnight. After at least 1 night, hollow-bearing trees can be removed in accordance with the steps below • When removing hollow-bearing trees, a spotter should be present at each tree to be removed to look for signs of animal movement in the tree to be cleared. The spotter should be able to communicate directly with plant operators • Prior to clearing hollow-bearing trees, use an excavator or loader to hit the trunk as high up the tree as possible several times. Wait at least 30 seconds. Repeat this process several times • Once the hollow-bearing limbs or hollow-bearing tree are on the ground, the spotter must check each hollow for signs of wildlife before the next limb/tree is removed • If taking the tree down in stages, remove non-hollow-bearing limbs first. Then remove hollow-bearing limbs • Records of any animals removed or injured must be retained • Record the number and size of hollows removed, to inform the placement of nest boxes (Protocol 6).	EPC Construction Manager

PROTOCOL 7: Hollow-bearing tree removal guidelines	**OBJECTIVE: Minimise harm to resident fauna**	**Responsibility**
3. Handling wildlife	• Direct contact with any wildlife should be avoided wherever possible • Any uninjured wildlife must be encouraged to leave the site • If wildlife is injured, WIRES or similarly-qualified and licensed personnel should be contacted to collect and treat any injured individuals *Notes:* *The local number for WIRES should be retained onsite by the EPC Construction Manager:* ***13 000 WIRES*** *or* ***13 00 556 686***	EPC Construction Manager

PROTOCOL 8: **Monitor and adapt actions**	**OBJECTIVE:** **Improve management of flora and fauna / respond to on ground results**	**Responsibility**
Aims: The protocols above will be adapted as required to ensure the following objectives are achieved. • Design measures implemented to minimise impacts • No direct or indirect impacts on constraint areas • Clearing restricted to only that required, indirect impacts of clearing managed • Habitat elements (hollows, rocks and logs) replaced • Specific plans implemented where required • No injured fauna • Any fauna trapped, removed at first light • WIRES called immediately, if required for injured animals • Disturbed areas stabilised to prevent weed ingress or soil erosion • Regular tool box talks addressing the above issues Implementation: • Ecologist input sought at a minimum of once per month, immediately before and during clearing, at or following monthly compliance meetings by the EPC Construction Manager, MSFPL Construction Manager, Environmental Site Officer and Environmental Representative (or as required). • The ecologist will be updated as to the on ground results of the above protocols and will evaluate the need for onsite inspection and change to any protocols to improve the on ground results. • Documented results of the evaluation will be provided within two weeks of each contact with the ecologist, to the MSFPL Project Manager, Environmental Site Officer and Environmental Representative. • Additionally, the ecologist's input in evaluating and updating controls may be requested at any additional time, in response to on ground progress.		EPC Construction Manager

5 REFERENCES

Landcom 2004 Managing Urban Stormwater Construction: Soils and construction Vol 4. Fourth edition, March 2004.

NGH Environmental 2010a. Manildra Solar Farm Biodiversity Assessment. Report prepared November 2010 (provided as an appendix to the Environmental Assessment 2010b).

NGH Environmental 2010b. Manildra Solar Farm Environmental Assessment. Report prepared November 2010.

NGH Environmental 2010c. Manildra Solar Farm Biodiversity Addendum. Report prepared December 2010 (provided as an appendix to the Submissions Report 2010d).

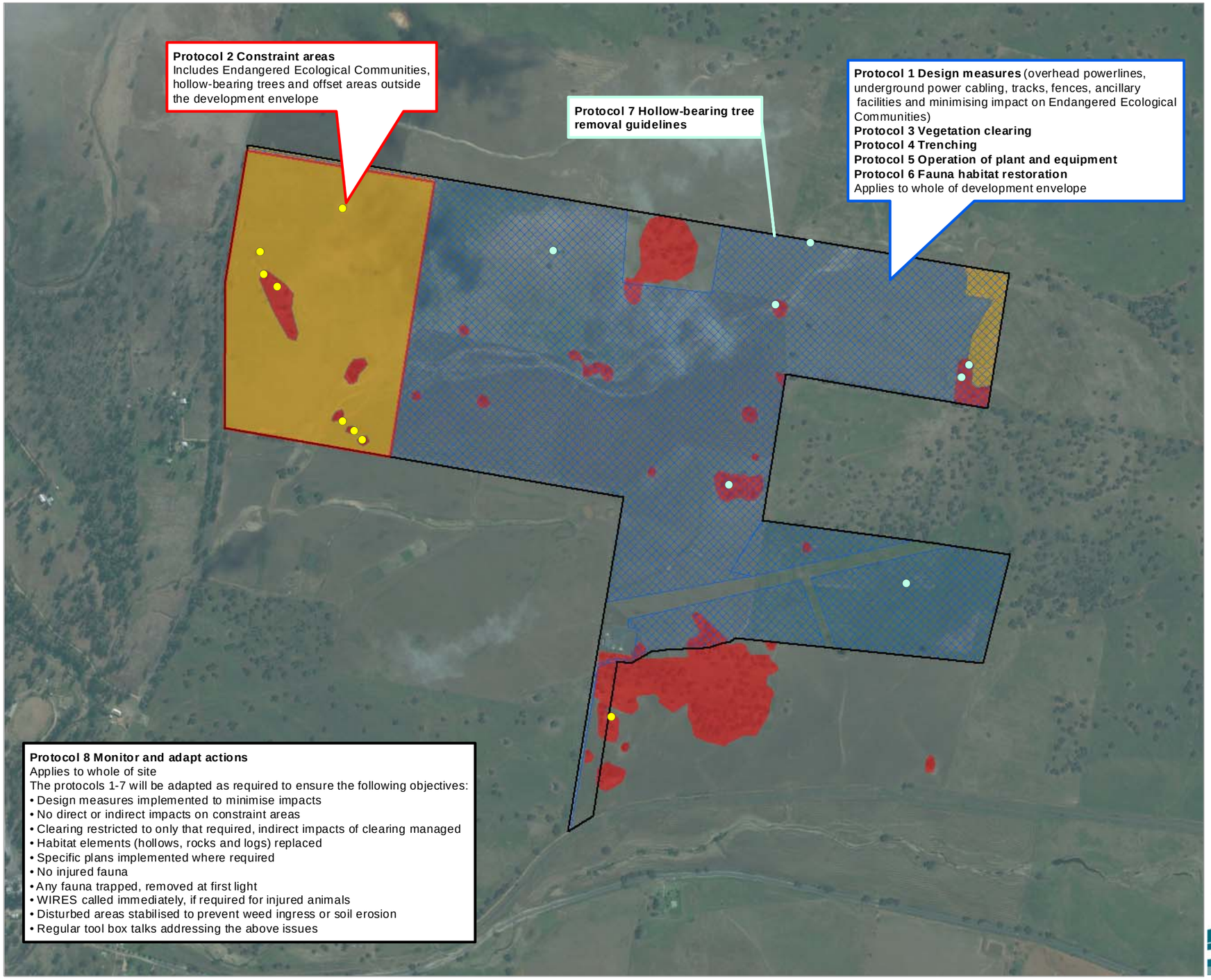
NGH Environmental 2010d. Manildra Solar Farm Submissions Report. Prepared December 2010.

NGH Environmental 2012 Manildra Solar Farm Offset Strategy, Final V2 Report prepared October 2012.

APPENDIX A FLORA AND FAUNA SITE PLAN

This Flora and Fauna Environmental Management Site Plan illustrates where the protocols described in this document apply. Specifically, it identifies:

Areas where design measures apply	• Perimeter fencing • Power poles and overhead powerlines • Tracks • Ancillary facilities
Areas where all impacts must be avoided:	• Constraints areas adjoining the development envelope
Areas where impacts must be specifically managed:	• Constraints areas within the development envelope



FLORA AND FAUNA MANAGEMEN
PLAN

Manildra Solar Farm

Hollow-bearing trees inside developement envelope

Hollow-bearing trees outside developement envelope

Offset site boundary

Site boundary

Development envelope: stage one and

Endangered Ecological Community

Box Gum Woodland (poor)

Box Gum Woodland Derived Grassland (poor-moderate)

Notes:
- Data collected by nghenvironmental (2010)
- Base map Copyright © Esri and its data suppliers.

0 50 100 200 Metres

A3 @ 1:10000
Ref: 6274
Author: JB

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APPENDIX B CONDITION CROSS REFERENCE

Project conditions of relevance to the management of flora and fauna impacts are included detailed below. Items addressed in this plan are shaded blue.

Legend:

FFMP	Flora and Fauna Management Plan, this document
CEMP	Construction Environmental Management Plan
OEMP	Operation Environmental Management Plan
GCMP	Groundcover Management Plan
OP	Offset Plan
OS	Offset Strategy

ID	Full text	Timing	Addressed in:
Condition of consent			
C1	The clearing of all native vegetation is to be limited to the minimal extent practicably required. Details regarding the procedures for clearing vegetation and minimising the extent of clearing shall be clearly included in the Flora and Fauna Management Plan required by in condition C14(a).	Pre-construction	FFMP
C2	The Proponent shall prepare a biodiversity offset strategy, in consultation with OEH and the landholder to the satisfaction of the Secretary, to guide the development of the offset package required in condition E3. The offset strategy is to be prepared by an ecologist and submitted for approval prior to the commencement of construction and include: (a) Consideration of all native vegetation losses and the adequacy of the proposed offset; (b) Demonstration of how the offset will 'improve or maintain' biodiversity values; (c) The proposed offset ratios and connectivity improvements; (d) Proposed management actions; (e) Demonstration of how the strategy was prepared in accordance with OEH's *Principles for the Use of Biodiversity Offsets in NSW;* and (f) Measures to ensure in-perpetuity the conservation commitment.	Pre-Construction	OS
C13	The Proponent shall prepare and implement a Construction Environmental Management Plan (CEMP) to outline environmental management practices and procedures to be followed during construction of the project. The Plan shall be prepared in consultation with NOW and Cabonne Shire Council and be consistent with the Guideline for the Preparation of	Pre-construction	CEMP **(k) FFMP**

ID	Full text	Timing	Addressed in:
	Environmental Management Plans (DIPNR, 2004 or its latest revision) and shall include, but not necessarily be limited to: (k) Maps or plans clearly indicating where the project area has been reduced to minimise impacts to EEC and native grasses in good condition		
C14	A part of the Construction Environmental Management Plan required under condition C13 of this approval, the proponent shall prepare and implement the following: a) a **Flora and Fauna Management Plan**, developed in consultation with OEH, to outline measures to protect and minimise loss of native vegetation and native fauna habitat as a result of construction of the project. The Plan shall include, but not necessarily limited to: (i) plans showing terrestrial vegetation communities; important flora and fauna habitat areas; location where EECs, native pasture; and areas to be cleared. The plans shall also identify vegetation adjoining the site where this contains important habitat areas and /or threatened species, populations or ecological communities; (ii) methods to manage impacts on flora and fauna species and their habitat which may be directly or indirectly affected by the project, such as location of fencing, procedures for vegetation clearing or soil removal/stockpiling and procedures for re-locating hollows or installing nesting boxes and managing weeds; (iii) procedures to accurately determine the total area, type, and condition of vegetation community to be cleared; (iv) reference to the Ground Cover Management Plan required in condition C14(b); and (v) a procedure to review management methods where they are found to be ineffective.	Construction	FFMP
C14	b) a Ground Cover Management Plan, developed in consultation with OEH, to outline measures to ensure adequate vegetation cover and composition beneath the solar PV array. The Plan shall include, but not necessarily be limited to: (i) procedures to minimise disturbance to ground cover not impacted by the project particularly in the area of the native pasture in good condition; (ii) procedures for the stabilisation, rehabilitation and revegetation of disturbed ground cover including reference to field trials where required; (iii) weed management measures to control and prevent the spread of noxious weeds; (iv) monitoring methods to assess the impact of the project on the ground cover vegetation; and (v) a procedure to review management methods where they are found to be ineffective.	Construction	GCMP

ID	Full text	Timing	Addressed in:
E3	Details of the offset 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 have 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 that 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.	Pre-Construction	OP
F6	The proponent shall implement a revegetation and rehabilitation program for all areas of the development footprint which are disturbed during the construction of the project, but which are not required for the ongoing operation of the project including temporary construction facility sites and sections of construction access roads, The Proponent shall ensure that all revegetation measures are implemented progressively where possible and in all cases within six months of the cessation of construction activities at the relevant area. Unless otherwise agreed to by the Secretary, the Proponent shall monitor and maintain the health of all revegetated areas until such time that the plantings have been verified by an independent and suitably qualified expert (whose appointment has been agreed to by the Secretary) as being established, in good health and self sustaining.	Construction	GCMP
Revised statements of commitment, Submissions report 2010			
1	An Offset Plan will be prepared by an ecologist consistent with the 'Principles for the use of biodiversity offsets in NSW', as outlined in the Biodiversity Assessment, and submitted for approval prior to the commencement of works. The plan would be developed in consultation with the landowner and would offset the impact of the development for the period that the impact occurs.	Pre-construction	OP
2	The PV array, site access tracks and other infrastructure should be sited to avoid constraints identified within the Biodiversity Assessment constraints mapping. These include: • The larger stands of Box-Gum Woodland across the site	Design Phase	FFMP

ID	Full text	Timing	Addressed in:
	• Hollow bearing trees[2] • Isolated shade trees where possible • Native grassland and associated rock outcrops in the Western Paddock • As far as possible rock outcrops across the proposal site together with a minimum 2.5 metre buffer to avoid shading.		
3	Areas of high biodiversity value would be clearly identified throughout construction and protected from the direct and indirect impacts of the Proposal. Contractors and staff would be made aware of the significance and sensitivity of these areas.	Design phase	FFMP
4	The western paddock of the proposed solar farm site should be avoided if possible to minimise impacts to grassy groundcover flora comprising the Box-Gum Woodland EEC.	Design phase	FFMP
5	Where security concerns permit perimeter fences should not contain barbed wire, particularly the top strands. If a cycisolated mesh fence is to be used efforts should be made to increase the visibility to fast flying parrots.	Design Construction	FFMP
6	If used, and where practicable, power poles and overhead powerlines will be bird-safe using flags or marker balls, large wire size and wire and conductor spacing.	Design Construction	FFMP
7	If the removal of any hollow bearing trees was required this activity would be proceeded by a pre clearance check by a qualified ecologist including anabat survey and stagwatching.	Pre-Construction	FFMP
8	Works will avoid impacts to mature eucalypts wherever possible. Tree protection standards should comply with Australian standard AS4970-2009 Protection of trees on development sites (Standards Australia, 2009). Wherever practicable, excavations and vehicle/machinery movements will occur outside the canopy dripline of large eucalypts.	Design Construction	FFMP
9	Existing farm tracks should be used wherever possible to minimise the number of new roads.	Construction	CEMP
10	Where cement is included in cable trench backfill, at least 20 centimetres of cement-free topsoil will be replaced as the top layer in the backfill.	Construction	CEMP

[2] The planned layout of the PV arrays, site access tracks and other infrastructure will require the removal of up to 8 hollow-bearing trees from the development area. The Biodiversity Assessment (**ngh**environmental, 2010a) and Biodiversity Assessment Addendum (**ngh**environmental, 2010c) assumed that the removal of hollow-bearing trees from the works footprint would be necessary and potential impacts were therefore assessed accordingly. A new measure was recommended by the Biodiversity Addendum to ensure impacts to significant hollow-bearing trees and therefore hollow dependent fauna, are minimised: *If pre-clearance surveys identify hollow bearing trees that are significant to the viability of local threatened species populations (for example a threatened microbat roost tree) these trees would be retained and infrastructure would be designed to accommodate them.* This was not carried over into the Submissions Report and therefore does not form a commitment of the project. Nonetheless a protocol has been developed to address as much as possible this measure.

ID	Full text	Timing	Addressed in:
11	Where practicable, whole sods will be removed with an excavator where these areas are well-vegetated with dense root systems. Sods will be stored in moist, shaded conditions and replaced following the works. Sod storage time will be minimised and sods will be replaced in a manner that maximises the chances of re-establishment.	Construction	CEMP
12	Where possible, as a precaution, works should be planned to avoid sensitive times for Superb Parrots - September to January.	Construction	FFMP
13	Excavated topsoil, subsoil will be stored separately and replaced in a manner that replicates the original profile as closely as possible.	Construction	CEMP
14	Where practicable, grass surfaces and shrubs will be retained or restored on infrequently used vehicle routes.	Construction	CEMP
15	Site stabilisation, rehabilitation and revegetation of all disturbed areas would be undertaken without delay.	Construction	GCMP
16	As a general rule, disturbed areas will be used preferentially for vehicle and machinery access, materials laydown, stockpiling of cleared vegetation and the deposition and retrieval of spoil whenever practicable.	Construction	CEMP
17	Works will be avoided during, and immediately following heavy rainfall events to protect soils and vegetation at the site.	Construction	CEMP
18	Weed / pathogen controls will be implemented, including: o Machinery and vehicles used in construction works will be washed before and after site access to reduce the introduction and spread of weeds and pathogens. o Laydown sites for excavated spoil, equipment and construction materials will be weed-free or treated for weeds wherever practicable. o Weed monitoring will be carried out at all sites after the completion of construction works and ongoing weed control will occur where noxious or invasive species are recorded. In particular, monitoring will be undertaken during the following late spring/early summer, and remedial action taken as required. o Sediment control materials should be weed free (straw bales, geotextiles). o Imported materials such as sand and gravel will be sourced from sites which do not show evidence of noxious weeds or Phytophthora infection.	Construction	GCMP
19	If dams are removed during site development works, alternative watering points should be established to compensate for their loss and maintain similar habitat resources for native fauna.	Construction	FFMP
20	Any trench sections left open for greater than a day would be inspected daily, early in the morning and any trapped fauna removed. The use of ramps or ladders to facilitate trapped fauna escape is recommended.	Construction	FFMP
21	Rock and log habitat removed during the construction phase will be reinstated following the works.	Construction	FFMP

ID	Full text	Timing	Addressed in:
22	Where tree hollows are required to be removed, these should be replaced by nest boxes of similar size in nearby trees.	Construction	FFMP
23	Wherever possible small rock outcrops at the site should be excluded from the array, together with a minimum 2.5 metre buffer to avoid shading.	Construction	CEMP
24	A groundcover management plan would be developed that would include regular monitoring of vegetation cover and composition and allow for adaptive management. This would include: • Establishment of a shade tolerant perennial groundcover across the cropping and exotic dominated grazing paddocks prior to the installation of the PV arrays • Advice from an agronomist in relation to preferred species/varieties, establishment methods of alternative pastures and best practice management. Where information is lacking, trials may be required onsite	Pre-Construction Construction Operation	GCMP
25	If localised erosion is detected, effective treatments would be applied without delay, such as hardening with mulch, reseeding and covering with an open weave jute matting, gypsum application to improve structure and infiltration, protection with geotextile fabric or localised flow dispersal and diversion structures.	Operation	OEMP
26	The space between the PV array rows should be maintained and kept clear to enable access by vehicles for ongoing weed control, and pasture renovation if required.	Operation	OEMP
27	Efforts should be made to minimise disturbance to the existing groundcover during construction. Construction and maintenance vehicles should not access the site when soils are very wet to minimise soil compaction and disturbance.	Construction Operation	CEMP OEMP
28	Fencing along Molong Manildra Road should be maintained so as macropods and other large native fauna are not funnelled along the perimeter fence and onto the road creating a traffic hazard and collision risk to the animal.	Operation	OEMP
29	Monitoring of fauna site habitat usage pre and post construction is recommended but not considered essential.	Operation	OEMP
Text from Environmental assessment (page numbers provided as ID)			
P13	The identified environmental risks and impacts would be managed in accordance with the Statement of Commitments, and implemented via a Construction Environmental Management Plan (CEMP) during the construction period and an Operation Environmental Management Plan (OEMP) for the operational phase. The EMPs would comply with the environmental management systems (EMS) standard ISO14001: 2004.	Construction	CEMP
P35	Trenches would be back-filled with sand to approximately 300 millimetres depth from ground level, then capped with a concrete slab or other protective material, and then top-covered	Construction	GCMP

ID	Full text	Timing	Addressed in:
	with soil. The trenches would be revegetated with pasture species to stabilise disturbed soils.		
P36	The trenches (associated with the connection to Manildra 132kV substation) would be revegetated with pasture species to stabilise disturbed soils.	Construction	GCMP
P37	Once the construction phase has finished, any tracks not used for normal farming practice or PV array maintenance would be rehabilitated. Internal access tracks would be maintained to allow maintenance and repairs to the PV array.	Operation	GCMP
P43	Weed control would be undertaken as required using a spray unit mounted on a quad bike. Groundcover vegetation around the panel rows would be either slashed or grazed by sheep to maintain a safe height below the panels.	Operation	GCMP
Text from Biodiversity Assessment, within the Environmental Assessment (page numbers provided as ID)			
p45	Trenches should be backfilled as soon as possible to minimise the chance of fauna becoming trapped. If trenches are left open for any length of time small ramps or ladders should be installed to allow trapped fauna to escape.	Construction	FFMP
p45	Construction materials should not be stockpiled for extended periods of time as local fauna may take up residence and be injured when the materials are moved.	Construction	FFMP
Text from Biodiversity Assessment Addendum, within Submissions Report (page numbers provided as ID)			
P16	If pre-clearance surveys identify hollow bearing trees that are significant to the viability of local threatened species populations (for example a threatened microbat roost tree) these trees would be retained and infrastructure would be redesigned to accommodate them.	Construction	FFMP

Appendix D

GROUNDCOVER MANAGEMENT PLAN

Manildra Solar Farm

Groundcover Management Plan

FEBRUARY 2016

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Document Verification

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Project File Name:	Manildra_Groundcover_Management_Plan_final v1 3

Revision	Date	Prepared by (name)	Reviewed by (name)	Approved by (name)
Final v1.3	03/02/16	Jane Blomfield (minor changes)		Brooke Marshall

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CONTENTS

1 INTRODUCTION 1

1.1 THE PROJECT 1

1.2 RELATIONSHIP TO PROJECT APPROVAL, OTHER ASSESSMENTS AND PLANS 1

1.3 OBJECTIVES OF THIS PLAN AND APPROACH 2

1.4 APPROVAL CONDITIONS CROSS REFERENCE TABLE 3

2 BACKGROUND INFORMATION 7

2.1 GROUNDCOVER VEGETATION AND ITS CONDITION 7

2.2 DISTURBANCE AND WEEDS 7

3 POTENTIAL IMPACTS OF THE PROJECT 10

3.1 CONSTRUCTION IMPACTS 10

3.1.1 Impact areas 10

3.1.2 Management and monitoring strategies 10

3.2 OPERATIONAL IMPACTS 11

3.2.1 Impacts - known and unknown 11

3.2.2 Management and monitoring strategies 11

4 GROUNDCOVER MANAGEMENT PROTOCOLS 13

4.1 MINIMAL DISTURBANCE DURING CONSTRUCTION PROTOCOL 13

4.2 WEED CONTROL PROTOCOL 14

4.3 REHABILITATION PROTOCOL 16

4.4 GROUNDCOVER MANAGEMENT 19

5 GROUNDCOVER MONITORING REQUIREMENTS 20

6 CONCLUSION 23

7 REFERENCES 24

APPENDIX A MONITORING DATA SHEET ..... A-I

APPENDIX B CABONNE SHIRE COUNCIL LOCAL NOXIOUS WEEDS MANAGEMENT RESOURCES ..... B-I

TABLES

Table 1-1 Details of how each relevant statement of commitment and consent condition has been addressed by this management plan. 3

Table 2-1 Noxious weeds at the subject site and their distribution 9

Table 3-1 Estimated impact areas of final layout (provided September 2015). 10

FIGURES

Figure 2-1 Distribution of vegetation types within the project area (Biodiversity Addendum; 2010d) 8

Figure 2-2 African Boxthorn 9

Figure 2-3 Bathurst Burr 9

Figure 2-4 Scotch Thistle 9

Figure 5-1 Monitoring plot arrangement 21

ACRONYMS AND ABBREVIATIONS

BA	Biodiversity Assessment
CEMP	Construction Environmental Management Plan
DoPE	(NSW) Department of Planning and Environment
FFMP	Flora and Fauna Management Plan
EEC	Endangered Ecological Community
LLS	Local Land Services
NSW	New South Wales
OEH	(NSW) Office of Environment and Heritage, formerly Department of Environment, Climate Change and Water
PV	Photovoltaic
SoC	Statement of Commitment
sp/spp	Species/multiple species

1 INTRODUCTION

1.1 THE PROJECT

The approved Manildra Solar Farm will be constructed in the central western area of NSW, on farmland adjacent to an existing substation, approximately 2 kilometres north-east of Manildra and 30 kilometres east of Parkes. The project encompasses the construction and operation of approximately 50MW of photovoltaic (PV) arrays over an area of approximately 180 hectares. It includes associated electrical infrastructure, maintenance facilities, access tracks and minor upgrades to adjacent roads.

1.2 RELATIONSHIP TO PROJECT APPROVAL, OTHER ASSESSMENTS AND PLANS

The Manildra Solar Farm project was approved by the NSW Department of Planning in March 2011, under Part 3A (Major Projects) of the NSW *Environmental Planning and Assessment Act 1979* (EP&A Act). In October 2014, a modification application was submitted to the NSW Department of Planning and Environment under Section 75W of the EP&A Act. The Modification 1 application sought to include the use of tracking panels that would have a 5 metre maximum height. This Modification was approved on 25 March 2015 by the delegate of the Minister for Planning, subject to conditions.

In July 2015, a second Modification application was submitted to the NSW Department of Planning and Environment under Section 75W of the EP&A Act. The modification 2 application sought to modify the Project's Approval, including: extending the lapse date of the approval by 3 years (i.e. to March 2019); allowing string inverters to be installed at the project; changing the noise monitoring requirements; and, updating the schedule of land for the project. The Modification 2 application was approved on 28 August 2015 by the Minister for Planning, subject to conditions.

Specific mitigation measures to minimise impacts to groundcover form part of the project's consent conditions, including the commitment to prepare a management plan to monitor and respond to adverse groundcover impacts, as required.

This Groundcover Management Plan forms a sub-plan of the Construction Environmental Management Plan (CEMP) for the project and is linked to the Flora and Fauna Management Sub-Plan (FFMP). The plan also addresses rehabilitation of disturbed areas and weed control and has operational management aspects, as per condition of consent requirements.

A Biodiversity Assessment (BA) was completed in November 2010 as part of an environmental assessment for the project (NGH Environmental 2010a). The BA discussed the potential impacts to groundcover within areas that would be covered by the solar arrays, due to altered microclimate. The degree of impact to vegetation composition and cover from factors such as reduced light, altered moisture distribution and near ground wind levels following the installation of the PV arrays cannot be predicted with certainty.

1.3 OBJECTIVES OF THIS PLAN AND APPROACH

This management plan has been prepared to address relevant statements of commitment made by the proponent and the conditions of approval for the project. This plan is structured as follows:

- Background information
    - Vegetation types and their condition onsite
    - Disturbance and weeds onsite
- Potential impacts of the project and management strategies
- Management protocols specific to:
    - Minimising disturbance to groundcover
    - Weed control
    - Rehabilitation of areas disturbed by the project
    - Grazing management, if desirable
    - Reporting and responding to the results of monitoring
- Groundcover monitoring requirements and protocol

While the monitoring program is specific to detecting changes in groundcover vegetation within the array area, management protocols for minimising disturbance, weed control and rehabilitation, apply to the entire project site.

1.4 APPROVAL CONDITIONS CROSS REFERENCE TABLE

Table 1-1 below identifies the statements of commitment and conditions of consent relevant to groundcover management and how they have been addressed in this plan.

Table 1-1 Details of how each relevant statement of commitment and consent condition has been addressed by this management plan.

ID	Commitment/condition	Comment	Section Reference
Revised Statements of commitment, Submissions report 2010			
14	Where practicable, grass surfaces and shrubs will be retained or restored on infrequently used vehicle routes.	The rehabilitation protocol provided in this document satisfies this condition.	Section 4.1
15	Site stabilisation, rehabilitation and revegetation of all disturbed areas would be undertaken without delay.	The rehabilitation protocol provided in this document satisfies this condition.	Section 4.3
17	Works will be avoided during and immediately following heavy rainfall events to protect soils and vegetation at the site.	The minimal disturbance protocol provided in this document satisfies this condition.	Section 4.1
18	Weed/pathogen controls will be implemented, including: • Machinery and vehicles used in construction works will be washed before and after site access to reduce the introduction and spread of weeds and pathogens. • Laydown sites for excavated spoil, equipment and construction materials will be weed-free or treated for weeds wherever practicable. • Weed monitoring will be carried out at all sites after the completion of construction works and ongoing weed control will occur where noxious or invasive species are recorded. In particular, monitoring will be undertaken during the following late spring/early summer, and remedial action taken as required. • Sediment control materials should be weed free (straw bales, geotextiles).	The weed control protocol provided in this document satisfies this commitment.	Section 4.2

ID	Commitment/condition	Comment	Section Reference
	• Imported materials such as sand and gravel will be sourced from sites which do not show evidence of noxious weeds or Phytophthora infection.		
24	A groundcover management plan would be developed that would include regular monitoring of vegetation cover and composition and allow for adaptive management. This would include: • Establishment of a shade tolerant perennial groundcover across the cropping and exotic dominated grazing paddocks prior to the installation of the PV arrays • Advice from an agronomist in relation to preferred species/varieties, establishment methods of alternative pastures and best practice management • Where information is lacking, trials may be required onsite	This monitoring protocol in section 5 has been developed with reference to several botanical investigations of the site over several years. Currently the site to be developed has had several species of shade tolerant perennial groundcover established. These include exotic species such as Lucerne, Phalaris and Sub Clover Species.	Section 5
26	The space between the PV array rows should be maintained and kept clear to enable access by vehicles for ongoing weed control, and pasture renovation if required.	Addressed in Design phase but noted in the weed control protocol.	Sections 4.2
27	Efforts should be made to minimise disturbance to existing groundcover during construction. Construction and maintenance vehicles should not access the site when soils are very wet to minimise soil compaction and disturbance.	The minimal disturbance protocol provided in this document satisfies this condition.	Section 4.1
62	Thick and continuous pasture cover should be established prior to the installation of the array, and maintained at all times, including during winter and drought periods if possible.	The minimal disturbance protocol provided in this document satisfies this condition.	Section 4.1
NSW Department of Planning and Environment Conditions of Consent			
C14 b)	A Ground Cover Management Plan, developed in consultation with OEH, to outline measures to ensure adequate vegetation cover and composition beneath the solar PV array. The Plan shall include, but not necessarily be limited to:	This management plan satisfies this commitment. The input of an agronomist was not considered necessary in developing the protocols contained herein. Consultation with an agronomist is included within this plan's protocols, where rehabilitation targets are not being met. NSW OEH	Entire document

ID	Commitment/condition	Comment	Section Reference
		were provided with a draft plan for comment. This document now includes their comments regarding temporary impacts.	
	i) procedures to minimise disturbance to ground cover not impacted by the project particularly in the area of the native pasture in good condition;		Section 4.1
	ii) procedures for the stabilisation, rehabilitation and revegetation of disturbed ground cover including reference to field trials where required;		Section 4.3 and 5
	iii) weed management measures to control and prevent the spread of noxious weeds;		Section 4.2
	iv) monitoring methods to assess the impact of the project on the ground cover vegetation; and		Section 5
	v) a procedure to review management methods where they are found to be ineffective.		Section 5
F6	The proponent shall implement a revegetation and rehabilitation program for all areas of the development footprint which are disturbed during the construction of the project but, which are not required for the ongoing operation of the project including temporary construction facility sites and sections of construction access roads, The Proponent shall ensure that all revegetation measures are implemented progressively where possible and in all cases within six months of the cessation of construction activities at the relevant area. Unless otherwise agreed to by the Secretary, the Proponent shall monitor and maintain the health of all revegetated areas until such time that the plantings have been verified by an independent and suitably qualified expert (whose appointment has been agreed to by the Secretary) as being established, in good health and self sustaining.	The rehabilitation protocol provided in this document satisfies this condition.	Section 4.3
Text from Environmental Assessment (page numbers provided as ID)			
P37	Once the construction phase has finished, any tracks not used for	The rehabilitation protocol provided in this	Section 4.3

ID	Commitment/condition	Comment	Section Reference
	normal farming practice or PV array maintenance would be rehabilitated. Internal access tracks would be maintained to allow maintenance and repairs to the PV array.	document satisfies this commitment	
P43	Weed control would be undertaken as required using a spray unit mounted on a quad bike. Groundcover vegetation around the panel rows would be either slashed or grazed by sheep to maintain a safe height below the panels.	The weed control and grazing management protocols provided in this document satisfies this commitment.	Section 4.2

2 BACKGROUND INFORMATION

2.1 GROUNDCOVER VEGETATION AND ITS CONDITION

The majority of the proposal site (excluding the far western paddock) was under cropping at the time of the Biodiversity Assessment (2010a), or was dominated by exotic grass species. These areas where no overstorey is present do not constitute native vegetation. However, scattered paddock trees were present in cropped and exotic pasture areas and, in comparison with more intact native vegetation within and adjoining the proposal site, it was possible to ascertain the vegetation community that these trees were derived from.

Remnant native vegetation within and adjoining the proposal site is representative of Box-Gum Woodland communities including species such as White Box (*Eucalyptus albens*), Yellow Box (*E. melliodora*) and Blakely's Red Gum (*E. blakelyi*). Native grassland occurs in the far west of the site and is likely to be derived from these communities.

Other vegetation present within the proposal site was restricted to isolated paddock trees comprising Kurrajong (*Brachychiton populneus*) and the introduced Pepper Tree (**Schinus areira*).

In summary, three vegetation types were identified:

- Derived native grassland
- Box-Gum Woodland (native)
- Exotic (crop or pasture)

As part of this investigation, extensive surveying of vegetation condition was undertaken, demonstrating while some small areas were in good condition, the majority of the native vegetation was found to be in relatively poor condition as a result of extensive grazing. The distribution of the vegetation types within the project area at the time of the Biodiversity Assessment is shown in Figure 2-1.

2.2 DISTURBANCE AND WEEDS

Forests and woodlands have been cleared and thinned at the site to provide pasture. Clearing and agriculture has produced a range of direct and indirect impacts to flora habitats, including altered microclimate, loss of fauna responsible for pollination and dispersal, sheet erosion of soils, watercourse bed incision and damming, localised sedimentation and elevated soil nutrients. Minor gully erosion was evident in the drainage line in the south west of the western section of the site.

Agricultural activities have also resulted in the majority of the site being planted with introduced crop species such as Wheat and Canola. The disturbance has led to the colonisation of a range of other introduced plant species. In areas not utilised for cropping, grazing is likely to have reduced or eliminated selectively grazed or grazing sensitive species, such as Kangaroo Grass (*Themeda australis*), terrestrial orchids, forbs, wattles and pea shrubs.

Minor pasture weed species were common across the majority of the study area. Three noxious weeds declared for the Cabonne Shire Council Area under the *Noxious Weeds Act 1993* were recorded at the subject site. The status and distribution of these weeds at the site are summarised in Table 2-1.

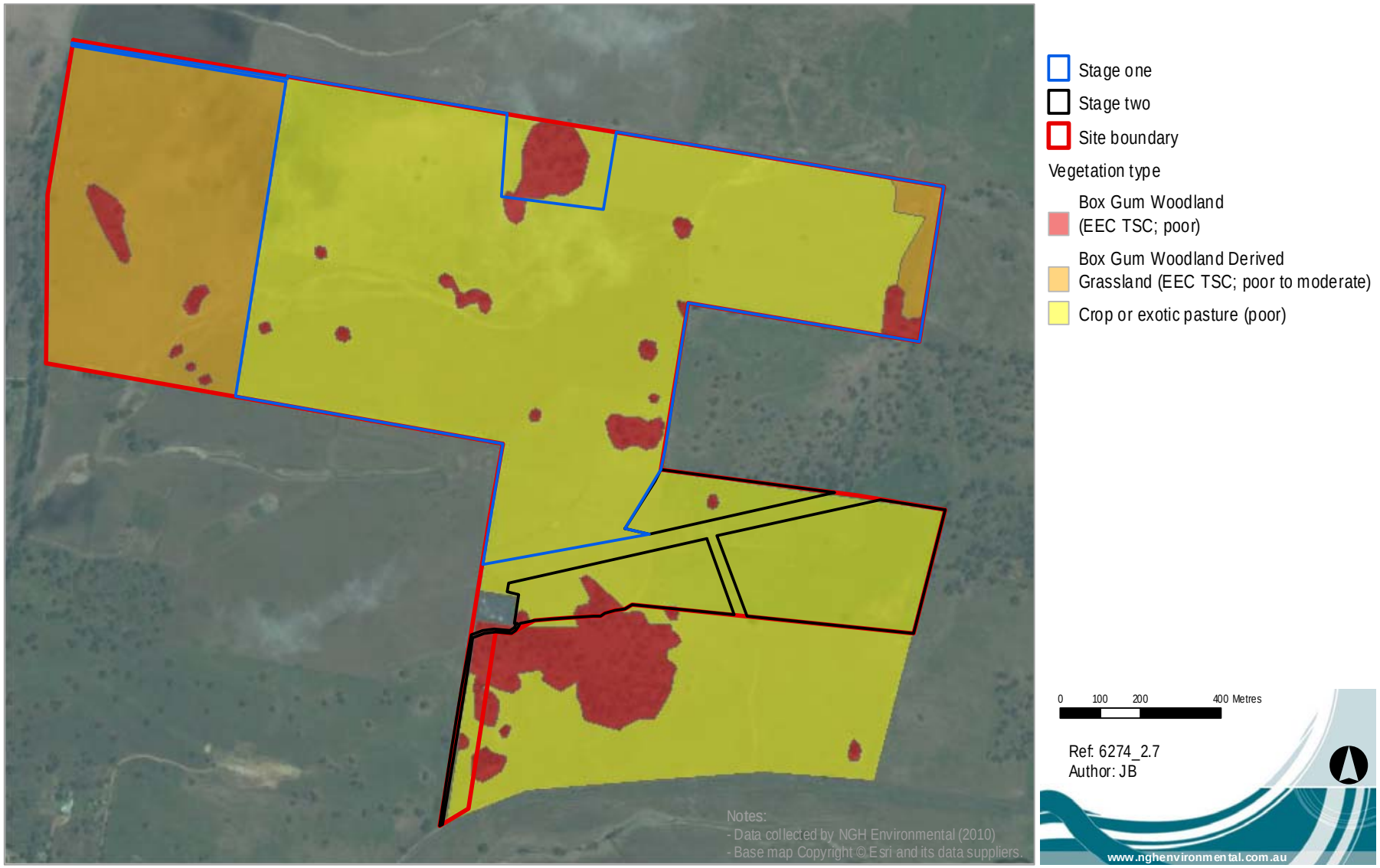

Figure 2-1 Distribution of vegetation types within the project area (Biodiversity Addendum; 2010d)

All of the recorded noxious weeds are listed as Class 4 weeds, meaning that the growth and spread of the plant must be controlled according to the measures specified in a management plan published by the local control authority.

Table 2-1 Noxious weeds at the subject site and their distribution

Weed species	Status	Abundance and distribution
African Boxthorn **Lycium ferocissimum*	Class 4	Uncommon in pasture across the site
Bathurst Burr **Xanthium spinosum*	Class 4	Occasionally in pasture across the site
Scotch Thistle **Onopordum acanthium*	Class 4	Uncommon in pasture across the site

Figure 2-2 African Boxthorn

Figure 2-3 Bathurst Burr

Figure 2-4 Scotch Thistle

The site carries noxious weeds which would require control before and after the proposed works. With the application of weed controls during and following construction, weed impacts within and off the proposal site are not expected to be significant. The spacing between the PV array rows would be adequate to allow an all-terrain vehicle to access the site for ongoing weed control and pasture renovation, as required.

3 POTENTIAL IMPACTS OF THE PROJECT

3.1 CONSTRUCTION IMPACTS

3.1.1 Impact areas

Based on an 'upper limit' of impact (largest layout being considered), around 137 ha of ground cover would be affected by the development. This is the total area within the development envelope and the vast majority of this vegetation is exotic (non-native); 129.50ha. The native vegetation to be affected is in poor condition although is listed as an Endangered Ecological Community (Box Gum Woodland and derived grasslands) at the State level. The loss of this vegetation is not considered to be significant and would be subject to an offset plan.

The major impacts to groundcover during construction would be:

- Through minor stripping and grading of the array area. To prepare site for installation of solar arrays, some areas under the arrays may need to be stripped and graded. If required, this activity will temporarily remove ground cover from the affected areas and compact the soil. Ground cover will be restored post-construction. Stripping and grading would be limited as much as practical.
- Through shading and trampling caused by vehicle movements and stockpiling of materials.

The development envelope and affected vegetation is mapped in Figure 2.1.

Table 3-1 Estimated impact areas of final layout (provided September 2015).

Total area of impact	Stage one (ha)	Stage two (ha)	Total (ha)
Native vegetation	6.34	0.92	7.26
Box Gum Woodland Derived Grassland (EEC, TSC)	*2.92*	*0.00*	*2.92*
Box-Gum Woodland (EEC, TSC)	*3.42*	*0.92*	*4.34*
Crop or exotic pasture	105.97	23.53	129.50
Total:	**112.31**	**24.44**	**136.76**

3.1.2 Management and monitoring strategies

The rehabilitation of areas disturbed temporarily during construction is addressed in Section 4.3: Rehabilitation protocol.

Short term monitoring (during the construction phase) of the ground cover at the Manildra Solar Farm will be undertaken with reference to photographic records of the ground cover. Photos will be taken

before impacts and regularly taken during the construction phase to allow for comparison monitoring of vegetation to be made and remedial actions taken where necessary.

3.2 OPERATIONAL IMPACTS

3.2.1 Impacts - known and unknown

Once construction has been completed, the solar farm will affect grassland at the site in two ways

- Through microclimatic changes, particularly in terms of rainfall distribution, shading from ground covering by the solar array
- Through trampling of vegetation caused by vehicle movements within the array area required for maintenance activities. The predicted impacts are discussed further below.

Rainfall distribution

There will be a concentration of rainfall runoff in a strip below the lower edge of the solar panel rows. This will increase rain splash intensity and soil erosion potential in this area during heavy rainfall events however, this will be partially offset by the operation of the tracker as the drip line will move change the position of the array throughout the day. A rain shadow below the solar panel rows will also be created. Soil in this area may be drier than surrounding soil, but this will be offset by reduced evapo-transpiration losses due to shading and reduced air movement, variations in the angle of rainfall and lateral movement of water from adjacent rain-exposed areas.

Note that no water will be introduced to wash the modules. If module washing is required, a dry brush will be used.

Shading

The total area of permanent shading has been modelled to be up to 30% of the area under the array (Biodiversity Assessment for the project; NGH Environmental 2010) affecting 36 ha of exotic dominated groundcover. 70% (84 ha) will be partially shaded depending on the season and time of day and operation of the tracker.

The shading effect is likely to lead to reduced insolation and daytime temperatures and result in lower rates of plant growth and biological productivity under the array. Growth may be offset by increased soil moisture in some seasons but the shading is likely to result in some shift in species composition (favouring more shade tolerant species).

Vehicle movements within the array

Periodically, vehicles will be required to move between the rows of solar panels for access and maintenance. This activity may result in compaction of the soil which may impede vegetation growth. The risk of compaction is particularly high during periods where the soils are wet.

Vehicle, equipment and the movement of personnel also provides a vector for the introduction and spread of weeds at the site.

3.2.2 Management and monitoring strategies

The project life will be approximately 50 years. Changes to micro-climatic conditions and shading under the arrays will have an unknown effect. Consistent with the findings of the environmental assessment for

the project, the best means of managing any future impact is considered to be through monitoring and adaptive management during the life of the project.

The management measures and groundcover monitoring protocol in Section 4 and 5 will allow for adaptive management to avoid and minimise these operational impacts.

4 GROUNDCOVER MANAGEMENT PROTOCOLS

Four protocols have been developed to manage impacts to ground cover as a result of the construction and operational phase of the Manildra Solar Farm:

1. Minimal disturbance: most relevant to construction impacts
2. Weed controls: required throughout construction and operation
3. Rehabilitation: required during construction and at the end of construction
4. Grazing management: most relevant to operation

4.1 MINIMAL DISTURBANCE DURING CONSTRUCTION PROTOCOL

OBJECTIVE: Minimise disturbance to ground cover

The following protocol outlines procedures to minimise disturbance to existing and established groundcover during construction, including areas that are subject to monitoring. This protocol applies during construction.

ID	ACTIVITY	PROTOCOL	RESPONSIBILITY
1	Minimise disturbance to groundcover: under the array	• Prior to the installation of the PV array, thick and continuous pasture cover must be established at the site. The pasture must be maintained at all times during construction, including during winter and drought periods if possible. The exception to this will be where stripping and grading is required. It is noted that currently the site to be developed has had several species of shade tolerant perennial groundcover established. These include exotic species such as Lucerne, Phalaris and Sub Clover Species. This ground cover will only be removed if stripping and grading is required for construction of solar arrays.	EPC Construction Manager
2	Minimise disturbance to groundcover: other areas within the development envelope	• Temporary impacts include construction traffic and all equipment laydown areas and stockpiles required during construction. Temporary impacts would be confined to crop / exotic pasture areas as mapped on Figure 2.1. The rehabilitation protocol would be applied to restore all areas disturbed by temporary impacts	EPC Construction Manager

ID	ACTIVITY	PROTOCOL	RESPONSIBILITY
		progressively during construction, in accordance with Section 4.3. • Where practicable, grass surfaces will be retained on infrequently used vehicle routes. • Heavy vehicles, equipment and machinery will not be parked in areas outside of disturbed areas or formalised tracks for periods in excess of 24 hours. Access and parking for other vehicles will be rationalised to minimise impacts, in a Traffic Management Plan. • Works will be avoided during and immediately following heavy rainfall events where there is pooling of water or flooding, to protect soils and vegetation at the site.	
3	Communicate about minimising disturbance:	• Toolbox / site inductions to discuss the importance of groundcover and minimising disturbance to ensure ongoing perennial groundcover across site. Topics to include soil disturbance, compaction, bare earth and erosion problems. • Specific management required near areas in good condition will be discussed in environmental inductions. E.g. Western Offset Paddock – no vehicles to enter this area; area fenced off.	EPC Construction Manager

4.2 WEED CONTROL PROTOCOL

OBJECTIVE: Treat existing weeds / minimise new infestations

The protocol below ensures that all relevant weed control mitigation measures are followed during construction works. This protocol applies to the entire development site. Ongoing operational weed monitoring will be undertaken as part of the ground cover monitoring, outlined in Section 5.

ID	ACTIVITY	PROTOCOL	RESPONSIBILITY
4	Treat existing infestations:	• Treat existing weed infestations in accordance with the noxious weed management methods outlined below this table. • Herbicides will be selected to minimise impacts on non-target species. Cabonne Shire Council or a qualified person (ecologist or agronomist) will be consulted to determine suitable herbicides based on the weeds present at the site prior to treatment.	EPC Construction Manager

ID	ACTIVITY	PROTOCOL	RESPONSIBILITY
		• Laydown sites for excavated spoil, equipment and construction materials will be weed-free or treated for weeds prior to use, so weeds are not spread.	
5	Manage noxious weeds	• The works areas contain a number of Class 4 noxious weeds as outlined in Section 2.2. o African Boxthorn, Bathurst Burr and Scotch Thistle • Class 4 weeds must be controlled according to the measures specified in a management plan published by the local control authority; Cabonne Council have produced a Noxious Weeds Policy which includes a management plan for Class 4 noxious weeds. • The most up to date policy and other relevant noxious weed information from Cabonne Council can be found on their website at http://www.cabonne.nsw.gov.au/sites/cabonne/files/public/images/documents/cabonne/mig/2757-weedsplan_20060621094609.pdf. A copy of this is provided in Appendix B.	EPC Construction Manager
6	Minimise new infestations:	• Minimise the area of disturbance by implementing the Vegetation Clearing Protocol within the Flora and Fauna Management Plan. • Imported fill and sediment control materials (e.g. straw bales, geotextiles), if required, will be weed free (confirmed by supplier). • Imported materials such as sand and gravel will be sourced from sites which do not show evidence of noxious weeds or Phytophthora infection. • Vehicle and machinery movements and temporary storage of equipment/materials will be confined to disturbed areas and defined tracks where possible. • Vehicles and machinery will be cleaned (tyres brushed or washed down) prior to accessing and leaving areas where noxious weeds have been identified. • Post works, promptly rehabilitate all disturbed areas according to the Rehabilitation Protocol in Section 4.3.	EPC Construction Manager
7	Reuse of weedy material:	• Mulched vegetation, if non-weedy, can be used in rehabilitation works however, weedy vegetation cannot be reused. The status of the material will be confirmed by the environmental site officer or ecologist. • Weedy vegetation will be treated onsite in preference to carting it away for disposal (mulching	EPC Construction Manager

ID	ACTIVITY	PROTOCOL	RESPONSIBILITY
		preferred over burning). Cartage of weedy material carries risk of spreading infestations.	
6	Maintain records:	• A map(s) will be prepared identifying the locations of existing noxious weed infestations. • Methods used for weed control and the timing of weed control activities will be documented.	MSFPL Site Manager
8	Ongoing weed monitoring and control	• Weed monitoring will be carried out at all sites after the completion of construction works. Ongoing weed control will occur where noxious or invasive species are recorded. In particular, monitoring will be undertaken during late spring/ early summer and remedial action taken as required. • The space between the PV array rows should be maintained and kept clear to enable access by vehicles for ongoing weed control, and pasture renovation if required.	MSFPL Site Manager

4.3 REHABILITATION PROTOCOL

OBJECTIVE: Successfully rehabilitate all areas disturbed by construction

The following protocol will be implemented to maximise the success of rehabilitation in areas that are temporarily disturbed such as the laydown area and temporary access routes. The objective of this protocol is to rapidly re-establish stable surfaces resistant to erosion and weed ingress and to ultimately return disturbed areas to their undisturbed state.

ID	ACTIVITY	PROTOCOL	RESPONSIBILITY

ID	ACTIVITY	PROTOCOL	RESPONSIBILITY
9	During construction works:	• Photographic records should be used as tool to monitor progress. Photos will be taken before impacts and regularly taken during the construction phase to allow for comparison monitoring of vegetation to be made and remedial actions taken where necessary. • Top soils from excavation that do not contain invasive or noxious weeds will be stored separately and respread prior to rehabilitation. Trenches will be filled such that top soil is placed above subsoil in the trench. • Where practicable, whole sods will be removed with an excavator where these areas are well-vegetated with dense root systems. Sods will be stored in moist, shaded conditions and replaced following the works. Sod storage time will be minimised and sods will be replaced in a manner that maximises the chances of re-establishment. • Rehabilitation and revegetation measures must be implemented at disturbed areas progressively throughout the construction phase where possible, and in all cases, within six months of the cessation of works at the relevant area. • The protocols will be adapted as required to ensure the objective is achieved. Indicators to be monitored will include: o Percentage grass cover – 70% is the minimum required (excluding areas required for internal access ways, roads and O&M facilities) o Weed ingress – bare ground is susceptible to weed infestation o Active soil erosion - bare ground is susceptible to soil erosion, further reducing the ability to re-establish ground cover	Ecologist to identify weedy areas where top soil is not to be reused.

ID	ACTIVITY	PROTOCOL	RESPONSIBILITY
10	After construction works:	• After construction is complete, any tracks not required for normal farming practice or PV array maintenance will be rehabilitated. Where practicable, grass surfaces will be restored on infrequently used vehicle routes. • In areas with limited topsoil, hydromulch or imported non-weedy topsoil will be used during rehabilitation and revegetation. • If rainfall is insufficient to establish the growth of vegetation, reseeded areas will be watered weekly until plants are established and self-sufficient (evidenced by germination and active growth of seeded species based on weekly monitoring). If germination is not occurring within two (2) weeks of reseeding, follow-up works would be considered as outlined below. • In rehabilitation areas that are actively grazed, stock will be restricted until a stable surface (70% grass cover) is achieved. • The success of the rehabilitation works will be monitored on a monthly basis post works to ensure stable surfaces (70% grass cover) are achieved within three (3) months of the commencement of rehabilitation. Follow-up works would be conducted if this is not achieved. • Follow-up works may include, surface ripping or scarification, using additives during watering to assist in water penetration, weed control and reseeding, as required by monitoring. • Within the exotic dominated pasture area which will be disturbed by the installation of the solar array, a mix of summer and winter tolerant perennials are recommended for re-seeding and may include but not be limited to species such as Winter Fescue, Cocksfoot, Perrenial Rye Grass, and existing pasture species at the site such as Phalaris, Lucerne and Sub Clover. Further advice on an appropriate groundcover mix suitable for local conditions would be sort from a qualified local agronomist as required. *Notes:* *Additional strategies may be required to achieve 70% cover, dependent on season, amount of top soil and species selected. Strategies will involve an ecologist or agronomist where 70% cover has not been achieved within three months of the commencement of rehabilitation activities.* *Rehabilitation techniques can range from replacement of top soil, allowing the natural seed bank to germinate, through to importation of topsoil and planting of tube stock. Maintenance (watering and follow-up seeding or planting) will similarly depend on the seasonal and other environmental conditions at the time of the works. The key to effective rehabilitation will be using strategies appropriate to the location and condition. These decisions will be made with input from an ecologist or agronomist as required.* *If native tube stock is used, several months lead time will be required from local nurseries.* *Erosion control devices work hand in hand with restoring ground cover – refer to Soil and Water Management Sub-plan.*	Site Construction Manager to ensure rehabilitation is undertaken as soon as possible as works progress. Site Construction Manager to ensure grass cover achieves 70% before ceasing maintenance and monitoring of these areas.

4.4 GROUNDCOVER MANAGEMENT

OBJECTIVE: Successfully maintain appropriate groundcover while reducing weeds and enhancing native species diversity

Grazing by sheep may be utilised within the array area to control biomass. A number of strategic grazing strategies can be implemented, for example; optimised, short-term or long-term deferred grazing or timed grazing. The strategy to be implemented will depend on the condition and composition of the grassland at the time and should be informed by a professional agronomist. It is noted that grazing may not be used and that slashing or isolated spraying (limited targeted applications where soil protection would not be reduced) may alternatively be implemented.

If grazing is to be utilised, the following protocol would be implemented.

ID	ACTIVITY	PROTOCOL	RESPONSIBILITY
11	Determine and implement suitable grazing, slashing or spraying strategies	• Prior to operation, consult with an agronomist and the land owner to determine the most suitable grazing strategies for the array area. Different strategies may be required for the western and eastern paddocks considering their past management and current composition. • Document the recommended strategy and append to this GCMP. Strategy must include suitable frequency of monitoring to gauge the impact of the grazing (i.e. in addition to annual groundcover monitoring) and each monitoring event must include agronomist advice regarding continuation of grazing or any changes to grazing management to ensure no adverse impacts are occurring. • If stock are brought into the area, they would come off pastures that are free of noxious weeds or subject to regular weed control.	MSFPL Site Manager
12	Adapt grazing strategies to changing grassland condition and composition	• Following each grazing monitoring event (i.e. in addition to the annual groundcover monitoring), consult with an agronomist to discuss the suitability of existing grazing regimes and adapt if recommended. • Document any alterations to the strategy. • Implement changes proposed by agronomist to improve the on-ground results of the strategy.	MSFPL Site Manager

5 GROUNDCOVER MONITORING REQUIREMENTS

Groundcover monitoring would commence the first winter after the PV panels have been installed and continue annually. Monitoring requirements are as follows:

Objectives	• The primary objective of this monitoring is to determine the effects of the panel shading on groundcover. • Secondarily, the monitoring will trigger management, where required, to maintain stable ground cover, suitable to resist erosion and weed infestation. • Given the highly modified nature of the groundcover at the development site and the dominance of exotic species, monitoring would focus on the degree of general vegetative cover and biomass present. The relative abundance of all native and exotic species and species diversity is not considered an important factor however gaining an idea of what species are being successful (or not) is crucial to ongoing adaptive management.
Personnel	• The surveys require an individual competent in the identification of common pasture species. They would optimally be undertaken by the same person, to reduce variations due to subjective assessments (for example in estimating percentage ground cover) but this is not essential.
Timing and duration	• Monitoring would be undertaken annually during early winter (June). This timing is considered most suitable as pasture growth is generally lower but remnant reproductive material may still be present which would enable identification of species or at least genera. Assessing the groundcover during this time provides for a better indication of the health of the groundcover as growth rates are down and climatic stresses are generally higher. Shading from the solar arrays would also likely have their greatest impact during this time as there is reduced insolation in general. • For at least the first three years, data will be collected annually and reported to the OEH. After three years, the need for monitoring and reporting would be reviewed in consultation with OEH.
Survey protocol	1. Permanent 5m x 1m monitoring plots would be established throughout the array area. At each monitoring location there would be two plots with one each placed in the following areas 2. In permanent shade, directly beneath panels 3. Between panels that will receive the most sun 4. Each plot would consist of a series of three 1m x 1m quadrats each spaced one metre apart. The top left hand corner and the top right hand corner of the plot under the arrays would be permanently marked with a steel stake or similar. These would serve as reference points for placing the quadrats. From these points, tape measures could be used to place each quadrat. It is not recommended that the plot in the inter-row spaces be permanently marked as it is likely to be subject to occasional vehicular traffic. The distance from the plot under the array to that in the inter-row space will be dependent on the final constructed layout and will be recorded during the monitoring. The arrangement at each monitoring location is illustrated below.

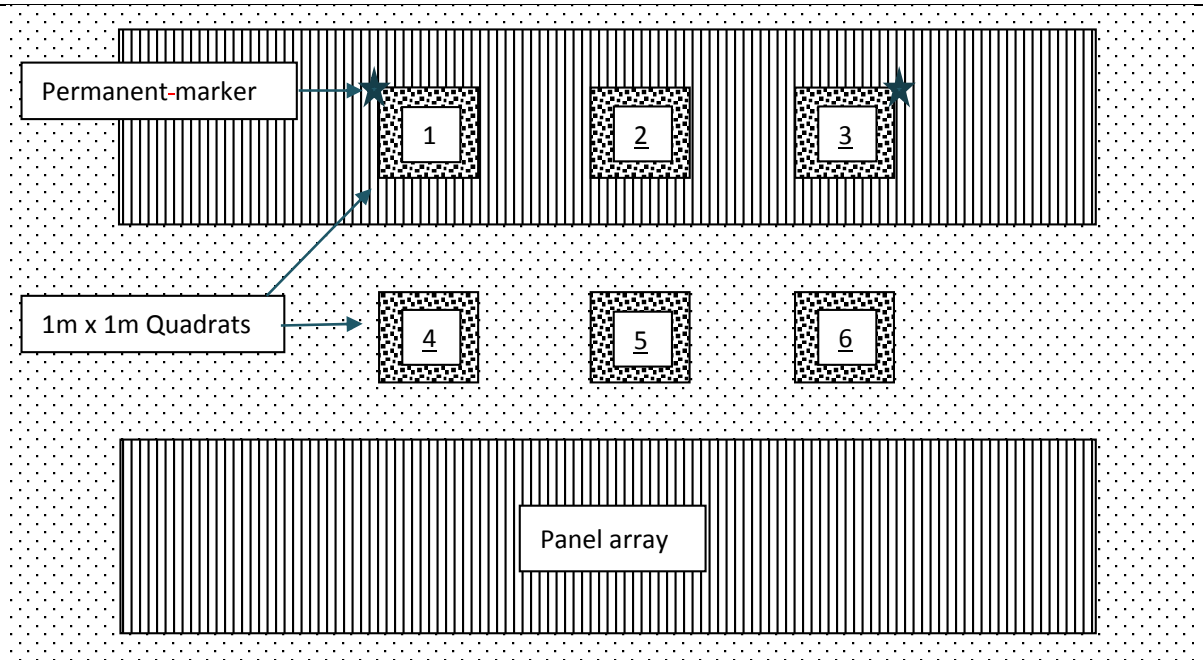

Figure 5-1 Monitoring plot arrangement

- It is suggested that monitoring plots be established at minimum of six locations across the array area (12 5m x 1m plots) capturing variations in aspect and topography. For each quadrat at a monitoring location the following will be recorded. Example data sheets as provided in Appendix A.
    - Total alive and dead/leaf litter vegetative cover using percentage cover estimates in 5% intervals
    - Total cover of bare ground using percentage cover estimates in 5% intervals
    - Dominant five species in each quadrat (or less if less species are present) and their percentage contribution to the living plant cover in each quadrat.
    - Total biomass using the rising plate method. Measurements will be taken at the centre of each quadrat.
    - A digital photographic image
    - Data recorded from each of the three quadrats would be averaged to provide a single value for each plot. Only one physical quadrat should be required which can be moved to the correct location in each plot using the reference points and a tape measure. The actual distance from the reference points back to the inter-row plot will also be recorded on the datasheets to allow for accurate replication.

	o In addition to the plot data recorded above, incidental records of any noxious weeds will also be recorded across the broader site.
Analysis and interpretation of data	• The data can be simply analysed by plotting the variables recorded over time to identify trends in declining or increasing cover and biomass. The relative abundance of certain species could also be plotted over time to gain an understanding of species that are being successful or declining. The data would be used to inform the requirement for management actions such as weed control, alterations to grazing regimes or seeding/planting as outlined in the response to monitoring protocol.
Benchmarks and indicators	• Indicators to be monitored will include: o Percentage grass cover – 70% is the minimum required o Weed ingress – bare ground is susceptible to weed infestation o Active soil erosion - bare ground is susceptible to soil erosion, further reducing the ability to re-establish ground cover • A data sheet including these indicators is provided in Appendix A.
Reporting requirements	• Within 3 months of annual monitoring events, the results will be written up in a report and submitted to the OEH. The report will contain as a minimum: o The noxious weed map(s) will be updated to reflect the current distribution of noxious weeds on the site o The results of monitoring o Details of management activities carried out such as weed control and rehabilitation o A discussion of the current groundcover condition relative to the results of monitoring from previous years monitoring o Recommendations for adaptive management
Response to results	• Management protocols will be adapted and implemented as required, as set out in Section 5. Particularly: o Weed control activities will be undertaken as per the Weed Control Protocol. o The OEH and an agronomist will be consulted to determine an effective approach to maintaining groundcover greater than 70% if this target is not being met. o Trials may be considered where information gaps are identified.

6 CONCLUSION

This Groundcover Management Plan has identified the potential impacts to groundcover at the Manildra Solar Farm site. A monitoring framework has been developed to monitor these impacts and series of protocols have been developed to adaptively manage impacts, primarily during construction but also into operations. With the implementation of this Groundcover Management Plan, new information will be provided on the impacts of PV solar arrays and impacts to the groundcover vegetation at the site are expected to be minimised.

7 REFERENCES

NGH Environmental (2010a) Biodiversity Assessment - Manildra Solar Farm, October 2010

NGH Environmental (2010b) Submissions Report – Manildra Solar Farm, December 2010

APPENDIX A MONITORING DATA SHEET

Manildra Solar Farm ground cover monitoring program

General details

Recorder:	Date:	Plot identifier
Plot location (include distance from reference points if an inter-row plot):		

Quadrat observations

Quadrat 1		**Quadrat 2**		**Quadrat 3**	
Percent total living cover:		Percent living cover:		Percent living cover:	
Percent total litter/dead cover:		Percent total litter/dead cover:		Percent total litter/dead cover:	
Percent bare ground:		Percent bare ground:		Percent bare ground:	
Dominant species 1. 2. 3. 4. 5.	% cover	Dominant species 1. 2. 3. 4. 5.	% cover	Dominant species 1. 2. 3. 4. 5.	% cover
Rising plate reading:		Rising plate reading:		Rising plate reading:	
Image reference:		Image reference:		Image reference:	
General notes, noxious weeds etc:					

APPENDIX B CABONNE SHIRE COUNCIL LOCAL NOXIOUS WEEDS MANAGEMENT RESOURCES

The following information was sourced from the Cabonne Shire Council Website http://www.cabonne.nsw.gov.au/sites/cabonne/files/public/images/documents/cabonne/mig/2757-weedsplan_20060621094609.pdf on the 3rd July 2015. It is recommended that the accuracy of this information be checked with Cabonne Shire Council on a bi-annual basis which is the review period of the plan.

Additionally, an A3 map is provided that can be used to plot infestations during weed monitoring.

Local Noxious Weeds Management Plan

The purpose of the Local Noxious Weeds Management Plan is to specify the control measures required for the various Class 4 noxious weeds listed in the table below.

Purpose

To specify the control measures required for the various class 4 noxious weeds listed in table below.

Control class

According to the Weed Control Order 19 under the Noxious Weeds Act 1993 (dated 23 December 2005), issued by the Minister for Primary Industries. The noxious weeds listed in table below are classified as class 4 weeds (A locally controlled weed).

Class 4 weeds are plants that pose a threat to primary production, the environment or human health, are widely distributed in an area to which the order applies and are likely to spread in the area or to another area.

Control Objective

The control objective for this class of weed is to minimise the negative impact of those plants on the economy, community and environment of New South Wales.

Control Measures

As listed in table below.

Management Plan

An owner/occupier (other than a public authority) of land in Cabonne Shire Council area must control class 4 noxious weeds according to the control measure specified in the table below. The management plan will be reviewed every two years.

Common Name	Botanical Name	Specified Control Measure	Weed Class
African boxthorn	*Lycium ferocissimum*	The plant must be fully and continuously suppressed and destroyed.	4
African lovegrass	*Eragrostis curvula*	The plant must be prevented from spreading and its numbers and distribution reduced.	4
Bathurst/Noogoora/Californian/cockle burrs	*Xanthium* species	The plant must be fully and continuously suppressed and destroyed.	4
Blackberry	*Rubus fruticosus* aggregate species	The plant must be fully and continuously suppressed and destroyed and plant may not be sold, propagated or knowingly distributed	4
Biddy Bush	*Cassinia arcuate*	The plant must be fully and continuously suppressed and destroyed.	4
Blue Heliotrope	*Heliotropium amplexicaule*	The plant must be prevented from spreading and its numbers and distribution reduced. Or biological control agents introduced, maintained and monitored	4
Buffalo Burr	*Solanum rostratum Dunal*	The plant must be fully and continuously suppressed and destroyed.	4
Chilean needle grass	*Nassella neesiana*	The plant must not be sold, propagated or knowingly distributed.	4
Devil's Claw	*Proboscidea louisiancu / Isicella lutea*	The plant must be prevented from spreading and its numbers and distribution reduced. Or biological control agents introduced, maintained and monitored	4
Green Cestrum	*Cestrum parqui*	The plant must be fully and continuously suppressed and destroyed. Or biological control agents introduced, maintained and monitored	4
Harrisia cactus	*Harrisia* species	The plant must be fully and continuously suppressed and destroyed. Or biological control agents introduced, maintained and monitored	4
Hemlock	*Conium maculatum*	The plant must be fully and continuously suppressed and destroyed.	4

Common Name	Botanical Name	Specified Control Measure	Weed Class
Nodding thistle	*Carduus nutans*	The plant must be prevented from spreading and its numbers and distribution reduced. Or biological control agents introduced, maintained and monitored	4
Pampas grass	*Cortaderia* species	The plant must be fully and continuously suppressed and destroyed.	4
Rhus tree	*Toxicodendron succedanea*	The plant must be fully and continuously suppressed and destroyed.	4
Scotch broom/English broom	*Cytisus scoparius*	The plant must be fully and continuously suppressed and destroyed.	4
Scotch thistle, Stemless thistle, Illyrian thistle, Taurian thistle	*Onopordum* species	The plant must be prevented from spreading and its numbers and distribution reduced. Or biological control agents introduced, maintained and monitored.	4
Serrated tussock	*Nassella trichotoma*	The plant must be fully and continuously suppressed and destroyed.	4
Silverleaf Nightshade	*Solanum elaeagnifolium*	The plant must be prevented from spreading and its numbers and distribution reduced.	4
Spiny Burr-Grass	*Cenchrus incertus/Cenchrus longispinus*	The plant must be prevented from spreading and its numbers and distribution reduced. Or biological control agents introduced, maintained and monitored	4
St John's Wort	*Hypericum perforatum*	The plant must be prevented from spreading and its numbers and distribution reduced. Or biological control agents introduced, maintained and monitored	4
Sweet briar	*Rosa rubiginosa*	The plant must be prevented from spreading and its numbers and distribution reduced.	4
Tree of Heaven	*Ailanthus altissima*	The plant must be prevented from spreading and its numbers and distribution reduced. Or biological control agents introduced, maintained and monitored.	4
Wild Radish	*Raphanus raphanistrum*	The plant must be prevented from spreading and its numbers and distribution reduced. Or biological control agents introduced, maintained and monitored.	4

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Weed management map. Use this map to record infestations prior to control actions. This will keep track of progress and note any new areas requiring treatment.

Appendix E

LANDSCAPE PLAN

Manildra Solar Farm

Landscape Plan

FEBRUARY 2016

www.nghenvironmental.com.au

Document Verification

Project Title: Manildra Solar Farm CEMP

Project Number:	6274
Project File Name:	Manildra_LP final v1.2

Revision	Date	Prepared by (name)	Reviewed by (name)	Approved by (name)
Final V1.2	03/02/16	Jane Blomfield (minor changes)		Brooke Marshall

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CONTENTS

1 INTRODUCTION 1

1.1 THE PROJECT 1

1.2 LEGISLATIVE CONTEXT AND SCOPE OF THIS PLAN 1

1.3 RELATIONSHIP TO OTHER ASSESSMENTS AND PLANS 1

1.3.1 Source documents 1

1.3.2 Associated environmental management plans 2

1.3.3 Scope of this plan 2

1.4 OBJECTIVES OF THE LP 3

2 EXISTING ENVIRONMENT AND KEY IMPACTS 4

2.1 VISUAL CONTEXT 4

2.2 CHARACTER OF THE PROJECT 4

2.3 KEY VISUAL IMPACTS 4

2.3.1 Mitigating factors 4

2.3.2 Predicted impacts 4

3 MANAGEMENT FRAMEWORK 6

3.1 RESPONSIBILITIES 6

3.2 SUBCONTRACTOR MANAGEMENT 7

3.3 CONSULTATION REQUIREMENTS 7

3.4 ENVIRONMENTAL MONITORING, REPORTING AND COMPLIANCE 8

4 KEY STRATEGIES FOR MITIGATION 9

4.1 ONSITE BOUNDARY PLANTING 9

4.1.1 Location 9

4.1.2 Species 9

4.1.3 Density and planting methods 9

4.1.4 Establishment and monitoring requirements 9

4.2 ROADSIDE PLANTING 11

4.2.1 Location 11

4.2.2 Species 11

4.2.3 Density and planting methods 11

4.2.4 Establishment and monitoring requirements 11

4.3 ON NEIGHBOURS PROPERTIES 12

4.4 ADDITIONAL MITIGATION STRATEGIES 12

5 IMPLEMENTATION PLAN 13

6 REFERENCES 15

APPENDIX A CONDITION CROSS REFERENCE ..... A-I

TABLES

Table 2-1: Predicted visibility of the solar farm 5

Table 3-1: Personnel with specific LP responsibilities 6

Table 3-2: Consultation requirements: LP 8

Table 5-1: Planting implementation plan 13

FIGURES

Figure 4-1 Possible onsite boundary planting (source Moir Landscape Architecture 2010b) 10

Figure 4-2 Section through solar farm, showing boundary planting (source Moir Landscape Architecture 2010b) 11

ACRONYMS AND ABBREVIATIONS

BA	Biodiversity Assessment
BoP	Balance of Plant Contractor / Engineering, Procurement and Construction Contractor
MSFPL	Manildra Solar Farm Pty Ltd
CEMP	Construction Environmental Management Plan
DoPE	(NSW) Department of Planning and Environment
EA	Environmental Assessment
EPC	Engineering, Procurement and Construction Contractor / Balance of Plant Contractor
ER	Environmental Representative
EWMS	Environmental Work Method Statement
LP	Landscape Plan
MW	Megawatt
NSW	New South Wales
OEMP	Operation Environmental Management Plan
PV	Photovoltaic
RMS	Roads and Maritime Services
SCECO	Site Construction and Environmental Compliance Officers
SoC	Statement of Commitment
VVR	Visual Verification Report

1 INTRODUCTION

1.1 THE PROJECT

The approved Manildra Solar Farm will be constructed in the central western area of NSW, on farmland adjacent to an existing substation, approximately 2 kilometres north-east of Manildra and 30 kilometres east of Parkes. The project encompasses the construction and operation of approximately 50MWac of photovoltaic (PV) arrays over an area of approximately 180 hectares. It includes associated electrical infrastructure, maintenance facilities, access tracks and minor upgrades to adjacent roads.

1.2 LEGISLATIVE CONTEXT AND SCOPE OF THIS PLAN

The Manildra Solar Farm project was approved by the NSW Department of Planning in March 2011, under part 3A (Major Projects) of the NSW *Environmental Planning and Assessment Act 1979* (EP&A Act). In October 2014, a modification application was submitted to the NSW Department of Planning and Environment under Section 75W of the EP&A Act. The Modification 1 application sought to include the use of tracking panels that would have a 5 metre maximum height. This Modification was approved on 25 March 2015 by the delegate of the Minister for Planning, subject to conditions.

In July 2015, a second Modification application was submitted to the NSW Department of Planning and Environment under Section 75W of the EP&A Act. The modification 2 application sought to modify the Project's Approval, including: extending the lapse date of the approval by 3 years (i.e. to March 2019); allowing string inverters to be installed at the project; changing the noise monitoring requirements; and, updating the schedule of land for the project. The Modification 2 application was approved on 28 August 2015 by the Minister for Planning, subject to conditions.

The consolidated Conditions of Consent (August 2015) for the Project (including the Conditions from the approved Project Modifications 1 and 2), outline specific requirements for landscape management during construction and operation.

In addition, requirements have also been taken from the Submissions Report, prepared by NGH Environmental December 2010. Items that must be addressed in this plan are identified in Appendix B.

1.3 RELATIONSHIP TO OTHER ASSESSMENTS AND PLANS

1.3.1 Source documents

The following documents form source documents for the development of this plan.

- NGH Environmental 2010a. Manildra Solar Farm Environmental Assessment. Report prepared October 2010.
- Moir Landscape Architecture 2010b. Manildra Solar Farm Visual Impact Assessment. Report prepared October 2010 (included as Appendix F, within the Manildra Solar Farm Environmental Assessment)
- Moir Landscape Architecture 2012 Manildra Solar Farm Viewpoint Analysis Update, Report prepared January 2012.
- NGH Environmental 2010b. Manildra Solar Farm Submissions Report. Report prepared December 2010.

1.3.2 Associated environmental management plans

Associated environmental management plans of relevance to this plan include:

Construction Environmental Management Plan	An overarching Construction Environmental Management Plan (CEMP), currently in preparation, applies to this project. This Landscape Plan (LP) is a sub-plan of the CEMP.
Visual Verification Report	This report will verify actual post-construction views from identified receivers and advise if any changes to proposed screening measures are required.
Operation Environmental Management Plan	An overarching Operation Environmental Management Plan (OEMP), would be prepared to manage the operational stage of the project. Informed by the post-construction Visual Verification Report, the establishment and maintenance of plantings within this plan would carry over into operation. As such, this LP is also a sub-plan of the OEMP.

1.3.3 Scope of this plan

This Landscape Plan is presented in 4 parts:

Section 2	Existing environment and key impacts	Identification of landscaping objectives and standards based on visual impacts and local environmental values identified in the EA (2010a).
Section 3	Management framework	Consistent with the implementation of other construction environmental management plans and including consultation requirements to seek feedback from: Affected residents Interested community members Local council Roads and Maritime Services
Section 4	Key strategies for mitigation	Including selection of appropriate species to enhance, mitigate and or augment landscaping to minimise the visual impact of the project On the project site At residences On local roads
Section 5	Implementation plan	Setting out procedures to: Implement the planting following completion of construction when visual impacts are better known. Monitor plantings to ensure objectives are being met (established and maintained)

1.4 OBJECTIVES OF THE LP

The overall objective of the visual mitigation is to achieve a better visual integration of the Manildra Solar Farm and the retention of existing landscape character at both local, and regional scales (NGH Environmental 2010a). The mitigation measures attempt to lessen the visual impact of the proposed development whilst enhancing the visual character of the surrounding environment. Key performance indicators are set as follows for each specific objective of this plan.

It is noted that construction related mitigation (dust control, restoration of earthworks, colour and design of infrastructure) are covered within other plans and not within this LP.

LP Objective	Key performance outcome
Identification of landscaping objectives and standards based on visual impacts and local environmental values identified in the EA (2010a)	Compliance with strategies recommended in the EA.
Appropriate species to enhance, mitigate and or augment landscaping to minimise the visual impact of the project, on the project site, at residences, on local roads.	Reasonable stakeholder expectations are met with regard to type and location of planting. (Stakeholders in include affected residents, interested community members, local Council and Roads and Maritime Services (RMS).
Provide procedures to implement and monitor plantings to ensure objectives are being met.	All stages of implementation carried out effectively and in a timely manner. Plants are properly established and maintained.

2 EXISTING ENVIRONMENT AND KEY IMPACTS

2.1 VISUAL CONTEXT

The proposed Manildra Solar Farm is located to the north east of the Manildra township in central western New South Wales. The topography of the proposed solar farm site is defined by slightly undulating, grazing land, generally devoid of native vegetation. The majority of the Site is cleared with tree coverage occurring in sparse patches.

The broader landscape is characterised by a mosaic of agricultural land with a sparse coverage of remnant native woodland and riparian vegetation. Creek and natural drainage lines branch from the Mandagery Creek through the low points of the slightly undulating landscape.

2.2 CHARACTER OF THE PROJECT

The Photovoltaic (PV) array will be relatively low lying, reaching a height of between 3 to 5m above the existing ground level. The solar farm is designed as an array of panels arranged in a mounted horizontally in the north-south direction. Throughout the day, the arrays will track the sun, tilting 45 degrees to the east when the sun comes up and tracking through to 45 degree tilt to the west at sundown. The highest visual effect of the PV panels is likely to be seen from the east and west, where the most surface area is visible. Visibility of the solar farm from the north and south would be significantly lower.

It is noted that the project's consent conditions were modified in March 2015 to allow the option of tracking PV panels with a maximum height of 5m. Under the originally approved fixed panel project, the PV array would have been 2 - 3m above the existing ground level. The highest visual effect of the PV panels would have been likely to be seen from the north and south, where the most surface area would be visible.

2.3 KEY VISUAL IMPACTS

2.3.1 Mitigating factors

The solar farm site is characterised by undulating, cleared pastoral land. In general, existing landscape features of the region which assist in the reduction of the visual impact of the solar farm include:

- Riparian vegetation associated with Mandagery Creek to the east of Manildra. This provides a strong visual screen for a large percentage of developed area.
- The natural topography prevents views to the site from residential properties to the south of the site associated with Old Orange Road.
- Areas surrounding the proposed development are largely uninhabited parcels of undulating land with a sparse coverage of woodland vegetation.

2.3.2 Predicted impacts

The highest visual impact would be felt from those areas within the immediate vicinity of site, in particular a narrow section of Molong Manildra Road. The Molong Manildra Road is located approximately 500m to the east of the site at its closest point. Views from Molong Manildra Road are towards the western edge of the proposed development and would be seen as a grey line within the

landscape. Due to topography and existing vegetation, views to the site other than from Molong Manildra Road are restricted to areas of private land. No residences are located within these vantage areas.

Regarding other receivers, visual impacts can be summarised as shown in Table 2-1.

Table 2-1: Predicted visibility of the solar farm

Location / receiver	Visibility
Manildra town and associated residential properties.	Solar farm would not be visible.
North - A small number of homesteads are located to the north of the Site. The closest property is "Yarran" farmhouse, from which the site would be obscured by a rise in topography between the site and farmhouse.	Solar farm would not be visible.
East.	Solar farm would not be visible.
South (roads and railway).	Solar farm would not be visible.
West.	Existing plantings in this direction would buffer views of the solar farm.
Molong Manildra Road.	'Glimpse' views would occur for 500m of Molong Manildra Road, approximately 2.6km from the Manildra town centre.
Manildra Toogong Road.	Existing plantings in this direction would obscure views of the solar farm.

It is noted that this information is drawn from the assessment conducted in 2010 and that changes to existing screening vegetation may have changed. A site visit was undertaken in June 2015 and while no changes were noted, the Visual Impact Verification Report would address this issue categorically.

In the context of the area, the solar farm is expected to have a moderate visual impact. It would have a low visual impact within the context of the landscape character and scenic quality of the region. The greatest visual impact would be apparent within the immediate vicinity of the solar farm however once landscape mitigation methods have been implemented and the growth of screen planting surrounding the site has matured, the visual impact of the Solar Farm would be minimal.

3 MANAGEMENT FRAMEWORK

3.1 RESPONSIBILITIES

Responsibilities specific to the LP are detailed below in Table 3-1.

Table 3-1: Personnel with specific LP responsibilities

Name	Organisation	Role	Responsibility	Authority
TBA	MSFPL	Senior management and strategic control	Responsible for providing the required resources to facilitate the Landscape Plan	Authority to limit or stop works.
TBA	Contractor	Operational Site Manager	Determining sequence and interaction of processes. Ensure communications and reporting framework in place. Ensure the goals of the CEMP and sub-plans are achieved. Report incidents to ER and to agencies as required. Ensure environmental management is appropriate and resourced. Review CEMP and sub-plans. Ensure timely delivery of corrective actions. Ensure requirements of the CEMP and sub-plans are communicated and implemented. Implement and comply with communications and reporting framework. Responsible for compliance with all applicable environmental legislation and contract obligations. Responsible for the implementation and maintenance of CEMP Implement and monitor corrective actions Comply with regulations within CEMP Ensure training is delivered and appropriate	All aspects of the environmental performance of the project during construction. Authority to update and implement CEMP, upon ER endorsement and agency approval, where required. Authority to limit or stop works. Authority to require environmental actions to be undertaken. Reports to the Proponent.
TBA	TBA	Environmental Representative	The principal point of advice in relation to the environmental performance of the project. Oversee the implementation of all environmental management plans and monitoring programs required under the planning approval, and advise the Proponent upon the achievement of these plans/programs. Consider and advise the Proponent on its compliance obligations against all matters specified in the conditions of the planning approval and the Statement of Commitments and all other licences and approvals related to the environmental performance and impacts of the project. Ensure environmental auditing is undertaken in accordance with all relevant project Environmental Management Systems.	Authority to require environmental actions to be undertaken.

Name	Organisation	Role	Responsibility	Authority
			Be given the authority and independence to require reasonable steps be taken to avoid or minimise unintended or adverse environmental impacts, and failing the effectiveness of such steps, to direct that relevant actions be ceased immediately should an adverse impact on the environment be likely to occur.	
TBA	TBA	Site Construction and Environmental compliance officer (SCECO)	SCEOs are responsible for the day-to-day management of all on-site environmental aspects including ensuring establishment and maintenance of plantings required by the Landscape Plan. This role can be performed a construction staff member or construction manager, if they are trained and experienced in the relevant subject areas (vegetation management).	Implementation of stop work orders. Reports to EPC manager.
All site personnel		Contractors and their staff	Ensure goals of CEMP and sub-plans are implemented upon instruction. Identify and proactively report incidents. Receive training.	Suggest Stop Work orders *(stop work permitted if action deemed unsafe).*

3.2 SUBCONTRACTOR MANAGEMENT

Subcontractors are required to adapt the CEMP specific to their detailed activities. They are required to prepare activity related **Environmental Work Method Statements (EWMS).** They may elect to prepare their own CEMP framework document but if so it must comply with the requirements stipulated in this CEMP and sub-plans.

CEMP and EWMS documentation is to be supplied to the EPC Contractor prior to works being undertaken. The EPC Contractor will be responsible for verifying whether the subcontractor documents:

1. Are consistent with the CEMP framework and sub-plans
2. Adequately address the environmental risks of the activity

Formal advice in this respect will be provided to the subcontractor before works can commence.

3.3 CONSULTATION REQUIREMENTS

Consultation requirements relevant to the LP are summarised below. Consultation will be undertaken based on the findings of the Visual Verification Report. Table 3-2 sets out the process for how this consultation will be triggered and undertaken, where required. Suggested landscaping techniques for minimising visual impact of the solar farm have also been included in this table.

Table 3-2: Consultation requirements: LP

Stage of project	Consultation requirements	Status
After construction, prior to planting	**Any resident identified by the VVR as affected** Tree planting to achieve screening for homesteads with visual impacts to block parts of the development would be undertaken with each resident demonstrated to be affected, after the construction of the facility.	The VVR will confirm whether this consultation is required.
After construction, prior to planting	**Interested community members** Site boundary and road side planting would address impacts to the broader community. Where adjacent to any other planting works (Landcare or Bushcare for example), that group could be contacted and notified of the proposed plantings.	The VVR will confirm whether this consultation is required.
After construction, prior to planting	**Local council** Any road side plantings, where they occur on Council administered roads, would be undertaken in consultation with the Council.	The VVR will confirm whether this consultation is required.
After construction, prior to planting	**Roads and Maritime Services (RMS)** Any road side plantings, where they occur on RMS administered roads, would be undertaken in consultation with the RMS.	The VVR will confirm whether this consultation is required.

3.4 ENVIRONMENTAL MONITORING, REPORTING AND COMPLIANCE

The CEMP and all associated sub-plans (including this Landscape Management Sub-plan) will be implemented on site during the construction period. The implementation will be monitored, reviewed and audited throughout the construction phase as described in the CEMP.

It is noted that the trigger for visual impact screen planting in accordance with this plan, will be the end of the construction period however, visual impact screen planting may be undertaken during construction phase if it does not interfere with onsite activities. To ensure compliance with this plan, the implementation phase of this plan would also be captured by the Operational Environmental Management Plan (OEMP), particularly with regard to monitoring and response to on-ground results.

4 KEY STRATEGIES FOR MITIGATION

4.1 ONSITE BOUNDARY PLANTING

Visual screen planting would be undertaken as required by the VVR in the form of boundary planting around the solar farm. This would ensure visibility is restricted from roads and nearby homesteads.

4.1.1 Location

Possible planting areas are identified in Figure 4-1, along the north, south and western boundaries. The Visual Verification report would verify the extent of planting required based on the actual impact of the infrastructure, post-construction.

4.1.2 Species

The species for use as screen planting would be endemic to the area to enhance the existing landscape character and be a seen as a continuation of the existing native vegetation.

The native remnants remaining in the locality are Box-Gum Woodland remnants and derived grasslands although in many locations the groundcover is exotic.

A representative species selection is proposed for the overstorey to provide a more 'natural' visual screen as follows:

- White Box (*Eucalyptus albens*)
- Blakely's Red gum (*Eucalyptus blakelyi)*
- Yellow Box (*Eucalyptus melliodora*)

No mid or understorey planting is proposed. It is noted the understorey in many areas of the locality has been replaced by exotic species (weeds or crop species).

4.1.3 Density and planting methods

- Hardened tube stock will be planted out.
- Trees within each row and the rows themselves can be spaced 3 to 5 metres apart.

4.1.4 Establishment and monitoring requirements

Tube stock will be planted in autumn with:

- Water crystals, or regularly watered until established
- Tree guards, to provide some protection from wind and wildlife
- Stock proof tree guards, where planted in paddocks being grazed

Trees will be monitored and mortalities replaced in the first 5 years, to ensure the screen is well established.

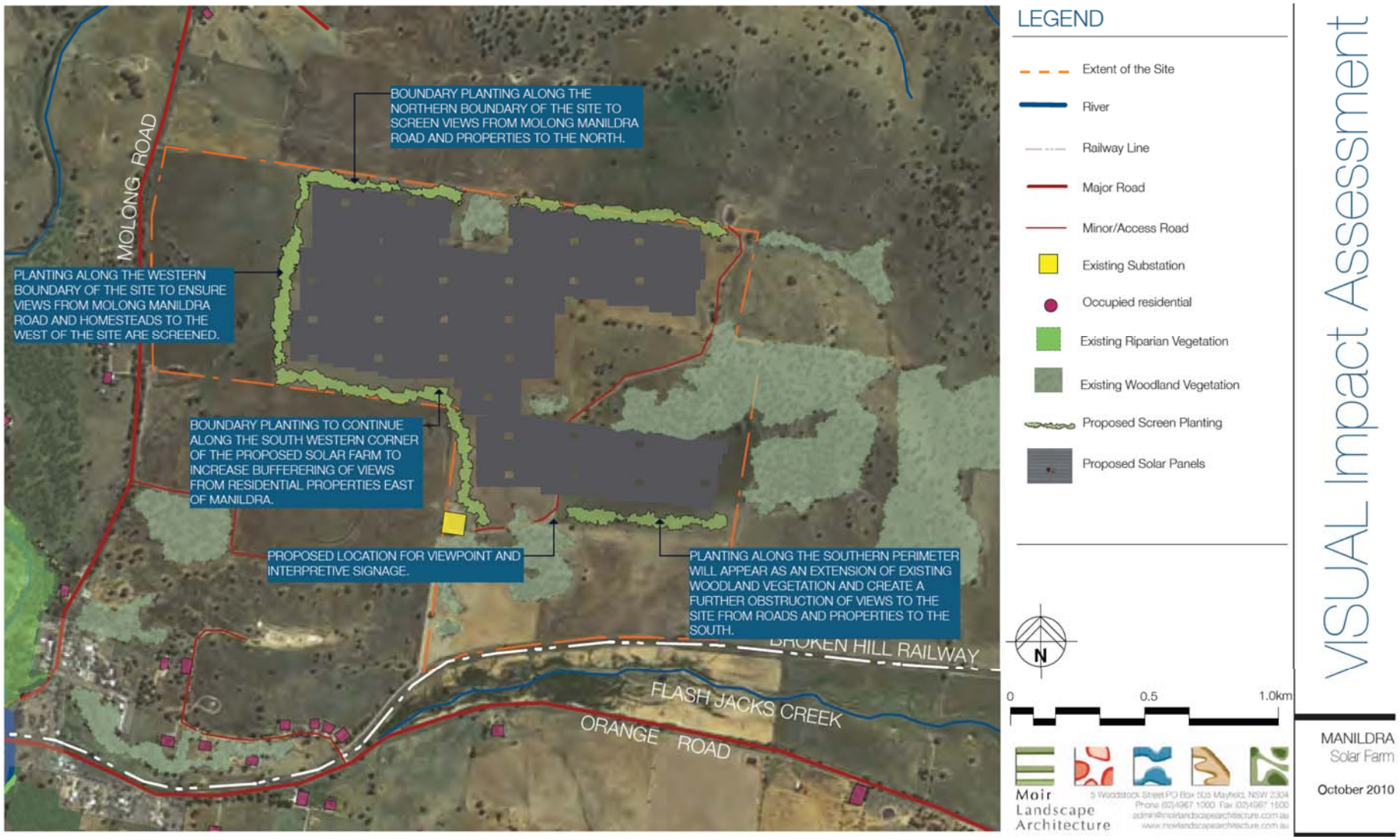

Figure 4-1 Possible onsite boundary planting (source Moir Landscape Architecture 2010b)

Figure 4-2 Section through solar farm, showing boundary planting (source Moir Landscape Architecture 2010b)

4.2 ROADSIDE PLANTING

4.2.1 Location

It is likely that the boundary planting detailed about would be sufficient to reduce views from Molong Manildra Road. However, in consultation with Council and RMS, additional planting may be undertaken within the road reserve if the boundary planting is not deemed to sufficiently address the visual impact by the Visual Verification Report.

The area identified in the Visual Impact Assessment was a 500m section of Molong Manildra Road, approximately 2.6km from the Manildra town centre.

4.2.2 Species

A representative species selection is proposed for the overstorey to provide a more 'natural' visual screen as follows:

- White Box
- Blakely's Red Gum
- Yellow Box

No mid or understorey planting is proposed.

4.2.3 Density and planting methods

- Hardened tube stock will be planted out.
- Trees within each row and the rows themselves can be spaced 3 to 5 metres apart, allowing for inter-planting with existing trees in this area.

4.2.4 Establishment and monitoring requirements

Tube stock will be planted in autumn with:

- Water crystals, or regularly watered until established
- Tree guards, to provide some protection from wind and wildlife
- Stock proof tree guards, where planted in paddocks being grazed

Trees will be monitored and mortalities replaced in the first 5 years, to ensure the screen is well established.

4.3 ON NEIGHBOURS PROPERTIES

If recommended by the Visual Verification Report, post-construction, foreground planting could be provided to homesteads within close proximity, in place of or in addition to onsite boundary planting within the solar farm, where agreed to by the affected landowners.

4.4 ADDITIONAL MITIGATION STRATEGIES

It is noted that an area on the southern edge of the site was identified as a potential location for a public viewpoint due to the expansive views over the proposed solar farm site. This feature is not currently proposed.

It is noted that construction related mitigation measures (dust control, restoration of earthworks, colour and design of infrastructure) are covered within other construction management plans and not within this LP.

5 IMPLEMENTATION PLAN

An implementation plan is provided, based on the planting strategy set out in Section 4.

Table 5-1: Planting implementation plan

Timing	Task	Implementation activity	Performance objective
Construction	Boundary planting	Establish all onsite boundary planting as indicated on Figure 4-1 or as confirmed to be required, based on the Visual Verification Report (VVR). In the latter case, planting can be delayed until the results of the VVR are obtained. This can occur as part of construction, where the planting would not impede other site works and where the seasonal window is appropriate (autumn). Native vegetation is slow growing, nonetheless, the sooner that the vegetation is established, the sooner it will contribute to mitigating the impact of the solar site. Trees will be monitored and mortalities replaced in the first 5 years, to ensure the screen is well established.	Planting undertaken in appropriate seasonal window (autumn). Follow up watering and maintenance of tree guards undertaken until plants established.
Post construction	Visual Verification Report	Validate the views of infrastructure on road sides (a 500m stretch of Molong Manildra Road – 2.6km from Manildra town centre) and at nearest residences.	Visual impact assessment validated on ground. All viewpoints visited. Need for supplementary road side and residential planting identified or rules out by ground validation.

Timing	Task	Implementation activity	Performance objective
Post construction	Consultation	If required by the Visual Verification Report, consult with: • Council and RMS regarding proposed planting on Molong Manildra Road • Nearest residences regarding proposed supplementary boundary or residential property planting.	Supplementary road side planting presented to Council, if this need is identified by ground validation. Supplementary road side planting presented to affected residents, if this need is identified by ground validation. Feedback incorporated into plan.
Post construction	Undertake planting	As agreed with stakeholders, implement supplementary planting: • on Molong Manildra Road, if required • Nearest residences, if required.	Planting undertaken in appropriate seasonal window (autumn). Follow up watering and maintenance of tree guards undertaken until plants established, in consultation with landowners. (Maintenance regimes and responsibilities would be determined in consultation with stakeholders and the plan updated to reflect these arrangements.

6 REFERENCES

NGH Environmental 2010a. Manildra Solar Farm Environmental Assessment. Report prepared October 2010.

Moir Landscape Architecture 2010b. Manildra Solar Farm Visual Impact Assessment. Report prepared October 2010 (included as Appendix F, within the Manildra Solar Farm Environmental Assessment)

NGH Environmental 2010b. Manildra Solar Farm Submissions Report. Report prepared December 2010.

APPENDIX A CONDITION CROSS REFERENCE

Project conditions of relevance to the Landscape Plan are included detailed below. Items addressed in this plan are shaded blue.

LP Landscape Plan, this document

VVR Visual Verification Report

CEMP Construction Environmental Management Plan

ID	Full text	Timing	Addressed in:
Condition of consent			
C14	**c) A landscape plan for the approval of the Secretary. In preparing the plan, the proponent shall consult with council. The plan shall include but not necessarily be limited to :** **i. Identification of landscaping objectives and standards based on visual impacts and local environmental values;** **ii. Details of species used to enhance, mitigate and or augment landscaping to minimise the visual impact of the project, particularly with respect to the impacts on nearby residences** **iii. Implementation, management and monitoring strategies to ensure the establishment and ongoing maintenance of landscaped areas** **iv. A consultation strategy to seek feedback from affected residents and the interested community on the proposed landscape measures**	**Pre construction**	**LP**
F4	Within 6 months of the commissioning of the project, the proponent shall prepare and submit a visual impact verification report for the Secretary's approval… Within 18 months of the approval of the visual impact verification report by the Secretary, the proponent shall ensure that the measures identified in the report are implemented…	Post construction	VVR
F5	The proponent shall ensure that any permanent buildings are designed and constructed to minimise visual intrusion to nearest sensitive receptors as far as reasonable and feasible, including appropriate external finishes and landscape planting to screen views.	Pre construction	CEMP

ID	Full text	Timing	Addressed in:
F6	The proponent shall implement a revegetation and rehabilitation program for all areas of the development footprint which are disturbed during the construction of the project, but which are not required for the ongoing operation of the project including temporary construction facility sites and sections of construction access roads, The Proponent shall ensure that all revegetation measures are implemented progressively where possible and in all cases within six months of the cessation of construction activities at the relevant area. Unless otherwise agreed to by the Secretary, the Proponent shall monitor and maintain the health of all revegetated areas until such time that the plantings have been verified by an independent and suitably qualified expert (whose appointment has been agreed to by the Secretary) as being established, in good health and self sustaining.	Construction	GCMP
Revised statements of commitment, Submissions report 2010			
30	Measures to reduce visual impacts during construction, including but not limited to the following: • Dust reduction throughout the construction process • Restoration of any earthworks required for the construction • Clearing of existing vegetation would be kept to a minimum	Construction	CEMP and FFMP
31	Measures include but are not limited to the following: • Colour of above ground infrastructure to be sympathetic to the landscape character • Underground cabling to be utilised if practical • The design and location of ancillary works are to incorporate measures which would reduce this visual impact	Construction Operation	CEMP OEMP
32	• **Visual screen planting is to be undertaken in the form of boundary planting around the solar farm, foreground planting at affected viewpoints and residential tree planting.** • **Screening vegetation would be planted along the northern, southern and western perimeters of the site.** • **Roadside planting along the eastern edge of Manildra Molong Road may be undertaken to ensure views from the road are fragmented** • **Tree planting would be undertaken in consultation with relevant landowners to achieve screening for homesteads with visual impacts to strategically block parts of the development.** • **Species typical of the area would be selected to enhance the existing landscape character.**	**Post construction**	**LP**
33	A designated viewing area may be provided where visitors would be able to safely view the solar farm and surrounding landscape.	Construction Operation	CEMP OEMP

Appendix F

OFFSET STRATEGY

Offset Strategy

MANILDRA SOLAR FARM

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Document Verification

Project Title:

Offset Strategy

Manildra Solar Farm

Project Number:	4601
Project File Name:	Manildra Solar Farm_Offset Strategy v3.2.doc

Revision	Date	Prepared by (name)	Reviewed by (name)	Approved by (name)
Version 3.2	03/02/16	Brooke Marshall (minor changes)		Brooke Marshall

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CONTENTS

1 INTRODUCTION 1

1.1 BACKGROUND 1

1.2 AIM OF THIS STRATEGY 1

1.3 LEGISLATIVE CONTEXT 2

2 NATIVE VEGETATION LOSSES AND THE ADEQUACY OF THE PROPOSED OFFSET 4

2.1 AREAS TO BE IMPACTED 4

2.2 NATIVE VEGETATION WITHIN THE SITE BOUNDARIES 5

2.3 WHAT WILL BE OFFSET? 1

2.3.1 Permanent impacts 1

2.3.2 Temporary impacts 1

3 'IMPROVE OR MAINTAIN' BIODIVERSITY VALUES 2

4 OFFSET RATIOS AND CONNECTIVITY IMPROVEMENTS 3

4.1 LOCATING AN OFFSET SITE 3

4.2 OFFSET RATIOS 3

4.3 CONNECTIVITY 4

5 MANAGEMENT ACTIONS 5

6 PRINCIPLES OF THE USE OF BIODIVERSITY OFFSET IN NSW 6

7 IN-PERPETUITY CONSERVATION COMMITMENT 10

8 CONCLUSION 11

9 REFERENCES 12

APPENDIX A BIOBANKING CALCULATIONS 13

APPROACH 13

METHOD 13

RESULTS 17

APPENDIX B CREDIT PROFILE 19

TABLES

Table 2-1 Estimated impact areas of each proposal component 4

Table 2-2 Estimated impact areas of final layout (provided September 2015). 5

Table 2-3 Calculated area of impact excluding native vegetation remnants <0.25 ha.....5

Table 9-1 Native vegetation zones within the project.....14

Table 9-2 Plot data used in the assessment.....16

Table 9-3 Benchmark data (OEH Oct 2008). 16

Table 9-4 Credit conversion: area estimated to achieve offset requirement.....18

Table 9-5 Native vegetation zones within the project's nominated offset site.....18

1 INTRODUCTION

1.1 BACKGROUND

The Manildra Solar Farm was approved 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.

1.2 AIM OF THIS STRATEGY

The aim of this document is to set out a strategy to satisfy Condition of Approval C.2: the preparation of an offset strategy. This condition forms part of the project's conditions of approval (set out in Section 1.3, below).

As required by the Manildra Solar Farm NSW project approval, this draft strategy has been prepared by an ecologist and requires input from the NSW Office of Environment and Heritage (OEH, formerly Department of Environment Climate Change and Water DECCW) prior to finalisation and submission to the NSW Department of Planning and Infrastructure.

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. This has been undertaken in Appendix A.

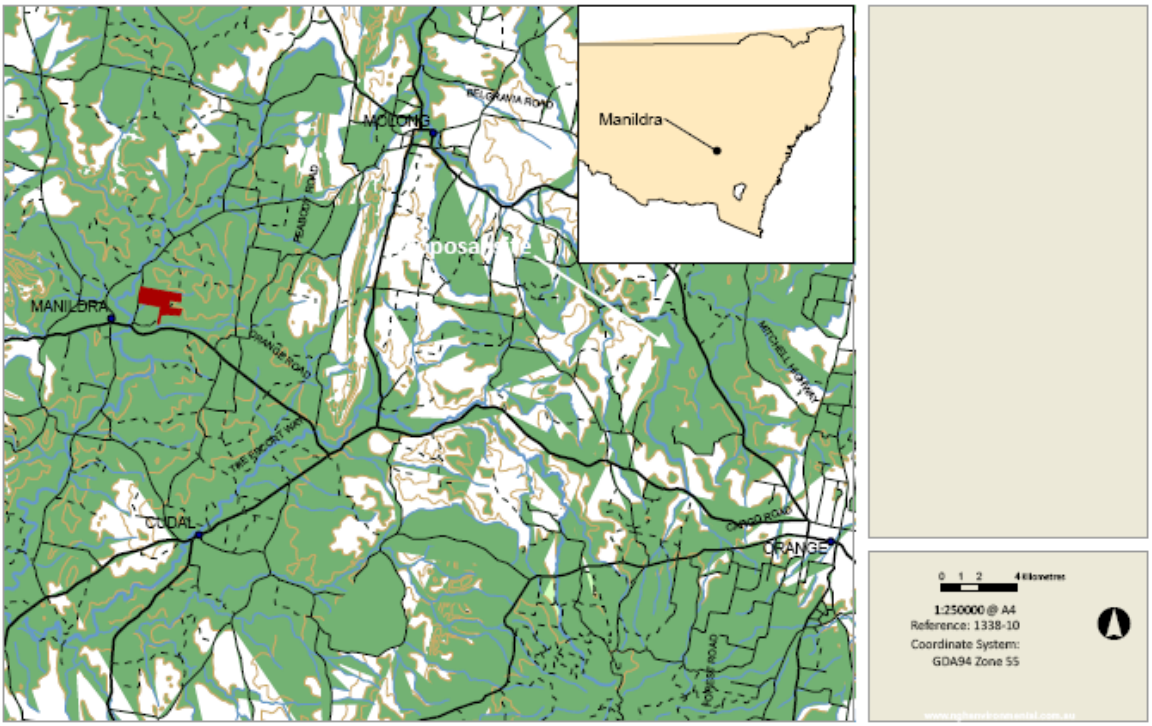


Figure 1-1. Location of the Manildra solar farm (source: nghenvironmental 2010a)

1.3 LEGISLATIVE CONTEXT

The Manildra Solar Farm was approved by the NSW Department of Planning 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 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 – this document
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

Specific to the offset strategy, Condition of Approval C.2 states:

> *The proponent shall prepare a biodiversity offset strategy, in consultation with DECCW and the landholder to the satisfaction of the Director-General, to guide the development of the offset package required in condition E3. The offset strategy is to be prepared by an ecologist and submitted for the approval prior to commencement of construction and include:*
>
> *a) consideration of all native vegetation losses and the adequacy of the proposed offset*

b) demonstration of how the offset will 'improve or maintain' biodiversity values;
c) the proposed offset ratios and connectivity improvements;
d) proposed management actions;
e) demonstrations of how the strategy was prepared in accordance with DECCW's Principles of the Use of Biodiversity Offset in NSW; and
f) measures to ensure in-perpetuity the conservation commitment.

This report is structured to address these specific areas in Sections 2 – 7.

Regarding the offset plan, Condition of Approval E.3, referred to above, includes the following requirements:

> *Details of the offset strategy* [package] *shall be submitted for the approval of the Director-General prior to the commencement of operation or as agreed by the Director-General. 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 (**ngh**environmental 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 NATIVE VEGETATION LOSSES AND THE ADEQUACY OF THE PROPOSED OFFSET

2.1 AREAS TO BE IMPACTED

The development will require temporary and permanent infrastructure components. Temporary components include stock pile areas, construction compounds and access tracks. Permanent components include the site office and facilities, solar array mounted on concrete footings or pylons, and transmission infrastructure.

The final infrastructure layout and location of temporary components has not yet been finalised. Estimated impact area footprints for each infrastructure component are shown in Table 2.1.

Table 2-1 Estimated impact areas of each proposal component

Source: Table 7-1 Manildra Solar Farm Biodiversity Assessment, nghenvironmental 2010a

Component	Quantity	Length (m)	Width (m)	Area (m^2)
Site office and facilities	1	20	20	400
Underground electricity transmission (control room to substation)	1	500	0.5	250
Solar Panels	180,000	2	1	360,000 (panel surface) 306,000 (ground coverage assuming 30 degree tilt of panels)
Concrete footing or Pile driven posts	30,000 or 50,000	3.05 or 0.1	0.19 or 0.1	17,385 or 500
Underground cabling (2 circuits)	2	1,250	0.5	1,250
Inverters	72	4.3	2.2	681
Pad-mount transformers	36	4.3	2.2	681
Site access track	1	500	8	4,000 of which 2,000 is already cleared (an existing track)
Internal access tracks	1	5,000	8	40,000
Perimeter tracks	1	7,000	8	56,000
Perimeter fencing	1	7,000	1	7,000
Temporary laydown area	1			20,000
Parking	1			750
Operations and maintenance building (operational stage)	1	12	9	108

2.2 NATIVE VEGETATION WITHIN THE SITE BOUNDARIES

The Biodiversity Assessment (**ngh**environmental 2010) discusses the important habitat elements onsite. These include Box-Gum Woodland and Derived Native Grasslands, an Endangered Ecological Community under the NSW *Threatened Species Conservation Act 1995* (White Box-Yellow Box-Blakely's Red Gum Woodland Endangered Ecological Community). Large areas of vegetation are non-native, dominated by exotic species (refer to Figure 3.1.2). Potential for an east west wildlife corridor is provided by overstorey vegetation to the south of the development envelope.

Impacts on native vegetation are shown in Table 2.2 and Figure 2.1. It is noted that this is an upper limit and that the final footprint is likely to impact less native vegetation. The calculations are also precautionary in that they include remnants less than 0.25ha in area. At the time of approval of this project, the Biobanking methodology would not have required offsets for these areas of vegetation (pers. Comm. D. Geering OEH 2015). These native vegetation remnants less than 0.25ha total 0.93 ha.

Table 2-2 Estimated impact areas of final layout (provided September 2015).

Total area of impact	Stage one (ha)	Stage two (ha)	Total (ha)
Native vegetation	6.34	0.92	7.26
Box Gum Woodland Derived Grassland (EEC, TSC)	2.92	0.00	2.92
Box-Gum Woodland (EEC, TSC)	3.42	0.92	4.34
Crop or exotic pasture	105.97	23.53	129.50
Total:	**112.31**	**24.44**	**136.76**

Table 2-3 Calculated area of impact excluding native vegetation remnants <0.25 ha

Area of impact excluding native vegetation remnants <0.25ha	Stage one (ha)	Stage two (ha)	Total (ha)
Native vegetation	5.50	0.83	6.33
Box Gum Woodland Derived Grassland (EEC, TSC)	*2.92*	*0*	*2.92*
Box-Gum Woodland (EEC, TSC)	*2.58*	*0.83*	*3.41*
Crop or exotic pasture	105.97	23.53	129.50
Total:	**111.47**	**24.35**	**135.83**

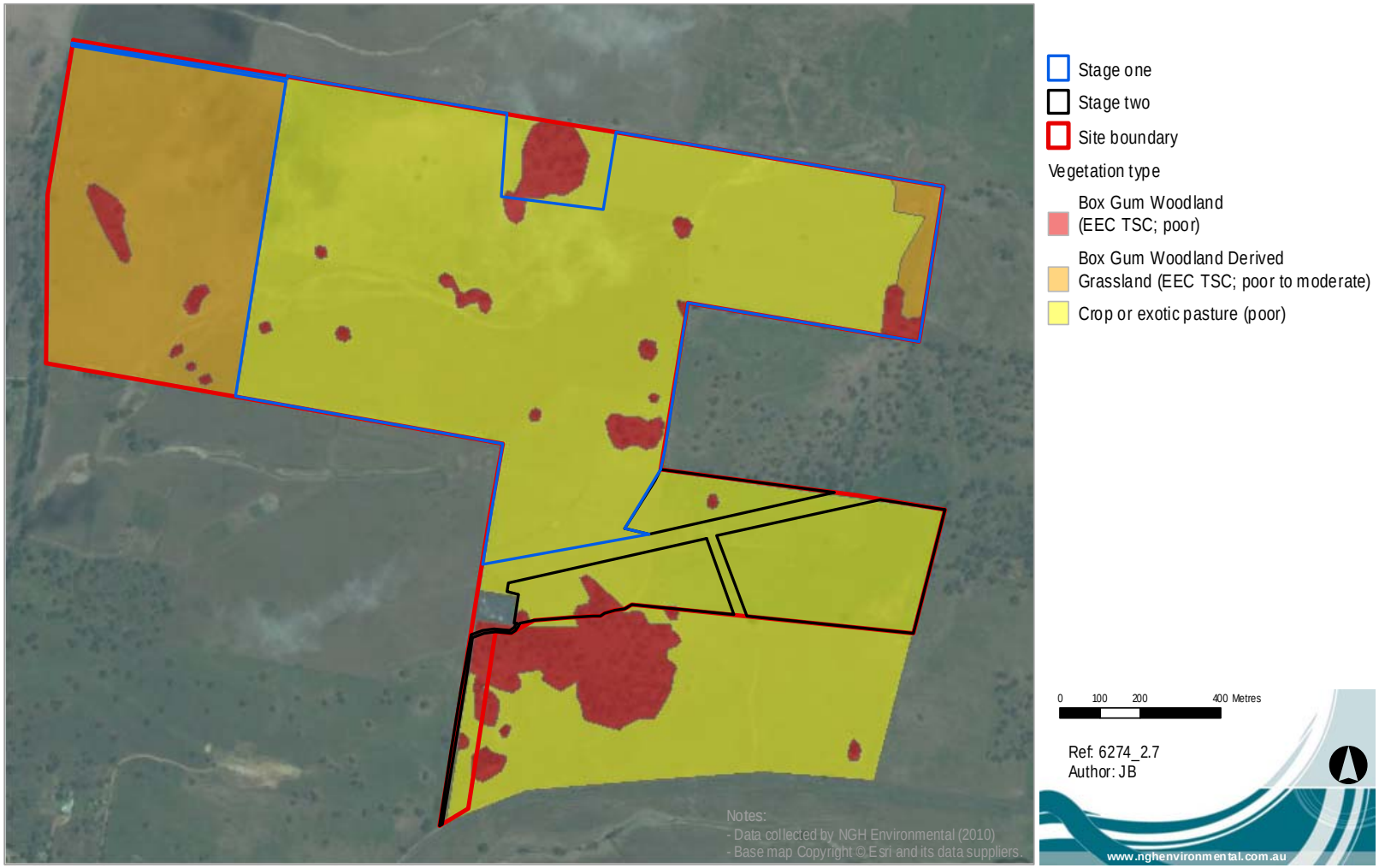


Figure 2-1 Distribution of vegetation types within the project area

2.3 WHAT WILL BE OFFSET?

2.3.1 Permanent impacts

It is proposed that only native-dominated vegetation to be permanently removed by the development will be offset.

The exact area to be offset will be calculated by overlaying the final permanent infrastructure footprint over a validated vegetation map, prior to construction. This will ensure that the final offset area will:

- Reflect the final infrastructure layout. The developer has the opportunity to reduce offset requirements in the detailed design of the site, by maximising the development within exotic areas and minimising development within native areas. With regard to this development, using pylons rather than concrete footings and minimising access track widths provide opportunities to reduce vegetation impacts and therefore offset requirements.
- Take into account any changes in native vegetation condition and extent prior to the development commencing. For example, increased rainfall may result in larger native species dominated areas within the development footprint and these are required to be offset. The vegetation mapping should be validated by an ecologist in an appropriate survey window (to maximise native species detection) prior to construction.

The array will be mounted approximately 3m above the ground. Where it occurs over native vegetation, it is proposed that 100% of the array area be considered a permanent habitat loss and offset accordingly.

2.3.2 Temporary impacts

As temporary impacts occurring in native dominated vegetation have potential to be rehabilitated, these areas would not be included in the offset plan (i.e. they would not be permanent impacts). The requirement for effective rehabilitation however assumes:

- No trees would be cleared (this would be considered a permanent impact to be offset)
- Native ground cover (of suitable species endorsed by an ecologist) is effectively re-established in these areas in the short term

Where these conditions cannot be met, the areas in question would be included in the offset calculations and permanently offset.

This stipulation provides the incentive to both:

- Avoid or minimise impacts in areas of intact native vegetation
- Effectively rehabilitate these areas, where avoidance is not feasible

A Flora and Fauna Management Plan and Groundcover Management Plan stipulate management measures required during construction including rehabilitation.

3 'IMPROVE OR MAINTAIN' BIODIVERSITY VALUES

Clearing land or modifying native vegetation results in a biodiversity loss; habitat is removed or degraded. The purpose of an offset site is not just to equal the vegetation to be affected by the development, but to ensure that over time, through dedicated management actions, an improvement in the offset site's biodiversity values will balance out that initial loss. That is why offset ratios are not 1:1 but are usually much higher.

An 'improve or maintain biodiversity value' outcome is proposed to be achieved for this project as follows:

Regarding the development site:

- Permanent infrastructure in native dominated areas will be minimised as much as practical
- Temporary infrastructure will be located in exotic dominated areas as much as practical
- Native dominated areas subject to temporary impacts will be rehabilitated to pre-impact condition and where this is not achievable, the area will be considered a permanent impact to be offset.
- Residual impact to native vegetation (that cannot be avoided or minimised) will be offset.

These stipulations are intended to minimise the impacts on native vegetation, which will in turn reduce the offset requirements for the developer.

Regarding the offset site:

- The offset ratio will be either:
    - 1:10 'like for like' or 'like for better', in terms of vegetation type and condition

      OR

    - Calculated specifically using the OEH endorsed Biobanking methodology

  A 1:10 offset ratio is considered appropriate by OEH where endangered ecological communities are being impacted. Using the Biobanking methodology is the preferred option as it is both a tool accepted to provide a 'maintain or improve' outcome as well as being able to precisely reflect the condition of the vegetation in question.

- In the selection of the offset site, the ability to enhance landscape connectivity will be considered.
- The offset site will be managed for biodiversity value improvement. Specific management prescriptions will be developed and implemented. Their success will be monitored and adapted as required. Refer to Section 5 of this strategy for examples.
- The offset site will be established in perpetuity. Refer to Section 7 of this strategy for details.
- Provision will be made to fund the management actions required to be implemented at the offset site. Refer to Section 7 of this strategy.
- The offset site will complement existing biodiversity conservation initiatives. That is, it will not include a site already set aside to be managed for biodiversity conservation, such as under an existing Property Vegetation Plan.

4 OFFSET RATIOS AND CONNECTIVITY IMPROVEMENTS

4.1 LOCATING AN OFFSET SITE

The Proponent is currently considering offset sites, including the ability to locate offsets within the project's site boundary. In particular the following is noted:

- The area to the west of the development envelope, within the site boundary, has higher quality native vegetation than that to be impacted by the development. Securing this area as an offset has the following advantages:
    - It can achieve 'like for like' in terms of native vegetation type and 'like for better' in terms of vegetation condition
    - It will reduce the area required to be offset (as it will achieve a lower ratio due to it being of better condition than the area to be impacted) under a Biobanking survey methodology
- Similarly, the area to the south of the development envelope presents an opportunity to enhance landscape connectivity:
    - Replanting trees in this area could enhance the east west link adjacent to the site
- Both sites present opportunities for efficient management actions by the developer and land owner, in conjunction with onsite construction and operation. For example,
    - Management responsibility can be clearly set out as part of the lease agreement with the landowner
    - More expensive elements such as fencing, weed control and replanting in the offset site could be accomplished efficiently during the construction phase

4.2 OFFSET RATIOS

As discussed in Section 3, the offset ratio will be either:

- 1:10 'like for like' or 'like for better', in terms of vegetation type and condition

  OR

- Calculated specifically using the OEH endorsed Biobanking methodology

To verify that suitable offset areas can be found within the site boundaries, a Biobanking assessment was undertaken. In consultation with OEH, benchmark data rather than field collected data were allowed to be used. The results are presented in Appendix A and demonstrate the western portion of the site is sufficient to meet Biobanking requirements. It contains the correct vegetation types and is of sufficient size to meet the offset requirement. The resulting offset ratio is approximately 1 : 6.

4.3 CONNECTIVITY

Specific to the Manildra site, connectivity improvements have been specified. This will have three important benefits:

- Enhanced functioning of remnant vegetation as a wildlife corridor
- Enhanced viability of previously fragmented remnants
- Reduced 'edge effects' in the offset area, allowing for greater improvements over time

If a biometric (Biobanking) assessment approach is taken, connectivity values would be incorporated into the credit statement. Additionally, however, connectivity should be considered during the selection of the offset site, to maximise these connectivity benefits.

As discussed in Section 4.1, there is an opportunity to enhance connectivity by including the area to the south of the development envelope in the offset plan and undertaking tree planting in this area. An additional advantage is that the offset areas would be under as few landholdings as possible, which should assist the co-ordinated management of the offset sites.

5 MANAGEMENT ACTIONS

A management plan is required to set out how the offset site will be managed. This plan would be completed and signed by the land owner to ensure that all measures are committed to. The plan also includes checklists useful for keeping track of the actions undertaken. The plan is likely to be required by OEH to be submitted as part of the establishment of the offset site. Note, a template plan can be downloaded as a word document from the Biobanking website.

The plan should include clear targets so that actions can be adapted if required to meet the intent of the management action. The overall objective of the management actions will be 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 will be developed as part of the offset plan . Once a site is determined however, the following actions are likely to be required:

- 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 (species to be determined by an ecologist) to enhance landscape connectivity in specific areas.

6 PRINCIPLES OF THE USE OF BIODIVERSITY OFFSET IN NSW

Impacts must be avoided first by using prevention and mitigation measures.

Offsets are then used to address remaining impacts. This may include modifying the proposal to avoid an area of biodiversity value or putting in place measures to prevent offsite impacts.

By way of iterative infrastructure planning including considering refined constraints mapping, the proposal has avoided and mitigated, proposing to offset only residual impacts. This is documented within the Biodiversity Assessment (**ngh**environmental 2010a).

The development envelope allows for further micro-siting of infrastructure, and this can also be used as an opportunity to reduce the offset requirement, as discussed in several sections of this strategy.

All regulatory requirements must be met.

Offsets cannot be used to satisfy approvals or assessments under other legislation, e.g. assessment requirements for Aboriginal heritage sites, pollution or other environmental impacts (unless specifically provided for by legislation or additional approvals).

The conditions of approval with regard to offsetting are set out in Section 2 of this strategy. The strategy is structured to address each explicitly. Approvals or assessments under other legislation are not relevant to this proposal.

Offsets must never reward ongoing poor performance.

Offset schemes should not encourage landholders to deliberately degrade or mismanage offset areas in order to increase the value from the offset.

This can be addressed in two ways:

a) The offset site can be set up in perpetuity – this removes the incentive to degrade the offset site to facilitate development at a later date

b) The management measures can have clear targets and be set out to push most management to the beginning of the agreement, where successful accomplishment of targets would be rewarded by less intensive management in ongoing years. This suits measures such as weed control which are more easily achieved with intensive efforts than with small ongoing efforts.

This strategy proposes to address both aspects, as discussed in Sections 5 (management) and 7 (in-perpetuity security) of this strategy.

Offsets will complement other government programs.

A range of tools is required to achieve the NSW Government's conservation objectives, including the establishment and management of new national parks, nature reserves, state conservation areas and regional parks and incentives for private landholders.

The offset site has not yet been selected. As discussed in Section 3, it has been established that it cannot be a site already used as a type of biodiversity conservation reserve.

Offsets must be underpinned by sound ecological principles.

They must:

- *include the consideration of structure, function and compositional elements of biodiversity, including threatened species*
- *enhance biodiversity at a range of scales*
- *consider the conservation status of ecological communities*
- *ensure the long-term viability and functionality of biodiversity.*

Biodiversity management actions, such as enhancement of existing habitat and securing and managing land of conservation value for biodiversity, can be suitable offsets. Reconstruction of ecological communities involves high risks and uncertainties for biodiversity outcomes and is generally less preferable than other management strategies, such as enhancing existing habitat.

These are features that need to be considered in the selection of the offset site as well as the management actions for the site. Biobanking credit calculation is the most accurate and demonstrable way to take these issues into account during site selection. As set out in Section 3 of this strategy, the selection of the offset site will consider the ability to enhance landscape connectivity. As set out in Section 5, it will be managed, subject to a management plan prepared for the offset site specifically. The success of management actions will be monitored and adapted as required to achieve their set objectives.

Offsets should aim to result in a net improvement in biodiversity over time.

Enhancement of biodiversity in offset areas should be equal to or greater than the loss in biodiversity from the impact site.

Setting aside areas for biodiversity conservation without additional management or increased security is generally not sufficient to offset against the loss of biodiversity. Factors to consider include protection of existing biodiversity (removal of threats), time-lag effects, and the uncertainties and risks associated with actions such as revegetation.

Offsets may include enhancing habitat, reconstructing habitat in strategic areas to link areas of conservation value, or increasing buffer zones around areas of conservation value and removal of threats by conservation agreements or reservation.

As above, this is incorporated in Section 3 of this strategy.

Offsets must be enduring - they must offset the impact of the development for the period that the impact occurs.

As impacts on biodiversity are likely to be permanent, the offset should also be permanent and secured by a conservation agreement or reservation and management for biodiversity. Where land is donated to a public authority or a private conservation organisation and managed as a biodiversity offset, it should be accompanied by resources for its management. Offsetting should only proceed if an appropriate legal mechanism or instrument is used to secure the required actions.

The offset security for this development is required in perpetuity. This is discussed in Section 7 of this strategy.

Offsets should be agreed prior to the impact occurring.

Offsets should minimise ecological risks from time-lags. The feasibility and in-principle agreements to the necessary offset actions should be demonstrated prior to the approval of the impact. Legal commitments to the offset actions should be entered into prior to the commencement of works under approval.

The strategy sets out a pathway to establish the offset site and its management. This strategy requires input from OEH and landholders prior to any impacts occurring.

It is a requirement that all offset arrangements be in order prior to operation. The offset plan will verify that the objectives set out in this strategy have been achieved.

Offsets must be quantifiable - the impacts and benefits must be reliably estimated.

Offsets should be based on quantitative assessment of the loss in biodiversity from the clearing or other development and the gain in biodiversity from the offset. The methodology must be based on the best available science, be reliable and used for calculating both the loss from the development and the gain from the offset. The methodology should include:

- *the area of impact*
- *the types of ecological communities and habitat/species affected*
- *connectivity with other areas of habitat/corridors*
- *the condition of habitat*
- *the conservation status and/or scarcity/rarity of ecological communities*
- *management actions*
- *level of security afforded to the offset site.*

These points are addressed in this document. As stated, biometric assessment offers the most demonstrable method to undertake the first six points. A PVP is proposed to ensure long term security.

The best available information/data should be used when assessing impacts of biodiversity loss and gains from offsets. Offsets will be of greater value where:

- *they protect land with high conservation significance*
- *management actions have greater benefits for biodiversity*
- *the offset areas are not isolated or fragmented*
- *the management for biodiversity is in perpetuity (e.g. secured through a conservation agreement).*

The validation of the vegetation at the time of offset calculations will ensure that the best available information is used. The definition of the offset site will be done according to Section 3, to ensure like for like (or better) and considering ways to enhance landscape connectivity. Section 7 addresses perpetuity.

Management actions must be deliverable and enforceable.

The management plan for the offset site is discussed in Section 5. This guidance information is intended to ensure that the actions achieve their objectives, to improve biodiversity values at the offset site.

Offsets must be targeted.

They must offset impacts on the basis of like-for-like or better conservation outcome. Offsets should be targeted according to biodiversity priorities in the area, based on the conservation status of the ecological community, the presence of threatened species or their habitat, connectivity and the potential to enhance condition by management actions and the removal of threats. Only ecological communities that are equal or greater in conservation status to the type of ecological community lost can be used for offsets. One type of environmental benefit cannot be traded for another: for example, biodiversity offsets may also result in improvements in water quality or salinity but these benefits do not reduce the biodiversity offset requirements.

Offsets have been proposed based on biodiversity values and achieve a like for like or like for better outcome.

Offsets must be located appropriately.

Wherever possible, offsets should be located in areas that have the same or similar ecological characteristics as the area affected by the development.

Section 3 sets out the rational for defining the offset site, including like for like (or better). Two areas that would meet this objective are identified. Both land to the west and south of the development envelope have features that would make them highly suitable for offsets.

Offsets must be supplementary.

They must be beyond existing requirements and not already funded under another scheme. Areas that have received incentive funds cannot be used for offsets. Existing protected areas on private land cannot be used for offsets unless additional security or management actions are implemented. Areas already managed by the government, such as national parks, flora reserves and public open space cannot be used as offsets.

This point has been considered in Section 3.

Offsets and their actions must be enforceable through development consent conditions, licence conditions, conservation agreements or a contract.

Offsets must be audited to ensure that the actions have been carried out, and monitored to determine that the actions are leading to positive biodiversity outcomes.

The establishment of a CPVP on the land title ensures in-perpetuity security for the offset site. Management actions would be shared between the developer (for the life of the impact) and the landowner (post development), as discussed in Section 7.

7 IN-PERPETUITY CONSERVATION COMMITMENT

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)

Four options may be considered for securing a long-term management arrangement at the offset site:

- Biobanking agreement (TSC Act , part 7 A)
- Conservation Property Vegetation Plan (CPVP) (Native Vegetation Act)
- Local Environmental Plan: Environmental Zone E2 or E3 (Environmental Planning and Assessment Act)
- Plan of management with S.88b covenant (Environmental Planning and Assessment Act)

It is proposed that a Conservation Property Vegetation Plan (CPVP) be established over the offset area that 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. These management actions should be consistent with recommendations specified in this document.

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. The Proponent, if they do not intend to purchase the offset sites, would ensure the land owners have sufficient resources and information to implement the management actions as this forms a condition of the solar farm's consent. 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.

8 CONCLUSION

This document is intended to set out the framework for identifying, securing and managing an offset site suitable to achieve a 'maintain or improve' biodiversity outcome for the project, in line with the project's approval requirements.

It has been prepared in consultation with OEH. A draft document was provided to OEH in October 2012. After further consultation, a revised document was prepared including a preliminary Biobanking assessment to confirm the suitability of the proposed offset site.

It is recommended that this document also be forwarded to involved land holders to ensure that the commitments are fully understood and all opportunities to minimise the offset requirement (by minimising clearing of native vegetation) have been explored.

The offset plan, required to be developed prior to operation, would fully detail:

- The final areas of native vegetation to be impacted and their current condition (including collection of plot data prior to any impacts and in suitable seasonal conditions)
- The final offset areas (including collection of plot data prior to any impacts and in suitable seasonal conditions)
- The ability of the offsets to achieve a 'maintain or improve' biodiversity outcome for the project
- Specific management actions for the offset site
- Demonstration that the site is secured in perpetuity under a suitable instrument.

9 REFERENCES

nghenvironmental 2010a. Manildra Solar Farm Biodiversity Assessment. Report prepared for Infigen Energy, October 2010.

nghenvironmental 2010b. Manildra Solar Farm Submissions Report. Report prepared for Infigen Energy, December 2010.

Seidel J. and Briggs S. 2008. Biobanking Operation Manual. NSW Department of Environment and Climate Change, Sydney.

APPENDIX A BIOBANKING CALCULATIONS

APPROACH

To inform this offset strategy, preliminary BioBanking calculations were undertaken as follows:

- Framework for Biodiversity Assessment option selected for BioBanking calculations, reflecting that the project is a Major Project
- Impact areas and threatened species values entered, as collected from the 2010 Biodiversity Assessment
- Plot data manufactured from OEH database benchmark data, to estimate the site values of each vegetation type to be impacted
- Resultant credit profile converted to areas, using the OEH credit converter tool.

The key decision points in this process are documented below.

METHOD

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 as estimated from aerial imagery;

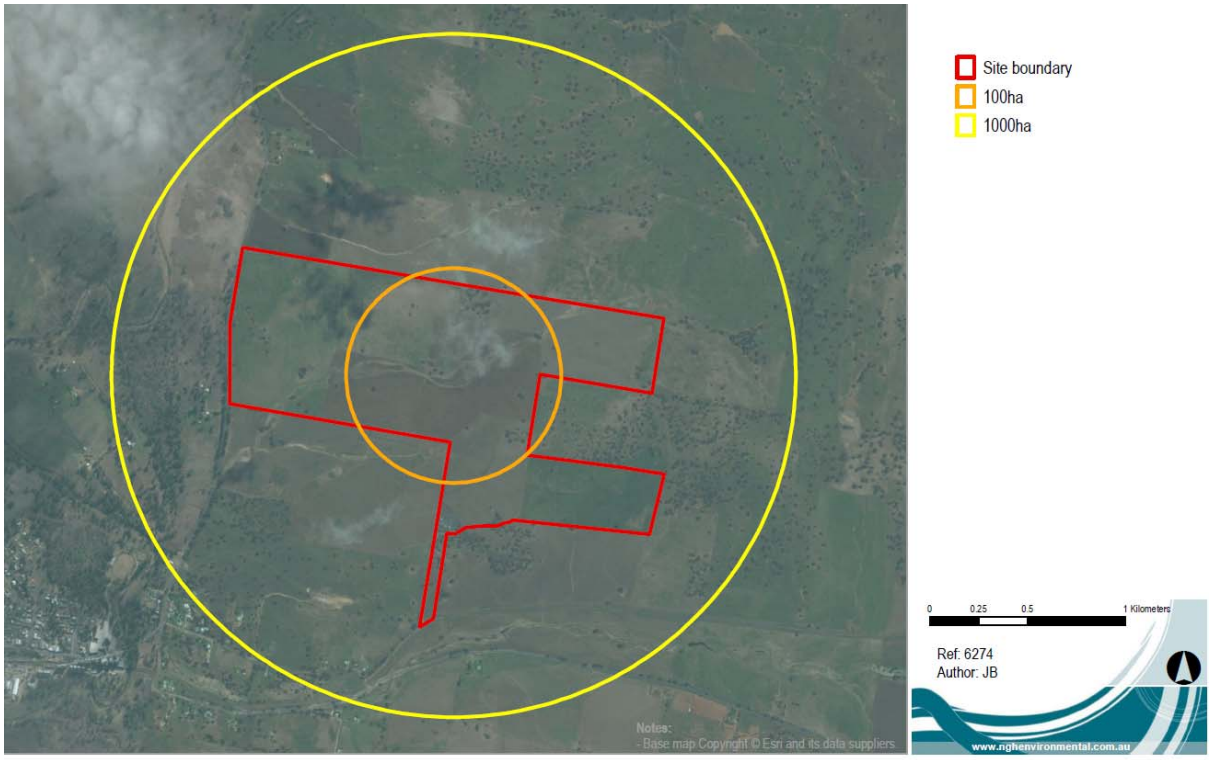
Outer assessment circle before development: <5% after development: <5%

Inner assessment circle before development: <5% 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.



Vegetation zones

The native vegetation zones that would be impacted by the project as entered into the BioBanking Credit Calculator (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).

Table 9-1 Native vegetation zones within the project

Zone	Total (ha)	Condition class	Plots required	Site value score
Box Gum Woodland Derived Grassland (EEC, TSC)	2.92	Moderate to good	2	62
Box-Gum Woodland (EEC, TSC)	4.34	Moderate to good	3	58

Notes:

- No geographic / habitat features were entered, on the basis of the results of the Biodiversity Assessment (2010) that assessed low potential for the returned species to occur.
- Exotic pasture has not been included in the assessment.
- Native remnants less than 0.25ha have been included as a precautionary measure, to provide an upper limit offset requirement to the client.
- As this assessment is preliminary, 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'.

Plot data used in the assessment

The following plot data have been derived from benchmark data on the OEH vegetation data base. Generally, the median range of the lower and upper benchmarks has been used.

For the derived grassland, the overstorey is entered as zero and no fallen logs, regeneration or hollows are assumed to occur. For the woodland, native midstory and groundcover as entered as zero as these areas area comprised of overstorey above exotic pasture.

As the data were not collected in the field and are 'manufactured', not Easting and Northing location apply; '111111, 1111111' has been entered for each plot. The number of plots required, as shown Table 9-1, have been duplicated for each zone.

The management scores *with development* have been entered as zero for each parameter – that is, total removal of habitat would result from the development. Current site value scores are shown in Table 9-1. Future site value scores would all be zero.

Table 9-2 Plot data used in the assessment

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

Overstorey removed.

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
1	**23**	**0**	**10.5**	**42.5**	**4**	**11.5**	**0**	**0**	**0**	**0**	**111111**	**1111111**	**1**

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

Native midstorey and understorey removed.

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
2	**23**	**21.5**	**0**	**0**	**0**	**0**	**100**	**1**	**1**	**66**	**111111**	**1111111**	**1**

Benchmark data used to derive the plot data are shown below

Table 9-3 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
	Richn ess	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

Site surveys

Predicted species assumed to occur where returned as:

- Grey-crowned Babbler (eastern subspecies) — *Pomatostomus temporalis subsp. temporalis*
- Little Lorikeet — *Glossopsitta pusilla*
- Swift Parrot — *Lathamus discolor*

Species requiring survey were returned as:

- Brush-tailed Phascogale — *Phascogale tapoatafa*
- Koala — *Phascolarctos cinereus*
- Regent Honeyeater — *Anthochaera phrygia*
- Squirrel Glider — *Petaurus norfolcensis*

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

RESULTS

Offset requirement

The following ecosystem and threatened species credits have been returned by the assessment. The full offset profile generated by the BCC is provided in Appendix B.

- Blakely's Red Gum Yellow Box grassy tall woodland of the NSW South Western Slopes Bioregion (derived grassland) — 145 credits
- Blakely's Red Gum Yellow Box grassy tall woodland of the NSW South Western Slopes Bioregion — 202 credits

There are no species credits generated by the assessment.

Credit conversion

The OEH ‘credit converter’ tool has been used to convert the credit requirements of the development into an estimate of the areas of each vegetation type and threatened species habitat needed to satisfy those credit requirements.

Table 9-4 Credit conversion: area estimated to achieve offset requirement

Entity requiring offsets	Credit requirement	Area of land required, as determined by the credit calculator
Blakely's Red Gum - Yellow Box grassy tall woodland of the NSW South Western Slopes Bioregion	347	37.3 hectares

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.

Candidate offset site

The paddock to the west of Stage 1 was evaluated to determine its ability to meet the offset requirement for the project. It contains the correct vegetation types and is of sufficient size to meet the offset requirement. The resulting offset ratio is approximately 1 : 6.

Table 9-5 Native vegetation zones within the project's nominated offset site

Zone	Total (ha)	Condition class
Box Gum Woodland Derived Grassland (EEC, TSC)	40.31	Moderate to good
Box-Gum Woodland (EEC, TSC)	1.54	Moderate to good
Total	**41.85**	

APPENDIX B CREDIT PROFILE

BioBanking Credit Calculator

Ecosystem credits

Proposal ID :	0035/2015/2353MP
Proposal name :	Manildra solar farm
Assessor name :	Brooke Marshall
Assessor accreditation number :	0035
Tool version :	v4.0
Report created :	03/02/2016 11:13

Assessment circle name	Landscape score	Vegetation zone name	Vegetation type name	Condition	Red flag status	Management zone name	Management zone area	Current site value	Future site value	Loss in site value	Credit required for bio diversity	Credit required for TS	TS with highest credit requirement	Average species loss	Species TG Value	Final credit requirement for management zone
one	12.00	LA120_Moderate/Good_Derived grassland	Blakely's Red Gum - Yellow Box grassy tall woodland of the NSW South Western Slopes Bioregion	Moderate/Good_Derived grassland	Yes	1	2.92	62.00	0.00	62.00	145	90	Little Lorikeet	66.67	1.80	145
one	12.00	LA120_Moderate/Good	Blakely's Red Gum - Yellow Box grassy tall woodland of the NSW South Western Slopes Bioregion	Moderate/Good	Yes	2	4.34	58.00	0.00	58.00	202	126	Little Lorikeet	33.33	1.80	202

BioBanking Credit Calculator

Species credits

Proposal ID :

Proposal name :

Assessor name :

Assessor accreditation number :

Tool version : v4.0

Report created : 03/02/2016 11:13

Scientific name	Common name	Species TG value	Identified population?	Can Id. popn. be offset?	Area / number of loss	Negligible loss	Red flag status	Number of credits
			No					

Appendix G

OFFSET PLAN

Offset Plan

MANILDRA SOLAR FARM

FEBRUARY 2017

ngh environmental

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Document Verification

Project Title:	Manildra Solar Farm
Project Number:	16-044
Project File Name:	Manildra OP 011116.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

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CONTENTS

1 INTRODUCTION AND CONTEXT 1
1.1 BACKGROUND 1
1.2 LEGISLATIVE CONTEXT 2
2 IMPLEMENTATION OVERVIEW 3
3 CONSULTATION SUMMARY 4
4 ESTIMATED CREDIT REQUIREMENT 5
4.1 APPROACH 5
4.2 METHOD 5
4.2.1 Landscape assessment 5
4.2.2 Vegetation zones 7
4.2.3 Plot data used in the assessment 7
4.2.4 Site surveys 10
4.3 RESULTS 11
5 SUITABILITY OF THE OFFSET SITE 12
5.1 IDENTIFICATION AND JUSTIFICATION OF THE OFFSET SITE 12
5.2 APPROACH 13
5.3 METHOD 13
5.3.1 Landscape assessment 13
5.3.2 Vegetation zones 13
5.3.3 Site surveys 16
5.4 RESULTS 16
5.5 FINAL OFFSET BOUNDARY DELINEATION – REDUCED OFFSET SITE 16
6 SECURITY AND MANAGEMENT 19
6.1 SECURITY MECHANISMS 19
6.1.1 Security options 19
6.1.2 Selection of an option 19
6.1.3 Implementation of the CPVP for the Manildra Offset Site 20
6.2 MANAGEMENT MEASURES 21
6.2.1 Management actions 21
6.3 MONITORING AND REPORTING 29
7 CONCLUSION 31

APPENDIX A BIOBANKING CREDIT REPORT – DEVELOPMENT SITE 32

APPENDIX B BIOBANKING CREDIT REPORT – ORIGINAL OFFSET SITE 33

APPENDIX C BIOBANKING CREDIT REPORT – REVISED OFFSET SITE 34

APPENDIX D SPECIES LISTS FROM PLOT DATA 35

APPENDIX E FINANCIAL ARRANGEMENTS TO MANAGE THE OFFSET SITE 36

APPENDIX F CORRESPONDENCE 37

APPENDIX G FIELD MAP TEMPLATE 38

APPENDIX H ADDITIONAL INFORMATION: REGENERATION POTENTIAL 39

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.

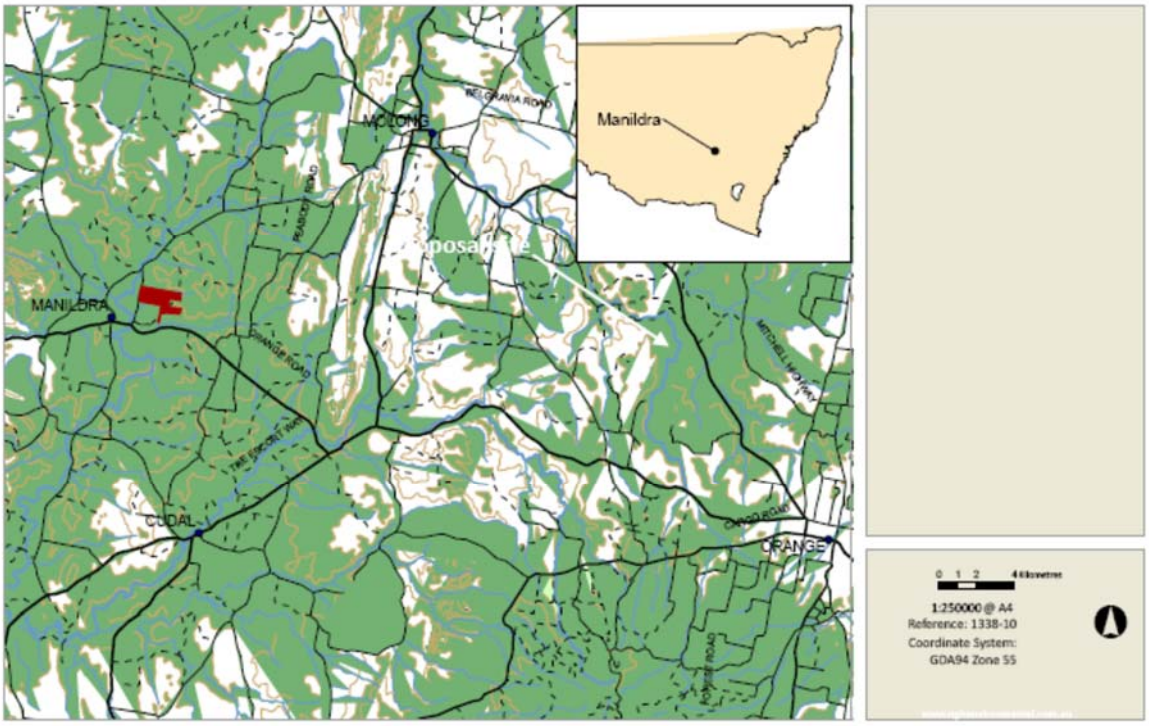

Figure 1-1. Location of the Manildra solar farm (source: nghenvironmental 2010a)

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 OEH 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 OEH (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 (**ngh**environmental 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 at 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[1] 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 forwared 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.

[1] 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 remants 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.

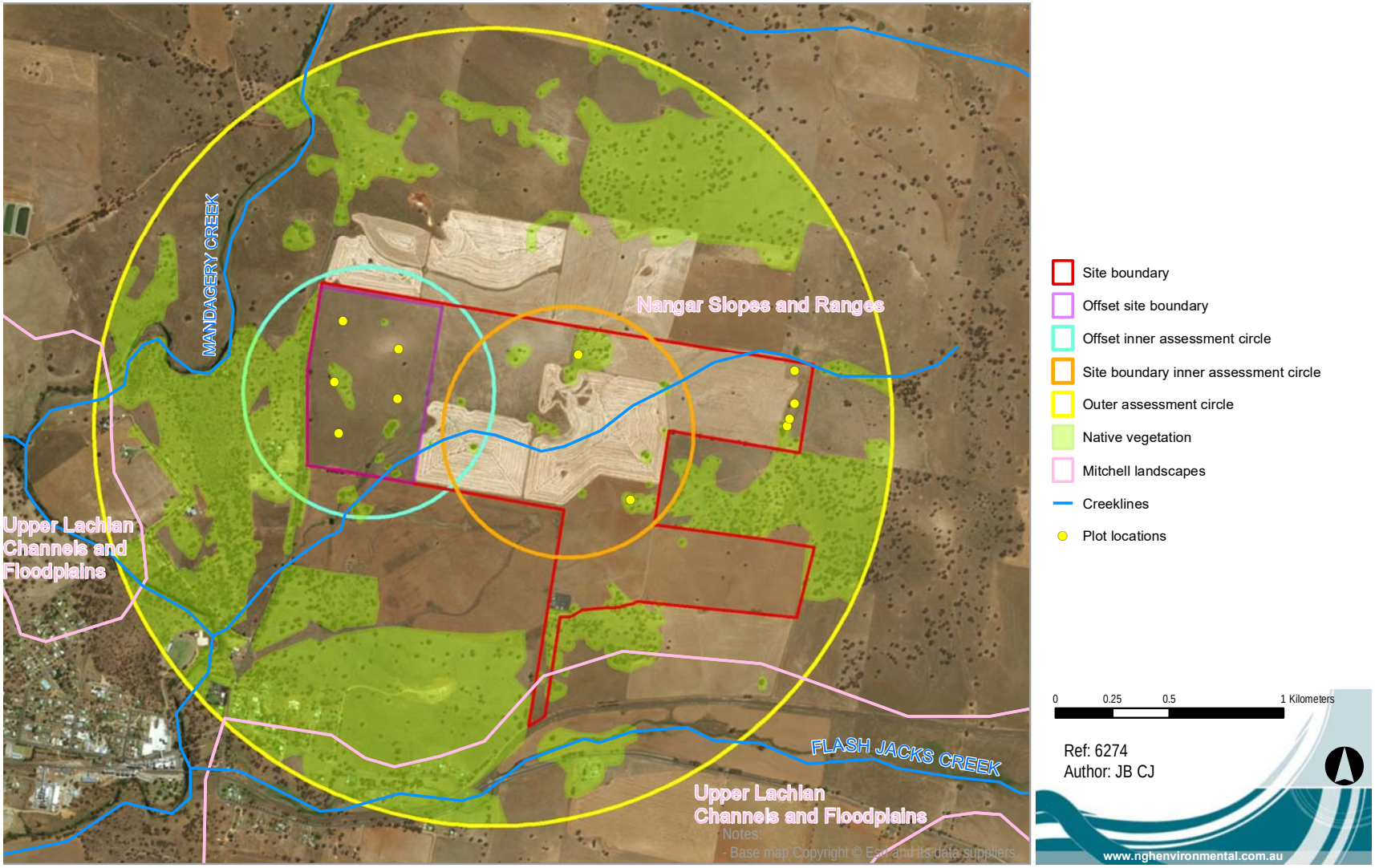

Figure 4-1 Extent of native vegetation in the study area (shows original offset site in its entirety, now reduced as shown in Section 5).

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			
Box Gum Woodland Derived Grassland (EEC, TSC)	***2.92***	***0***	***2.92***	**Moderate to good**	***2***	**9.33**
Box-Gum Woodland (EEC, TSC)	***2.58***	***0.83***	***3.41***	**Moderate to good**	***3***	**26.67**
Crop or exotic pasture	105.97	23.53	129.50			
Total:	**111.47**	**24.35**	**135.83**			

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.

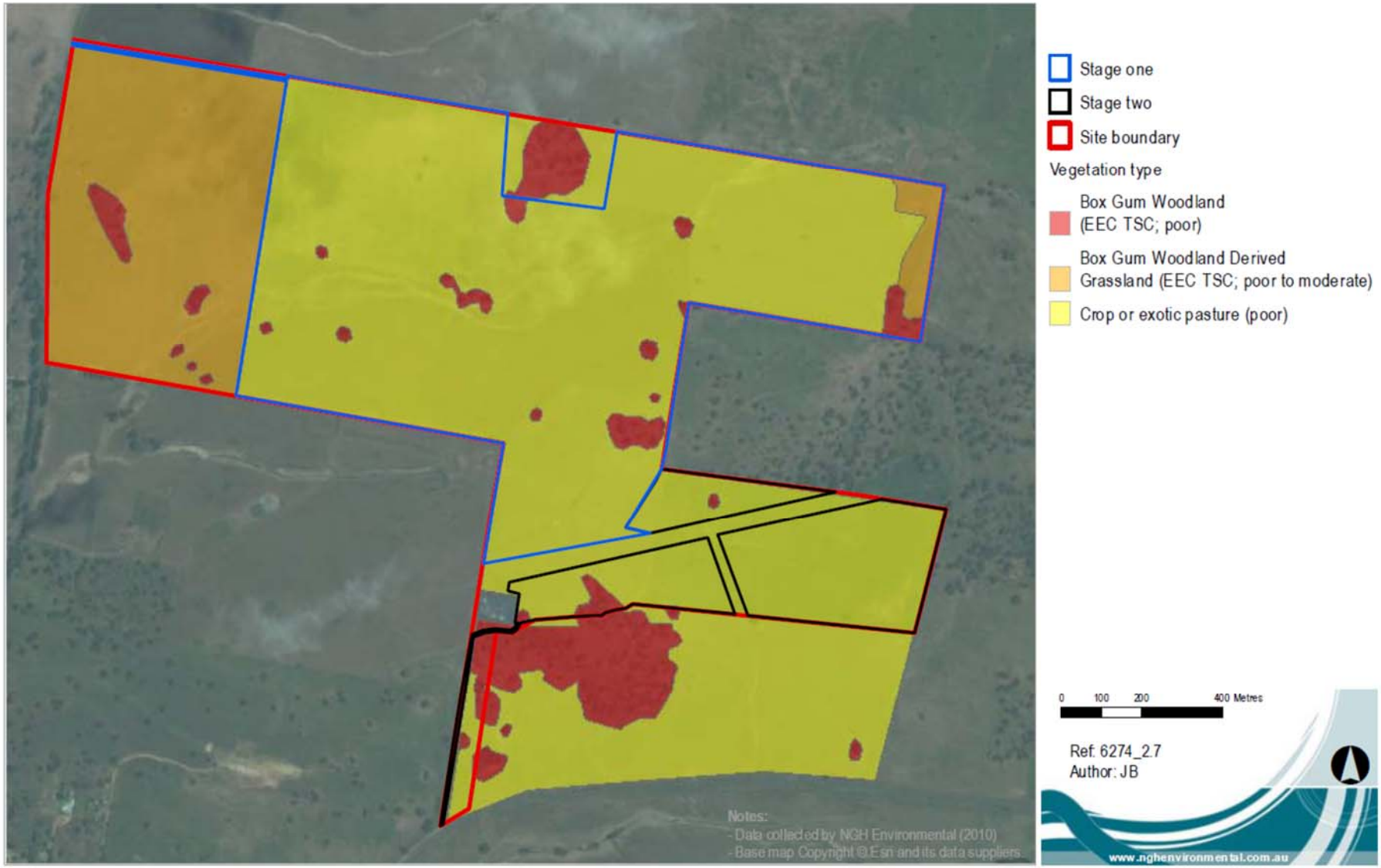

Figure 4-1 Impact areas required for development, shown as Stage 1 and 2

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

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	*Phascogale tapoatafa*	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Eastern Pygmy-possum	*Cercartetus nanus*	Yes	Yes	Yes	Yes					Yes	Yes	Yes	Yes
Koala	*Phascolarctos cinereus*	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Narrow Goodenia	*Goodenia macbarronii*	Yes	Yes							Yes	Yes	Yes	Yes
Regent Honeyeater	*Anthochaera phrygia*	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Squirrel Glider	*Petaurus norfolcensis*	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[2].

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.*

[2] 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. [3]

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%

The 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).

[3] 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	*Phascogale tapoatafa*
Eastern Pygmy-possum	*Cercartetus nanus*
Koala	*Phascolarctos cinereus*
Narrow Goodenia	*Goodenia macbarronii*
Regent Honeyeater	*Anthochaera Phrygia*
Squirrel Glider	*Petaurus norfolcensis*

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.

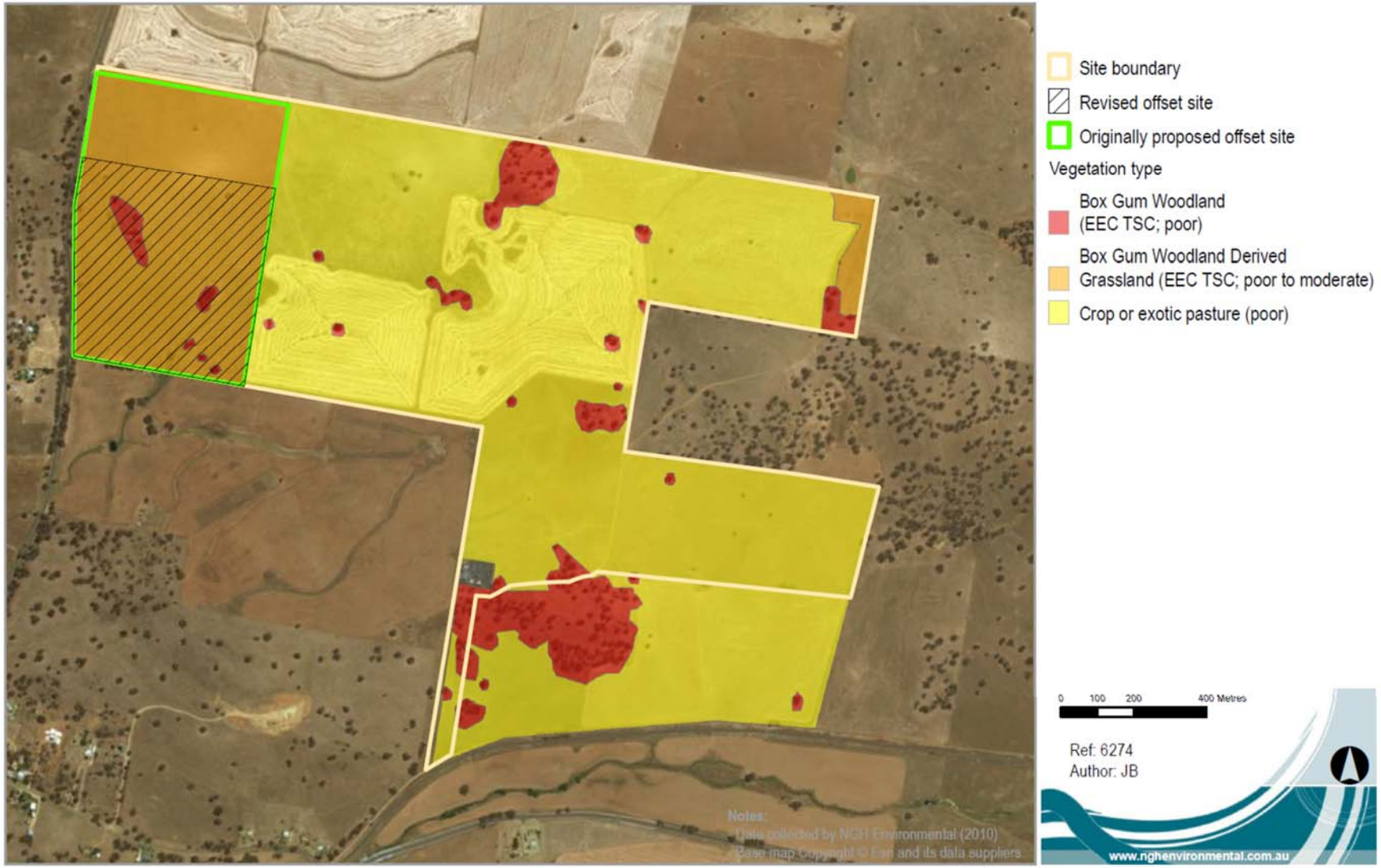

Figure 5-1 Original and revised offset site boundary

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.[4]

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.

[4] Additional information regarding the site's potential for natural regeneration is provided in Appendix H.

Management action table

Management issue	Objective	Management action details	Location	Timing of management action
1. Fencing	Restrict all impacts from adjacent agricultural activities	• Ensure that all external gates have adequate locks. • Install signage at each external gate access point (within 12 months of commencement of the PVP). • Signs are to notify that the area is a conservation area. • A contact number for emergencies and further information should be provided. • Fencing should fully exclude stock and also illegal access for dumping of rubbish or collection of firewood. • Install stock exclusion fencing around the perimeter of the Offset Site. Minimum construction standards for fencing include: o a 7 wire fence line, comprising the following: o 1.57mm HT top barbed wire; o lines 2.5mm HT wire; o 5 metre steel picket spacing's (165cm); o 5 strainers per kilometre; o One stay per strainer • Carry out regular inspections of fencing and maintenance as required.	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		• The clearing of native vegetation, whether remnant or regrowth, is not permitted. • The landholder is to retain regrowth and/or natural regeneration of native plant species. • No planting or spreading of non-native vegetation and farming practices that use mechanical cultivation at any time. • No collection of timber, rocks or removal of native vegetation is allowed within the fenced Offset Site. • No use of the site for recreational activities that involve the use of motorised vehicles, horse riding and exercising of domestic pets. • No apiaries are allowed to be installed within the Offset Site. • No dumping of garbage or fire wood collection.	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	• Install nine nest boxes on the offset site suitable for Superb Parrot. • LLS will provide guidance to the landowner on the type, size and mounting options to install the hollows. • Monitor nest boxes to ensure they remain secure. If infested by bees, eradicate infestation.	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	• Grazing is prohibited at flowering and seed set for native grasses. • Stock grazing would not occur in any areas with less than 85% ground cover. • 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: o 3-4 metal stakes o Sheep yard mesh • (These can be reused once plants are tall enough to withstand grazing).	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.	• 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. • 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: African boxthorn **Lycium ferocissimum* Bathurst burr **Xanthium spinosum* Scotch thistle **Onopordum acanthium* • Targeted weed control would be carried out in accordance with Carbonne Council guidelines (http://www.cabonne.nsw.gov.au/environment/noxious-weeds). • Weed control activities will be undertaken by personnel suitably experienced in weed identification and treatment. • Weed control activities would be informed by weed mapping and annual monitoring. • Reporting of annual weed control works to be prepared annually. Reporting is to include: o Areas worked o Timing of works o Weeds targeted o Techniques and equipment used o Issues encountered o Recommendations for ongoing weed control.	Whole of Offset Site	Complete weed mapping at commencement. Update annually. Target weed species in accordance with Carbonne Council guidelines

Management issue	Objective	Management action details	Location	Timing of management action
		o Updated mapping (can be hardcopy mark ups) of key infestations treated		
6. Weed hygiene	Manage weeds effectively	• Prevent the movement of weed material from weed infested areas into the offset area. • Ensure that all vehicles and equipment entering the Offset Site are clean and free of weed seed prior to entry. • Treat noxious infestations.	At each external access point	At all times.
7. Feral animal control	Control feral animal abundance	• Monitor site for rabbit scat and warrens. • If present, contact the local Livestock Health and Pest Authority (LHPA) for advice regarding best management practices.	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.	• 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%). • 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. • In areas targeted for supplementary planting, 20 trees per hectare is a guide. • Planting would comprise tree and shrub species present within the surrounding Box-Gum Woodland. Suggested species include: o *Brachychiton populneus* o *Eucalyptus albens* o *Eucalyptus blakelyi* o *Eucalyptus melliodora* o *Eucalyptus microcarpa* o *Astroloma humifusum* o *Enchylaena tomentosa* o *Eremophila debilis* • 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). • 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).	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
9. Controlled burning (optional)	The application of fire may stimulate shrub regeneration if a shrub seed bank persists in the soil.	• A Fire Management Strategy (FMS) would be developed in conjunction with an ecologist, bushfire planners and the Rural Fire Service. The FMS would include: o Mapping of fence lines and gates o Mapping of trails including trail categories relating to appropriate vehicle type o Mapping of water points o 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). • 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. • Bushfire management controls will consider any locations that should be protected from burning.	To be determined by the FMS	To be determined by the FMS

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
Verify the extent of development site impacts and assess whether the area exceeds the areas used in this Offset Plan (Section 4). 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. Report findings to DPE, to fulfil Project Approval conditions.	Completion of the construction	Proponent / operator
Monitor site condition against biometric benchmarks and base line data (included in this report, Section 5 and restated below). 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. Actions may be required if the offset site is not within bench marks for Blakely's Red Gum - Yellow Box grassy tall woodland of the NSW South Western Slopes Bioregion (LA120)**.**	Annually, for life of solar farm development (or not less than 25 years), as part of the project's Annual Environmental Report.	Proponent / operator
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.	Annually.	Landowner
Management plan review – for effectiveness and the need for adaptation	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
Total	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
Blakely's Red Gum - Yellow Box grassy tall woodland of the NSW South Western Slopes Bioregion, (LA120) White Box grassy woodland in the upper slopes sub-region of the NSW South Western Slopes Bioregion, (LA219) Fuzzy Box Woodland on alluvial brown loam soils mainly in the NSW South Western Slopes Bioregion, (LA145) Red Box - White Box +/- Red Stringybark hill woodland in the NSW South Western Slopes Bioregion, (LA252)	Upper Slopes - Lachlan and any IBRA subregion that adjoins the IBRA subregion in which the development occurs

APPENDIX B BIOBANKING CREDIT REPORT – ORIGINAL OFFSET SITE

BioBanking credit report

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
Total	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:

Vegetation type or threatened species	Management action details
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

BioBanking credit report

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

Plant Community type	Area (ha)	Credits created
Blakely's Red Gum - Yellow Box grassy tall woodland of the NSW South Western Slopes Bioregion	29.52	89.00
Total	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
CLASS FILICOPSIDA																							
Aspleniaceae																							
Pleurosorus rutifolius	Bristly Cloak Fern													1									
CLASS MAGNOLIOPSIDA																							
SUBCLASS MAGNOLIIDAE																							
Apiaceae																							
Hydrocotyle laxiflora	Stinking Pennywort													1									
Asteraceae																							
**Arctotheca calendula*	Capeweed					10								2		2							
Calotis lappulacea	Yellow Burr-daisy									3		5		3		5				2		5	
**Carduus pycnocephalus*	Slender Thistle													10									
**Carthamus lanatus*	Saffron Thistle			10						250	10	90	5			10						200	5
**Centaurea calcitrapa*	Star Thistle			1		10				50	1	50	5	40	2	90	3	40		100	1	30	1
**Chondrilla juncea*	Skeleton Weed																					200	2
Cotula australis	Carrot Weed							10						500	2								
**Cirsium vulgare*	Spear Thistle	1				3								2				1					
**Conyza sp.*						1																	
Cymbonotus lawsonianus	Bears-ear			2																			
Euchiton sphaericus																4							
**Hypochaeris glabra*	Smooth Catsear									10						500	30			300	10	5000	20
**Hypochaeris radicata*	Catsear			10		20		1		50	1	20		500	5	200	5			150	5	200	1
**Lactuca serriola*	Prickly Lettuce					10																	
**Silybum marianum*	Variegated Thistle	10	1	20		3								5	1			2					
**Sonchus oleraceus*	Common Sowthistle	30		5		5						3		5		2							
Stuartina muelleri	Spoon Cudweed					15		300	2	300	2	70	1			400	5						
Triptilodiscus pygmaeus	Common Sunray			50																			
Vittadinia sp.												2										1	
Boraginaceae																							
**Echium plantagineum*	Paterson's Curse	150	10	20																			
Brassicaceae																							
**Brassica* sp.																		5					
**Capsella bursa-pastoris*	Shepherd's Purse	1		2		500	15	50		30		150	5	200	3	10		300	10				
**Lepidium africanum*				1																			
**Sisymbrium orientale*	Indian Hedge Mustard	50	1	15		15						1											
Campanulaceae																							
Wahlenbergia luteola				30		5				10		5											
Caryophyllaceae																							
**Cerastium glomeratum*	Mouse-ear Chickweed					5		500	2	80		100	2	80		90	1	15		30		500	5
**Petrorhagia nanteuilii*																				1		1000	1
**Polycarpon tetraphyllum*	Four-leaved Allseed											50											
**Sagina apetala*	Annual Pearlwort							20		50		200	1										
**Stellaria media*	Common Chickweed							20															
Chenopodiaceae																							
Maireana microphylla	Small-leaf Bluebush															2							
Convolvulaceae																							

Dichondra repens	Kidney Weed			30	5									2									
Crassulaceae																							
Crassula sieberiana	Australian Stonecrop			2		10				20		30		100		6							
Fabaceae: Faboideae																							
Glycine tabacina				60	2																		
**Medicago minima*	Woolly Burr Medic									10		100	5										
**Medicago polymorpha*	Burr Medic	2		300	10	70	1			1000	20	500	20	30	1	200	50	50	1			5000	30
**Medicago sativa*	Lucerne			1																			
**Trifolium arvense*	Haresfoot Clover			100	10					200	5	30	1	20		20						50	2
**Trifolium campestre*	Hop Clover			15				1		500	15	300	5	50		40				50	2	50	1
**Trifolium glomeratum*	Clustered Clover			10						50		40	1	200	2								
**Trifolium pratense*	Red Clover	2		5		1000	60					50	1										
**Trifolium repens*	White Clover			20		30						20		100	2			10		20	1	30	1
**Trifolium striatum*	Knotted Clover									10													
**Trifolium subterraneum*	Subteranean Clover									400	10	20		100	2	100	20			500	35	500	35
**Trifolium tomentosum*	Woolly Clover											1											
Geraniaceae																							
**Erodium cicutarium*	Common Storksbill					20				20		20		300	10	50							
Erodium crinitum	Blue Storksbill	5				5				20				100	5			30				1	
**Erodium moschatum*	Musky Crowfoot					1																	
Geranium dissectum				90	5																		
**Geranium molle*	Cranesbill Geranium													5								15	
Goodeniaceae																							
Goodenia pinnatifida				100	5																		
Lamiaceae																							
**Lamium amplexicaule*	Dead Nettle					1												20					
**Marrubium vulgare*	White Horehound	1		3		1												2					
**Salvia verbenaca*	Vervain			25																			
**Stachys arvensis*	Stagger Weed									1										1			
Malvaceae																							
**Malva parviflora*	Small-flowered Mallow	700	60	1		5		2				1						500	30				
Sida Corrugata	Corrugated Sida									2												10	
Myrsinaceae																							
**Anagallis arvensis*	Scarlet Pimpernel			40	1					5		25											
Myrtaceae																							
Eucalyptus albens	White Box	2	50	2	40	1	50							2	30								
Oxalidaceae																							
Oxalis perennans				1		1		15		2		20		1		15				5		500	10
Papaveraceae																							
**Papaver hybridum*	Rough Poppy					8				1		10											
Plantaginaceae																							
Plantago varia				30																			
**Veronica peregrina*	Wandering Speedwell					5		300	2	1		30				5							
Polygonaceae																							
**Polygonum aviculare*	Wireweed											1											
Rumex brownii	Swamp Dock	5		2		1		5		3				2		10		8		8		20	1
Rosaceae																							
**Aphanes arvensis*	Parsley-piert									10												100	1

Sapindaceae																							
Alectryon oleifolius	Western Rosewood													1	1								
Solanaceae																							
**Lycium ferocissimum*	African Boxthorn													1									
Urticaceae																							
**Urtica urens*	Small Nettle	1000	20			4												100	5				
SUBCLASS LILIIDAE																							
Anthericaceae																							
Arthropodium minus				8								15		30									
Dichopogon fimbriatus	Nodding Chocolate Lily			500	15																		
Asphodelaceae																							
Bulbine bulbosa	Native Leek			500	20																		
Colchicaceae																							
Wurmbea dioica	Early Nancy			2																			
Iridaceae																							
**Romulea minutiflora*	Small-flowered Onion Grass									20													
**Romulea rosea*	Onion Grass							1															
Juncaceae																							
Juncus sp.																				1			
Lomandraceae																							
Lomandra filiformis subsp. *coriacea*				10												3							
Lomandra filiformis subsp. *filiformis*														1								2	
Phormiaceae																							
Dianella porracea	Riverine Flax-lily			1																			
Poaceae																							
Aristida sp.																				10			
Austrostipa scabra	Speargrass			3		50	1			40	1	70	5	10		500	20			40	1	30	1
**Avena barbata*	Bearded Oats																			5			
**Bromus catharticus*	Prairie Grass	2																					
**Bromus diandrus*	Great Brome	10		5000	30	1						10											
**Bromus hordeaceus*	Soft Brome			500	10	20		400	5	10		100	5	5000	20	50		100	1	1000		2000	10
**Bromus molliformis*	Soft Brome					1						20	1										
**Bromus rubens*	Red Brome																			1			
Cynodon dactylon	Couch																			10			
**Hordeum leporinum*	Barley Grass	1500	15	10		2000	70	3000	70	100	2	200	15	400	5	6		20000	70			2	
**Lolium perenne*	Perennial Ryegrass	10		300	10	200	10	1		100	2	40	1					1					
**Lolium rigidum*	Wimmera Ryegrass	200	2	2000	30	200	5	20		30		500	15	10000	40								
Microlaena stipoides	Weeping Grass																					50	
**Poa annua*	Winter Grass					10		1000	1									20					
**Poa bulbosa*	Bulbous Poa			5		20		100		600	15	200	5	40		50	1			•		400	2
Poa sieberiana				3																			
**Rostraria cristata*	Annual Cat's Tail							30															
Rytidosperma sp.				10		100	5	200	10			20		1				10		30	1	10	
Rytidosperma sp. (2)						10								5									
**Vulpia bromoides*	Squirrel Tail Fescue																	1000	5	5000+	70	5000	50
**Vulpia muralis*								500	5														
**Vulpia myuros*	Rat's Tail Fescue			5000	20	50	1	500	5	2000	20	2000	20	1000	2	4000	35						

No. Native Species	38																						
No. Introduced Species	65																						
Total Species	103																						

* Introduced species

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;

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 6(a) of Exhibit 1 to the Lease, being that amount represented by A in the following formula:

A = ($10,000 x B) / C

where

"B" is the area (expressed in hectares) of Leased Area affected by a PVP (as determined by the Grantee); and

"C" is the total area (expressed in hectares) of Leased Area and Cotton Leased Area affected by a PVP (as determined by the Grantee).

APPENDIX F CORRESPONDENCE

Office of Environment & Heritage

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.

Yours sincerely

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

25 November 2016

PO Box 2111 Dubbo NSW 2830
Level 1 48-52 Wingewarra Street Dubbo NSW
Tel: (02) 6883 5330 Fax: (02) 6884 8674
ABN 30 841 387 271
www.environment.nsw.gov.au

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.

Yours sincerely

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

22 December 2016

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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

ngh environmental

www.nghenvironmental.com.au

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

APPENDIX H ADDITIONAL INFORMATION: REGENERATION POTENTIAL

FLORASEARCH

37 Kent Avenue, Orange, NSW 2800
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.

Appendix H

SOIL AND WATER MANAGEMENT PLAN

RCR Infrastructure

entura
Hydro Tasmania

MANILDRA SOLAR FARM

Soil and Water Management Plan

13 June 2017

Prepared by Hydro-Electric Corporation
ABN48 072 377 158

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Contents

1. Introduction 1

1.1 Project Description 1
1.2 Report Scope 1
1.3 Proposed Site Works 1
1.4 Objectives 1

2. Erosion Potential Factors 3

2.1 Topography and drainage 3
2.2 Vegetation 3
2.3 Geology 4
2.4 Climate 4
2.5 Proposed site construction activities 4
2.5.1 Site Levelling 4
2.5.2 PV panel installation 4
2.5.3 Roads, laydown areas and platforms 4
2.5.4 Maintenance and control building 5

3. Design process 7

3.1 Site constraints and characteristics 7
3.2 Soil loss calculation 8
3.3 Erosion at dry creek bed 9
3.4 PV frame/pile locations - drainage considerations 10
3.5 Earthworks - topographic considerations 10

4. Summary of Control Measures To Be Implemented 13

4.1 Earthworks levelling 13
4.2 Access Roads 14
4.3 Construction laydown area and O&M building area 14
4.4 Sedimentation Control 15
4.5 Erosion control 15
4.6 Drainage Control 15
4.7 Vegetation Removal 15
4.8 Soil Stockpiles 16

5. Monitoring 17

Appendices

A Erosion and Sediment Control Plans

B Rainfall intensity

C Erosion Risk Assessment

D Geotechnical testing results

E Erosion Hazard Assessment

List of figures and tables

Figure 3.1: Manildra Solar Farm site – Flood modelling for 1:100 AEP storm 10

1. Introduction

1.1 Project Description

The Manildra Solar Farm is a proposed 48.5MW solar power station to be developed by First Solar. The site is located approximately 2km east of the township of Manildra in NSW. The solar farm, occupying approximately 120ha of land, will be powered by 466,000 solar panels and produce enough energy to power 14,000 homes.

1.2 Report Scope

The scope of this report is to assess potential erosion and sedimentation issues associated with the Manildra Solar Farm proposal. This document has been prepared in accordance with the guidelines provided in *Managing Urban Stormwater: Soils and Construction, 2004* (Landcom 2004). This is referred to as 'the Blue Book'.

The Blue Book advises that land of greater than 2500m^2 disturbed area requires a Soil and Water Management Plan SWMP, addressing potential soil erosion and sediment pollution. In addition, the Manildra Solar Farm Project Approval (DA) document-Part D, requires that soil and water management controls be put in place during construction.

1.3 Proposed Site Works

The construction of the Manildra 48.5MW Solar Farm will involve the following key construction activities:

- earthworks - site levelling
- access roads
- PV Array structures
- construction and operation laydown areas/platforms
- maintenance and control building

1.4 Objectives

The objective of this soil and water management plan is to describe the specific requirements that will be implemented in order to minimise erosion and sediment discharge from the Manildra Solar Farm site. This includes activities that occur during and after the construction.

The report will assess the soil and water implications of the development and plan for erosion and sediment control using engineering design principles to assess the site constraints and integrate elements of the development.

Proposed methods of sedimentation and erosion control include design and construction activities that will:

- minimise the area of soil disturbed and exposed to erosion;
- conserve topsoil for later site rehabilitation and revegetation;
- control water flow through the site;
- expediently rehabilitate disturbed lands, and
- develop and maintain soil and water management measures appropriately during construction phase.

2. Erosion Potential Factors

The assessment of erosion and sedimentation risks inherent in the proposed solar farm has considered the following factors:

- topography and drainage
- vegetation
- geology and soil types
- climate
- construction activities

2.1 Topography and drainage

The site topography is gently undulating with typical ground gradients of 5 to 10%. Generally the site falls from the east to the west with levels varying from 505m (AHD) to 450m (AHD). The site is approximately 1600m wide from east to west and 1100m wide from north to south. The majority of the site diverts overland flow to the west. There are no creeks present on the site, however, there is a dry creek bed that forms the main drainage feature across the site. This is the primary stormwater overland flow path and as such, site drainage is predominantly in a northeast to southwest direction. As the dry creek bed forms the main site drainage path, this is the ideal location to facilitate primary erosion and sedimentation control features.

Even in substantial storm events the flow depth remains shallow. Flood modelling undertaken indicates that for a 1 in 100 year storm event, at most locations, flow depths less than 500mm and flow velocities less than 2m/s can be expected. In a 1 in 2 year storm the depths and velocities will be significantly less.

There is however one localised region where the dry creek bed becomes deep. Its depth increases to approximately 2.5m. In this localised region, flows would not spread overland and as a result, flow velocities would increase. Flood modelling indicates that for a 1 in 100 year storm event, flows in this small section of the creek would be constricted and flow velocities would increase to approximately 4m/s. From site observations this deep region appears to be man-made.

2.2 Vegetation

The site has a history of being cultivated and used for cropping. The majority of the site has been cropped, while two paddocks are grassed. There are a few isolated trees that will be removed, however the site will largely remain in its current well-grassed condition at the end of construction and rehabilitation through re-vegetation and topsoil reinstatement is completed.

The proposed site grading as part of the solar farm development will have some impact on current condition, however revegetation will restore any lost ground cover. Only a small portion of the site will be altered to construct site access roads, a construction laydown area and an operation/ maintenance area.

2.3 Geology

The 1:100,000 Geological Survey of New South Wales Molong Map Sheet indicates the site is underlain by Wansey formation of the Sulurian Aged Goonical Group. A geotechnical site investigation has been conducted by Coffey Geotechnics and extracts are included for reference in Appendix D. The investigation details a subsurface profile generally consisting of a clay layer overlying a weathered sandstone or siltstone or andesite rock layer. The geotechnical report indicates that based on Emerson class testing, the clays encountered on site may be easily eroded where they are disturbed or exposed or are present in the natural water courses.

2.4 Climate

Rainfall intensity and frequency data has been obtained from the Bureau of Meteorology for the site. This data is included in Appendix B. The data from the Bureau indicates that this is not a high rainfall area and intense rainfall events are not common. Weather forecasts will be monitored during periods of construction activity. In wet weather rainfall events will be a potential source of erosion and in the dry weather wind events have the potential to cause erosion. Mean average wind speeds are highest between October and February.

2.5 Proposed site construction activities

2.5.1 Site Levelling

In order to maintain necessary operational clearances for the PV panel tracking mechanism, earthworks are required to level areas of the site. This will require cut or fill operations affecting approximately 13.1ha of the 120ha site. These activities may present a risk for erosion and sedimentation. Entura have undertaken detailed earthworks modelling in order to ensure that the cut and fill required is minimised. All material cut will be re-used as fill in other areas of the site. No site levelling material will be removed from site or imported. The detailed modelling has ensured that the cut and fill areas will be surrounded by buffer zones of undisturbed topsoil stabilised with the existing well-established grass.

2.5.2 PV panel installation

The PV panels are to be installed across the majority of the site as shown on Drawing NC03-GN-ENT-DWG-1050. The panels are supported on a mechanical tracking system mounted on steel piles. The steel piles are driven directly into the soil. By the nature of pile driving, the process does not expose or generate any loose disturbed material. The sediment and erosion impacts of the PV panel installation are expected to be minimal. During usual weather only minor disturbance will be generated from vehicle traffic, labourers and the pile driving rig. In the event of extreme wet and dry conditions on site activities shall be monitored and revised accordingly.

2.5.3 Roads, laydown areas and platforms

Site access roads, laydown areas and platforms will also require cut and fill earthworks operations. Topsoil will be removed, subgrade will be prepared and fill material will be compacted and imported. Crushed rock will be used to form a network of access roads and hardstand areas for construction activities. Access roads will be unsealed and will have a maximum grade of 8%. The construction of the roadways will affect approximately 3.7ha of the site. The construction laydown area will affect

4.24ha and an operational and maintenance area will affect 0.63ha. These construction activities are identified as having erosion and sedimentation risk.

2.5.4 Maintenance and control building

The maintenance and control building will require the construction of a footing system and the construction of the building itself. The building will be built on a platform area as described in Section 2.5.3. Construction activities will concentrate on the platform area and as such do not pose a significant sedimentation or erosion risk. Once completed, the building will utilise rainwater collected on site and amenities will have associated waste water treated on site. Local erosion and sediment control measures like the use of straw bales filter will be implemented as necessary.

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3. Design process

Proposed site works outlined in Section 2.5 have been assessed for risks associated with potential factors causing erosion and sedimentation. A number of risks have been identified as requiring engineering analysis in order to quantify, assess and or develop strategies to minimise the risk.

The site constraints and characteristics have been analysed to develop a series of key design parameters which are utilised to determine appropriate sediment and erosion control mechanisms.

3.1 Site constraints and characteristics

Table 3.1: Manildra Solar Farm - site constraints and characteristics

Constraint/characteristic	Value/rating
Rainfall erosivity	low (R-factor is 1300)
Slope gradient	moderate (5-10%)
Potential erosion hazard	low (from figure 6 in Landcom (2004))
Soil erodibility (subsoil)	low to moderate (0.025)
Calculated soil loss	up to 192 t/year
Soil loss class	Class 2
Soil texture group	Type F (the bulk of which are fine grained; 33% or more are finer than 0.02 mm)
Percent dispersible (subsoil)	less than 10 precent
75% percentile 5 day rainfall event	20mm/hr
Total site area	120ha approx
Disturbed site areas	cut 6.71ha
	fill 6.4ha
	roads 3.68ha
	construction laydown 4.24ha
	O&M building area 0.63ha
	Total area 21.67ha

Based on the above site values/ratings and the information and assessments provided in Appendices B through to E, the site has been assessed as a **low erosion risk** as per assessments presented further in this document. Based on the above assessment, control measures to be implemented under this soil and water management plan are outlined in Table 3.2.

Table 3.2: Manildra Solar Farm – erosion and sediment control measures

Flow type	Control Measure
sheet flow	sediment fences
	buffer zones
	Mulch bunds
concentrated flow	straw bale barriers, sand bags, fibre logs
	rock lining

3.2 Soil loss calculation

The process of soil loss estimation has four important applications to soil and water management. These are:

- assess the erosion risk at a site
- identify suitable measures to overcome the erosion risk
- estimate the required capacity of sediment retarding basins
- compare the effectiveness of various erosion control measures

The Blue Book outlines a method for estimating the long term average annual soil loss from sheet and rill flow at sites using the Revised Universal Soil Loss Equation (RUSLE).

A= R K LS P C

Where A is the computed soil loss (tonnes/ha/yr)

Using the above equation an estimation of annual soil loss for the Manildra solar farm site has been calculated below. Values for the Manildra Solar Farm site estimated below are based on Appendix A of the Blue Book.

R = rainfall erosivity factor = 1300

K = Soil Erodibility

First approximation of the Soil Erodibility: 0.01

Final approximation of Soil Erodibility Factor K: 0.025

LS = Slope Length/Gradient Factor = 2.8

P = Erosion Control Practice Factor = 1.3

C= Ground Cover and Management Factor = 0.075

Based on the values above the computed soil loss at the site is

A = 1300 x 0.025 x 2 x 1.3 x 0.075

A = 8.87 tonnes/ha/yr

The computed soil loss calculation takes into consideration the minimisation of earthworks as outlined in Section 3.5 and illustrated in Appendix A and the measures proposed for erosion and sediment control summarised in Section 4.

The area that will be disturbed during construction is estimated to be 21.67 Ha. Therefore, the total annual soil loss can be estimated at 192 tonnes/year (the product of 8.87 x 21.67). Assuming a soil density of 1.8 tonne/m^3 (a reasonable and conservative estimate) this equates to an average annual soil loss at the site of approximately 106m^3/yr.

Chapter 6.3.2 (General Recommendation) of the Blue Book advises that where the average annual soil loss is less than 150 m^3/annum, the construction of a sediment basin is not necessary. As a result, the sediment and erosion control measures outlined in this document do not need to include the construction of a sediment pond.

3.3 Erosion at dry creek bed

As outlined in Section 2.1, there is a man-made deep section in the dry creek bed on the site. This section is up to 2.5m deep at the worst location. Entura have conducted flood modelling as part of the early stages of the design process, and extracts of a 1 in 100 year flood model are illustrated in Figure 3.1 below. The man made excavated channel found on site constricts flow in this region of the creek and flow velocities up to 4m/s can be expected. Whilst this analysis is for the design storm event, erosion control measures will be undertaken at this location in order to return the dry creek bed to its original form. In its original form during the design storm event, the shallow creek banks are breached and the stormwater flow becomes a wide overland flow. Flood modelling indicates flow widths up to 100m wide and depths of 500mm are likely.

With reference to Figure 3.3, under the 1 in 100 year flood modelling, in the natural portions of the creek, flow velocities are expected to remain at or below 2 m/s. At such velocities, erosion potential is low across the grassed creek bed and the adjoining banks.

An engineered solution is proposed for the manmade excavated channel for the control of erosion and sediment transport. It is proposed to repair this portion of the creek using engineered fill and a method of stabilisation using geotextile materials on the finished ground surface. The resulting flattening of this area of the dry creek bed will provide a wider section for the water flow and associated reduction of flow velocities, leading to better control of soil erosion. This provides risk mitigation of erosion and sedimentation during construction as well as the operation phases of the solar farm.

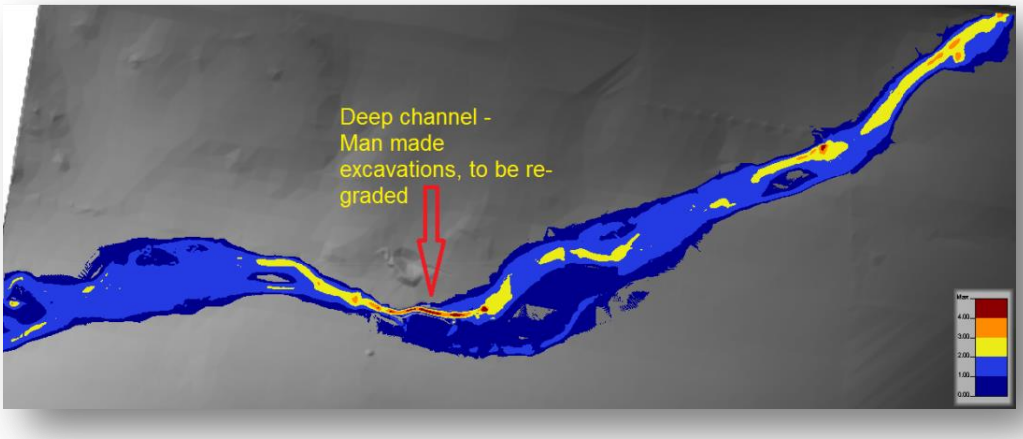

Figure 3.1: Manildra Solar Farm site – Flood modelling for 1:100 AEP storm

3.4 PV frame/pile locations - drainage considerations

Solar panels are to be supported on a series of driven steel piles. The solar panels and piles are to cover almost the entire site including the dry creek bed areas.

During a major rain storm, water will flow through the creek bed. As part of the design work, Entura has undertaken flow and scour modelling in order to examine the effects of the water flowing around the steel piles to determine the potential for soil erosion would jeopardise the structural integrity (i.e. loss of embedment due to scour) of the steel piles to be constructed in the creek section. As mentioned in the previous section, erosion control measure in the form of geotextile installation is being proposed. However, the extent of assessed erosion (i.e. depths and amounts) is considered very limited in the context of risk of sedimentation.

The modelling conducted by Entura indicates that scouring and associated erosion will not be significant if flow velocities are approximately at, or below, 2m/s. With reference to Section 3.3 and Figure 3.1, Entura have conducted flood modelling for a 1 in 100 year storm event. If remediation works are undertaken as outlined in Section 3.3, flow velocity will remain at around 2m/s even under significant storm events. As such, it is determined that erosion around piles in the creek bed will not become an issue once such remediation works have been undertaken. It is however recommended to develop and maintain an inspection program for these piles.

3.5 Earthworks - topographic considerations

The PV panels for the proposed solar farm are to be mounted to a single axis tracker. The solar tracker rotates the PV panels around a north-south oriented torque tube. The tracking mechanism is approximately 77m long. As the tracking mechanism torque tube forms a straight line, undulations in ground topography can interfere with the rotating PV panels. The rotating PV panels need to maintain a minimum and maximum operational ground clearance. Undulations of the ground topography can compromise these clearances requiring regions to be either excavated or filled in order to maintain acceptable ground clearances.

Excavation and filling activities can pose sedimentation and erosion risks. By minimising the amount of excavation and filling required, the risk is also minimised. To this end, Entura has undertaken earthworks modelling in order to minimise the amount of cut and fill required.

Entura undertook site modelling using 12D software to help shape the approach to grading and earthworks. The initial site modelling led to the adoption of the approach to start with establishing the minimum excavation requirements and then using the cut materials as fill on site. This eliminates the need to cart materials off site. The amount of excavation is governed by the need to maintain a minimum collision clearance of 360mm above ground (with the PV panels tilted at 60 degrees to the horizontal).

The detailed earthwork modelling has allowed for localised cut and fill areas to be identified. Refer to Appendix A for details. These areas will be surrounded by existing intact grass areas that act as a buffer to any erosion. As the areas are now localised and relatively small, daily control measures can be put in place enabling localised erosion and sedimentation control procedures to ensure that the risk is contained and minimised. Refer to section 05 for details of control measures.

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4. Summary of Control Measures To Be Implemented

Refer to Appendix A for Erosion and Sedimentation Control Plan.

4.1 Earthworks levelling

- Earthworks cut and fill areas are balanced in order to avoid the need to cart materials off site.
- Referring to the cut and fill layout shown in Appendix A the cut and fill is required in a series of discrete areas. Excavation of cut and fill areas are to be staged so that each area is completed sequentially. In addition, a cut area shall be completed with a fill area nearby so that material from the cut area can be immediately placed and compacted at the nearby fill area. This will minimise traverse of heavy machinery across the site and as such minimise the impact to vegetation.
- Cut and fill areas shall be staged and completed in sections to enable permanent revegetation of each area sequentially.
- Cut and fill areas will be worked across slopes with downslope widths limited to 80m. Areas shall be stabilised before working sequential down slope regions.
- Maximum flow lengths along disturbed areas shall be limited to 80m. Where flow lengths exceed 80m, sediment fences or straw bales shall be installed.
- Permanent stabilisation and revegetation shall commence within seven days of competing each cut or fill area.
- Stripped topsoil shall be stockpiled and retained for reuse for sequential revegetation and stabilisation procedures.
- At completion, all exposed surfaces shall be adequately stabilised and revegetated. All disturbed areas will be re-vegetated via soft tyred ATV with seed spreader and will broadcast approved seed and fertilizer mix as per Ground Cover Management Plan and watered via water truck with batter spray / water cannon until established. All revegetated areas shall be watered and fertilised as required to achieve minimum 70% cover.
- Weather conditions shall be suitably monitored to ensure that in the event of a rainfall event sedimentation fences are installed downslope of cleared areas where sedimentation may occur from sheet flow associated with rainfall events.
- Areas shall be fully stabilised or sedimentation fences in place before any shutdown.
- Clearing shall be kept to no more than 5m beyond cut and fill areas.
- Areas outside cut and fill areas where vegetation has been damaged by construction activities shall be stabilised and revegetated as soon as practical.
- Sediment fences or sand bags/fibre logs shall be installed along concentrated formed batter edge flow paths.
- Dust control measures such as watering trucks will need to be made available especially during dry weather to prevent wind erosion.

4.2 Access Roads

- Access roads will require the import of crushed rock material. The vehicle site entry point will have vibration grid in addition to spray seal as management tools, as per the approved Traffic Management Plan.
- Dust control measures such as watering will be available as required during road construction activities.
- Vehicle speeds shall be limited to a maximum speed of 25km/h.
- Sediment fences or sand bags/fibre logs shall be installed along concentrated road edge flow paths.
- Sediment fences shall be installed downslope of any batters where sheet flow may present with sedimentation.
- Sediment fences or sand bags/fibre logs shall be installed where concentrated flow paths intersect with road construction activities.
- Maximum flow lengths along disturbed areas shall be limited to 80m. Where flow lengths exceed 80m sediment fences or straw bales shall be installed.
- Road batters: Re-vegetation and stabilization will be achieved with seeding of approved seed mix as per the ground cover management plan.
- Revegetated areas shall be watered and fertilised as required to achieve minimum 70% cover.
- Generally, internal roads are surrounded by grassed buffer regions. Construction roads along the site's western and some of the southern boundaries as shown in Appendix A shall be constructed with a mulch bund at the perimeter of the site. A second option would be the use of a combination of geotextile wrapped straw bale and silt fence (see Appendix A).

4.3 Construction laydown area and O&M building area

- Cut and fill excavation activities shall be stabilised and revegetated as soon as practical.
- Permanent site stabilisation and revegetation shall commence within seven days of completing cut or fill area, or as soon as practical (weather permitting).
- Platform batters shall be adequately stabilised and revegetated. Areas will be re-vegetated via soft tyred ATV with seed spreader and will broadcast approved seed and fertilizer mix as per Ground Management Plan. Watering will be via water truck with batter spray / water cannon until vegetation established.
- Revegetated areas shall be watered and fertilised as required to achieve minimum 70% cover.
- Dust control measures such as watering trucks will need to be available as required during hardstand and road construction activities.
- Sediment controls shall be installed at the downstream boundaries of the construction areas.
- Sediment fences and/or straw bale filter or sand bags/fibre logs shall be installed at the base of formed batters where concentrated flow paths may form.

4.4 Sedimentation Control

- The site generally drains to the dry creek bed. At specific locations within the dry creek bed, rock check dams or silt fences are to be incorporated in the Erosion and Sediment Control Plan (Appendix A). These will reduce flow velocities and control sediment transport and being constructed of coarse rockfill, they are not designed to hold water.
- A small portion of the site at the south drains to the south western boundary of the site. Along these boundaries a mulch berm will be constructed to control sediment as shown in the Erosion and Sediment Control Plan (Appendix A).

4.5 Erosion control

- The existing erosion in the dry creek bed will be repaired. The existing deep portions of the creek bed will be reinstated with engineered fill. The fill material will be stabilised with Landlok450® geofabric (or recommended equivalent) to enhance erosion protection. This will return the creek in this region to its original stable form and function.
- Soil stockpiles shall be located away from overland flow paths.
- Potential concentrated flow paths will be treated with sand bags/fibre logs.
- During dry weather watering trucks shall be made available to limit dust and wind erosion.

4.6 Drainage Control

- Invert crossings have been incorporated in the design of the internal access roads. These are low-points in the road design which act as an over-flow design feature to facilitate runoff passage for the overland sheet flow and for any flow forming in the normally dry creek bed. Erosion resistance materials will be specified for these zones as they will remain as permanent features. During the construction stage straw bale or silt fences are to be installed downslope of these crossings.
- A permanent cut-off drain is to be installed at the south west boundary of the O&M building area. The cut-off drain will discharge at the northwest corner of the O&M building area. A permanent rock lined dispersion facility will be installed at the termination point of the cut-off drain in order to transition the concentrated flow to overland sheet flow.
- Permanent cut-off drains shall be rock lined and shall discharge to stabilised rip rap for rock lined area to facilitate transition to sheet flow.
- PV panel piles installed across the dry creek bed will not adversely affect drainage capacity.

4.7 Vegetation Removal

- Vegetation clearing will be kept to a minimum with the few isolated and scattered trees being removed. These trees shall be chipped and mulched on site for use as site.
- Clearing of grass shall be kept to no more than 2-5m beyond where bulk earthworks and construction would take place. Grass vegetation removed for levelling will be revegetated as soon as practicable.

4.8 Soil Stockpiles

- Stockpiling of excavated material will have suitable downstream protection through the use of geofabric silt fence and straw bales.
- Topsoil removed will be stockpiled for possible reuse (shown in the drawing in Appendix A).
- Soil stockpiles shall be located away from overland flow paths.

5. Monitoring

Site inspection and monitoring will be undertaken to ensure the objectives of the Soil and Water Management Plan are met and the control measures perform effectively. The following monitoring program shall be implemented:

- Weather forecasts shall be monitored and recorded daily.

- Erosion and sedimentation control measures will be inspected:
    - Weekly;
    - at least 24 hours prior to predicted rainfall;
    - daily when rainfall is occurring; and
    - after the rainfall event has finished.

- Discharge points will be inspected weekly and prior to and post any rain event. If the discharge points are not stable then the downstream offsite dam will be inspected for evidence of sedimentation on the dam apron (with photographic evidence taken). If there is evidence of off-site sedimentation, a Corrective Action will be raised and the Soil and Water Management Plan reviewed accordingly.

- During operation the site will be monitored regularly for erosion, particularly where erosion control measures have been implemented. Where erosion is identified, the cause will be rectified and any impacts remediated.
- It is noted that this inspection regime will also specifically cover the area where the dry creek emerges into the site in the north-east corner of the site, to observe if runoff emerging upstream of the site would or would not accentuate sediment transport at the Manildra Solar Farm site.

- Every inspection relating to the effectiveness of the erosion and sediment controls will be documented on the Inspection Checklist (refer MSF_CEMP_F01).

- The health of revegetation will be inspected weekly and additional revegetation undertaken where 70% cover has not been achieved.

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Appendices

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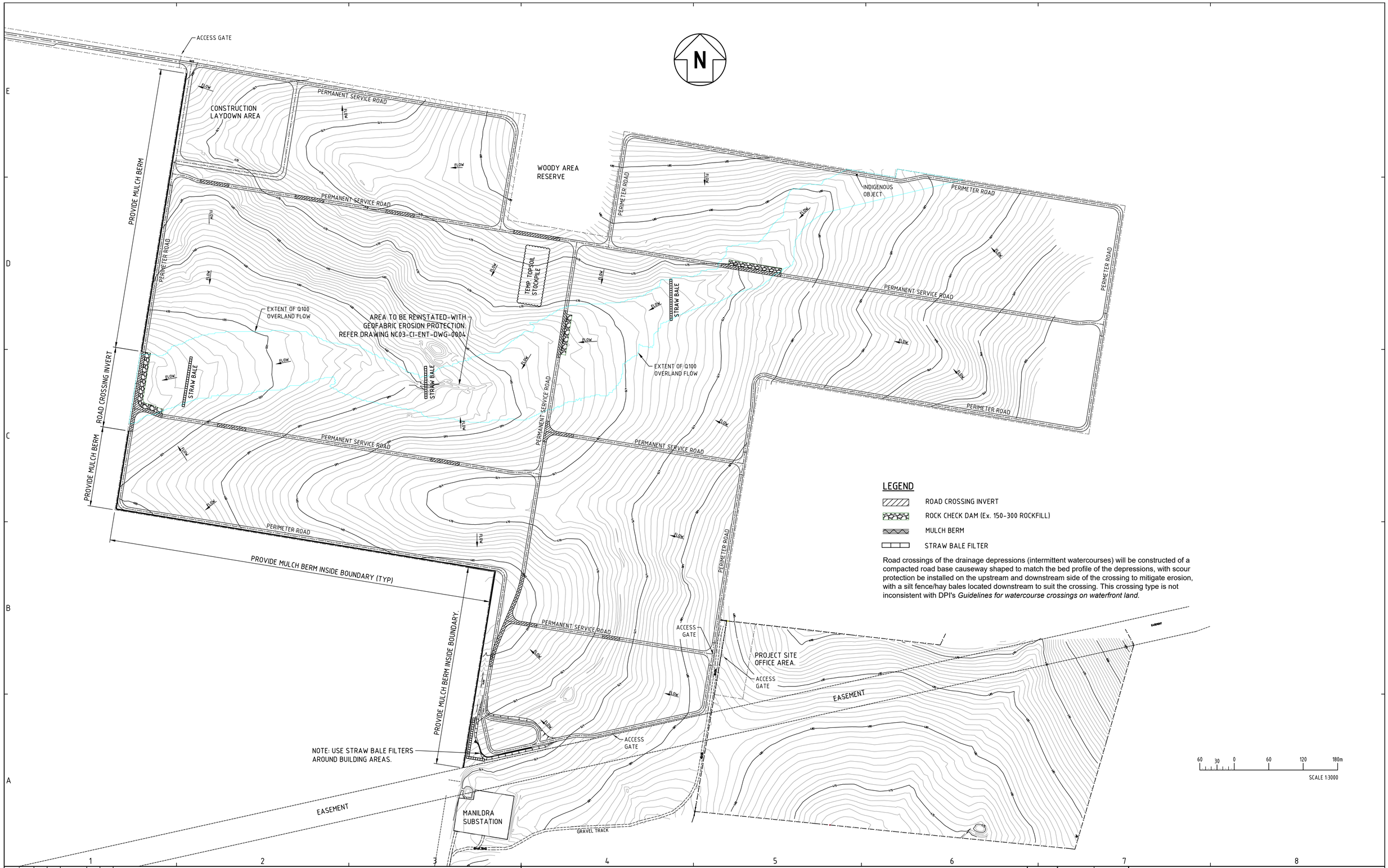
A Erosion and Sediment Control Plans



LEGEND

- ROAD CROSSING INVERT
- ROCK CHECK DAM (Ex. 150-300 ROCKFILL)
- MULCH BERM
- STRAW BALE FILTER

Road crossings of the drainage depressions (intermittent watercourses) will be constructed of a compacted road base causeway shaped to match the bed profile of the depressions, with scour protection be installed on the upstream and downstream side of the crossing to mitigate erosion, with a silt fence/hay bales located downstream to suit the crossing. This crossing type is not inconsistent with DPI's *Guidelines for watercourse crossings on waterfront land.*

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ALTERATIONS				
REV	DRAWN	CHKD	ENTURA APPD / DATE	CLIENT APPROVED / DATE
ORIGINAL ISSUE				
A	P.T			
SEDIMENTATION BUNDS AMENDED. ROADWAYS UPDATE. CHECK DAMS UPDTE. MULCH BERM ADDED.				
B	P.T			

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DESIGNED	BDS
CHECKED	AA
APPROVED	
DATE	
CLIENT APP'D	
DATE	

CLIENT: RCR INFRASTRUCTURE — ENGAGEMENT No: E306470

TITLE: MANILDRA SOLAR FARM
48.5 MW CAPACITY
EROSION & SEDIMENT CONTROL
GENERAL ARRANGEMENT

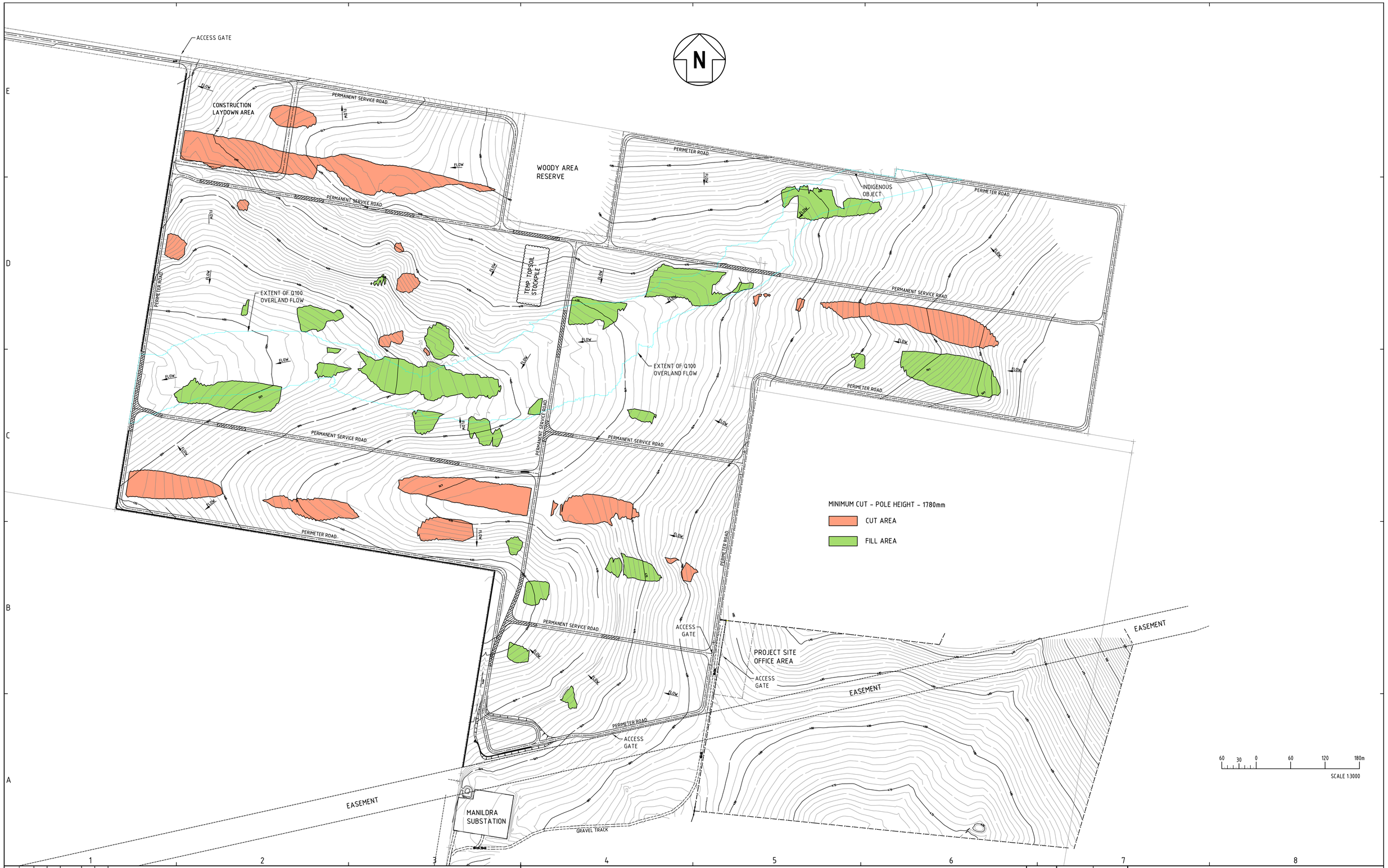
SCALE: AS SHOWN

SIZE: A1

ORG No: NC03 – CI – ENT – DWG – 0001

REV: B

FILENAME: P:\PROJECT\CONSULTDM\E306XXX\E3064XX\E306470\CIVIL\DRAWINGS\NC03-CI-ENT-DWG-0001.DWG



ENTURA IS A BUSINESS OF HYDRO-ELECTRIC CORPORATION ABN 48 072 377 158

ALTERATIONS				
ORIGINAL ISSUE	REV A	DRAWN P.T	CHKD	ENTURA APPD / DATE
				CLIENT APPROVED / DATE
PERIMETER & PERMANENT SERVICE ROADWAYS UPDATED.	REV B	DRAWN P.T	CHKD	ENTURA APPD / DATE
				CLIENT APPROVED / DATE

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CLIENT APP'D	
DATE	

CLIENT: RCR INFRASTRUCTURE ENGAGEMENT No: E306470

TITLE
MANILDRA SOLAR FARM
48.5 MW CAPACITY
CUT AND FILL AREAS
GENERAL ARRANGEMENT

SCALE: AS SHOWN

SIZE: A1

DRG No. NC03 - CI - ENT - DWG - 0002

REV: B

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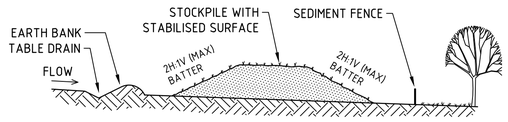
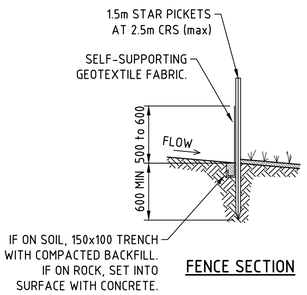
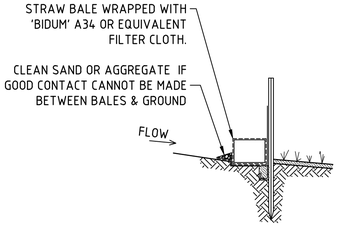


STOCKPILE DETAIL
NTS

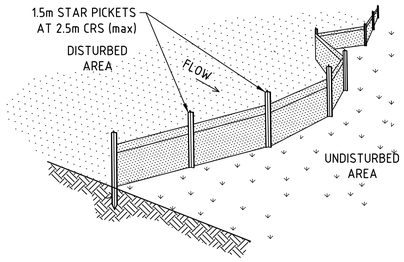
STOCKPILE NOTES
1. PLACE STOCK PILES MORE THAN 5 METRES FROM EXISTING VEGETATION, CONCENTRATED WATER FLOW, ROADS & HAZARD AREAS.
2. CONSTRUCT ON THE CONTOUR AS LOW, FLAT ELONGATED MOUNDS.
3. WHERE THERE I SUFFICIENT AREA TOPSOIL STOCKPILES SHALL BE LESS THAN 2 METRES IN HEIGHT.
4. WHERE STOCKPILES ARE TO BE PLACE FOR MORE THAN 10 DAYS, STABILISE BY GRASS SEEDING OR MULCHING.
5. CONSTRUCT EARTH BANKS (LOW FLOW) ON THE UPSLOPE SIDE TO DIVERT WATER AROUND STOCKPILES AND SEDIMENT FENCES 1 TO 2 METRES ON THE DOWNSLOPE.



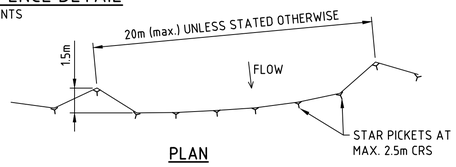
FENCE SECTION



SECTION
WITH STRAW BALE

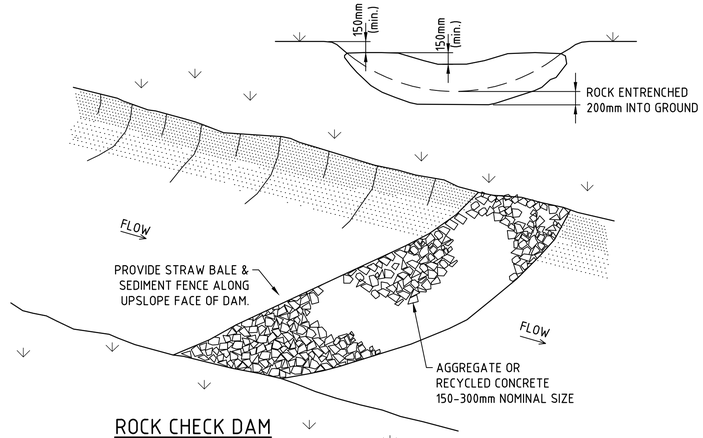


SEDIMENT FENCE DETAIL
NTS



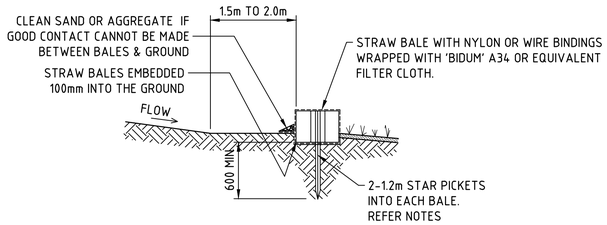
PLAN

SEDIMENT FENCE DETAILS
1. CONSTRUCT SEDIMENT FENCES AS CLOSE AS POSSIBLE TO BEING PARALLEL TO THE CONTOURS OF THE SITE, BUT WITH SMALL RETURNS AS SHOWN IN THE DRAWING TO LIMIT THE CATCHMENT AREA OF ANY ONE SECTION TO $1000m^2$ 50 L/s.
2. CUT A 150mm DEEP TRENCH ALONG THE UPSLOPE LINE OF THE FENCE FOR THE BOTTOM OF THE FABRIC TO BE ENTTRENCHED.
3. DRIVE 1.5m LONG STAR PCKETS INTO THE GROUND AT 2.5m INTERVALS (max.) AT THE DOWNSLOPE EDGE OF THE TRENCH. ENSURE THE STAR PICKETS ARE FITTED WITH SAFETY CAPS.
4. FIX SELF-SUPPORTING GEOTEXTILE TO THE UPSLOPE SIDE OF THE POSTS TO ENSURE IT GOES TO THE BASE OF THE TRENCH. FIX THE GEOTEXTILE WITH WIRE TIES OR AS RECOMMENDED BY THE MANUFACTURER. ONLY USE GEOTEXTILE SPECIFICALLY PRODUCED FOR SEDIMENT FENCING. THE USE OF SHADE CLOTH FOR THIS PURPOSE IS NOT PERMITTED.
5. JOIN SECTIONS OF FABRIC AT A SUPPORT POST WITH A 150mm OVERLAP.
6. BACKFILL THE TRENCH OOVER THE BASE OF THE FABRIC AND COMPACT IT THOROUGHLY OVER THE GEOTEXTILE.
7. SEDIMENT FENCES SHALL BE ERECTED CONVEX TO THE CONTOUR TO POND WATER.

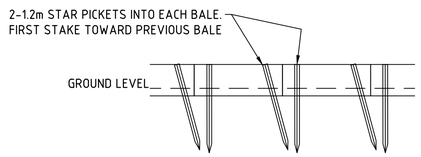


ROCK CHECK DAM
NTS

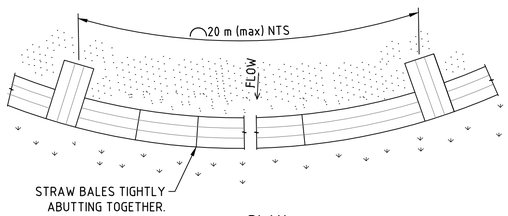
CHECK DAM NOTES
1. CHECK DAMS CAN BE BUILT WITH VARIOUS MATERIALS. INCLUDING ROCKS, SANDBAGS AND STRAW BALES. THE MAINTENANCE PROGRAM SHOULD ENSURE THE DAM'S INTEGRITY IS RETAINED ESPECIALLY WHERE CONSTRUCTED WITH STRAW BALES. IN THE CASE OF BALES, THIS MAY REQUIRE THE BALES REPLACEMENT EVERY TWO TO FOUR MONTHS.
2. TRENCH THE CHECK DAM 200mm INTO THE GROUND ACROSS IT'S WHOLE WIDTH. WHERE ROCK IS USED, FILL THE TRENCHES TO AT LEAST 100mm ABOVE THE GROUND SURFACE TO REDUCE UNDERCUTTING.
3. NORMALLY, THE MAXIMUM HEIGHT SHOULD NOT EXCEED 600mm ABOVE THE GULLY FLOOR. THE CENTRE SHOULD ACT AS A SPILLWAY, BEING AT LEAST 150mm LOW THAN THE OUTER EDGES OF THE CHECK DAM.
4. SPACE THE CHECK DAMS SO THE TOE OF THE UPSTREAM DAM LEVEL IS LEVEL WITH THE SPILLWAY OF THE NEXT DAM.



STRAW BALE SECTION

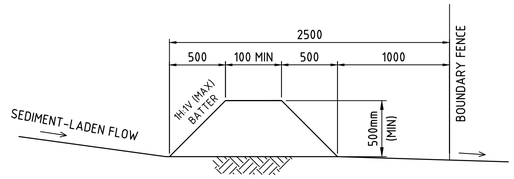


ELEVATION



PLAN

SEDIMENT CONTROL STRAW BALE CONSTRUCTION NOTES
1. CONSTRUCT THE STRAW BALE SEDIMENT FILTER AS CLOSE AS POSSIBLE TO BEING PARALLEL TO THE CONTOURS OF THE SITE.
2. PLACE BALES LENGTHWISE IN A ROW WITH ENDS TIGHTLY ABUTTING. USE STRAW TO FILL ANY GAPS BETWEEN BALES. STRAWS ARE TO BE PLACED PARALLEL TO THE GROUND.
3. ENSURE THE MAXIMUM HEIGHT OF THE FILTER IS ONE BALE.
4. EMBED EACH BALE INTO THE GROUND 75mm TO 100mm AND ANCHOR WITH TWO 1.2 metre STAR PICKETS OR STAKES. ANGLE THE FIRST STAR PICKET OR STAKE IN EACH BALE TOWARDS THE PREVIOUSLY LAID BALE. DRIVE THE PICKETS OR STAKES 600mm INTO THE GROUND AND , IF POSSIBLE FLUSH WITH THE TOP OF THE BALES. WHERE STAR PICKETS ARE USED AND THEY PROTRUDE ABOVE THE TOP OF THE BALES, ENSURE THE PICKETS ARE FITTED WITH SAFETY CAPS.
5. WHERE A STRAW BALE SEDIMENT FILTER IS CONSTRUCTED DOWNSLOPE FROM A DISTURBED BATTER, ENSURE THE BALE FILTERS ARE PLACED 1.5 to 2 metres DOWNSLOPE FROM THE BATTER TOE.
6. ESTABLISH A MAINTENANCE PROGRAM THAT ENSURES THE INTEGRITY OF THE BALES IS RETAINED - THEY COULD REQUIRE REPLACEMENT EACH TWO to FOUR MONTHS.



MULCH BERM FILTER

MULCH BERM CONSTRUCTION NOTES
MATERIALS
1. MULCH MUST COMPLY WITH THE REQUIREMENTS OF AS4454.
2. MAXIMUM SOLUBLE SALT CONCENTRATION OF 5dS/m
3. MOISTURE CONTENT OF 30% to 50% PRIOR TO APPLICATION

BERM INSTALLATION
1. REFER TO APPROVED PLANS FOR LOCATION AND EXTENT.
2. WHEN SELECTING THE LOCATION OF THE MULCH FILTER BERM, TO THE MAXIMUM DEGREE PRACTICAL, ENSURE THE BERM IS LOCATED:
   - TOTALLY WITHIN THE PROPERTY BOUNDARIES.
   - ALONG A LINE OF CONSTANT ELEVATION (PREFERRED , BUT NOT ALWAYS PRACTICAL).
   - AT LEAST 1m . OR IDEALLY 3m FROM THE TOE OF A FILL EMBANKMENT
   - AWAY FROM AREAS OF CONCENTRATED FLOW.
3. ENSURE THE BERM IS INSTALLED IN A MANNER THAT AVOIDS THE CONCENTRATION OF FLOW ALONG THE BERM OR THE UNDESIRABLE DISCHARGE OF WATER AROUND THE END OF THE BERM.
4. ENSURE THE BERM HAS BEEN PLACED SUCH THAT PONDING UP-SLOPE OF THE BERM IS MAXIMISED.
5. ENSURE BOTH ENDS OF THE BERM ARE ADEQUATELY TURNED UP THE SLOP TO PREVENT FLOW BYPASSING PRIOR TO WATER PASSING OVER THE BERM.
6. ENSURE 100% CONTACT WITH THE SOIL SURFACE.
7. WHERE SPECIFIED, TAKE APPROPRIATE STEPS TO VEGETATE THE BERM.

BERM MAINTENANCE
1. DURING THE CONSTRUCTION PERIOD, INSPECT ALL BERMS AT LEAST WEEKLY AND AFTER ANY SIGNIFICANT RAIN. MAKE NECESSARY REPAIRS IMMEDIATELY.
2. REPAIR OR REPLACE ANY DAMAGED SECTIONS OF THE BERM.
3. WHEN MAKING REPAIRS, ALWAYS RESTORE THE SYSYEM TO ITS ORIGINAL CONFIGURATION UNLESS AN AMENDED LAYOUT IS REQIRED OR SPECIFIED.
4. REMOVE ACCUMULATED SEDIMENT IF THE SEDIMENT DEPTH EXCEEDS A DEPTH OF 100mm OR 1/3 THE HEIGHT OF THE BERM.
5. DISPOSE OF SEDIMENT IN A SUITABLE MANNER THAT WILL NOT CAUSE A EROSION OR POLLUTION HAZARD.

BERM REMOVAL (IF REQUIRED)
1. WHEN DISTURBED AREAS UP-SLOPE OF THE BERM ARE SUFFICIENTLY STABILISED TO RESTRAIN EROSION, THE BERM MAY BE REMOVED.
2. REMOVE ANY COLLECTED SEDIMENT AND DISPOSE OF IN A SUITABLE MANNER THAT WILL NOT CAUSE AN EROSION OR POLLUTION HAZARD.
3. REHABILITATE/REVEGETATE THE DISTURBED GROUND AS NECESSARY TO MINIMISE THE EROSION HAZARD.

GENERAL NOTES:
1. REFER TO SOIL & WATER MANAGEMENT REPORT FOR ADDITIONAL REQUIREMENTS.

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ALTERATIONS

REV	DRAWN	CHKD	ENTURA APPD / DATE	CLIENT APPROVED / DATE	
A	PT				ORIGINAL ISSUE
B	PT				MULCH FILTER BERM ADDED. ROAD CROSSING DELETED. BALES WRAPPED WITH BIDUM A34.

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DATE	
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DATE	

CLIENT: RCR INFRASTRUCTURE
ENGAGEMENT No: E306470
TITLE: MANILDRA SOLAR FARM 48.5 MW CAPACITY EROSION & SEDIMENT CONTROL DETAILS
SCALE: NTS
SIZE: A1
ORG No: NC03 - CI - ENT - DWG - 0003
REV: B

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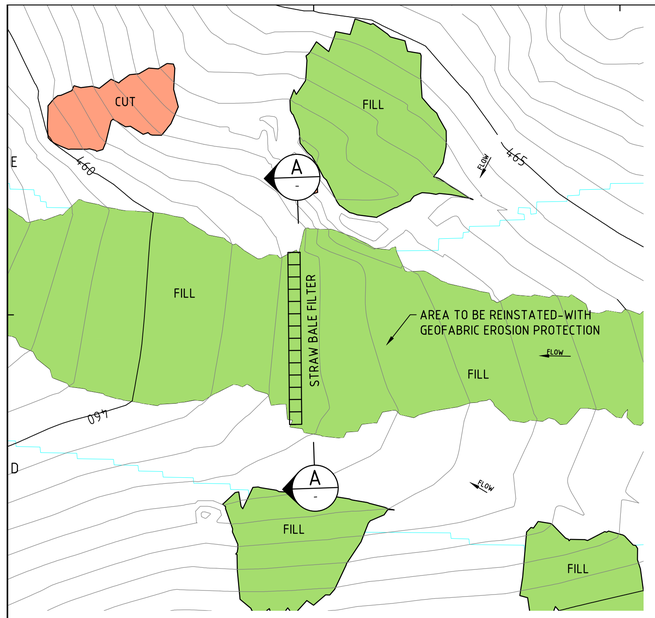
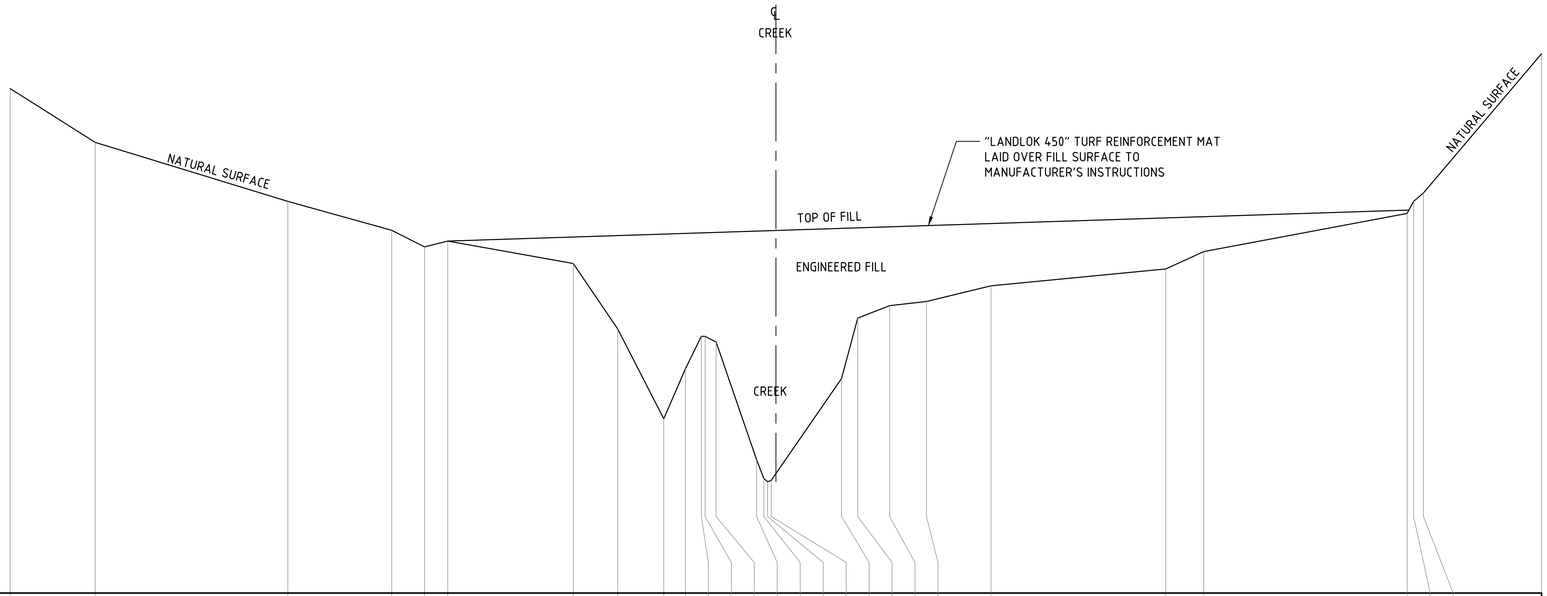


PLAN ON CREEK FILL

SCALE 1:1000



DATUM 459.0

CREEK BED LEVELS	462.293	461.942	461.557	461.368	461.260	461.298	461.151	460.724	460.138	460.464	460.677	460.675	460.638	459.871	459.747	459.726	459.736	460.401	460.795	460.876	460.903	461.006	461.116	461.229	461.478	461.557	461.612	462.521
OFFSET	-50.000	-44.448	-31.866	-25.080	-22.942	-21.429	-13.232	-10.329	-7.325	-5.910	-4.865	-4.619	-3.903	-1.257	-0.784	-0.537	-0.300	4.286	5.345	7.428	9.829	14.049	25.465	27.946	41.222	41.642	42.282	50.000

CREEK SECTION

SCALE HORIZONTAL 1:200
SCALE VERTICAL 1:20

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ALTERATIONS

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A	P.T		

ORIGINAL ISSUE

CLIENT APPROVED / DATE

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DATE	

CLIENT: RCR INFRASTRUCTURE
ENGAGEMENT No: E306470

TITLE
MANILDRA SOLAR FARM
48.5 MW CAPACITY
CUT AND FILL AREAS
CREEK CROSS SECTION

SCALE: AS SHOWN
SIZE: A1

DRG No. NC03 - CI - ENT - DWG - 0004
REV. A

FILENAME: P:\PROJECT\CONSULTDM\E306XXX\E3064XX\E306470\CIVIL\DRAWINGS\NC03-CI-ENT-DWG-0004.DWG

B Rainfall intensity

Australian Government
Bureau of Meteorology

Location

Label: Manildra Solar Farm

Latitude: -33.18 [Nearest grid cell: 33.1875 (S)]

Longitude:148.69 [Nearest grid cell: 148.6875 (E)]

IFD Design Rainfall Depth (mm)

Issued: 07 May 2017

Rainfall depth for Durations, Exceedance per Year (EY), and Annual Exceedance Probabilities (AEP).
FAQ for New ARR probability terminology

	Annual Exceedance Probability (AEP)						
Duration	**63.2%**	**50%#**	**20%***	**10%**	**5%**	**2%**	**1%**
1 min	1.70	1.91	2.61	3.11	3.61	4.30	4.85
2 min	2.86	3.22	4.39	5.21	6.04	7.13	7.98
3 min	3.95	4.45	6.06	7.20	8.34	9.86	11.1
4 min	4.92	5.54	7.55	8.97	10.4	12.3	13.8
5 min	5.78	6.51	8.88	10.5	12.2	14.5	16.3
10 min	8.93	10.1	13.8	16.4	19.0	22.7	25.6
15 min	11.0	12.4	17.0	20.2	23.5	28.0	31.7
30 min	14.7	16.6	22.7	27.0	31.4	37.5	42.3
1 hour	18.7	21.0	28.7	34.1	39.5	47.0	52.9
2 hour	23.2	26.1	35.4	41.9	48.5	57.4	64.4
3 hour	26.3	29.6	40.0	47.3	54.6	64.4	72.2
6 hour	32.8	36.9	49.7	58.6	67.4	79.3	88.6
12 hour	40.9	46.0	62.0	73.0	83.9	98.6	110
24 hour	50.2	56.4	76.2	90.1	104	122	136
48 hour	59.2	66.7	90.8	108	125	147	164
72 hour	64.0	72.1	98.5	118	137	161	179
96 hour	67.2	75.7	104	124	145	170	189
120 hour	69.6	78.4	107	128	150	176	196
144 hour	71.7	80.8	111	132	154	181	202
168 hour	73.7	83.1	114	135	157	185	207

Note:
The 50% AEP IFD **does not** correspond to the 2 year Average Recurrence Interval (ARI) IFD. Rather it corresponds to the 1.44 ARI.
* The 20% AEP IFD **does not** correspond to the 5 year Average Recurrence Interval (ARI) IFD. Rather it corresponds to the 4.48 ARI.

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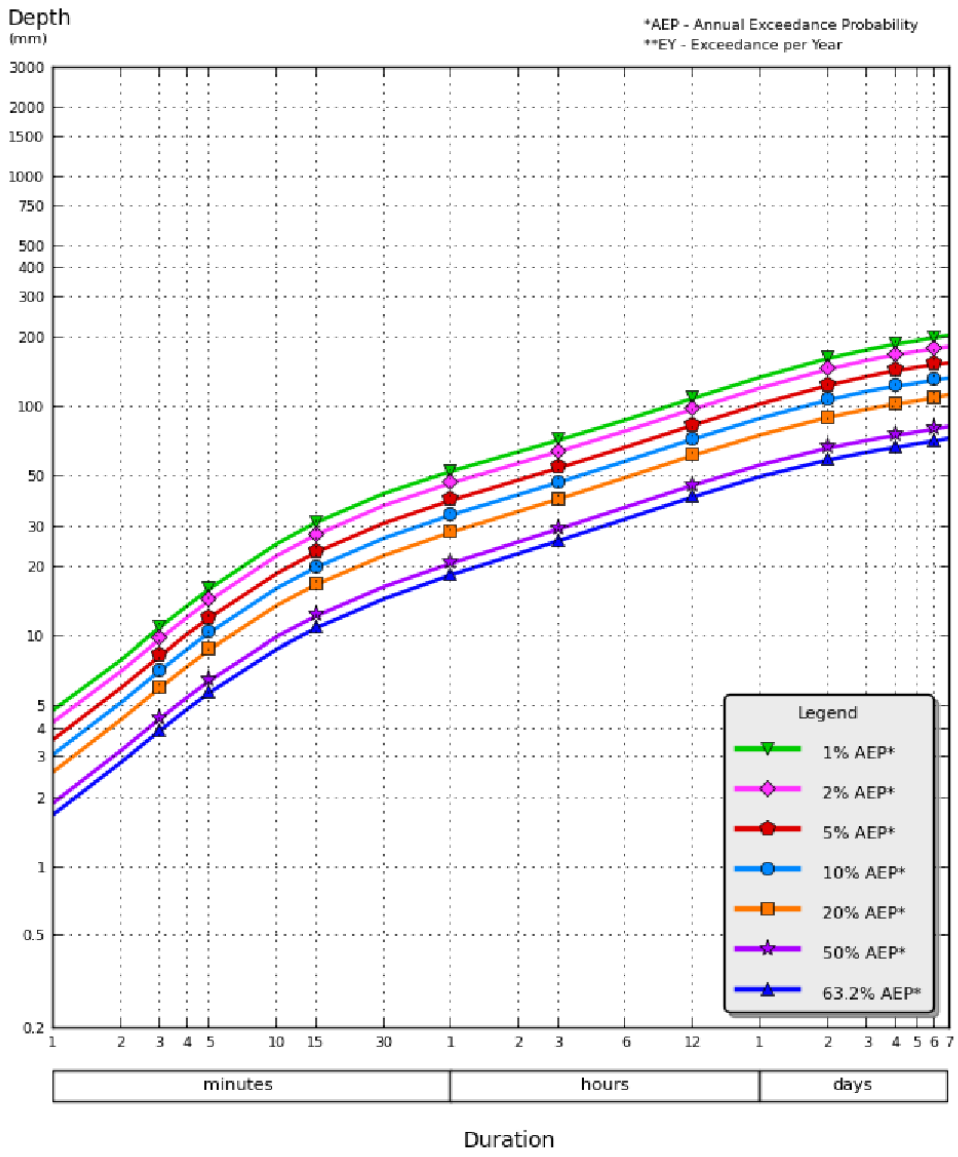

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C Erosion Risk Assessment

This assessment was undertaken with reference to the Blue Book.

C.1 Soil Loss Estimation Methodology

The erosion risk assessment described below acts as an indicator to determine what levels of erosion and sedimentation control measures should be applied to the project. The estimated soil loss from a range of slopes was calculated using the Revised Universal Soil Loss Equation (RULSE). This equation aims to predict the long term soil loss rate from a given site based on the site characteristics.

$A = K * R * Ls * P * C$

Where:

A = predicted soil loss per hectare per year

K = soil erodibility factor

R = rainfall erosivity factor

Ls = slope length/gradient factor

P = erosion control factor

C = ground cover and management factor

C.2 Soil Erodibility K

Field investigations have been completed with a summary of test pit results presented in Appendix B. Geotechnical investigations have revealed that the development site consists predominately of soils of clays and silty clays (type CH and CI). The soil erodibility factor applies to subsoils, as it is assumed topsoil will be stripped for construction (only in areas where construction is occurring).

Generally, the K-factor ranges from 0.005 (very low) to 0.075 (very high).

For the Manildra Solar Farm site, the K factor was assessed with reference to Figure A3 Soil Erodibility Nomograph in the Blue Book. The First Approximation of the Soil Erodibility was 0.01, while the Final Approximation was 0.025, which was adopted.

A number of tests were undertaken on the existing material to determine the Emerson class number. Geotechnical testing (Coffey 2016) of the area indicated that material has an Emerson Class of 5 and 6 therefore the K factor adopted is considered reasonable to conservative.

C.3 Rainfall Erosivity Factor R

The rainfall erosivity factor (R-factor) is a measure of the ability of rainfall to cause erosion. It is the product of the total energy and the intensity of the rainfall event.

As the Blue Book indicates, in some areas in eastern Australia, rainfall erosivity does not vary much throughout the year. Such areas usually have quite low R-factors, so erosion hazards are relatively low. However, local rainfall statistics in other areas show marked seasonal trends and some of these have quite high R-factors. In these areas, development and construction works programs should take advantage of the statistical information and encourage works on lands with high erosion hazards to be undertaken in "drier" months. This risk-based approach recognises that unseasonable rainfall events might occur at unexpected times, both from one year to another and seasonally.

The R factor was assessed using the Rainfall Erosivity value Maps in Appendix B of the Blue Book. The R Factor value of 1300 was adopted for the Manildra site.

C.4 C and P Factors

Within the Revised Universal Soil Loss Equation (RULSE), the C and P-factors are used to describe the management of the site with respect to reducing soil loss. The P-factor reflects the roughening or smoothing of the soil surface by machinery. By reducing the velocity of runoff and the tendency of runoff the P-factor will reduce. C Factor is the Grass Cover factor and was estimated considering a grass cover of 45% which we consider a reasonable assumption.

The P Factor As such the C and P factors adopted are 0.075 and 1.3 respectively.

C.5 Ls Factor

The slope length (Ls) factor can vary between different slope lengths and different slope gradients.

Table A1 in Appendix A of the Blue Book presents Ls factors estimated using the RUSLE for construction sites. A value of 2.8 was adopted for the Manildra Solar Farm site that equates approximately to a ground gradient of 10% and a slope length of 80m.

C.6 Annual soil Loss Rates

The resulting estimated soil loss A in Tonnes/Ha/Yr is 8.87. Conservatively, the overall area that will be disturbed during construction is assumed to be 21.67 Ha.

This assumption of the disturbed area takes into consideration the minimisation of earthworks adopted in design, and the control measures being proposed in this document.

It should be noted slope lengths greater than 200 m are not permitted with the use of RUSLE, and as a consequence any slopes longer than 200 m are required to be contoured.

This analysis results in a Soil Loss value of less than 192 Tonnes/Ha / Year which is equivalent to approximately 106 m^3/Ha/Year (i.e. less than 150 m^3 in volume; refer to the Blue Book).

Soil loss classes in accordance with IECA (2008) are shown in the following table:

Soil Loss Class	Soil Loss Rate (t/ha/yr)	Erosion Risk
1	0 to 150	Very Low
2	151 to 225	Low
3	226 to 350	Low - Moderate
4	351 to 500	Moderate
5	501 to 750	High
6	751 to 1500	Very High
7	> 1500	Extremely High

Therefore, there is a Low risk of soil erosion taking place on this site. The erosion and sediment control measures outlined in this document shall be adopted.

D Geotechnical testing results

Coffey undertook a limited geotechnical investigation program in March 2016 comprising the excavation of 9 test pits and associated logging and testing within the 120 hectare site. The report produced was entitled Manildra Solar Farm – Geotechnical Investigation, referenced GEOTABTF10200AA-AB Rev 02 and dated 20 April 2016. The stratigraphy encountered by Coffey in the test pits varied from the published geology for the site. A summary of laboratory soil classification test results is tabulated below.

Location	Depth (m)	Material Description	% Gravel	% Sand	% Fines	Atterberg limits tests		Linear Shrinkage %	Emerson Class
						Plasticity Index (%)	Liquid Limit (%)		
TP1	0.3 – 0.4		-	-	-	-	-	-	5
TP1	2.9 – 3.0		-	-	-	39	56	13.5	-
TP2	0.1 – 0.3		-	-	-	34	53	13.0	5
TP3	1.0 – 1.3		1	6	93	45	65	16.0	5
TP4	0.5 – 1.3		15	44	41	29	43	12.0	5
TP8	0.3 – 0.6		8	15	77	46	70	15.5	5
TP8	3.0 – 3.2		7	53	40	-	-	-	-
TP9	0.1 – 0.3		20	71	9	-	-	-	-

The soils were mainly clayey in composition however, sandy soils were also encountered in test pits 4, 5, 6 and 9. Significant gravels and boulders were encountered within the soil matrix from the weathering of the underlying parent bedrock. Bedrock was typically encountered at shallow depth and refusal was reached.

Laboratory chemical testing was also undertaken on selected soil samples as summarised in the table below.

Parameter	Unit	TP4 (0.5 – 1.3m)	TP5 (2.8 – 2.9m)	TP7 (1.0 – 1.2m)	TP8 (0.2 - 0.4m)
pH (1:5 aqueous extract)	pH units	8.5	8.4	8.4	7.7
Chloride	mg/kg	8.5	< 5	5.8	12
Sulphate	mg/kg	11	<10	19	19
Conductivity (1:5 aqueous extract)	mg/kg	120	46	39	26
Salinity (determined from EC)	mg/kg	62	28	25	< 20
Moisture	%	16	12	13	19
Resistivity	Ohm.cm	1,000 to 45,000	1,000 to 45,000	1,000 to 45,000	1,000 to 45,000

The results indicate that the subsurface materials are slightly basic (pH values of > 6.5), and have low concentrations of sulphates (<20 ppm) and chlorides (<20 ppm), and are of low salinity (<70 mg/kg).

Soil texture group assessed as group F with less than 10% dispersible fines.

E Erosion Hazard Assessment

Condition	Points	Estimated Score	Trigger value	
AVERAGE SLOPE OF DISTURBANCE AREA		2	4	
• not more than 3% [3% . 33H:1V]	0			
• more than 3% but not more than 5% [5% = 20H:1V]	1			
• more than 5% but not more than 10% [10% = 10H:1V]	2			
• more than 10% but not more than 15% [15% . 6.7H:1V]	4			
• more than 15%	6			
SOIL CLASSIFICATION GROUP (AS1726)		2		Note that a score of 2 or greater represents a need for greater erosion protection (turfing and hydro-mulching is recommended)
• GW, GP, GM, GC	0			
• SW, SP, OL, OH	1			
• SM, SC, MH, CH	2			
• ML, CL, or if *imported fill* is used, or if soils are untested	3			
EMERSON (DISPERSION) CLASS NUMBER		2	6	Based on Emerson Class Number ECN testing (Coffey 2016)
• Class 4, 6, 7, or 8	0			
• Class 5	2			
• Class 3, (default value if soils are untested)	4			
• Class 1 or 2	6			
DURATION OF SOIL DISTURBANCE		2	6	Proposed that works are covered up within 8 weeks of works being undertaken
• not more than 1 month	0			
• more than 1 month but not more than 4 months	2			
• more than 4 months but not more than 6 months	4			
• more than 6 months	6			
AREA OF DISTURBANCE		3	4	Area of disturbance in any one area will be less than 5000m^2.
• not more than 1000 m^2	0			
• more than 1000 m^2 but not more than 5000 m^2	1			
• more than 5000 m^2 but not more than 1 ha	2			
• more than 1 ha but not more than 4 ha	4			
• more than 4 ha	6			
WATERWAY DISTURBANCE		0	2	No disturbance to waterways/channels proposed.
• No disturbance to a watercourse, open drain or channel	0			
• Involves disturbance to a constructed open drain or channel	1			
• Involves disturbance to a natural watercourse	2			
REHABILITATION METHOD		2		
Percentage of area (relative to total disturbance) revegetated by seeding without light mulching (i.e. worst-case revegetation method).				
• not more than 1%	0			
• more than 1% but not more than 5%	1			
• more than 5% but not more than 10%	2			
• more than 10%	4			
RECEIVING WATERS		2		
• Saline waters only	0			
• Freshwater body (e.g. creek or freshwater lake or river)	2			
SUBSOIL EXPOSURE		2		
• No subsoil exposure except of service trenches	0			
• Subsoils are likely to be exposed	2			
EXTERNAL CATCHMENTS		1		
• No external catchment	0			
• External catchment diverted around the soil disturbance	1			
• External catchment not diverted around the soil disturbance	2			
ROAD CONSTRUCTION		2		
• No road construction	0			
• Involves road construction works	2			
pH OF SOILS TO BE REVEGETATED		0		Materials testing from Coffey 2016
• more than pH 5.5 but less than pH 8	0			
• other pH values, or if soils are untested	1			
Total Score		**20**		The Total Score is 20, which is greater than 17, and no Trigger Score was reached or exceeded. An Erosion and Sediment Control plan would be required.

Appendix I

EMERGENCY RESPONSE PLAN

RCR	SITE EMERGENCY & PREPAREDNESS PLAN	Revision Date: 14 June 2017
Subject:	SITE EMERGENCY & PREPAREDNESS PLAN	
Prepared By:	Andrew Conning	

Project: Manildra Solar Farm

Division: RCR Infrastructure

Client: Manildra Solar PTY LTD

Section	Rev	Change Record	Revision Date	Comments
All	A	Issued for Review	27.04.2017	
All	B	Project Specific Changes Made	14.06.2017	

TABLE OF CONTENTS

1 INTRODUCTION AND PURPOSE 3
2 APPLICATION 3
3 REFERENCE DOCUMENTS 3
4 RESPONSIBILITIES 4
5 PLANNING FOR EMERGENCY SITUATION 5
6 EMERGENCY RESPONSE 8
7 POTENTIAL EMERGENCY SCENARIOS & RESPONSE 11
INJURED PERSON 11
EVACUATION 13
FATALITY 14
FIRE / EXPLOSION 15
BUSHFIRE 16
VEHICLE ACCIDENT 17
LIGHTNING 18
CYCLONES ..... Error! Bookmark not defined.
URGENT MEDICAL TRANSFER 19
BULK Hydrocarbon / HAZARDOUS MATERIAL INCIDENT 20
SNAKE BITE 21
APPENDIX A - CONTACT NUMBERS FOR REFERENCE 234
APPENDIX B - AREA INSPECTION SHEET 25

Note: Crisis Management - LEG-RCR-PRO-003

Prior to any crisis, management personnel are to be familiar with the contents of LEG-RCR-PRO-003. This specific document outlines the roles and responsibilities of personnel involved in a crisis management situation. It also defines the limitations of authority, ownership of crisis information and authority to disseminate information. This is controlled by RCR's Chief Executive Officer.

UHF Radio Channels:

TBA

1 INTRODUCTION AND PURPOSE

RCR undertakes to provide an outline of the roles, responsibilities, training requirements, resources, and communication protocols, necessary for emergency management and response on the Project.

The purpose of this document is to provide an integrated framework between RCR systems and Sub Contractors for a controlled response to emergency situations at the Manildra Solar Farm Project.

This plan addresses how the Project will respond effectively, expediently and in an organised manner to an unplanned event to minimise loss and recovery delays to the project whilst accepting the client's authority to manage the emergency. RCR is prepared to provide initial management and integrated continuance in partnership with Emergency Services. Our priorities in the event of an emergency are:

1) Personnel Safety
2) Environment and Heritage Protection
3) Property Protection
4) and RCR Commercial Reputation

This Site Emergency Response Plan (ERP) will be immediately activated if there is any danger to personnel, property or the environment. As such, the ERP will be made available and communicated to all staff on site as part of the Site-Specific Induction.

2 APPLICATION

This Plan applies to all RCR Personnel, and sub-contractors working at the Manildra Solar Farm Project

3 REFERENCE DOCUMENTS

Reference	Description	
Acts & Regulations	New South Wales	*Work Health and Safety Act. 2011* *Work Health and Safety Regulation (WHS Regulation) 2011 Work Health and Safety (Codes of Practice).* *Protection of the Environment Operations Act 1997 No 156*
Australian Standards	AS 3745 AS 4360	Emergency Control and Procedures for Building Structure and Workplaces Risk Management
Project Documents		*Workplace Health and Safety Management Plan*

DEFINITIONS/ABBREVIATIONS

Emergency	Any event that arises internally or from external sources, which may adversely affect persons or the community, and which requires an immediate response.
Evacuation	An evacuation is the rapid removal of people from an immediate or threatened danger in a safe and orderly manner
Emergency Control Organisation	A structured organization of trained and authorized personnel that will initiate an appropriate response to emergency situations.
Muster point	Pre-defined assembly point where employees gather following the announcement of an evacuation
Emergency Control Organisation	A structured organization of trained and authorized personnel that will initiate an appropriate response to emergency situations.
BoM	Bureau of Meteorology
Shelter	A place of safety within a building, structure or workplace — which is not under threat from an emergency; and from which people are able to disperse after escaping the effect of an Emergency to a road or open space.
Shall	Indicates that a statement is mandatory.
Should	Indicates a recommendation.
FSE	Manildra Solar PTY LTD
EC	Emergency Coordinator

4 RESPONSIBILITIES

Person	Responsibilities
Project Manager	• Ensuring that this plan is adhered to • Ongoing review of Project's risks to ensure this Plan is relevant and adequately covers identified credible emergency scenarios • Nominating an RCR Emergency Response Coordinator (ERC) • Assigning a person as responsible for the maintenance of First Aid Supplies and Spill Response Equipment. • Supporting the Emergency Response Coordinator in responding to an emergency • Establishing names and emergency contacts of those injured, contact emergency contacts, arrange support if required • Establishing the Hospital visitation of any injured personnel and continued care • Organizing Employee Assistance Program (EAP) support and other counselling assistance if required • Liaises with client and external emergency service personnel in case of emergencies.

Person	Responsibilities
	• Liaises with RCR Executive General Manager and HSEQ Manager- Corporate in case of emergencies.
Managers and Supervisors	• Ensure that they are aware of the location of their personnel at all times • Report the status of their personnel to the ERC at the Muster Point • Ensure that all their personnel at the muster point do not leave until the all clear is given by the ERC • Ensure that all their personnel conduct themselves in an orderly manner • Ensuring their work group is evacuated to the nearest muster point.
HSE Manager/ Advisor	• Ensures the operation maintains effective and up to date emergency response plans with inclusion of all major potential emergency considerations • Audits the process and verify the ongoing monitoring that this procedure is maintained up to date • Provides training and service to all areas of their division in relation to this procedure. • Ensures employees and visitors within their areas are familiar with the location of the muster points. • Ensures employees and contractors within their areas are familiar with the relevant actions as outlined in the plans that relate to their work area, • Participates in exercises, as required by the client or by RCR procedures. • Reviewing and updating this Plan

5 PLANNING FOR EMERGENCY SITUATION

Emergency scenarios

This SEPP has been developed taking into account credible emergency scenarios based the intended construction works and the environment in which they will be undertaken. These emergency risks are also identified/ inferred in RCR's Project's HAZID/ CRAW.

Emergency Control Centre

The designated Emergency Control Centre for RCR will be in the site's main office area. The RCR Emergency Control Centre shall have the following equipment and resources available:

- Detailed maps of the area
- UHF radio for monitoring of emergency calls
- A whiteboard or similar
- A copy of the Emergency Response Plan
- Telephone, Email, Internet and Radio communications
- Adequate room for essential personnel

- Poster showing first aiders for the site
- Emergency & First Aid Equipment

First Aiders

The Project will provide sufficient qualified first aid trained personnel for each work area or team, with an overall ratio of 5% of the crew on site.

Emergency & First Aid Equipment

Work groups will have available radios and mobile phones (those authorised to have one) to engage an emergency response. The emergency and first aid equipment will be stored in a manner that protects the equipment from damage. First aid kits shall be maintained by the supervisors and HSE staff, and shall be inspected regularly.

The following emergency response equipment has been identified for the Project:

- Fire Extinguishers
- First Aid Equipment/ Burn Kit
- Compression Bandages (for snake bites)
- Blast horn
- Environmental Spill Equipment
- Radio with designated channels
- All emergency equipment, for example fire extinguishers, blast horns, first aid kits, environmental spill equipment, shall be inspected on a regular basis and replenished/replaced as necessary, prioritising a state of readiness at all times.

First aid facilities and services will be located at points convenient to the workforce and where there is a risk of an injury occurring. At least one first aid kit shall be portable. These points shall be:

- Supervisor's vehicles - Outdoor First Aid Kit
- Office - Basic First Aid kit
- Plant operating on site
- Stores office

The list of first aiders shall be displayed on notice boards. The first aiders will be contacted in the event of an injury. It is their responsibility to administer treatment to the victim within their capacity until medical help arrives.

Medical Facilities & MEDIVAC

RCR will provide an initial treatment facility, and primary treatment transportation on site. In the event that further treatment is required for a medical emergency (Major Injury or Illness) RCR onsite staff will coordinate and manage the emergency in consultation with the NSW Ambulance. Where a medical emergency evacuation (Medivac) is required RCR staff shall manage and coordinate the medivac with RCR Management. Medivac from the Manildra Solar Farm Project site options include:

- NSW Ambulance
- NSW Aeromedical Air Ambulance

The method of medivac from site will be the decision of the attending NSW Ambulance Paramedic personnel, the doctor and, RCR Management. Destination and method of transport will be determined on access to site and the nature of the medical emergency.

Environmental

Environmental Spill Kits, Temporary Bunds, Environmental Response PPE will be stored in a central location and appropriate signage erected to notify of location

Communication

General

An Emergency Response Plan/Procedure will be posted on notice boards. It will also form the basis and inspiration from time to time of topics for discussion through toolbox and prestart meetings and as part of the Site-Specific induction.

Emergency Contact Details & Site Setup

A list of Site Emergency Contacts shall be displayed conspicuously at the site crib room, notice boards and office. The site emergency contact list and emergency response requirements shall be communicated to new starters at induction.

A site map illustrating the location of primary and alternate emergency muster points will be displayed on site. A copy of the site plan will be periodically reviewed to ensure it is up to date and displayed at visible locations (e.g. notice boards, entrance gates, crib rooms).

Pre-existing Medical Information

As part of the site induction workers will be asked to contact HSE if they have any pre-existing medical information that the Project needs to be aware of in the event of a medical emergency (e.g. diabetes, medication etc). This information is to be recorded in a secure location.

Training

Induction

All persons inducted onto site will be made aware of how to recognise an emergency situation, show examples of these type of emergencies, how to raise the alarm, response to an emergency situation and location of the muster point(s). Inductions will be delivered to visitors, contractors and new employees. Where a person has not undertaken a Site-Specific induction, they will be escorted for the entire duration of their visit by senior or fully inducted site personnel.

Emergency Training and Exercises will be developed to reflect the most likely of emergency situations as identified in the Project CRAW

Training needs for this Project will include but not be limited to:

- First Aid Training
- Incident Investigation Root Cause Anaysis
- Spill response
- Fire Warden
- Handling Hazardous substances

Training will be delivered by a variety of means including, External Service Providers (RTO): First Aid Training, Handling Hazardous Substances / Toolbox Talks: Site Preparedness, Flora and Fauna Awareness.

Records will be maintained on the employees HR File and reflective of the Project Risk Training Needs Analysis.

Emergency exercises may be held with the approval of Project Manager in the form of resource and equipment checks, emergency toolbox topics, desktop exercises, practical drill, operational drill or other exercises designed to systematically include all personnel likely to be involved. All exercises or drills shall be recorded.

Emergency Planning Review

The contents of the ERP will be reviewed after each drill or actual emergency situation to validate the content and comparisons made between expected and actual outcomes. Review of the ERP will also occur after a significant change in scope of works. Outcomes from drills and incidents will be used to continuously improve the ERP.

6 EMERGENCY RESPONSE

Initial Response

The following response will be the standard approach applied to an emergency, commonly known as the "ICER": -

- **Isolate**: Isolate the source of the problem. For example, shut doors, switch off gas or electricity or secure yourself away from any danger, rescue injured persons if safe to do so.
- **Contain/ Cordon**: Contain or cordon off the area. For example, shut down air-conditioning systems, prevent others from entering the hazardous zone or alert people in the area.
- **Evacuate**: Evacuate via the nearest safe exit if your safety is at risk to the muster point. Stay calm, do not run.
- **Raise the Alarm**: Raise the alarm for the premises or site, contact the emergency response team if necessary or emergency services.

If possible during the incident, personnel should record the sequence of events on the incident log. Following an incident, an investigation will commence, evidence will be gathered and statements will be taken. RCR personnel involved in any incident are not to accept any liability for the incident.

Initial notification and escalation process

In the event of an emergency, workers should initially:

- Ensure yourself and others are not at risk
- Raise the alarm - The procedure for raising an alarm over two-way radio as follows:
  - Emergency, Emergency, Emergency
  - Your name
  - Your location
  - Emergency details (if involving an injury, the person's name is not to be broadcast on the radio)
  - Assistance required
  - Don't hang up, wait for questions or instructions

- Any person discovering an incident to immediately raise the alarm and report to their Supervisor
- RCR Management/ or delegate is to notify the Project/ HSE Manager and coordinate first aid response
- Supervisor is to ensure safety of the workers, secure the area, preserve all evidence and record all entry.
- Site Emergency & Preparedness Plan is activated
- RCR to gather and confirm latest details of incident and forward such relevant details by way of Initial Incident Log & Details within 1 hour of the emergency
- If the emergency as evaluated by the Project Manager constitutes a crisis, LEG-RCRPRO-003 Crisis Management will be activated immediately

Securing of Incident Scene

If the incident is of a serious nature the scene is to be secured immediately after the situation is under control. The RCR Site Management Team Leader (eg Project Manager) shall be responsible for securing the scene quickly to ensure vital evidence has not been destroyed, altered or removed.

Where a person has suffered serious harm, or is deceased, all areas adjacent to the accident scene are to remain undisturbed until otherwise advised by an inspector or police.

Photographs, Video & Witness Statements

The Project Manager shall delegate responsibility to take photographs and/or video recording of the incident to assist in explaining the incident and subsequent investigation. The delegate shall take all practical precautions to prevent third parties from taking photographs or video footage.

Giving Statements to Third Parties

No statement should be given directly to a third party involved in an incident. All statements given to third parties or otherwise shall be reviewed and vetted by RCR Legal prior to being released. This is to ensure that statements do not disadvantage the individual or the Company.

Legal Considerations & Legal Professional Privilege

RCR personnel involved in any incident are not to accept any liability for the incident. In the event of serious incident consideration should be given to seek legal professional privilege. The HSEQ Manager – Corporate shall be contacted to determine and organize legal professional privilege. All personnel are to adhere to Legal advice given by the company.

Media/Social Media

In line with LEG-RCR-PRO-003 Crisis Management: No statements must be made to the media unless authorised pursuant to the procedure. Likewise, no RCR personnel may make any comment on behalf of the Client unless specifically authorised by The Client to do so.
If requested for a statement, the response shall be:

"I am not authorized to answer your questions; however the person who can assist you is The Client Corporate Communication Team."

Site Management shall instruct personnel that are not to release any form of comment, video, photographs pertaining to the incident on any form of social media forums (e.g. Facebook, twitter, blog sites etc.).

Recovery/ Post emergency activities

The Project Manager will be responsible for the following actions after an emergency response has been activated:

- wait to receive an all clear from the client in the event that the site has been evacuated
- Inspect the workplace for damage, repairs and to ensure it's safe for personnel to return to work.
- Liaise with any relevant parties to advise the emergency situation is now closed or 'under control.'
- Arrange a post emergency debrief

Debrief

A post emergency debrief shall be held where everyone involved has the opportunity to have "their say" and make comment about successes and failures that occurred within the emergency situation. Any deficiencies identified should be recorded and incorporated into the review of the Emergency Management System documentation.

The Debrief will cover:

- Information processing - Was it effective? Were channels correctly used? What were the results?
- Information received - When was the incident identified? By whom? Was the incident correctly assessed? Was potential to expand identified?
- Planning - Were all options to resolve the incident identified? Was the best course of action chosen? Was the control plan effective? Were people able to respond to the plan?
- Control - Who was in control? Did the control structure work? How good was the internal communication? Were external emergency services involved? How did this work?
- Communication Systems - How well did they work? Was the equipment/ hardware sufficient? Did it work effectively?
- Response to procedures - Did people do as they were required and according to procedure (e.g. follow SOPs), or was a degree of panic?
- Hand over's -Did these work effectively? What were the problems?
- Reporting – Were all important parties kept informed? What were the failings? What improvements are required?
- Media - Was media relations/control effective? What improvements are required?
- Any conclusions, modifications, alterations that are agreed upon shall be managed via management of change process.

Employee Assistance Program (EAP) Counselling

After the emergency, all personnel shall be offered EAP counselling. Example of when EAP counselling may be required:

- Witnessing serious physical injury;
- The unexpected death or suicide of a relative, friend or co-worker;
- Involvement as a victim or observer of armed robbery, assaults or other serious crimes;
- The loss of valued possessions by theft, fire and other accidents.

Recovery Works

Recovery works may be required after an emergency. Example of recovery works include;

- Removal of contaminated soil after a spill
- Benching to repair a collapsed excavation wall

- Repair of underground services, etc

As soon as possible after the emergency has been dealt with, appropriate barricading/ signage shall be erected to prevent unauthorised work being performed.

Prior to commencing any recovery works, the Project Manager shall:

- Verify with Commercial Manager any insurance, contractual or legal requirements which may have financial implications should recovery works commence without prior approval
- Assess the risks associate with the works
- Assess any requirements to involve third parties, such as contacting utility providers, seeking Client approval prior to commencing recovery works

Investigation

Incident Investigation shall be conducted SAP

7 POTENTIAL EMERGENCY SCENARIOS & RESPONSE

The following credible potential emergency scenarios have been identified from the projects HAZID and CRAW:

1) Injured Person
2) Evacuation
3) Fatality
4) Fire/ Explosion
5) Bushfire
6) Vehicle Accident
7) Severe Weather Event
8) Urgent Medical Transfer
9) Snake Bite
10) Missing person/ Non-arrival at expected journey management check in
11) Other Significant Event

INJURED PERSON

First Person on the scene raises the alarm via:

EMERGENCY UHF RADIO CHANNEL: TBA

"EMERGENCY, EMERGENCY, EMERGENCY"

Advise of incident status

Attract attention, send someone to contact Medical Centre, via Emergency Operator advise clearly and slowly;

- Your name, location
- Number of person(s) involved and extent of injuries
- What has happened
- Identify nearest landmark
- What actions you have taken
- Any exposures that are likely to escalate the incident (e.g. fumes, fire etc) then:

DRABCD

D DANGER Check surrounding area for remaining danger

R Check person for RESPONSE (call or gently shake them)

A Check AIRWAYS are clear

B Check patient is BREATHING (No sign of breathing – 5 quick breaths)

C Check CIRCULATION (If no pulse – start C.P.R. – if trained)

D Defibrillator (if available)

Patient breathing and stable; put in recovery position.

Ensure safety of others, secure accident scene (isolate power, mechanical drives, belts, motors etc).

If safe to do so, remain at incident scene until the Incident Controller or Paramedic arrives.

Paramedic will assume control of any patient(s) upon on their arrival.

Provide Incident Report to Emergency Coordinator when feasible.

EVACUATION

EMERGENCY UHF RADIO CHANNEL: TBA

"EMERGENCY, EMERGENCY, EMERGENCY"

RAISE THE ALARM FIRST

1. Instructions to evacuate an area shall be passed by Emergency Radio Channel.
2. Team Leaders and designated wardens shall advise persons within area to evacuate.
3. On being instructed, evacuate area to Emergency Assembly Area; remain until advised otherwise
4. All visitors to be escorted to Emergency Assembly Area.
5. All personnel are required to participate in head count; results to be relayed to Emergency Coordinator/s.
6. Ensure all personnel at Emergency Assembly Area are informed of emergency status.
7. Advise all personnel to comply with instructions from client Area Wardens.
8. Consider immediate shut down of operations and securing of the area.

If Flooding Incident:

1. Hazardous areas to be barricaded / sign-posted and personnel to be advised of situation.
2. Post Area Wardens near any entry areas to ensure personnel do not enter unintentionally.
3. Emergency Services to be called to assist with any rescue or evacuation activities.
4. Mobilise equipment and resources to assist with pumping and damming via Site Services.

If Extreme Weather Incident

1. Monitor weather forecasts during evacuation activities
2. If personnel working in remote locations, ensure they are advised to return or evacuate to alternate location; include them in head count.
3. Advise relevant authorities of status; plan evacuation route according to available information.
4. If communications unavailable, make own evacuation travel arrangements as appropriate

FATALITY

(First person on the scene)

RAISE THE ALARM FIRST

EMERGENCY UHF RADIO CHANNEL: TBA

"EMERGENCY, EMERGENCY, EMERGENCY"

1. Notify Incident Controller immediately – via secure means of communication (phone) via the Emergency Operator.
2. Do not touch anything relating to the fatality area or surrounds unless it is of immediate danger.
3. Secure area until assistance arrives.
4. Incident Controller will notify by phone/radio:
    a. Site Manager
    b. Paramedic to attend
    c. Workplace Health & Safety Inspector
    d. Human Resources representative
    e. Police
5. Paramedic will perform Obvious Death Protocol.
6. Team Leader will:
    a. Notify relevant Manager / Superintendent
    b. Confirmation identification of the deceased

Note: Crisis Management LEG-RCR-PRO-003

Prior to any crisis, management personnel are to be familiar with the contents of LEG-RCR-PRO-003. This specific procedure outlines the roles and responsibilities of personnel involved in a crisis management situation. It also defines the limitations of authority, ownership of crisis information and authority to disseminate information. This procedure is controlled by RCR's Chief Executive Officer.

FIRE / EXPLOSION

RAISE THE ALARM FIRST

EMERGENCY UHF RADIO CHANNEL: TBA

"EMERGENCY, EMERGENCY, EMERGENCY"

A. Rescue any personnel in danger, (if safe to do so)
B. Initiate Evacuation of work area to the Emergency Assembly Areas.
C. Contain fire, close doors / windows along the way
D. Extinguish fire only if safe to do so, and if you are confident and trained to do so.

1. If the fire is small and the responder is trained, use nearest fire extinguisher and attempt to extinguish source (direct extinguisher towards the base of the fire).
2. If fire escalates / is bigger than first anticipated, raise alarm ensuring all personnel in area are evacuated.
3. Confirm location, extent and type of fire / explosion; where possible eliminate source.
4. Ensure safety of all personnel if responding to fire.
5. Raise alarm via Emergency Operator (as above).
6. Shut down / isolate electrical supply to affected area if authorised and safe to do so.
7. Check for any exposures that are likely to escalate incident (fuel drums, chemicals, oxy-acetylene bottles, petrol, kero, gas cylinders, tyres etc).
8. If gas fire, do not try to extinguish unless gas flow can be turned off IMMEDIATELY – if not concentrate on stopping spread of fire and cooling activities.
9. Evacuate personnel at risk to Emergency Assembly Areas - or to safe distance upwind from incident area; await further instructions
10. If rescuing personnel in danger, ensure own escape route first; do not endanger yourself by entering an area containing smoke / noxious fumes.
11. All personnel to be accounted for at Emergency Assembly Areas by means of a head count.

BUSHFIRE

RAISE THE ALARM FIRST

EMERGENCY UHF RADIO CHANNEL: TBA

"EMERGENCY, EMERGENCY, EMERGENCY"

1. Advise Emergency Operator to mobilise Emergency Response Team and water carts so as to prevent fire spread.
2. Attempt to extinguish fire using portable fire extinguishers or fire hose reels.
3. Vehicles / equipment to be moved out of oncoming path of bushfire.
4. All non-essential personnel to evacuate to the nominated Emergency Assembly Areas.
5. Wear appropriate personal protective equipment if fighting bushfire.
6. If indoors, close all windows, vents and doors.
7. Hose down areas around buildings, stationary equipment or storage facilities.
8. Once fire has passed, ensure all previously threatened areas are inspected for any mop-up or extra firefighting requirements.

VEHICLE ACCIDENT

RAISE THE ALARM FIRST

EMERGENCY UHF RADIO CHANNEL: TBA

"EMERGENCY, EMERGENCY, EMERGENCY"

Person at Accident Scene:

1. Request assistance of Emergency Response Team as required.
2. Switch off vehicle ignition – if safe to do so.
3. If vehicle fire involved, initiate vehicle fire suppression if fitted and safe to do so.
4. Assess vehicle and site damage; take necessary actions to secure / isolate accident scene.
5. If vehicle in contact with power lines, stay clear and advise occupants to stay in vehicle.
6. Do not try to remove casualties from vehicle unless other dangers are present.
7. When possible, rescue trapped or injured personnel and provide medical aid (if qualified) maintain airway.
8. Cover any spilt fuel with sand or dirt.
9. Ensure Police are notified (if necessary).

If you are the Driver involved in the Accident:

1. Provide necessary information to Police or other vehicle driver (if applicable) – DO NOT ADMIT LIABILITY or make promises that either you or the Company may not be able to fulfil.
2. If camera available, take photos of accident site and vehicles (consider ignition source issue).
3. Provide a report of your version of events to RCR Management when possible.
4. Take whatever precautions are necessary to minimize impact of damages and liability.
5. Emergency Response Team to be informed if dangerous goods / hazardous substances are involved for onsite accidents.
6. Have appropriate Manager attend site to initiate accident investigation and reporting.
7. Vehicle diver/operator is to attend site medic with Supervisor for mandatory drug and alcohol testing.

LIGHTNING – 30/30 Rule

ALERT PERSONNEL ON SITE WIDE RADIO CHANNEL

Thunderstorms are most prevalent from September to March in Central West NSW according to the BoM, but can occur all year round.

When lightning strikes it usually includes several strokes which all occur within about ½ of a second. Lightning can travel over the surface of the ground and through the ground and can be lethal to anyone within an 18-metre radius of the strike on land and 180 metres on water. When you first see lightning, or hear thunder is when action should be taken.

Lightning to be recognised by **sound** – thunder is heard, lightning is coming, or **visual** - observing lightning flashes.

Note: If the flash to thunder interval is less than 30 seconds, lightning is occurring within approximately 10km (3 seconds = approx. 1km).

This 10km vicinity shall be the "SAFE ZONE" which is to be applied.

During the approach of a thunderstorm, if the time interval between a lightning flash and the sound of thunder is less than 30 seconds, workers on the ground are to cease work and seek safe shelter immediately. All mobile equipment operators shall remain in their equipment avoiding contact with metal components unless alternative transport is available close by. Supervisors to account for all their personnel by means of the sign-on register.

Once the storm conditions have dissipated, personnel should wait a further 30 minutes, after hearing the last thunder before leaving the safe area location and returning to their work areas

Contractor Management

RCR management shall ensure appropriate actions are taken to eliminate/minimise harm to personnel and equipment during thunderstorms and lightning including:

- Ensure outdoor works are suspended as required.
- Ensure personnel are advised the lightning procedure is in effect.
- Lower crane booms, loads and attachments and suspend crane operations.
- Lower EWP equipment and suspend EWP operations.
- Ensure drilling/piling rigs lower masts where able to do so.
- Ensure personnel constructing steel erections, dams, or water reservoirs
- Including surveyors working with GPS systems suspend work.
- Personnel working at heights suspend works and return to ground level.
- Conduct inspections of the work area to identify any hazards or issues.
- Ensure loose objects and materials are tied down and secured.
- Work areas are inspected and made safe.
- Construction operations to commence after the "ALL CLEAR" is received.

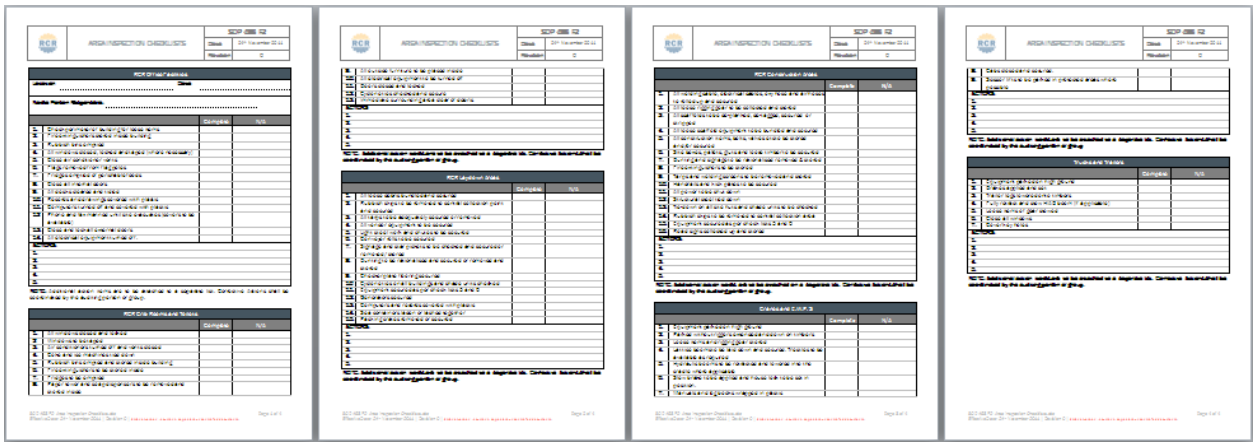
Monitoring Lightning Activities

The RCR Workplace Manager shall ensure that lightning detectors or a storm tracker website such as (BOM) are monitored. Actions shall be determined based upon the intensity, distance, speed, direction and travel of the lightning activity, as determined through observation, weather reports and warnings from storm tracking equipment. Any actions shall be communicated to personnel and contractors by the quickest possible means. Personnel shall ensure that work areas are evacuated when directed by the site manager.

Emergency Response

In the event personnel are struck by lightning they can be assisted safely as they carry no electrical charge. Injured personnel should be treated as soon as possible by qualified first aiders or emergency services.

See appendix a for WHS-RCR-CHK-012 checklist form



URGENT MEDICAL TRANSFER

1. Notify the Site Paramedic, RCR Project Manager, Safety Manager
2. Paramedic will:
   - Assess and treat situation accordingly
   - Liaise with site Ambulance for activation of transfer
   - Prepare and stabilise patient for transfer
   - Notify Site Manager of situation once transfer is complete
3. RCR Managers will:
   - Assist Paramedic as required
   - Notify Sydney Head Office and submit incident notification.

BULK Hydrocarbon / HAZARDOUS MATERIAL INCIDENT

(First person on the scene)

RAISE THE ALARM FIRST

EMERGENCY VHF MINE RADIO CHANNEL:

"EMERGENCY, EMERGENCY, EMERGENCY"

1. Assess types of substance(s) & likely quantities.
2. Obtain all Safety Data Sheets and other relevant documentation from logistics or Medical Centre. Ensure Emergency Services receive copies.
3. If safe to do so assist trapped or injured personnel and provide medical aid (if qualified).
4. Use emergency showers and eye washes to rinse any contaminated personnel.
5. Do not approach spill area if substance is totally unknown.
6. Try to minimise impact on incident area by:
7. CONTROL/CEASE flow – CONTAIN substance – CLEAN UP spill.
8. Contain spill by using any readily available bunding.
9. Block drain inlets, sumps, wharf scuppers etc; call for assistance as required.
10. Establish decontamination area (upwind of incident).
11. Establish upwind communication point.
12. Warn personnel in area to go upwind of incident site.
13. Identify and isolate any other sources of ignition and restrict vehicular access to spill area.
14. Do not go downwind of any fume / smoke source / alert rescue personnel.
15. Ensure personnel situated downwind of any potential spill residue or toxic fume / plume are alerted.
16. If substance is flammable, ignition risk can be reduced with foam blanket (if available).
17. If the spill is un-containable, ensure evacuation procedures are initiated.

SNAKE BITE

RAISE THE ALARM FIRST

EMERGENCY VHF MINE RADIO CHANNEL:

"EMERGENCY, EMERGENCY, EMERGENCY"

Contact Site Control Immediately

1. Avoid anything that might threaten or scare the snake. If a snake feels cornered it will bite to defend itself. **Most snake bites happen when people try to catch or kill snakes**
2. In the unlikely event that you see a snake inside make sure you give it an opportunity to escape and then get help. Don't panic. It won't attack you. Australian snakes normally don't do that. Unless you give them a reason to
3. Snake venom does not move in the bloodstream as many people assume. It moves in tiny lymphatic vessels under the skin. This means it is comparatively easy to restrict its movement and to delay onset of symptoms for many hours.
4. If you are bitten, do the following:
    a. A **pressure immobilisation bandage** should be applied immediately. It will apply pressure over a wide area of the bitten limb. Bandage the limb about as firmly as you would a sprained ankle. An elastic bandage is ideal for this. **Do not cut off the blood flow**
    b. Place the bandage over the bite and wrap the limb, first away from the heart, then back towards the heart. The finished bandage should reach from just above the fingers or toes as far up the limb as possible with the available materials.
    c. The limb should be **immobilised** using a splint. The person should avoid any movement. If help is far away someone needs to go and get help. The casualty **must not attempt to walk!**
    d. **Do not** wash the bite. Venom on the skin is needed to positively identify the snake and administer the correct anti-venom.
    e. **Do not** cut bitten area.
    f. **Do not** suck venom out of wound.
    g. **Do not** use a constrictive bandage/tourniquet.
    h. **Do not** try to catch the snake.

Other Significant Events

RCR recognises the dynamic nature of the work environment and appreciates the differences in each circumstance toward the most appropriate management solution. Our goal as always is primarily prevention, with that said we undertake to manage all circumstances in a professional manner to contain the event, recover from the circumstance, distribute our findings and learnings, and improve our procedure to prevent similar circumstances. This is largely achieved through the shared partnership we establish with the client in emergency response management.

APPENDIX A

For Your Reference

Emergency Radio	UHF Channel: TBA
Mobile Phone Emergency	
Paramedic (non urgent)	
RCR Construction Manager	Jeff Drummond - 0411 259 210
RCR HSE Manager	Beresford Tuppin – 0459 894 601
RCR HSE Advisor	Andrew Conning – 0404 454 092
RCR Project Manager	Alan Robinson – 0472 869 544
NSW Emergency Services	000
Manildra RFS	Andrew Gosper- 0428 816 902
Manildra Police Station	02 6364 5084
Molong Hospital	02 6392 3300
Orange Health Services	02 6362 8122
Wellness House Orange	02 6391 5900

APPENDIX B	RCR Office Facilities		
Location		**Date**	
Name Person Responsible:			
		Complete	N/A
1.	Check perimeter of building for loose items		
2.	Fire extinguishers stored inside building		
3.	Rubbish bins emptied		
4.	All windows closed, locked and taped (where necessary)		
5.	Close air conditioner vents		
6.	Flags removed from flag poles		
7.	Fridges emptied of perishable foods		
8.	Close all internal doors		
9.	All desks cleared and tidied		
10.	Records and drawings covered with plastic		
11.	Computers turned off and covered with plastic		
12	Phone and fax manned until site evacuates (covers to be available)		
13.	Close and lock all external doors		
14.	All electrical equipment turned off.		
ACTIONS:			
1.			
2.			
3.			
4.			
5.			

NOTE: Additional action items are to be attached to a separate list. Corrective Actions shall be coordinated by the auditing person or group.

RCR Crib Rooms and Toilets			
		Complete	N/A
1.	All windows closed and locked		
2	Windows to be taped		
3.	Air conditioners turned off and vents closed		
4.	Coke and ice machines tied down		
5.	Rubbish bins emptied and stored inside building		
6.	Fire extinguishers to be stored inside		
7.	Fridges to be emptied		
8.	Paper tower and soap dispensers to be removed and stored inside		
9.	All outside furniture to be placed inside		
10.	All electrical equipment to be turned off		
11.	Doors closed and locked		
12.	Cyclone ties checked and secure		
13.	Immediate surrounding area clear of debris		
ACTIONS			
1.			
2.			
3.			
4.			
5.			

NOTE: Additional action items are to be attached to a separate list. Corrective Actions shall be coordinated by the auditing person or group.

RCR Laydown Areas			
		Complete	N/A
1.	All loose debris bundled and secured		
2.	Rubbish skips to be removed to central collection point and secured		
3.	All tarps to be adequately secured or removed		
4.	All vendor equipment to be secured		
5.	Light steel work and chutes to be secured		
6.	Conveyor rolls to be secured		

7.	Signage and star pickets to be checked and secured or removed/ stored		
8.	Bunting to be rationalised and secured or removed and stored		
9.	Checker plate flooring secured		
10	Cyclone ties on all buildings and shade units checked		
11.	Equipment secured as per check lists 5 and 6		
12.	Generators secured		
13.	Computers and records covered with plastic		
14.	Sea containers laden or lashed together		
15.	Packing crates removed or secured		
ACTIONS:			
1.			
2.			
3.			
4.			
5.			

NOTE: Additional action items are to be attached to a separate list. Corrective Actions shall be coordinated by the auditing person or group.

RCR Construction Areas			
		Complete	N/A
1.	All welding cable, electrical cables, oxy hose and air hoses to rolled up and secured		
2.	All loose rigging gear to be collected and stored		
3.	All scaffolds to be de-planked, de-tagged, secured or stripped		
4.	All loose scaffold equipment to be bundled and secured		
5.	All construction items, bolts, valves etc to be stored and/or secured		
6.	Site boxes, pallets, gluts and loose timber to be secured		
7.	Bunting and signage to be rationalised removed & stored		
8.	Fire extinguishers to be stored		
9.	Tarps and welding screens to be removed and stored		
10.	Handrails and kick plates to be secured		
11.	All power to be shut down		

12.	Structural steel tied down		
13.	Tie-down on all site huts and shade units to be checked		
14.	Rubbish skips to be removed to central collection area		
15.	Equipment secured as per check lists 5 and 6		
16.	Road signs collected up and stored		
ACTIONS:			
1.			
2.			
3.			
4.			
5.			

NOTE: Additional action items are to be attached on a separate list. Corrective Actions shall be coordinated by the auditing person or group.

Cranes and E.W.P.'S			
		Complete	N/A
1.	Equipment parked on high ground		
2.	Parked without riggers extended and down on timbers		
3.	Loose items and rigging gear stored		
4.	Lattice booms to be laid down and secured. Trestles to be available as required		
5.	Hydraulic booms to be retracted and lowered into the cradle where applicable		
6.	Slew brake to be applied and house lock to be set in position.		
7.	Manuals and log books wrapped in plastic		
8.	Cabs closed and secured.		
9.	Scissor lifts to be parked in protected areas where possible		
ACTIONS:			
1.			
2.			
3.			

4.	
5.	

NOTE: Additional action items are to be attached to a separate list. Corrective Actions shall be coordinated by the auditing person or group

Trucks and Trailers			
		Complete	N/A
1.	Equipment parked on high ground		
2.	Brakes applied and set		
3.	Trailer legs lowered onto timbers		
4.	Fully retract and stow HIAB boom (If applicable)		
5.	Loose items of gear stowed		
6.	Close all windows		
7.	Cover key holes		
ACTIONS:			
1.			
2.			
3.			
4.			
5.			

NOTE: Additional action items are to be attached to a separate list. Corrective Actions shall be coordinated by the auditing person or group.

Initial Incident Log & Details

Site Name:		**Reported By:**	
Company Involved:		**Time Reported:**	
Location:		**Date /Time of Event:**	
Summary Title:		**Form Completed by:**	

Incident Type (check one)

	Injury/Illness		Environmental Impact		Permit non compliance
	Property Damage / loss		Spill or Release		Security
	Near Miss		Fire / Explosion		Motor Vehicle Crash

Incident Type

Severity Level	Consequence		Type	Consequence	
Extreme	Catastroric (actual)		**Low**	Minor (actual)	
High	Major (actual)		**Near Miss**	(potential)	
Moderate	Serious (actual)				

Incident Description (initial information summary)

Immediate Actions Taken

Actions taken:	Person responsible:

Line Manager / Witnesses

Name	Job Title	Date/Time

Initial Incident Log & Details

Event Photos	

Full Incident Investigation Report Availability	
Date full incident report available:	
Advisor conducting investigation:	

Appendix J

EVIDENCE OF AGENCY CONSULTATION

CABONNE COUNCIL

Phone: (02) 6392 3247
Fax: (02) 6392 3260
Contact: K Blackwood

THE GENERAL MANAGER
POST OFFICE BOX 17
MOLONG 2866
Website: www.cabonne.nsw.gov.au
Email: council@cabonne.nsw.gov.au

Your Ref: 217136_CEMP_001A.docx
Doc ID: 838816
ABN: 41992 919 200

11 May 2017

Attn: Mr Andrew Brownlow
orange@geolyse.com

Dear Sir,

RE: MANILDRA SOLAR FARM
CONSTRUCTION ENVIRONMENTAL MANAGEMENT PLAN (CEMP)
DRAFT FOR REVIEW

Further to our meeting at Council's Molong office regarding the draft CEMP, Environmental Services staff have reviewed the documentation and note its contents. Our team looks forward to working with Geolyse and RCR Infrastructure on the Manildra Solar Farm project throughout the construction phase of the development.

Should you have any enquiries in relation to this matter please contact Council's Environmental Services Department on 6392 3247 between 9am and 11am Monday to Friday. Please note Council's Environmental Services staff are also available in person at the Canowindra HACC/Library building, Gaskill St Canowindra every Wednesday between 9.30am to 12.30pm.

Yours faithfully,

HJ Nicholls
DIRECTOR ENVIRONMENTAL SERVICES

Andrew Brownlow

From: Andrew Brownlow <abrownlow@geolyse.com>
Sent: Wednesday, 24 May 2017 1:35 PM
To: 'tim.baker@dpi.nsw.gov.au'; 'water.referrals@dpi.nsw.gov.au'
Cc: 'Beresford Tuppin'
Subject: Manildra Solar Farm CEMP

Mr Tim Baker
Department of Primary Industries - Water

Good Afternoon Tim

Please find below a link to the Construction Environmental Management Plan (CEMP) prepared for the Manildra Solar Farm (SSD: MP10_0122).
The Minister's consent requires that the CEMP to be submitted to the Department of Planning and Environment for approval must include evidence of consultation with DPI – Water.
To this end, if there is any element of the attached that you would like to discuss please do not hesitate to call. I have included the entire CEMP in the link, but note that the Soil and Water Management Plan is presented in **Appendix H**.
It is of course appreciated that we are just one of many things arriving on your desk and that everbody thinks their job is the most important. Notwithstanding, if there is anything at all we can do do facilitate your review as soon as possible, please do not hesitate to call.

The file can be downloaded at http://dms.geolyse.com
Username = 217136
Password = 631712

With thanks

Andrew

Andrew Brownlow
Manager - Environmental / Director (CEnvP)
Geolyse Pty Ltd
154 Peisley St
PO Box 1963
Orange NSW 2800
Ph: 02 6393 5000
Fx: 02 6393 5050
Mob: 0417 210 253
Email: abrownlow@geolyse.com
Web: www.geolyse.com

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Department of Primary Industries
Water

Contact: Tim Baker
Phone: 02 6841 7403
Mobile: 0428 162 097
Fax: 02 6884 0096
Email: tim.baker@dpi.nsw.gov.au

Our ref: OUT

Andrew Brownlow
Geolyse Pty Ltd
PO Box 1963
ORANGE NSW 2800

5 June 2017

Dear Andrew

Manildra Solar Farm – Construction Environmental Management Plan

I refer to your email dated 24th May 2017 requesting consultation with DPI Water on the Construction Environmental Management Plan (CEMP) for the Manildra Solar Farm. It is understood this consultation is in accordance with Condition C13 of Project Approval MP10_0122. DPI Water has reviewed the information supplied and provides the following comments and recommendations to enable further consideration of the matter.

Comments

- The key issues for DPI Water relate to the management of impacts to the watercourse through the site due to potential erosion and sedimentation generated during the construction period. Preparation of the Soil and Water Management Plan in accordance with relevant industry guidelines as stated in Section 18.2.1 of the CEMP is supported.
- Management of flooding and potential erosion and sedimentation through the site is recognised as a key issue. Measures to mitigate an increase in runoff and transport of sediment through the water course and downstream is supported. Implementation of a monitoring program following runoff events will also be required.
- DPI Water recommends consideration of the "*Guidelines for Watercourse Crossings on Waterfront Land* "for the proposed road crossings over the waterway. It is noted rock check dams are proposed on the upstream side of road crossings, however the design of the crossings to facilitate flow and consideration of managing erosion on the downstream side is not detailed.
- DPI Water advises the road crossings and rock check dams need to be designed to not hold back water. If this is proposed, consideration would need to be given to the size of these dams and whether they are consistent with the Maximum Harvestable Rights Dam Capacity, or if additional licensing or an alternate design is required.
- Adequate monitoring and maintenance of disturbed areas within and in close proximity to the waterway will be required to ensure stability and to minimise erosion and downstream impacts.

Should you have any further queries in relation to this submission please do not hesitate to contact Tim Baker on (02) 6841 7403.

Yours sincerely

Vickie Chatfield
Manager, Regional Water Regulation
Department of Primary Industries Water

Andrew Brownlow

From: Andrew Brownlow <abrownlow@geolyse.com>
Sent: 9 June 2017 10:13 AM
To: 'Tim Baker'
Cc: 'Water Referrals'; 'Beresford Tuppin'
Subject: RE: Manildra Solar Farm CEMP

Morning Tim

Thanks again for the turn around time. We have made the following additions in the CEMP/SWMP to incorporate your comments and recommendations. Rather than re-send the whole document I have just listed the changes made. The focus has been to bolster the monitoring.

Monitoring

Site inspection and monitoring shall be implemented to ensure the objectives of the Soil and Water Management Plan are met and the control measures perform effectively. The following monitoring program shall be implemented:

- *Weather forecasts shall be monitored daily.*
- *Erosion and sedimentation control measures shall be inspected:*
    - *weekly;*
    - *at least 24 hours prior to predicted rainfall;*
    - *daily when rainfall is occurring; and*
    - *after the rainfall event has finished.*
- *Discharge points shall be inspected weekly and prior to and post any rain event. If the discharge points are not stable then the downstream offsite dam will be inspected for evidence of sedimentation on the dam apron (with photographic evidence taken). If there is evidence of off-site sedimentation, a Corrective Action will be raised and the Soil and Water Management Plan reviewed accordingly.*

It is noted that this inspection regime will also specifically cover the area where the dry creek emerges into the site in the north-east corner of the site, to observe if runoff emerging upstream of the site would or would not accentuate sediment transport at the Manildra Solar Farm site.

- *Every inspection relating to the effectiveness of the erosion and sediment controls will be documented.*
- *The health of revegetation shall be inspected weekly and additional revegetation undertaken where 70% cover has not been achieved.*

Road crossings of the drainage depressions (intermittent watercourses) will be constructed of compacted road base causeway shaped to match the bed profile of the depressions (to facilitate flow), with a silt fence/hay bales located downstream to suit the crossing.

The rock check dams will be constructed of coarse rockfill, and will not be designed to hold water.

It would be very helpful at this end if you are able to confirm the above additions adequately address your comments.

Please also note that once the CEMP is approved by DPE, a copy of the CEMP will be provided to you for your records.

Andrew

Andrew Brownlow
Manager - Environmental / Director (CEnvP)
Geolyse Pty Ltd
154 Peisley St
PO Box 1963
Orange NSW 2800
Ph: 02 6393 5000
Fx: 02 6393 5050
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Andrew Brownlow

From: Tim Baker <tim.baker@dpi.nsw.gov.au>
Sent: 9 June 2017 10:26 AM
To: Andrew Brownlow
Subject: Re: Manildra Solar Farm CEMP

Thanks Andrew,

The references to monitoring and rock check dams are supported. In regards to the road crossings the following comments/recommendations are provided:

- installation of the hay bales downstream is supported to manage sediment during construction.
- its is recommended scour protection be installed on the upstream and downstream side of the crossing to mitigate erosion.

Regards
Tim

Tim Baker | Senior Water Regulation Officer
NSW Department of Primary Industries | Water
209 Cobra St | Dubbo NSW 2830 | PO Box 717, Dubbo NSW 2830
T: 02 6841 7403 | F: 02 6884 0096 | M: 0428 162 097 | E: Tim.Baker@dpi.nsw.gov.au
W: www.water.nsw gov.au | www.dpi.nsw.gov.au

Andrew Brownlow

From: Beresford Tuppin <Beresford.Tuppin@rcrtom.com.au>
Sent: Wednesday, 26 April 2017 11:00 AM
To: abrownlow (abrownlow@geolyse.com)
Subject: RFS Captain Site Visit Manildra Solar

Good Morning Andrew,

Please find attached a reply from Mr Andrew Gosper the Captain of Manildra RFS

Regards Baz

Beresford Tuppin | HSE Manager - Manildra Solar RCR Infrastructure

A: Level 21, Tower B, Zenith Building, 821 Pacific Highway, Chatswood NSW 2067 Australia
M: +61 0459 894 601
E: Beresford.Tuppin@rcrtom.com.au<mailto:Beresford.Tuppin@rcrtom.com.au> | W: www.rcrtom.com.au
[cid:image004.png@01D2BE7C.3CEA83F0]

From: Andrew and Lisa Gosper [mailto:algosper@live.com.au]
Sent: Wednesday, 26 April 2017 10:46 AM
To: Beresford Tuppin <Beresford.Tuppin@rcrtom.com.au>
Subject: Re: RFS Captain Site Visit Manildra Solar

Hi Baz
Thanks for the site inspection it was very informative, as Manildra RFS Captain I appreciate the plans and measures we spoke about fire risk management is great. I look forward to working with you during the coming for season October to April.
Cheers Andrew

_____

From: Beresford Tuppin <Beresford.Tuppin@rcrtom.com.au<mailto:Beresford.Tuppin@rcrtom.com.au>>
Sent: Monday, 24 April 2017 1:31:50 PM
To: andrew.gosper@cabonne.nsw.gov.au<mailto:andrew.gosper@cabonne.nsw.gov.au>
Cc: algosper@live.com.au<mailto:algosper@live.com.au>; abrownlow (abrownlow@geolyse.com<mailto:abrownlow@geolyse.com>); Bruce Smith; Jeff Drummond
Subject: RFS Captain Site Visit Manildra Solar

Good Afternoon Andrew,

Thank you for finding the time to visit the site of the Manildra Solar Plant on Tuesday. As discussed RCR take a whole of project safety approach (Ru SAFE) of which Bushfire safety is one important aspect.

Items considered and managed include but are not limited to:

Smoking and disposal of cigarette butts: Dedicated smoking area designated to compound areas with appropriate resources (DCP fire extinguishers / bare ground) Refuelling of Plant and Equipment: Refuelling points mapped on site, plastic lined with spill response kits Hot work such as welding and grinding: Gravelled workshop with spill response, DCP fire extinguishers, Fire Blanket Management of vegetation fuel loads on site: Advise from local RFS on managing vegetation fuel load reduction will be undertaken when required Petrol Powered vehicles and equipment: RCR minimise the use of Petrol equipment as far as possible diesel equipment will be used including only diesel light vehicles.

All water trucks that are used on site will have a remote controlled water cannon as a required fixture All vehicles and mobile plant are equipped with DCP fire extinguishers or auto deluge systems All vehicle and mobile plant under go a pre start inspection each morning prior to shift to assess if there are any deficiencies that would make them

unsafe to use for the operator or the environment RCR will develop a detailed Emergency Response Plan for the project of witch Bush Fire Response will be a major component

Thank you once again you for your suggestions and input on Tuesday

If you have any questions or queries on any aspect of this email please do not hesitate to call me on the number supplied below

Regards Baz

Beresford Tuppin | HSE Manager - Manildra Solar RCR Infrastructure

A: Level 21, Tower B, Zenith Building, 821 Pacific Highway, Chatswood NSW 2067 Australia
M: +61 0459 894 601
E: Beresford.Tuppin@rcrtom.com.au<mailto:Beresford.Tuppin@rcrtom.com.au> | W: www.rcrtom.com.au<https://apac01.safelinks.protection.outlook.com/?url=www.rcrtom.com.au&data=02%7C01%7CBeresford.Tuppin%40rcrtom.com.au%7Cee6a501e48394e213ad308d48c3d9247%7C17075ec1e5ec4401a46a61f01e052e0b%7C0%7C0%7C636287643452724009&sdata=Mc%2Fqx2gWUljviSXGrGUbRM7zTHLXBwHwhVVTyhjFPlU%3D&reserved=0>
[cid:image003.png@01D2BCFF.20339720]

Andrew Brownlow

From: Kel Mcnamara <Kel.Mcnamara@fire.nsw.gov.au>
Sent: Thursday, 13 April 2017 11:48 AM
To: Andrew Brownlow
Subject: RE: Construction of Manildra Solar Farm

Hi Andrew,

Thanks for the call today. I will send an email to the Station Officers and the Captain and Deputy Captain at Molong so they are aware that once completed you will send a copy of your bushfire management plan and some site information to them for their information and use should they need to respond to your site.

Should you require further information or advice the Rural Fire Service should be the first point of call as your site is within their Fire District and FRNSW thank you for keeping us in the loop.

Regards,

Kel

Superintendent Kel McNamara
A/Zone Commander

Region West 2

NSW | Fire & Rescue NSW

E kel.mcnamara@fire.nsw.gov.au | **T** (02) 6331 6372| **M** 0429 691 153 | **www.fire.nsw.gov.au**
114 Piper St Bathurst, NSW Australia

Do a Home Fire Safety Audit. It could save your life. **www.homefiresafetyaudit.com.au**

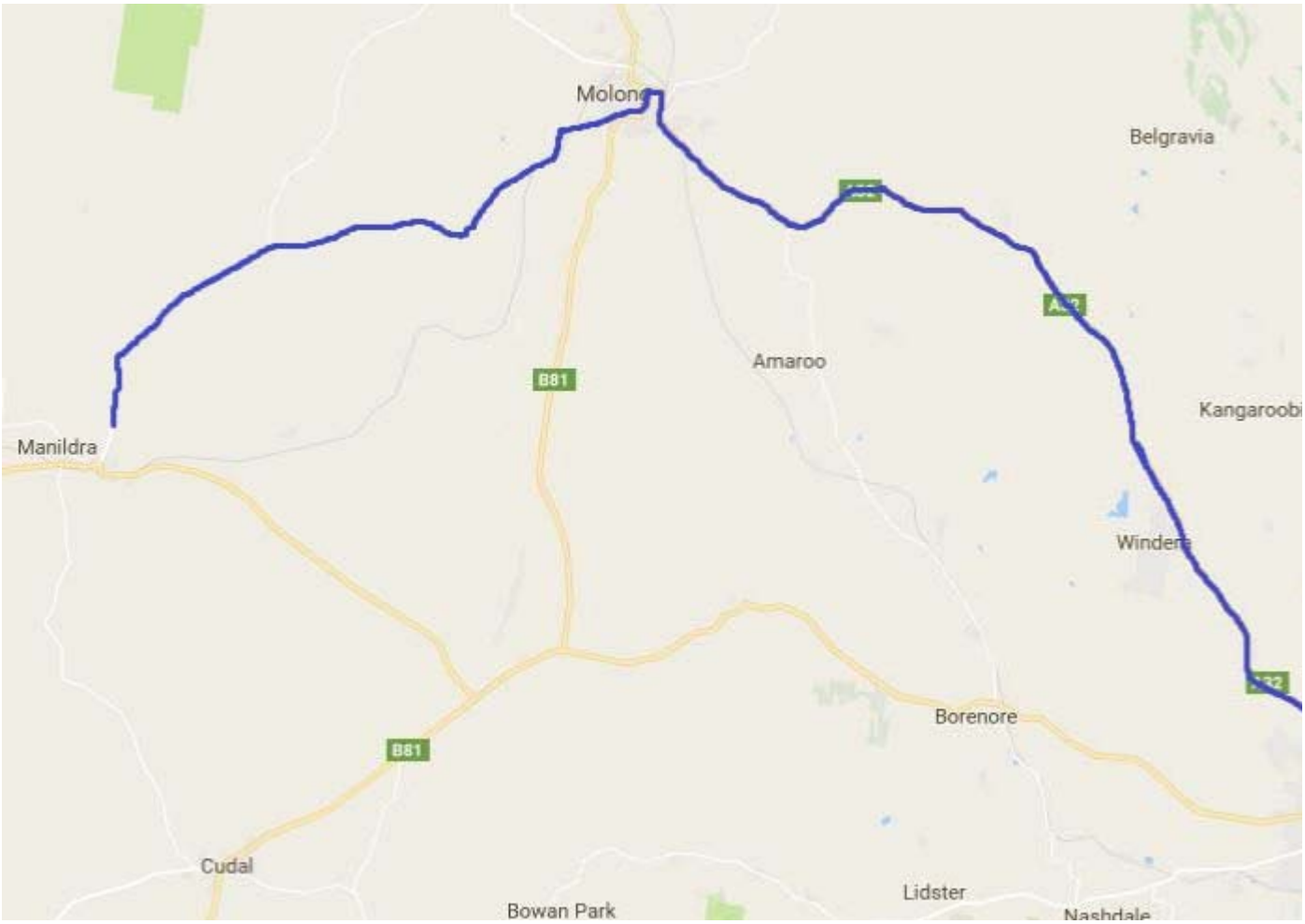
From: Andrew Brownlow [mailto:abrownlow@geolyse.com]
Sent: Thursday, 13 April 2017 10:19 AM
To: Kel Mcnamara
Cc: 'Beresford Tuppin'
Subject: Construction of Manildra Solar Farm

Mr Kel McNamara
Fire and Rescue NSW

Kel

Thanks very much for your time this morning.
As discussed, a bushfire management plan is being prepared as part of the construction management plan of the proposed Manildra Solar Farm. The map will give you a sense of location. The attachment shows the project that was approved.

The contractor (RCR Infrastructure) building the solar farm (which was approved as a state significant development back in 2015) is working with the local RFS Manildra Brigade captain on issues relating to access, water supply, managing fuel loads, communications, etc.
Similarly, RCR Infrastructure has established procedures for preparation of Emergency Response Plans for its construction sites. Mr Tuppin is RCR's Work Health Safety and Environment Manager for the project and I have copied him in on this email for this reason.
Notwithstanding the rural environment, and your comment that RFS is the appropriate agency to consult with in relation to bushfire management, as you suggested RCR would be happy to provide a copy of the bushfire management plan and Emergency Response Plan to Fire and Rescue's Orange and Molong stations so you have these available and are aware of the construction activity.
As mentioned, we need evidence that we have consulted with Fire and Rescue with respect to managing bushfire risk during construction and as such, confirmation that you are happy with this approach would be appreciated.
Thanks again for your time and if there is anything you would like to discuss please do not hesitate to give me a call.



Regards

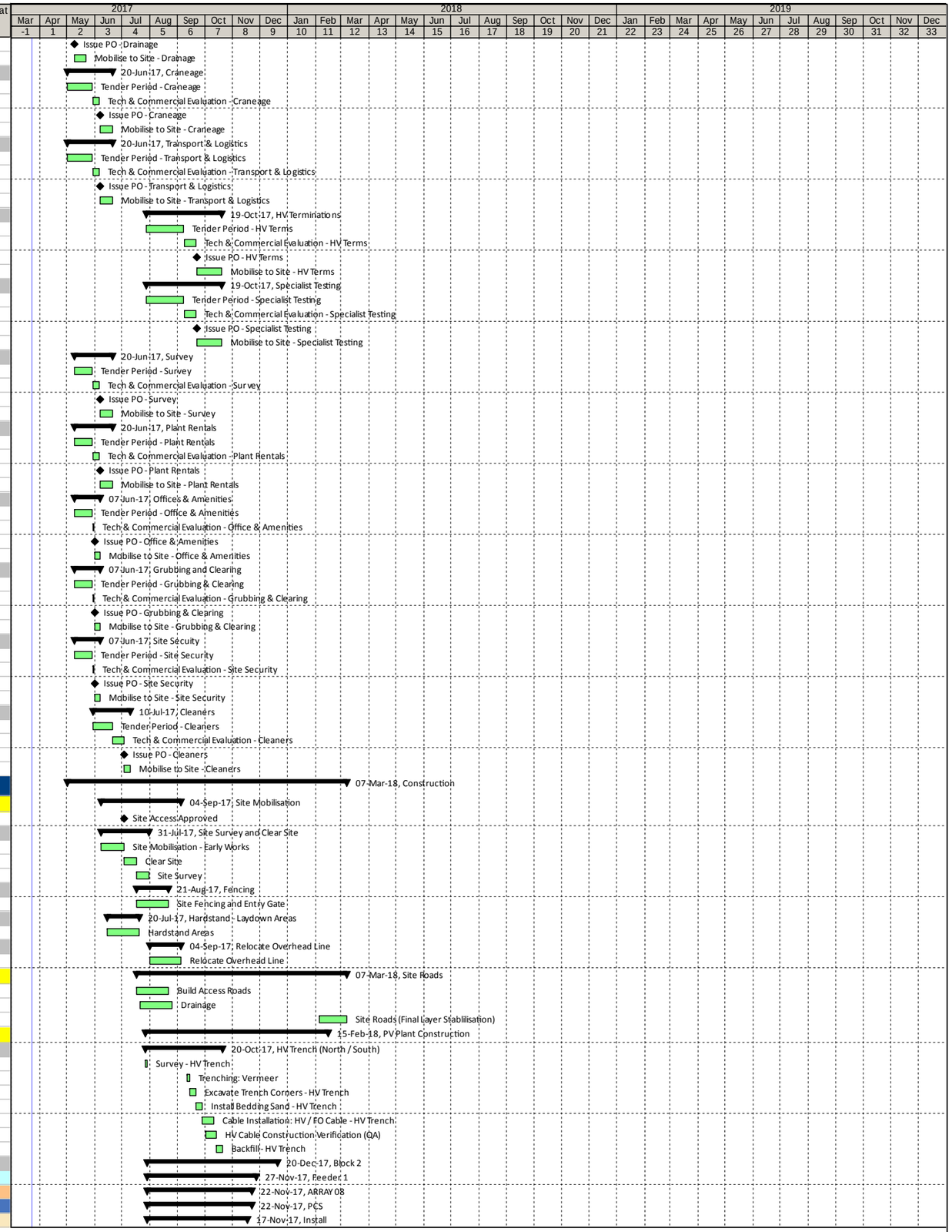
Andrew

Andrew Brownlow
Manager - Environmental / Director (CEnvP)
Geolyse Pty Ltd
154 Peisley St
PO Box 1963
Orange NSW 2800
Ph: 02 6393 5000
Fx: 02 6393 5050
Mob: 0417 210 253
Email: abrownlow@geolyse.com
Web: www.geolyse.com

Appendix K

CONSTRUCTION SCHEDULE

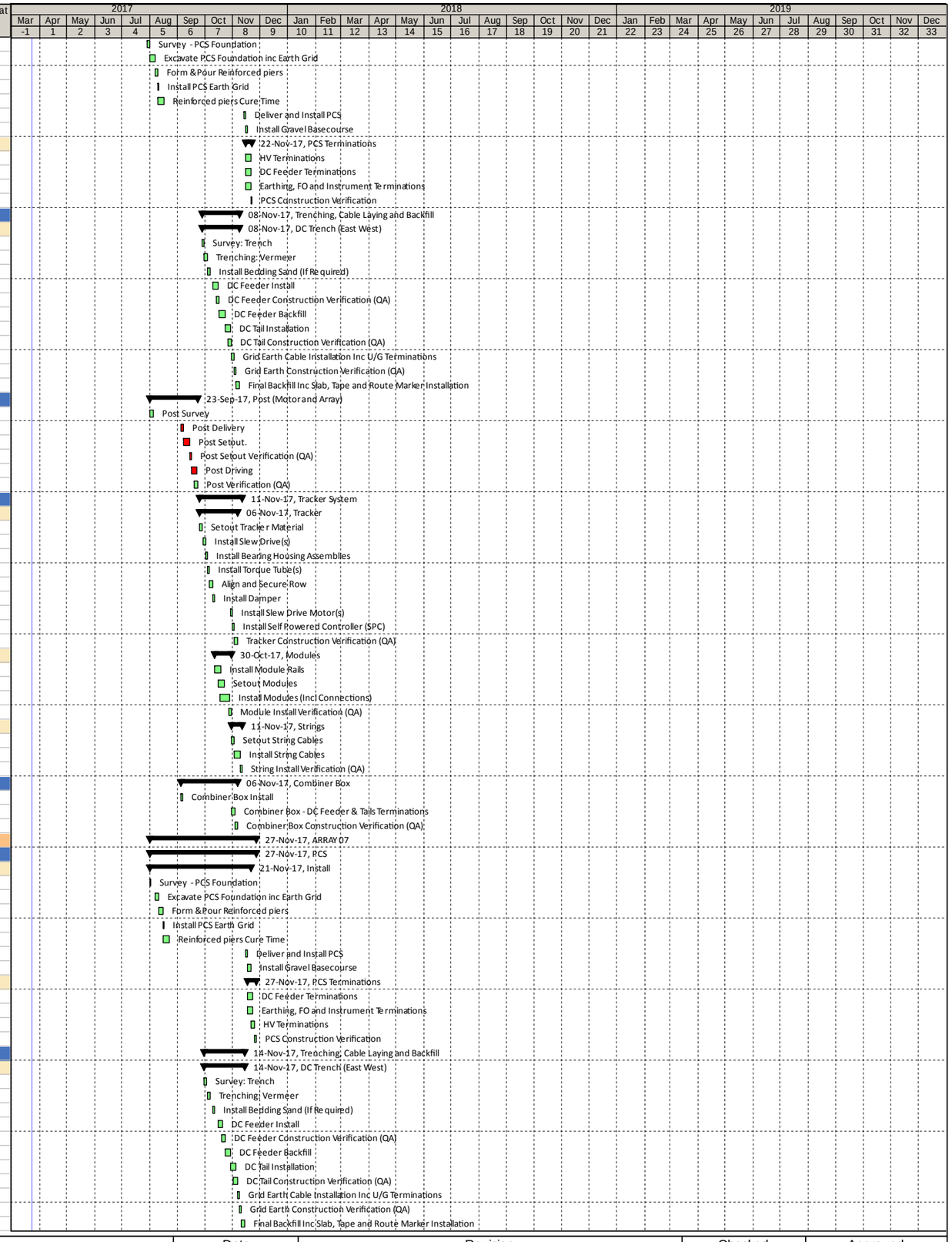
Activity ID	Activity Name	Original Duration	Start	Finish	Total Float
MAN_P_740	Issue PO - Drainage	0	09-May-17		58
MAN_P_750	Mobilise to Site - Drainage	14	09-May-17	22-May-17	82
Craneage		39	02-May-17	20-Jun-17	43
MAN_P_150	Tender Period - Craneage	20	02-May-17	29-May-17	38
MAN_P_500	Tech & Commercial Evaluation - Craneage	5	30-May-17	06-Jun-17	38
MAN_P_760	Issue PO - Craneage	0	07-Jun-17		38
MAN_P_770	Mobilise to Site - Craneage	14	07-Jun-17	20-Jun-17	53
Transport & Logistics		39	02-May-17	20-Jun-17	43
MAN_P_160	Tender Period - Transport & Logistics	20	02-May-17	29-May-17	38
MAN_P_510	Tech & Commercial Evaluation - Transport & Logistics	5	30-May-17	06-Jun-17	38
MAN_P_780	Issue PO - Transport & Logistics	0	07-Jun-17		38
MAN_P_790	Mobilise to Site - Transport & Logistics	14	07-Jun-17	20-Jun-17	53
HV Terminations		66	28-Jul-17	19-Oct-17	56
MAN_P_170	Tender Period - HV Terms	30	28-Jul-17	07-Sep-17	52
MAN_P_520	Tech & Commercial Evaluation - HV Terms	10	08-Sep-17	21-Sep-17	52
MAN_P_800	Issue PO - HV Terms	0	22-Sep-17		52
MAN_P_810	Mobilise to Site - HV Terms	28	22-Sep-17	19-Oct-17	75
Specialist Testing		66	28-Jul-17	19-Oct-17	56
MAN_P_180	Tender Period - Specialist Testing	30	28-Jul-17	07-Sep-17	52
MAN_P_530	Tech & Commercial Evaluation - Specialist Testing	10	08-Sep-17	21-Sep-17	52
MAN_P_820	Issue PO - Specialist Testing	0	22-Sep-17		52
MAN_P_830	Mobilise to Site - Specialist Testing	28	22-Sep-17	19-Oct-17	75
Survey		33	09-May-17	20-Jun-17	43
MAN_P_190	Tender Period - Survey	15	09-May-17	29-May-17	38
MAN_P_540	Tech & Commercial Evaluation - Survey	5	30-May-17	06-Jun-17	38
MAN_P_840	Issue PO - Survey	0	07-Jun-17		38
MAN_P_850	Mobilise to Site - Survey	14	07-Jun-17	20-Jun-17	53
Plant Rentals		33	09-May-17	20-Jun-17	43
MAN_P_200	Tender Period - Plant Rentals	15	09-May-17	29-May-17	38
MAN_P_550	Tech & Commercial Evaluation - Plant Rentals	5	30-May-17	06-Jun-17	38
MAN_P_860	Issue PO - Plant Rentals	0	07-Jun-17		38
MAN_P_870	Mobilise to Site - Plant Rentals	14	07-Jun-17	20-Jun-17	53
Offices & Amenities		23	09-May-17	07-Jun-17	53
MAN_P_210	Tender Period - Office & Amenities	15	09-May-17	29-May-17	46
MAN_P_560	Tech & Commercial Evaluation - Office & Amenities	2	30-May-17	31-May-17	46
MAN_P_880	Issue PO - Office & Amenities	0	01-Jun-17		46
MAN_P_890	Mobilise to Site - Office & Amenities	7	01-Jun-17	07-Jun-17	66
Grubbing and Clearing		23	09-May-17	07-Jun-17	53
MAN_P_230	Tender Period - Grubbing & Clearing	15	09-May-17	29-May-17	46
MAN_P_580	Tech & Commercial Evaluation - Grubbing & Clearing	2	30-May-17	31-May-17	46
MAN_P_920	Issue PO - Grubbing & Clearing	0	01-Jun-17		46
MAN_P_930	Mobilise to Site - Grubbing & Clearing	7	01-Jun-17	07-Jun-17	66
Site Secuity		23	09-May-17	07-Jun-17	53
MAN_P_240	Tender Period - Site Security	15	09-May-17	29-May-17	46
MAN_P_590	Tech & Commercial Evaluation - Site Security	2	30-May-17	31-May-17	46
MAN_P_940	Issue PO - Site Security	0	01-Jun-17		46
MAN_P_950	Mobilise to Site - Site Security	7	01-Jun-17	07-Jun-17	66
Cleaners		32	30-May-17	10-Jul-17	233
MAN_P_250	Tender Period - Cleaners	15	30-May-17	20-Jun-17	205
MAN_P_600	Tech & Commercial Evaluation - Cleaners	9	21-Jun-17	03-Jul-17	205
MAN_P_960	Issue PO - Cleaners	0	04-Jul-17		205
MAN_P_970	Mobilise to Site - Cleaners	7	04-Jul-17	10-Jul-17	298
Construction		234	01-May-17	07-Mar-18	54
Site Mobilisation		71	08-Jun-17	04-Sep-17	188
MAN_SF_1260	Site Access Approved	0	03-Jul-17		33
Site Survey and Clear Site		43	08-Jun-17	31-Jul-17	174
MAN_SF_1270	Site Mobilisation - Early Works	20	08-Jun-17	03-Jul-17	33
MAN_SF_1620	Clear Site	11	03-Jul-17	17-Jul-17	33
MAN_SF_1610	Site Survey	12	17-Jul-17	31-Jul-17	174
Fencing		28	17-Jul-17	21-Aug-17	174
MAN_SF_1670	Site Fencing and Entry Gate	28	17-Jul-17	21-Aug-17	174
Hardstand - Laydown Areas		28	15-Jun-17	20-Jul-17	199
MAN_SF_1700	Hardstand Areas	28	15-Jun-17	20-Jul-17	199
Relocate Overhead Line		28	01-Aug-17	04-Sep-17	188
MAN_SF_3280	Relocate Overhead Line	28	01-Aug-17	04-Sep-17	188
Site Roads		174	17-Jul-17	07-Mar-18	54
MAN_SF_1680	Build Access Roads	28	17-Jul-17	21-Aug-17	195
MAN_SF_1690	Drainage	28	21-Jul-17	25-Aug-17	195
MAN_SF_2350	Site Roads (Final Layer Stabilisation)	25	05-Feb-18	07-Mar-18	54
PV Plant Construction		149	27-Jul-17	15-Feb-18	2
HV Trench (North / South)		67	27-Jul-17	20-Oct-17	80
HV.170	Survey - HV Trench	2	27-Jul-17	29-Jul-17	24
HV.180	Trenching: Vermeer	3	11-Sep-17	14-Sep-17	18
HV.190	Excavate Trench Corners - HV Trench	6	14-Sep-17	21-Sep-17	18
HV.200	Install Bedding Sand - HV Trench	5	21-Sep-17	28-Sep-17	18
HV.210	Cable Installation: HV / FO Cable - HV Trench	10	28-Sep-17	11-Oct-17	18
HV.220	HV Cable Construction Verification (QA)	9	02-Oct-17	13-Oct-17	61
HV.230	Backfill - HV Trench	6	14-Oct-17	20-Oct-17	80
Block 2		114	29-Jul-17	20-Dec-17	35
Feeder 1		95	29-Jul-17	27-Nov-17	54
ARRAY 08		91	29-Jul-17	22-Nov-17	58
PCS		91	29-Jul-17	22-Nov-17	58
Install		88	29-Jul-17	17-Nov-17	61



Actual Work | Critical Remaining Work | Summary
Remaining Work | Milestone

Date	Revision	Checked	Approved
21-Apr-17	Manildra Baseline Rev 1	AM	BS

Activity ID	Activity Name	Original Duration	Start	Finish	Total Float
ARRAY.08.PCS.100	Survey - PCS Foundation	1	29-Jul-17	01-Aug-17	24
ARRAY.08.PCS.110	Excavate PCS Foundation inc Earth Grid	5	01-Aug-17	07-Aug-17	63
ARRAY.08.PCS.120	Form & Pour Reinforced piers	3	07-Aug-17	10-Aug-17	99
ARRAY.08.PCS.130	Install PCS Earth Grid	2	10-Aug-17	11-Aug-17	103
ARRAY.08.PCS.140	Reinforced piers Cure Time	6	10-Aug-17	17-Aug-17	99
ARRAY.08.PCS.150	Deliver and Install PCS	2	13-Nov-17	15-Nov-17	29
ARRAY.08.PCS.160	Install Gravel Basecourse	2	15-Nov-17	17-Nov-17	61
PCS Terminations		5	15-Nov-17	22-Nov-17	58
ARRAY.08.PCST.1(	HV Terminations	4	15-Nov-17	21-Nov-17	35
ARRAY.08.PCST.1:	DC Feeder Terminations	4	15-Nov-17	21-Nov-17	58
ARRAY.08.PCST.1:	Earthing, FO and Instrument Terminations	4	15-Nov-17	21-Nov-17	58
ARRAY.08.PCST.1:	PCS Construction Verification	1	21-Nov-17	22-Nov-17	58
Trenching, Cable Laying and Backfill		32	28-Sep-17	08-Nov-17	69
DC Trench (East West)		32	28-Sep-17	08-Nov-17	69
ARRAY.08.DC.100	Survey: Trench	2	28-Sep-17	30-Sep-17	18
ARRAY.08.DC.110	Trenching: Vermeer	3	30-Sep-17	04-Oct-17	18
ARRAY.08.DC.120	Install Bedding Sand (If Required)	3	04-Oct-17	07-Oct-17	18
ARRAY.08.DC.130	DC Feeder Install	5	10-Oct-17	16-Oct-17	18
ARRAY.08.DC.140	DC Feeder Construction Verification (QA)	2	14-Oct-17	17-Oct-17	30
ARRAY.08.DC.150	DC Feeder Backfill	5	17-Oct-17	23-Oct-17	30
ARRAY.08.DC.160	DC Tail Installation	5	23-Oct-17	30-Oct-17	30
ARRAY.08.DC.170	DC Tail Construction Verification (QA)	3	26-Oct-17	31-Oct-17	37
ARRAY.08.DC.180	Grid Earth Cable Installation Inc U/G Terminations	2	31-Oct-17	02-Nov-17	67
ARRAY.08.DC.190	Grid Earth Construction Verification (QA)	2	02-Nov-17	04-Nov-17	67
ARRAY.08.DC.200	Final Backfill Inc Slab, Tape and Route Marker Installation	3	04-Nov-17	08-Nov-17	69
Post (Motor and Array)		44	01-Aug-17	23-Sep-17	14
ARRAY.08.P.100	Post Survey	4	01-Aug-17	05-Aug-17	24
ARRAY.08.P.110	Post Delivery	3	04-Sep-17	07-Sep-17	0
ARRAY.08.P.120	Post Setout.	5	07-Sep-17	14-Sep-17	0
ARRAY.08.P.130	Post Setout Verification (QA)	2	14-Sep-17	16-Sep-17	0
ARRAY.08.P.140	Post Driving	5	16-Sep-17	22-Sep-17	0
ARRAY.08.P.150	Post Verification (QA)	4	19-Sep-17	23-Sep-17	14
Tracker System		38	25-Sep-17	11-Nov-17	66
Tracker		33	25-Sep-17	06-Nov-17	71
ARRAY.08.TR.100	Setout Tracker Material	4	25-Sep-17	28-Sep-17	14
ARRAY.08.TR.110	Install Slew Drive(s)	2	29-Sep-17	02-Oct-17	14
ARRAY.08.TR.120	Install Bearing Housing Assemblies	2	02-Oct-17	04-Oct-17	14
ARRAY.08.TR.130	Install Torque Tube(s)	2	04-Oct-17	06-Oct-17	14
ARRAY.08.TR.140	Align and Secure Row	2	06-Oct-17	10-Oct-17	14
ARRAY.08.TR.150	Install Damper	2	10-Oct-17	12-Oct-17	14
ARRAY.08.TR.200	Install Slew Drive Motor(s)	2	30-Oct-17	31-Oct-17	71
ARRAY.08.TR.220	Install Self Powered Controller (SPC)	2	01-Nov-17	02-Nov-17	71
ARRAY.08.TR.230	Tracker Construction Verification (QA)	2	03-Nov-17	06-Nov-17	71
Modules		14	12-Oct-17	30-Oct-17	66
ARRAY.08.TR.160	Install Module Rails	5	12-Oct-17	19-Oct-17	14
ARRAY.08.TR.170	Setout Modules	6	16-Oct-17	23-Oct-17	66
ARRAY.08.TR.180	Install Modules (Incl Connections)	9	18-Oct-17	28-Oct-17	66
ARRAY.08.TR.190	Module Install Verification (QA)	2	27-Oct-17	30-Oct-17	66
Strings		10	31-Oct-17	11-Nov-17	66
ARRAY.08.TR.210	Setout String Cables	3	31-Oct-17	03-Nov-17	66
ARRAY.08.TR.240	Install String Cables	5	03-Nov-17	09-Nov-17	66
ARRAY.08.TR.250	String Install Verification (QA)	2	09-Nov-17	11-Nov-17	66
Combiner Box		49	04-Sep-17	06-Nov-17	71
ARRAY.08.CB.100	Combiner Box Install	2	04-Sep-17	06-Sep-17	80
ARRAY.08.CB.110	Combiner Box - DC Feeder & Tails Terminations	3	31-Oct-17	03-Nov-17	37
ARRAY.08.CB.120	Combiner Box Construction Verification (QA)	2	03-Nov-17	06-Nov-17	71
ARRAY 07		94	01-Aug-17	27-Nov-17	54
PCS		94	01-Aug-17	27-Nov-17	54
Install		89	01-Aug-17	21-Nov-17	59
ARRAY.07.PCS.100	Survey - PCS Foundation	1	01-Aug-17	02-Aug-17	66
ARRAY.07.PCS.110	Excavate PCS Foundation inc Earth Grid	4	07-Aug-17	11-Aug-17	63
ARRAY.07.PCS.120	Form & Pour Reinforced piers	4	11-Aug-17	16-Aug-17	96
ARRAY.07.PCS.130	Install PCS Earth Grid	2	16-Aug-17	17-Aug-17	100
ARRAY.07.PCS.140	Reinforced piers Cure Time	6	16-Aug-17	23-Aug-17	96
ARRAY.07.PCS.150	Deliver and Install PCS	2	15-Nov-17	17-Nov-17	29
ARRAY.07.PCS.160	Install Gravel Basecourse	2	17-Nov-17	21-Nov-17	59
PCS Terminations		7	17-Nov-17	27-Nov-17	54
ARRAY.07.PCST.1:	DC Feeder Terminations	4	17-Nov-17	23-Nov-17	56
ARRAY.07.PCST.1:	Earthing, FO and Instrument Terminations	4	17-Nov-17	23-Nov-17	56
ARRAY.07.PCST.1(	HV Terminations	4	21-Nov-17	25-Nov-17	35
ARRAY.07.PCST.1:	PCS Construction Verification	1	25-Nov-17	27-Nov-17	54
Trenching, Cable Laying and Backfill		35	30-Sep-17	14-Nov-17	64
DC Trench (East West)		35	30-Sep-17	14-Nov-17	64
ARRAY.07.DC.100	Survey: Trench	2	30-Sep-17	03-Oct-17	21
ARRAY.07.DC.110	Trenching: Vermeer	3	04-Oct-17	07-Oct-17	20
ARRAY.07.DC.120	Install Bedding Sand (If Required)	3	10-Oct-17	12-Oct-17	20
ARRAY.07.DC.130	DC Feeder Install	5	16-Oct-17	21-Oct-17	18
ARRAY.07.DC.140	DC Feeder Construction Verification (QA)	2	20-Oct-17	23-Oct-17	30
ARRAY.07.DC.150	DC Feeder Backfill	5	23-Oct-17	30-Oct-17	30
ARRAY.07.DC.160	DC Tail Installation	5	30-Oct-17	04-Nov-17	30
ARRAY.07.DC.170	DC Tail Construction Verification (QA)	3	02-Nov-17	06-Nov-17	35
ARRAY.07.DC.180	Grid Earth Cable Installation Inc U/G Terminations	2	06-Nov-17	08-Nov-17	62
ARRAY.07.DC.190	Grid Earth Construction Verification (QA)	2	09-Nov-17	10-Nov-17	62
ARRAY.07.DC.200	Final Backfill Inc Slab, Tape and Route Marker Installation	3	10-Nov-17	14-Nov-17	64



Actual Work | Critical Remaining Work | Summary
Remaining Work | Milestone

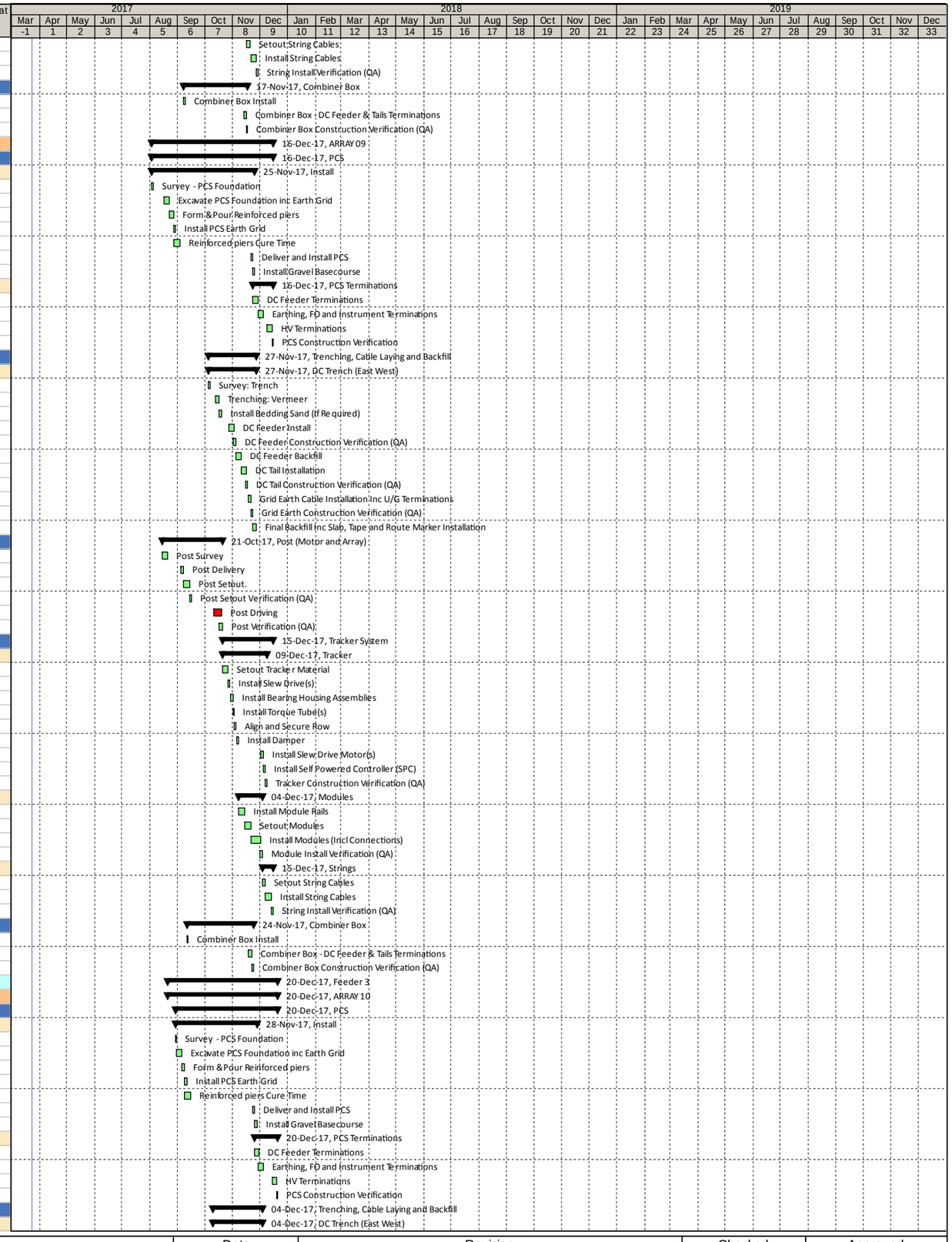
Date	Revision	Checked	Approved
21-Apr-17	Manildra Baseline Rev 1	AM	BS

Activity ID	Activity Name	Original Duration	Start	Finish	Total Float
Post (Motor and Array)		47	05-Aug-17	03-Oct-17	13
ARRAY.07.P.100	Post Survey	4	05-Aug-17	10-Aug-17	25
ARRAY.07.P.110	Post Delivery	3	04-Sep-17	07-Sep-17	5
ARRAY.07.P.120	Post Setout.	5	07-Sep-17	14-Sep-17	5
ARRAY.07.P.130	Post Setout Verification (QA)	2	14-Sep-17	16-Sep-17	5
ARRAY.07.P.140	Post Driving	7	22-Sep-17	02-Oct-17	0
ARRAY.07.P.150	Post Verification (QA)	4	28-Sep-17	03-Oct-17	13
Tracker System		29	03-Oct-17	08-Nov-17	68
Tracker		24	03-Oct-17	02-Nov-17	73
ARRAY.07.TR.100	Setout Tracker Material	4	03-Oct-17	07-Oct-17	13
ARRAY.07.TR.110	Install Slew Drive(s)	2	07-Oct-17	11-Oct-17	13
ARRAY.07.TR.120	Install Bearing Housing Assemblies	2	11-Oct-17	14-Oct-17	13
ARRAY.07.TR.130	Install Torque Tube(s)	2	14-Oct-17	17-Oct-17	13
ARRAY.07.TR.150	Align and Secure Row	2	17-Oct-17	18-Oct-17	13
ARRAY.07.TR.160	Install Damper	2	18-Oct-17	20-Oct-17	13
ARRAY.07.TR.200	Install Slew Drive Motor(s)	2	26-Oct-17	28-Oct-17	73
ARRAY.07.TR.220	Install Self Powered Controller (SPC)	2	28-Oct-17	31-Oct-17	73
ARRAY.07.TR.230	Tracker Construction Verification (QA)	2	31-Oct-17	02-Nov-17	73
Modules		13	14-Oct-17	31-Oct-17	68
ARRAY.07.TR.140	Install Modules (Incl Connections)	9	14-Oct-17	26-Oct-17	68
ARRAY.07.TR.170	Install Module Rails	5	20-Oct-17	27-Oct-17	13
ARRAY.07.TR.180	Setout Modules	6	24-Oct-17	31-Oct-17	68
ARRAY.07.TR.190	Module Install Verification (QA)	2	25-Oct-17	27-Oct-17	68
Strings		10	27-Oct-17	08-Nov-17	68
ARRAY.07.TR.210	Setout String Cables	3	27-Oct-17	31-Oct-17	68
ARRAY.07.TR.240	Install String Cables	5	31-Oct-17	06-Nov-17	68
ARRAY.07.TR.250	String Install Verification (QA)	2	07-Nov-17	08-Nov-17	68
Combiner Box		52	06-Sep-17	11-Nov-17	66
ARRAY.07.CB.100	Combiner Box Install	2	06-Sep-17	07-Sep-17	81
ARRAY.07.CB.110	Combiner Box - DC Feeder & Tails Terminations	3	06-Nov-17	09-Nov-17	35
ARRAY.07.CB.120	Combiner Box Construction Verification (QA)	2	09-Nov-17	11-Nov-17	66
Feeder 2		108	02-Aug-17	16-Dec-17	32
ARRAY 06		103	02-Aug-17	11-Dec-17	37
PCS		103	02-Aug-17	11-Dec-17	37
Install		89	02-Aug-17	23-Nov-17	51
ARRAY.06.PCS.100	Survey - PCS Foundation	1	02-Aug-17	03-Aug-17	69
ARRAY.06.PCS.110	Excavate PCS Foundation inc Earth Grid	5	11-Aug-17	17-Aug-17	63
ARRAY.06.PCS.120	Form & Pour Reinforced piers	4	17-Aug-17	22-Aug-17	94
ARRAY.06.PCS.130	Install PCS Earth Grid	2	22-Aug-17	23-Aug-17	98
ARRAY.06.PCS.140	Reinforced piers Cure Time	6	22-Aug-17	29-Aug-17	94
ARRAY.06.PCS.150	Deliver and Install PCS	2	17-Nov-17	21-Nov-17	29
ARRAY.06.PCS.160	Install Gravel Basecourse	2	21-Nov-17	23-Nov-17	51
PCS Terminations		16	21-Nov-17	11-Dec-17	37
ARRAY.06.PCST.1	DC Feeder Terminations	5	21-Nov-17	27-Nov-17	29
ARRAY.06.PCST.1	Earthing, FO and Instrument Terminations	5	27-Nov-17	02-Dec-17	29
ARRAY.06.PCST.1	HV Terminations	5	04-Dec-17	08-Dec-17	29
ARRAY.06.PCST.1	PCS Construction Verification	1	09-Dec-17	11-Dec-17	37
Trenching, Cable Laying and Backfill		38	03-Oct-17	21-Nov-17	53
DC Trench (East West)		38	03-Oct-17	21-Nov-17	53
ARRAY.06.DC.100	Survey: Trench	2	03-Oct-17	05-Oct-17	24
ARRAY.06.DC.110	Trenching: Vermeer	3	10-Oct-17	12-Oct-17	22
ARRAY.06.DC.120	Install Bedding Sand (If Required)	3	13-Oct-17	17-Oct-17	22
ARRAY.06.DC.130	DC Feeder Install	5	21-Oct-17	27-Oct-17	18
ARRAY.06.DC.140	DC Feeder Construction Verification (QA)	2	26-Oct-17	30-Oct-17	30
ARRAY.06.DC.150	DC Feeder Backfill	5	30-Oct-17	04-Nov-17	30
ARRAY.06.DC.160	DC Tail Installation	5	04-Nov-17	10-Nov-17	30
ARRAY.06.DC.170	DC Tail Construction Verification (QA)	3	08-Nov-17	11-Nov-17	33
ARRAY.06.DC.180	Grid Earth Cable Installation Inc U/G Terminations	2	13-Nov-17	15-Nov-17	37
ARRAY.06.DC.190	Grid Earth Construction Verification (QA)	2	15-Nov-17	16-Nov-17	37
ARRAY.06.DC.200	Final Backfill Inc Slab, Tape and Route Marker Installation	3	17-Nov-17	21-Nov-17	53
Post (Motor and Array)		50	10-Aug-17	12-Oct-17	11
ARRAY.06.P.100	Post Survey	4	10-Aug-17	15-Aug-17	28
ARRAY.06.P.110	Post Delivery	3	04-Sep-17	07-Sep-17	12
ARRAY.06.P.120	Post Setout.	5	07-Sep-17	14-Sep-17	12
ARRAY.06.P.130	Post Setout Verification (QA)	2	14-Sep-17	16-Sep-17	12
ARRAY.06.P.140	Post Driving	7	02-Oct-17	11-Oct-17	0
ARRAY.06.P.150	Post Verification (QA)	4	06-Oct-17	12-Oct-17	11
Tracker System		38	12-Oct-17	29-Nov-17	47
Tracker		33	12-Oct-17	22-Nov-17	52
ARRAY.06.TR.100	Setout Tracker Material	4	12-Oct-17	18-Oct-17	11
ARRAY.06.TR.110	Install Slew Drive(s)	2	18-Oct-17	20-Oct-17	11
ARRAY.06.TR.120	Install Bearing Housing Assemblies	2	20-Oct-17	23-Oct-17	11
ARRAY.06.TR.130	Install Torque Tube(s)	2	24-Oct-17	25-Oct-17	11
ARRAY.06.TR.140	Align and Secure Row	2	25-Oct-17	27-Oct-17	11
ARRAY.06.TR.150	Install Damper	2	27-Oct-17	30-Oct-17	11
ARRAY.06.TR.200	Install Slew Drive Motor(s)	2	15-Nov-17	17-Nov-17	52
ARRAY.06.TR.220	Install Self Powered Controller (SPC)	2	17-Nov-17	20-Nov-17	52
ARRAY.06.TR.230	Tracker Construction Verification (QA)	2	20-Nov-17	22-Nov-17	52
Modules		14	30-Oct-17	16-Nov-17	47
ARRAY.06.TR.160	Install Module Rails	5	30-Oct-17	04-Nov-17	11
ARRAY.06.TR.170	Setout Modules	6	01-Nov-17	08-Nov-17	47
ARRAY.06.TR.180	Install Modules (Incl Connections)	9	03-Nov-17	15-Nov-17	47
ARRAY.06.TR.190	Module Install Verification (QA)	2	14-Nov-17	16-Nov-17	47
Strings		10	16-Nov-17	29-Nov-17	47

Actual Work | Critical Remaining Work | Summary
Remaining Work | Milestone

Date	Revision	Checked	Approved
21-Apr-17	Manildra Baseline Rev 1	AM	BS

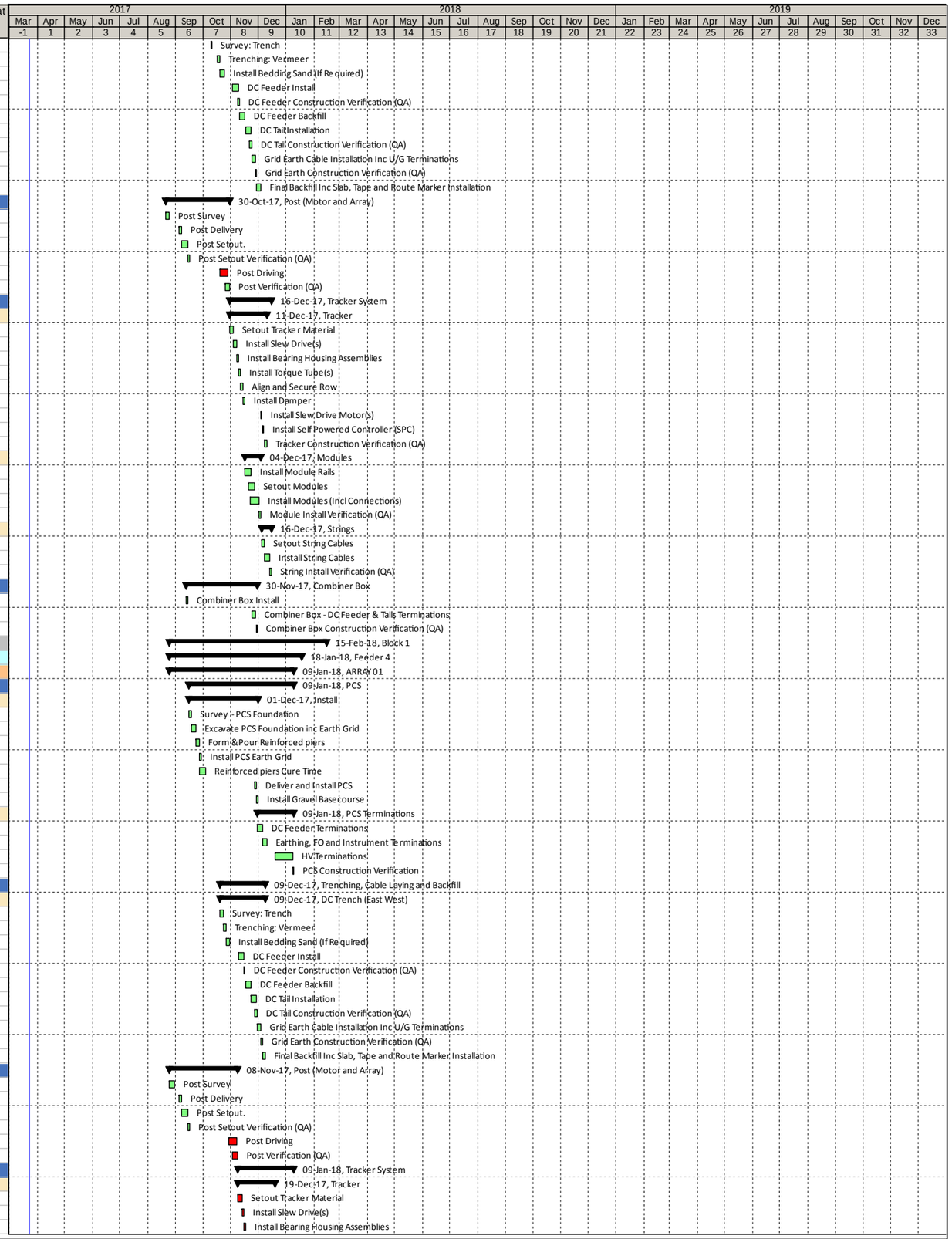
Activity ID	Activity Name	Original Duration	Start	Finish	Total Float
ARRAY.06.TR.210	Setout String Cables	3	16-Nov-17	20-Nov-17	47
ARRAY.06.TR.240	Install String Cables	5	21-Nov-17	27-Nov-17	47
ARRAY.06.TR.250	String Install Verification (QA)	2	27-Nov-17	29-Nov-17	47
Combiner Box		56	08-Sep-17	17-Nov-17	55
ARRAY.06.CB.100	Combiner Box Install	2	08-Sep-17	09-Sep-17	83
ARRAY.06.CB.110	Combiner Box - DC Feeder & Tails Terminations	3	13-Nov-17	16-Nov-17	33
ARRAY.06.CB.120	Combiner Box Construction Verification (QA)	2	16-Nov-17	17-Nov-17	55
ARRAY 09		107	03-Aug-17	16-Dec-17	32
PCS		107	03-Aug-17	16-Dec-17	32
Install		90	03-Aug-17	25-Nov-17	49
ARRAY.09.PCS.100	Survey - PCS Foundation	2	03-Aug-17	05-Aug-17	72
ARRAY.09.PCS.110	Excavate PCS Foundation inc Earth Grid	5	17-Aug-17	23-Aug-17	63
ARRAY.09.PCS.120	Form & Pour Reinforced piers	4	23-Aug-17	28-Aug-17	63
ARRAY.09.PCS.130	Install PCS Earth Grid	2	28-Aug-17	29-Aug-17	63
ARRAY.09.PCS.140	Reinforced piers Cure Time	6	28-Aug-17	04-Sep-17	94
ARRAY.09.PCS.150	Deliver and Install PCS	2	21-Nov-17	23-Nov-17	32
ARRAY.09.PCS.160	Install Gravel Basecourse	2	23-Nov-17	25-Nov-17	49
PCS Terminations		19	23-Nov-17	16-Dec-17	32
ARRAY.09.PCST.1	DC Feeder Terminations	5	23-Nov-17	29-Nov-17	32
ARRAY.09.PCST.1	Earthing, FO and Instrument Terminations	5	29-Nov-17	05-Dec-17	32
ARRAY.09.PCST.1	HV Terminations	5	09-Dec-17	15-Dec-17	29
ARRAY.09.PCST.1	PCS Construction Verification	1	15-Dec-17	16-Dec-17	32
Trenching, Cable Laying and Backfill		41	05-Oct-17	27-Nov-17	48
DC Trench (East West)		41	05-Oct-17	27-Nov-17	48
ARRAY.09.DC.100	Survey: Trench	2	05-Oct-17	07-Oct-17	27
ARRAY.09.DC.110	Trenching: Vermeer	3	13-Oct-17	17-Oct-17	24
ARRAY.09.DC.120	Install Bedding Sand (If Required)	3	17-Oct-17	20-Oct-17	24
ARRAY.09.DC.130	DC Feeder Install	5	27-Oct-17	03-Nov-17	18
ARRAY.09.DC.140	DC Feeder Construction Verification (QA)	2	02-Nov-17	04-Nov-17	30
ARRAY.09.DC.150	DC Feeder Backfill	5	04-Nov-17	10-Nov-17	30
ARRAY.09.DC.160	DC Tail Installation	5	10-Nov-17	16-Nov-17	30
ARRAY.09.DC.170	DC Tail Construction Verification (QA)	3	15-Nov-17	17-Nov-17	32
ARRAY.09.DC.180	Grid Earth Cable Installation Inc U/G Terminations	2	18-Nov-17	21-Nov-17	37
ARRAY.09.DC.190	Grid Earth Construction Verification (QA)	2	21-Nov-17	23-Nov-17	37
ARRAY.09.DC.200	Final Backfill Inc Slab, Tape and Route Marker Installation	3	23-Nov-17	27-Nov-17	48
Post (Motor and Array)		53	15-Aug-17	21-Oct-17	9
ARRAY.09.P.100	Post Survey	4	15-Aug-17	21-Aug-17	31
ARRAY.09.P.110	Post Delivery	3	04-Sep-17	07-Sep-17	19
ARRAY.09.P.120	Post Setout.	5	07-Sep-17	14-Sep-17	19
ARRAY.09.P.130	Post Setout Verification (QA)	2	14-Sep-17	16-Sep-17	19
ARRAY.09.P.140	Post Driving	7	11-Oct-17	20-Oct-17	0
ARRAY.09.P.150	Post Verification (QA)	4	17-Oct-17	21-Oct-17	9
Tracker System		45	21-Oct-17	15-Dec-17	33
Tracker		40	21-Oct-17	09-Dec-17	38
ARRAY.09.TR.100	Setout Tracker Material	4	21-Oct-17	26-Oct-17	9
ARRAY.09.TR.110	Install Slew Drive(s)	2	26-Oct-17	28-Oct-17	9
ARRAY.09.TR.120	Install Bearing Housing Assemblies	2	30-Oct-17	01-Nov-17	9
ARRAY.09.TR.130	Install Torque Tube(s)	2	01-Nov-17	02-Nov-17	9
ARRAY.09.TR.140	Align and Secure Row	2	03-Nov-17	04-Nov-17	9
ARRAY.09.TR.150	Install Damper	2	06-Nov-17	07-Nov-17	9
ARRAY.09.TR.200	Install Slew Drive Motor(s)	2	02-Dec-17	05-Dec-17	38
ARRAY.09.TR.220	Install Self Powered Controller (SPC)	2	05-Dec-17	07-Dec-17	38
ARRAY.09.TR.230	Tracker Construction Verification (QA)	2	07-Dec-17	09-Dec-17	38
Modules		21	08-Nov-17	04-Dec-17	33
ARRAY.09.TR.160	Install Module Rails	5	08-Nov-17	14-Nov-17	9
ARRAY.09.TR.170	Setout Modules	6	14-Nov-17	21-Nov-17	33
ARRAY.09.TR.180	Install Modules (Incl Connections)	9	21-Nov-17	02-Dec-17	33
ARRAY.09.TR.190	Module Install Verification (QA)	2	01-Dec-17	04-Dec-17	33
Strings		10	04-Dec-17	15-Dec-17	33
ARRAY.09.TR.210	Setout String Cables	3	04-Dec-17	07-Dec-17	33
ARRAY.09.TR.240	Install String Cables	5	07-Dec-17	13-Dec-17	33
ARRAY.09.TR.250	String Install Verification (QA)	2	14-Dec-17	15-Dec-17	33
Combiner Box		59	11-Sep-17	24-Nov-17	50
ARRAY.09.CB.100	Combiner Box Install	2	11-Sep-17	12-Sep-17	84
ARRAY.09.CB.110	Combiner Box - DC Feeder & Tails Terminations	3	18-Nov-17	22-Nov-17	32
ARRAY.09.CB.120	Combiner Box Construction Verification (QA)	2	22-Nov-17	24-Nov-17	50
Feeder 3		97	21-Aug-17	20-Dec-17	33
ARRAY 10		97	21-Aug-17	20-Dec-17	33
PCS		90	29-Aug-17	20-Dec-17	33
Install		72	29-Aug-17	28-Nov-17	51
ARRAY.10.PCS.100	Survey - PCS Foundation	1	29-Aug-17	30-Aug-17	63
ARRAY.10.PCS.110	Excavate PCS Foundation inc Earth Grid	5	30-Aug-17	05-Sep-17	63
ARRAY.10.PCS.120	Form & Pour Reinforced piers	3	05-Sep-17	08-Sep-17	63
ARRAY.10.PCS.130	Install PCS Earth Grid	2	08-Sep-17	11-Sep-17	102
ARRAY.10.PCS.140	Reinforced piers Cure Time	6	08-Sep-17	15-Sep-17	63
ARRAY.10.PCS.150	Deliver and Install PCS	2	23-Nov-17	25-Nov-17	44
ARRAY.10.PCS.160	Install Gravel Basecourse	2	25-Nov-17	28-Nov-17	51
PCS Terminations		20	25-Nov-17	20-Dec-17	33
ARRAY.10.PCST.1	DC Feeder Terminations	4	25-Nov-17	30-Nov-17	44
ARRAY.10.PCST.1	Earthing, FO and Instrument Terminations	4	29-Nov-17	05-Dec-17	41
ARRAY.10.PCST.1	HV Terminations	3	15-Dec-17	19-Dec-17	29
ARRAY.10.PCST.1	PCS Construction Verification	1	19-Dec-17	20-Dec-17	33
Trenching, Cable Laying and Backfill		44	10-Oct-17	04-Dec-17	47
DC Trench (East West)		44	10-Oct-17	04-Dec-17	47



Actual Work | Critical Remaining Work | Summary
Remaining Work | Milestone

Date	Revision	Checked	Approved
21-Apr-17	Manildra Baseline Rev 1	AM	BS

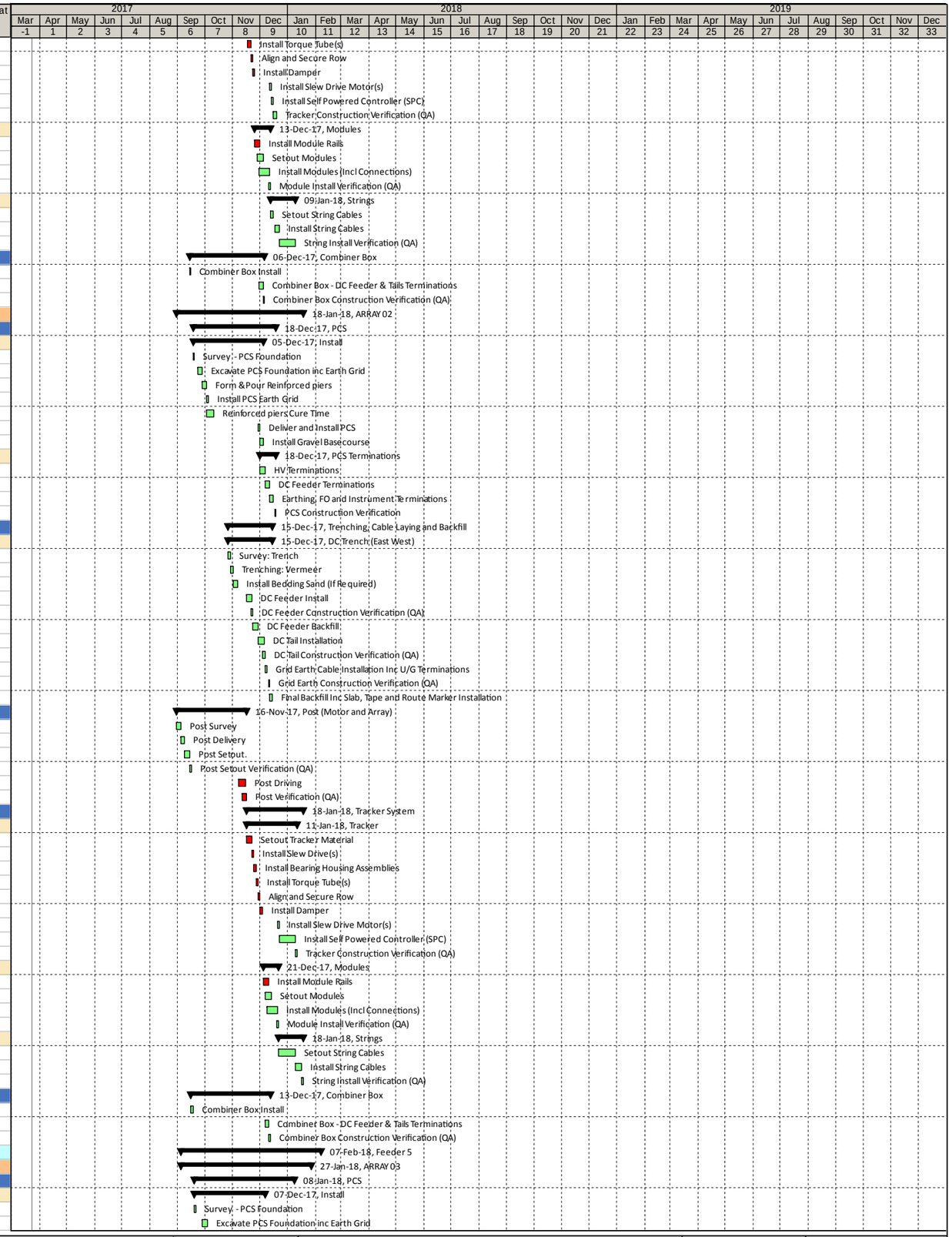
Activity ID	Activity Name	Original Duration	Start	Finish	Total Float
ARRAY.10.DC.100	Survey: Trench	2	10-Oct-17	11-Oct-17	30
ARRAY.10.DC.110	Trenching: Vermeer	3	17-Oct-17	20-Oct-17	26
ARRAY.10.DC.120	Install Bedding Sand (If Required)	3	20-Oct-17	24-Oct-17	26
ARRAY.10.DC.130	DC Feeder Install	5	03-Nov-17	09-Nov-17	18
ARRAY.10.DC.140	DC Feeder Construction Verification (QA)	2	08-Nov-17	10-Nov-17	30
ARRAY.10.DC.150	DC Feeder Backfill	5	10-Nov-17	16-Nov-17	30
ARRAY.10.DC.160	DC Tail Installation	5	17-Nov-17	23-Nov-17	30
ARRAY.10.DC.170	DC Tail Construction Verification (QA)	3	21-Nov-17	24-Nov-17	30
ARRAY.10.DC.180	Grid Earth Cable Installation Inc U/G Terminations	2	24-Nov-17	28-Nov-17	41
ARRAY.10.DC.190	Grid Earth Construction Verification (QA)	2	28-Nov-17	29-Nov-17	41
ARRAY.10.DC.200	Final Backfill Inc Slab, Tape and Route Marker Installation	3	29-Nov-17	04-Dec-17	47
Post (Motor and Array)		**56**	**21-Aug-17**	**30-Oct-17**	**6**
ARRAY.10.P.100	Post Survey	4	21-Aug-17	25-Aug-17	34
ARRAY.10.P.110	Post Delivery	3	04-Sep-17	07-Sep-17	26
ARRAY.10.P.120	Post Setout.	5	07-Sep-17	14-Sep-17	26
ARRAY.10.P.130	Post Setout Verification (QA)	2	14-Sep-17	16-Sep-17	26
ARRAY.10.P.140	Post Driving	7	20-Oct-17	28-Oct-17	0
ARRAY.10.P.150	Post Verification (QA)	4	25-Oct-17	30-Oct-17	6
Tracker System		**38**	**31-Oct-17**	**16-Dec-17**	**36**
Tracker		**33**	**31-Oct-17**	**11-Dec-17**	**41**
ARRAY.10.TR.100	Setout Tracker Material	4	31-Oct-17	03-Nov-17	6
ARRAY.10.TR.110	Install Slew Drive(s)	2	04-Nov-17	07-Nov-17	6
ARRAY.10.TR.120	Install Bearing Housing Assemblies	2	07-Nov-17	09-Nov-17	6
ARRAY.10.TR.130	Install Torque Tube(s)	2	09-Nov-17	11-Nov-17	6
ARRAY.10.TR.140	Align and Secure Row	2	11-Nov-17	14-Nov-17	6
ARRAY.10.TR.150	Install Damper	2	14-Nov-17	16-Nov-17	6
ARRAY.10.TR.200	Install Slew Drive Motor(s)	2	04-Dec-17	05-Dec-17	41
ARRAY.10.TR.220	Install Self Powered Controller (SPC)	2	06-Dec-17	07-Dec-17	41
ARRAY.10.TR.230	Tracker Construction Verification (QA)	2	08-Dec-17	11-Dec-17	41
Modules		**14**	**16-Nov-17**	**04-Dec-17**	**36**
ARRAY.10.TR.160	Install Module Rails	5	16-Nov-17	23-Nov-17	6
ARRAY.10.TR.170	Setout Modules	6	20-Nov-17	27-Nov-17	36
ARRAY.10.TR.180	Install Modules (Incl Connections)	9	22-Nov-17	02-Dec-17	36
ARRAY.10.TR.190	Module Install Verification (QA)	2	02-Dec-17	04-Dec-17	36
Strings		**10**	**05-Dec-17**	**16-Dec-17**	**36**
ARRAY.10.TR.210	Setout String Cables	3	05-Dec-17	08-Dec-17	36
ARRAY.10.TR.240	Install String Cables	5	08-Dec-17	14-Dec-17	36
ARRAY.10.TR.250	String Install Verification (QA)	2	14-Dec-17	16-Dec-17	36
Combiner Box		**63**	**12-Sep-17**	**30-Nov-17**	**49**
ARRAY.10.CB.100	Combiner Box Install	2	12-Sep-17	14-Sep-17	86
ARRAY.10.CB.110	Combiner Box - DC Feeder & Tails Terminations	3	24-Nov-17	28-Nov-17	30
ARRAY.10.CB.120	Combiner Box Construction Verification (QA)	2	29-Nov-17	30-Nov-17	49
Block 1		**126**	**25-Aug-17**	**15-Feb-18**	**0**
Feeder 4		**104**	**25-Aug-17**	**18-Jan-18**	**22**
ARRAY 01		**97**	**25-Aug-17**	**09-Jan-18**	**29**
PCS		**79**	**15-Sep-17**	**09-Jan-18**	**29**
Install		**61**	**15-Sep-17**	**01-Dec-17**	**48**
ARRAY.01.PCS.100	Survey - PCS Foundation	1	15-Sep-17	18-Sep-17	63
ARRAY.01.PCS.110	Excavate PCS Foundation inc Earth Grid	5	18-Sep-17	23-Sep-17	63
ARRAY.01.PCS.120	Form & Pour Reinforced piers	3	23-Sep-17	27-Sep-17	75
ARRAY.01.PCS.130	Install PCS Earth Grid	2	27-Sep-17	29-Sep-17	79
ARRAY.01.PCS.140	Reinforced piers Cure Time	6	27-Sep-17	04-Oct-17	75
ARRAY.01.PCS.150	Deliver and Install PCS	2	27-Nov-17	29-Nov-17	32
ARRAY.01.PCS.160	Install Gravel Basecourse	2	29-Nov-17	01-Dec-17	48
PCS Terminations		**20**	**30-Nov-17**	**09-Jan-18**	**29**
ARRAY.01.PCST.1	DC Feeder Terminations	4	30-Nov-17	06-Dec-17	44
ARRAY.01.PCST.1	Earthing, FO and Instrument Terminations	4	06-Dec-17	11-Dec-17	40
ARRAY.01.PCST.1	HV Terminations	4	19-Dec-17	08-Jan-18	29
ARRAY.01.PCST.1	PCS Construction Verification	1	08-Jan-18	09-Jan-18	29
Trenching, Cable Laying and Backfill		**40**	**20-Oct-17**	**09-Dec-17**	**42**
DC Trench (East West)		**40**	**20-Oct-17**	**09-Dec-17**	**42**
ARRAY.01.DC.100	Survey: Trench	2	20-Oct-17	23-Oct-17	26
ARRAY.01.DC.110	Trenching: Vermeer	3	23-Oct-17	26-Oct-17	26
ARRAY.01.DC.120	Install Bedding Sand (If Required)	3	26-Oct-17	31-Oct-17	26
ARRAY.01.DC.130	DC Feeder Install	5	09-Nov-17	15-Nov-17	18
ARRAY.01.DC.140	DC Feeder Construction Verification (QA)	2	15-Nov-17	16-Nov-17	18
ARRAY.01.DC.150	DC Feeder Backfill	5	17-Nov-17	23-Nov-17	18
ARRAY.01.DC.160	DC Tail Installation	5	23-Nov-17	29-Nov-17	18
ARRAY.01.DC.170	DC Tail Construction Verification (QA)	3	27-Nov-17	30-Nov-17	28
ARRAY.01.DC.180	Grid Earth Cable Installation Inc U/G Terminations	2	30-Nov-17	04-Dec-17	40
ARRAY.01.DC.190	Grid Earth Construction Verification (QA)	2	04-Dec-17	06-Dec-17	40
ARRAY.01.DC.200	Final Backfill Inc Slab, Tape and Route Marker Installation	3	06-Dec-17	09-Dec-17	42
Post (Motor and Array)		**59**	**25-Aug-17**	**08-Nov-17**	**4**
ARRAY.01.P.100	Post Survey	4	25-Aug-17	30-Aug-17	37
ARRAY.01.P.110	Post Delivery	3	04-Sep-17	07-Sep-17	33
ARRAY.01.P.120	Post Setout.	5	07-Sep-17	14-Sep-17	33
ARRAY.01.P.130	Post Setout Verification (QA)	2	14-Sep-17	16-Sep-17	33
ARRAY.01.P.140	Post Driving	7	30-Oct-17	07-Nov-17	0
ARRAY.01.P.150	Post Verification (QA)	4	03-Nov-17	08-Nov-17	4
Tracker System		**38**	**08-Nov-17**	**09-Jan-18**	**29**
Tracker		**33**	**08-Nov-17**	**19-Dec-17**	**34**
ARRAY.01.TR.100	Setout Tracker Material	4	08-Nov-17	13-Nov-17	4
ARRAY.01.TR.110	Install Slew Drive(s)	2	13-Nov-17	15-Nov-17	4
ARRAY.01.TR.120	Install Bearing Housing Assemblies	2	15-Nov-17	17-Nov-17	4



Actual Work | Critical Remaining Work | Summary
Remaining Work | Milestone

Date	Revision	Checked	Approved
21-Apr-17	Manildra Baseline Rev 1	AM	BS

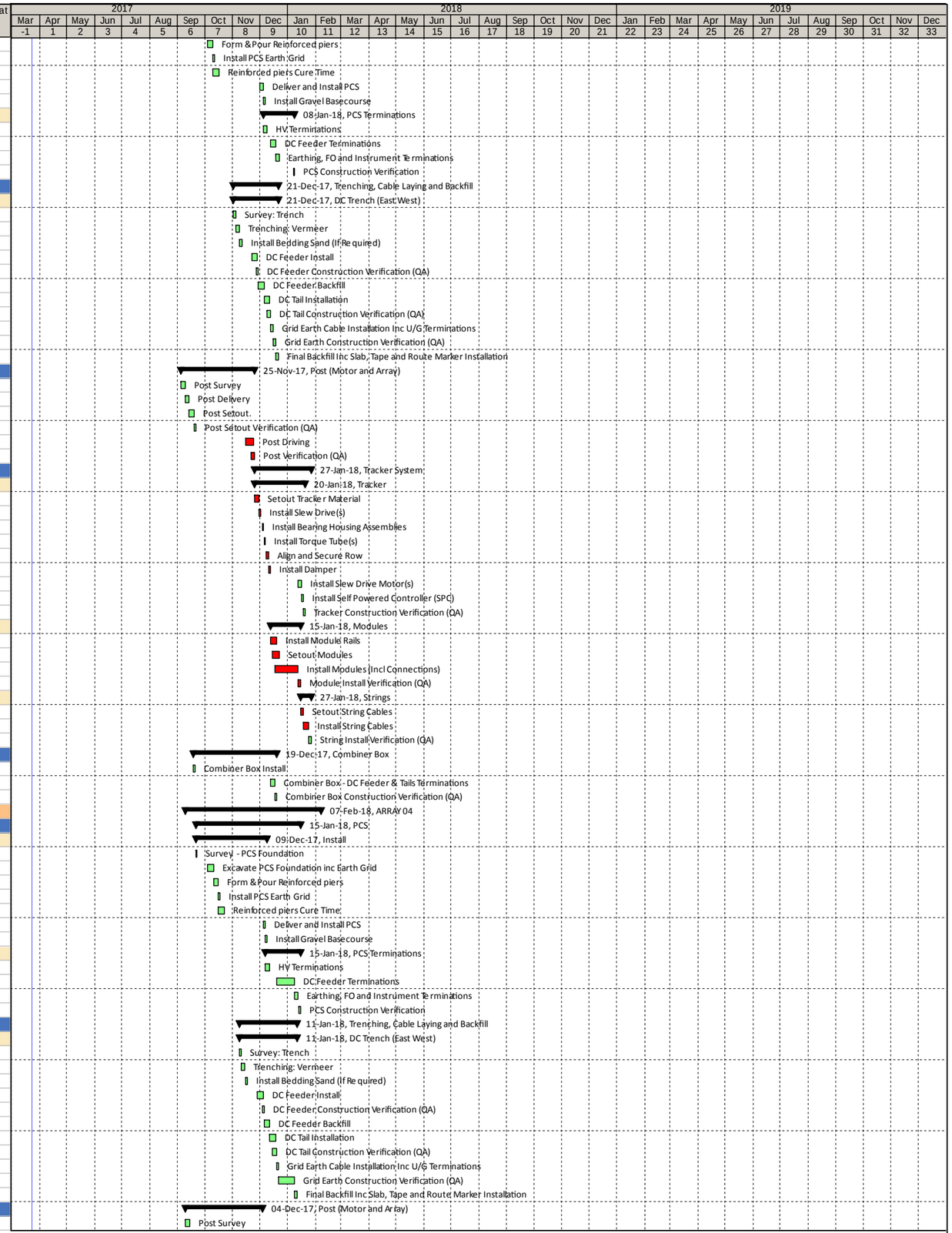
Activity ID	Activity Name	Original Duration	Start	Finish	Total Float
ARRAY.01.TR.130	Install Torque Tube(s)	2	17-Nov-17	21-Nov-17	4
ARRAY.01.TR.140	Align and Secure Row	2	21-Nov-17	23-Nov-17	4
ARRAY.01.TR.150	Install Damper	2	23-Nov-17	25-Nov-17	4
ARRAY.01.TR.200	Install Slew Drive Motor(s)	2	12-Dec-17	14-Dec-17	34
ARRAY.01.TR.220	Install Self Powered Controller (SPC)	2	14-Dec-17	16-Dec-17	34
ARRAY.01.TR.230	Tracker Construction Verification (QA)	2	16-Dec-17	19-Dec-17	34
Modules		14	25-Nov-17	13-Dec-17	14
ARRAY.01.TR.160	Install Module Rails	5	25-Nov-17	01-Dec-17	4
ARRAY.01.TR.170	Setout Modules	6	28-Nov-17	05-Dec-17	14
ARRAY.01.TR.180	Install Modules (Incl Connections)	9	30-Nov-17	12-Dec-17	14
ARRAY.01.TR.190	Module Install Verification (QA)	2	11-Dec-17	13-Dec-17	14
Strings		10	13-Dec-17	09-Jan-18	29
ARRAY.01.TR.210	Setout String Cables	3	13-Dec-17	16-Dec-17	14
ARRAY.01.TR.240	Install String Cables	5	18-Dec-17	22-Dec-17	29
ARRAY.01.TR.250	String Install Verification (QA)	2	22-Dec-17	09-Jan-18	29
Combiner Box		66	14-Sep-17	06-Dec-17	44
ARRAY.01.CB.100	Combiner Box Install	2	14-Sep-17	15-Sep-17	88
ARRAY.01.CB.110	Combiner Box - DC Feeder & Tails Terminations	3	30-Nov-17	05-Dec-17	28
ARRAY.01.CB.120	Combiner Box Construction Verification (QA)	2	05-Dec-17	06-Dec-17	44
ARRAY 02		100	30-Aug-17	18-Jan-18	22
PCS		72	18-Sep-17	18-Dec-17	35
Install		61	18-Sep-17	05-Dec-17	46
ARRAY.02.PCS.100	Survey - PCS Foundation	1	18-Sep-17	19-Sep-17	66
ARRAY.02.PCS.110	Excavate PCS Foundation inc Earth Grid	4	23-Sep-17	28-Sep-17	63
ARRAY.02.PCS.120	Form & Pour Reinforced piers	4	28-Sep-17	03-Oct-17	72
ARRAY.02.PCS.130	Install PCS Earth Grid	2	03-Oct-17	05-Oct-17	76
ARRAY.02.PCS.140	Reinforced piers Cure Time	6	03-Oct-17	11-Oct-17	72
ARRAY.02.PCS.150	Deliver and Install PCS	2	29-Nov-17	01-Dec-17	32
ARRAY.02.PCS.160	Install Gravel Basecourse	2	01-Dec-17	05-Dec-17	46
PCS Terminations		13	01-Dec-17	18-Dec-17	35
ARRAY.02.PCST.1(	HV Terminations	4	01-Dec-17	07-Dec-17	43
ARRAY.02.PCST.1:	DC Feeder Terminations	4	07-Dec-17	12-Dec-17	39
ARRAY.02.PCST.1:	Earthing, FO and Instrument Terminations	4	12-Dec-17	16-Dec-17	35
ARRAY.02.PCST.1:	PCS Construction Verification	1	18-Dec-17	18-Dec-17	35
Trenching, Cable Laying and Backfill		40	26-Oct-17	15-Dec-17	37
DC Trench (East West)		40	26-Oct-17	15-Dec-17	37
ARRAY.02.DC.100	Survey: Trench	2	26-Oct-17	30-Oct-17	26
ARRAY.02.DC.110	Trenching: Vermeer	3	30-Oct-17	02-Nov-17	26
ARRAY.02.DC.120	Install Bedding Sand (If Required)	3	02-Nov-17	06-Nov-17	26
ARRAY.02.DC.130	DC Feeder Install	5	16-Nov-17	22-Nov-17	18
ARRAY.02.DC.140	DC Feeder Construction Verification (QA)	2	21-Nov-17	23-Nov-17	18
ARRAY.02.DC.150	DC Feeder Backfill	5	23-Nov-17	29-Nov-17	18
ARRAY.02.DC.160	DC Tail Installation	5	29-Nov-17	06-Dec-17	18
ARRAY.02.DC.170	DC Tail Construction Verification (QA)	3	04-Dec-17	07-Dec-17	26
ARRAY.02.DC.180	Grid Earth Cable Installation Inc U/G Terminations	2	07-Dec-17	09-Dec-17	35
ARRAY.02.DC.190	Grid Earth Construction Verification (QA)	2	11-Dec-17	12-Dec-17	35
ARRAY.02.DC.200	Final Backfill Inc Slab, Tape and Route Marker Installation	3	12-Dec-17	15-Dec-17	37
Post (Motor and Array)		62	30-Aug-17	16-Nov-17	2
ARRAY.02.P.100	Post Survey	4	30-Aug-17	05-Sep-17	40
ARRAY.02.P.110	Post Delivery	3	05-Sep-17	08-Sep-17	40
ARRAY.02.P.120	Post Setout.	5	08-Sep-17	14-Sep-17	40
ARRAY.02.P.130	Post Setout Verification (QA)	2	14-Sep-17	16-Sep-17	40
ARRAY.02.P.140	Post Driving	7	07-Nov-17	15-Nov-17	0
ARRAY.02.P.150	Post Verification (QA)	4	11-Nov-17	16-Nov-17	2
Tracker System		38	16-Nov-17	18-Jan-18	22
Tracker		33	16-Nov-17	11-Jan-18	27
ARRAY.02.TR.100	Setout Tracker Material	4	16-Nov-17	22-Nov-17	2
ARRAY.02.TR.110	Install Slew Drive(s)	2	22-Nov-17	24-Nov-17	2
ARRAY.02.TR.120	Install Bearing Housing Assemblies	2	24-Nov-17	27-Nov-17	2
ARRAY.02.TR.130	Install Torque Tube(s)	2	27-Nov-17	29-Nov-17	2
ARRAY.02.TR.140	Align and Secure Row	2	29-Nov-17	01-Dec-17	2
ARRAY.02.TR.150	Install Damper	2	01-Dec-17	04-Dec-17	2
ARRAY.02.TR.200	Install Slew Drive Motor(s)	2	20-Dec-17	22-Dec-17	27
ARRAY.02.TR.220	Install Self Powered Controller (SPC)	2	22-Dec-17	09-Jan-18	27
ARRAY.02.TR.230	Tracker Construction Verification (QA)	2	09-Jan-18	11-Jan-18	27
Modules		14	05-Dec-17	21-Dec-17	7
ARRAY.02.TR.160	Install Module Rails	5	05-Dec-17	11-Dec-17	2
ARRAY.02.TR.170	Setout Modules	6	07-Dec-17	14-Dec-17	7
ARRAY.02.TR.180	Install Modules (Incl Connections)	9	09-Dec-17	20-Dec-17	7
ARRAY.02.TR.190	Module Install Verification (QA)	2	20-Dec-17	21-Dec-17	7
Strings		10	21-Dec-17	18-Jan-18	22
ARRAY.02.TR.210	Setout String Cables	3	21-Dec-17	09-Jan-18	7
ARRAY.02.TR.240	Install String Cables	5	10-Jan-18	16-Jan-18	7
ARRAY.02.TR.250	String Install Verification (QA)	2	16-Jan-18	18-Jan-18	22
Combiner Box		69	15-Sep-17	13-Dec-17	39
ARRAY.02.CB.100	Combiner Box Install	2	15-Sep-17	18-Sep-17	89
ARRAY.02.CB.110	Combiner Box - DC Feeder & Tails Terminations	3	07-Dec-17	11-Dec-17	26
ARRAY.02.CB.120	Combiner Box Construction Verification (QA)	2	11-Dec-17	13-Dec-17	39
Feeder 5		111	05-Sep-17	07-Feb-18	0
ARRAY 03		103	05-Sep-17	27-Jan-18	9
PCS		76	19-Sep-17	08-Jan-18	23
Install		62	19-Sep-17	07-Dec-17	37
ARRAY.03.PCS.100	Survey - PCS Foundation	1	19-Sep-17	21-Sep-17	69
ARRAY.03.PCS.110	Excavate PCS Foundation inc Earth Grid	5	28-Sep-17	04-Oct-17	63



Actual Work | Critical Remaining Work | Summary
Remaining Work | Milestone

Date	Revision	Checked	Approved
21-Apr-17	Manildra Baseline Rev 1	AM	BS

Activity ID	Activity Name	Original Duration	Start	Finish	Total Float
ARRAY.03.PCS.120	Form & Pour Reinforced piers	4	04-Oct-17	10-Oct-17	69
ARRAY.03.PCS.130	Install PCS Earth Grid	2	10-Oct-17	12-Oct-17	73
ARRAY.03.PCS.140	Reinforced piers Cure Time	6	10-Oct-17	17-Oct-17	69
ARRAY.03.PCS.150	Deliver and Install PCS	2	01-Dec-17	05-Dec-17	32
ARRAY.03.PCS.160	Install Gravel Basecourse	2	05-Dec-17	07-Dec-17	37
PCS Terminations		16	05-Dec-17	08-Jan-18	23
ARRAY.03.PCST.1(	HV Terminations	4	05-Dec-17	09-Dec-17	34
ARRAY.03.PCST.1:	DC Feeder Terminations	4	13-Dec-17	18-Dec-17	27
ARRAY.03.PCST.1:	Earthing, FO and Instrument Terminations	4	19-Dec-17	22-Dec-17	23
ARRAY.03.PCST.1:	PCS Construction Verification	1	08-Jan-18	08-Jan-18	23
Trenching, Cable Laying and Backfill		40	02-Nov-17	21-Dec-17	25
DC Trench (East West)		40	02-Nov-17	21-Dec-17	25
ARRAY.03.DC.100	Survey: Trench	2	02-Nov-17	04-Nov-17	26
ARRAY.03.DC.110	Trenching: Vermeer	3	04-Nov-17	08-Nov-17	26
ARRAY.03.DC.120	Install Bedding Sand (If Required)	3	08-Nov-17	11-Nov-17	26
ARRAY.03.DC.130	DC Feeder Install	5	22-Nov-17	28-Nov-17	18
ARRAY.03.DC.140	DC Feeder Construction Verification (QA)	2	27-Nov-17	29-Nov-17	18
ARRAY.03.DC.150	DC Feeder Backfill	5	29-Nov-17	06-Dec-17	18
ARRAY.03.DC.160	DC Tail Installation	5	06-Dec-17	12-Dec-17	18
ARRAY.03.DC.170	DC Tail Construction Verification (QA)	3	09-Dec-17	13-Dec-17	23
ARRAY.03.DC.180	Grid Earth Cable Installation Inc U/G Terminations	2	13-Dec-17	15-Dec-17	23
ARRAY.03.DC.190	Grid Earth Construction Verification (QA)	2	16-Dec-17	18-Dec-17	23
ARRAY.03.DC.200	Final Backfill Inc Slab, Tape and Route Marker Installation	3	19-Dec-17	21-Dec-17	25
Post (Motor and Array)		65	05-Sep-17	25-Nov-17	0
ARRAY.03.P.100	Post Survey	4	05-Sep-17	09-Sep-17	43
ARRAY.03.P.110	Post Delivery	3	09-Sep-17	13-Sep-17	43
ARRAY.03.P.120	Post Setout.	5	13-Sep-17	19-Sep-17	43
ARRAY.03.P.130	Post Setout Verification (QA)	2	19-Sep-17	21-Sep-17	43
ARRAY.03.P.140	Post Driving	7	15-Nov-17	24-Nov-17	0
ARRAY.03.P.150	Post Verification (QA)	4	21-Nov-17	25-Nov-17	0
Tracker System		38	25-Nov-17	27-Jan-18	9
Tracker		33	25-Nov-17	20-Jan-18	14
ARRAY.03.TR.100	Setout Tracker Material	4	25-Nov-17	30-Nov-17	0
ARRAY.03.TR.110	Install Slew Drive(s)	2	30-Nov-17	02-Dec-17	0
ARRAY.03.TR.120	Install Bearing Housing Assemblies	2	04-Dec-17	05-Dec-17	0
ARRAY.03.TR.130	Install Torque Tube(s)	2	06-Dec-17	07-Dec-17	0
ARRAY.03.TR.140	Align and Secure Row	2	08-Dec-17	11-Dec-17	0
ARRAY.03.TR.150	Install Damper	2	11-Dec-17	13-Dec-17	0
ARRAY.03.TR.200	Install Slew Drive Motor(s)	2	12-Jan-18	16-Jan-18	14
ARRAY.03.TR.220	Install Self Powered Controller (SPC)	2	16-Jan-18	18-Jan-18	14
ARRAY.03.TR.230	Tracker Construction Verification (QA)	2	18-Jan-18	20-Jan-18	14
Modules		14	13-Dec-17	15-Jan-18	5
ARRAY.03.TR.160	Install Module Rails	5	13-Dec-17	19-Dec-17	0
ARRAY.03.TR.170	Setout Modules	6	15-Dec-17	22-Dec-17	5
ARRAY.03.TR.180	Install Modules (Incl Connections)	9	18-Dec-17	12-Jan-18	5
ARRAY.03.TR.190	Module Install Verification (QA)	2	12-Jan-18	15-Jan-18	5
Strings		10	15-Jan-18	27-Jan-18	9
ARRAY.03.TR.210	Setout String Cables	3	15-Jan-18	18-Jan-18	5
ARRAY.03.TR.240	Install String Cables	5	18-Jan-18	24-Jan-18	5
ARRAY.03.TR.250	String Install Verification (QA)	2	24-Jan-18	27-Jan-18	9
Combiner Box		73	18-Sep-17	19-Dec-17	28
ARRAY.03.CB.100	Combiner Box Install	2	18-Sep-17	20-Sep-17	91
ARRAY.03.CB.110	Combiner Box - DC Feeder & Tails Terminations	3	13-Dec-17	18-Dec-17	24
ARRAY.03.CB.120	Combiner Box Construction Verification (QA)	2	18-Dec-17	19-Dec-17	28
ARRAY 04		107	09-Sep-17	07-Feb-18	0
PCS		80	21-Sep-17	15-Jan-18	18
Install		63	21-Sep-17	09-Dec-17	35
ARRAY.04.PCS.100	Survey - PCS Foundation	2	21-Sep-17	22-Sep-17	72
ARRAY.04.PCS.110	Excavate PCS Foundation inc Earth Grid	5	04-Oct-17	11-Oct-17	63
ARRAY.04.PCS.120	Form & Pour Reinforced piers	4	11-Oct-17	16-Oct-17	63
ARRAY.04.PCS.130	Install PCS Earth Grid	2	16-Oct-17	18-Oct-17	63
ARRAY.04.PCS.140	Reinforced piers Cure Time	6	16-Oct-17	23-Oct-17	67
ARRAY.04.PCS.150	Deliver and Install PCS	2	05-Dec-17	07-Dec-17	32
ARRAY.04.PCS.160	Install Gravel Basecourse	2	07-Dec-17	09-Dec-17	35
PCS Terminations		19	07-Dec-17	15-Jan-18	18
ARRAY.04.PCST.1(	HV Terminations	4	07-Dec-17	12-Dec-17	32
ARRAY.04.PCST.1:	DC Feeder Terminations	4	20-Dec-17	08-Jan-18	22
ARRAY.04.PCST.1:	Earthing, FO and Instrument Terminations	4	09-Jan-18	12-Jan-18	18
ARRAY.04.PCST.1:	PCS Construction Verification	1	13-Jan-18	15-Jan-18	18
Trenching, Cable Laying and Backfill		40	08-Nov-17	11-Jan-18	20
DC Trench (East West)		40	08-Nov-17	11-Jan-18	20
ARRAY.04.DC.100	Survey: Trench	2	08-Nov-17	10-Nov-17	26
ARRAY.04.DC.110	Trenching: Vermeer	3	10-Nov-17	14-Nov-17	26
ARRAY.04.DC.120	Install Bedding Sand (If Required)	3	15-Nov-17	17-Nov-17	26
ARRAY.04.DC.130	DC Feeder Install	5	28-Nov-17	05-Dec-17	18
ARRAY.04.DC.140	DC Feeder Construction Verification (QA)	2	04-Dec-17	06-Dec-17	18
ARRAY.04.DC.150	DC Feeder Backfill	5	06-Dec-17	12-Dec-17	18
ARRAY.04.DC.160	DC Tail Installation	5	12-Dec-17	18-Dec-17	18
ARRAY.04.DC.170	DC Tail Construction Verification (QA)	3	15-Dec-17	19-Dec-17	18
ARRAY.04.DC.180	Grid Earth Cable Installation Inc U/G Terminations	2	20-Dec-17	22-Dec-17	18
ARRAY.04.DC.190	Grid Earth Construction Verification (QA)	2	22-Dec-17	08-Jan-18	18
ARRAY.04.DC.200	Final Backfill Inc Slab, Tape and Route Marker Installation	3	09-Jan-18	11-Jan-18	20
Post (Motor and Array)		68	09-Sep-17	04-Dec-17	2
ARRAY.04.P.100	Post Survey	4	09-Sep-17	14-Sep-17	46



Actual Work | Critical Remaining Work | Summary
Remaining Work | Milestone

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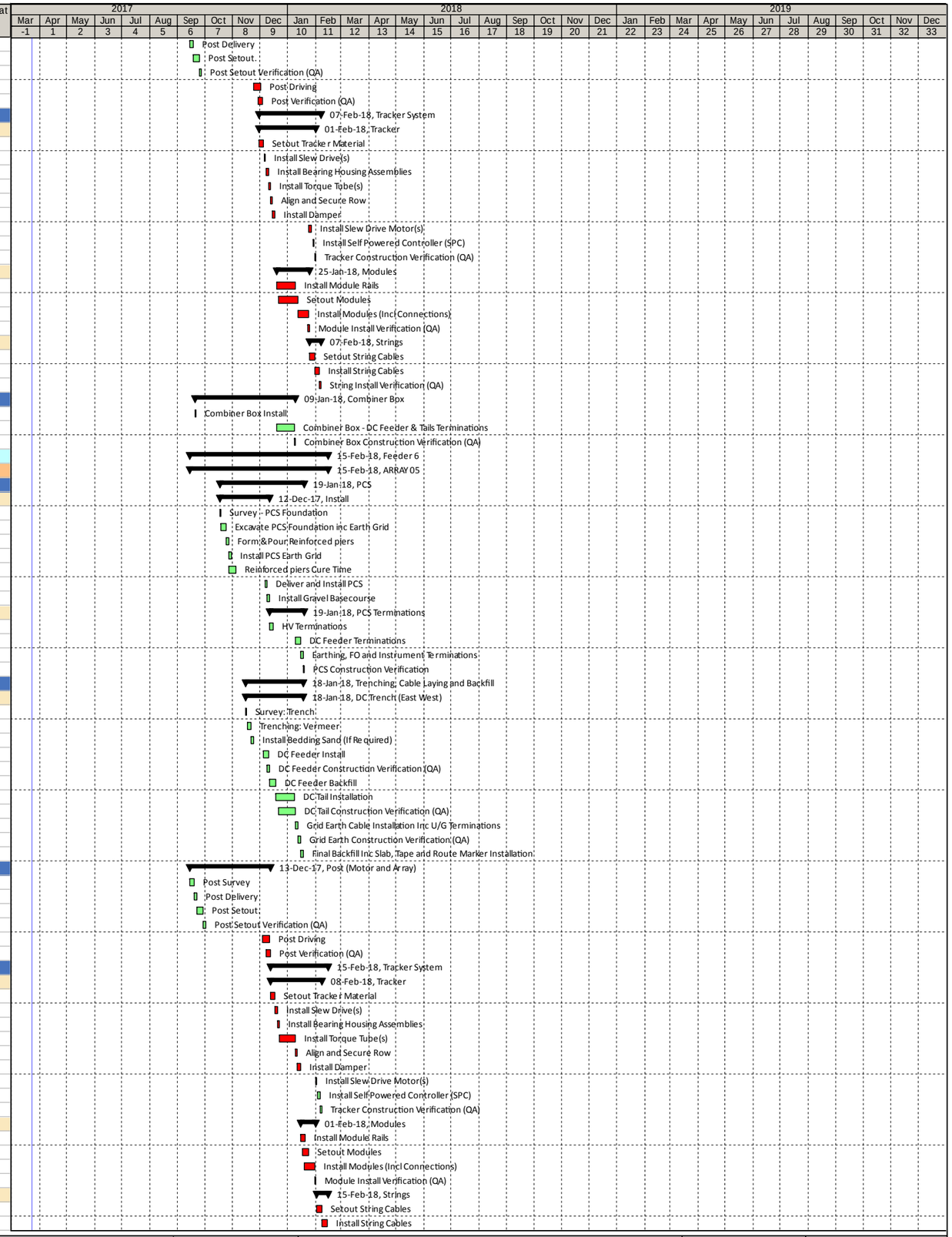
21-Apr-17	Manildra Baseline Rev 1	AM	BS

Activity ID	Activity Name	Original Duration	Start	Finish	Total Float
ARRAY.04.P.110	Post Delivery	3	14-Sep-17	18-Sep-17	46
ARRAY.04.P.120	Post Setout.	5	18-Sep-17	25-Sep-17	46
ARRAY.04.P.130	Post Setout Verification (QA)	2	25-Sep-17	27-Sep-17	46
ARRAY.04.P.140	Post Driving	7	24-Nov-17	02-Dec-17	0
ARRAY.04.P.150	Post Verification (QA)	4	29-Nov-17	04-Dec-17	2
Tracker System		42	30-Nov-17	07-Feb-18	0
Tracker		38	30-Nov-17	01-Feb-18	5
ARRAY.04.TR.100	Setout Tracker Material	4	30-Nov-17	05-Dec-17	1
ARRAY.04.TR.110	Install Slew Drive(s)	2	06-Dec-17	07-Dec-17	1
ARRAY.04.TR.120	Install Bearing Housing Assemblies	2	08-Dec-17	11-Dec-17	1
ARRAY.04.TR.130	Install Torque Tube(s)	2	11-Dec-17	13-Dec-17	1
ARRAY.04.TR.140	Align and Secure Row	2	13-Dec-17	15-Dec-17	1
ARRAY.04.TR.150	Install Damper	2	15-Dec-17	18-Dec-17	1
ARRAY.04.TR.200	Install Slew Drive Motor(s)	2	24-Jan-18	27-Jan-18	5
ARRAY.04.TR.220	Install Self Powered Controller (SPC)	2	29-Jan-18	30-Jan-18	5
ARRAY.04.TR.230	Tracker Construction Verification (QA)	2	31-Jan-18	01-Feb-18	5
Modules		18	19-Dec-17	25-Jan-18	0
ARRAY.04.TR.160	Install Module Rails	5	19-Dec-17	09-Jan-18	0
ARRAY.04.TR.170	Setout Modules	6	21-Dec-17	12-Jan-18	0
ARRAY.04.TR.180	Install Modules (Incl Connections)	9	12-Jan-18	24-Jan-18	0
ARRAY.04.TR.190	Module Install Verification (QA)	2	23-Jan-18	25-Jan-18	0
Strings		9	25-Jan-18	07-Feb-18	0
ARRAY.04.TR.210	Setout String Cables	3	25-Jan-18	31-Jan-18	0
ARRAY.04.TR.240	Install String Cables	4	31-Jan-18	05-Feb-18	0
ARRAY.04.TR.250	String Install Verification (QA)	2	05-Feb-18	07-Feb-18	0
Combiner Box		76	20-Sep-17	09-Jan-18	23
ARRAY.04.CB.100	Combiner Box Install	2	20-Sep-17	21-Sep-17	92
ARRAY.04.CB.110	Combiner Box - DC Feeder & Tails Terminations	3	20-Dec-17	08-Jan-18	23
ARRAY.04.CB.120	Combiner Box Construction Verification (QA)	2	08-Jan-18	09-Jan-18	23
Feeder 6		110	14-Sep-17	15-Feb-18	0
ARRAY 05		110	14-Sep-17	15-Feb-18	0
PCS		63	18-Oct-17	19-Jan-18	21
Install		44	18-Oct-17	12-Dec-17	40
ARRAY.05.PCS.100	Survey - PCS Foundation	1	18-Oct-17	19-Oct-17	63
ARRAY.05.PCS.110	Excavate PCS Foundation inc Earth Grid	5	19-Oct-17	25-Oct-17	63
ARRAY.05.PCS.120	Form & Pour Reinforced piers	3	25-Oct-17	28-Oct-17	63
ARRAY.05.PCS.130	Install PCS Earth Grid	2	28-Oct-17	31-Oct-17	67
ARRAY.05.PCS.140	Reinforced piers Cure Time	6	28-Oct-17	04-Nov-17	63
ARRAY.05.PCS.150	Deliver and Install PCS	2	07-Dec-17	09-Dec-17	37
ARRAY.05.PCS.160	Install Gravel Basecourse	2	09-Dec-17	12-Dec-17	40
PCS Terminations		19	12-Dec-17	19-Jan-18	21
ARRAY.05.PCST.1(	HV Terminations	4	12-Dec-17	16-Dec-17	35
ARRAY.05.PCST.1:	DC Feeder Terminations	4	10-Jan-18	15-Jan-18	24
ARRAY.05.PCST.1:	Earthing, FO and Instrument Terminations	3	15-Jan-18	18-Jan-18	21
ARRAY.05.PCST.1:	PCS Construction Verification	1	18-Jan-18	19-Jan-18	21
Trenching, Cable Laying and Backfill		40	15-Nov-17	18-Jan-18	22
DC Trench (East West)		40	15-Nov-17	18-Jan-18	22
ARRAY.05.DC.100	Survey: Trench	2	15-Nov-17	16-Nov-17	29
ARRAY.05.DC.110	Trenching: Vermeer	3	17-Nov-17	21-Nov-17	29
ARRAY.05.DC.120	Install Bedding Sand (If Required)	3	21-Nov-17	24-Nov-17	29
ARRAY.05.DC.130	DC Feeder Install	5	05-Dec-17	11-Dec-17	21
ARRAY.05.DC.140	DC Feeder Construction Verification (QA)	2	09-Dec-17	12-Dec-17	21
ARRAY.05.DC.150	DC Feeder Backfill	5	12-Dec-17	18-Dec-17	21
ARRAY.05.DC.160	DC Tail Installation	5	19-Dec-17	08-Jan-18	21
ARRAY.05.DC.170	DC Tail Construction Verification (QA)	3	22-Dec-17	09-Jan-18	21
ARRAY.05.DC.180	Grid Earth Cable Installation Inc U/G Terminations	2	10-Jan-18	12-Jan-18	21
ARRAY.05.DC.190	Grid Earth Construction Verification (QA)	2	12-Jan-18	15-Jan-18	21
ARRAY.05.DC.200	Final Backfill Inc Slab, Tape and Route Marker Installation	3	15-Jan-18	18-Jan-18	22
Post (Motor and Array)		71	14-Sep-17	13-Dec-17	0
ARRAY.05.P.100	Post Survey	4	14-Sep-17	19-Sep-17	49
ARRAY.05.P.110	Post Delivery	3	19-Sep-17	22-Sep-17	49
ARRAY.05.P.120	Post Setout.	5	22-Sep-17	29-Sep-17	49
ARRAY.05.P.130	Post Setout Verification (QA)	2	29-Sep-17	02-Oct-17	49
ARRAY.05.P.140	Post Driving	7	04-Dec-17	12-Dec-17	0
ARRAY.05.P.150	Post Verification (QA)	4	08-Dec-17	13-Dec-17	0
Tracker System		39	13-Dec-17	15-Feb-18	0
Tracker		33	13-Dec-17	08-Feb-18	6
ARRAY.05.TR.100	Setout Tracker Material	4	13-Dec-17	18-Dec-17	0
ARRAY.05.TR.110	Install Slew Drive(s)	2	18-Dec-17	20-Dec-17	0
ARRAY.05.TR.120	Install Bearing Housing Assemblies	2	20-Dec-17	22-Dec-17	0
ARRAY.05.TR.130	Install Torque Tube(s)	2	22-Dec-17	09-Jan-18	0
ARRAY.05.TR.140	Align and Secure Row	2	09-Jan-18	11-Jan-18	0
ARRAY.05.TR.150	Install Damper	2	11-Jan-18	15-Jan-18	0
ARRAY.05.TR.200	Install Slew Drive Motor(s)	2	01-Feb-18	02-Feb-18	6
ARRAY.05.TR.210	Install Self Powered Controller (SPC)	2	03-Feb-18	06-Feb-18	6
ARRAY.05.TR.220	Tracker Construction Verification (QA)	2	06-Feb-18	08-Feb-18	6
Modules		14	15-Jan-18	01-Feb-18	0
ARRAY.05.TR.160	Install Module Rails	5	15-Jan-18	20-Jan-18	0
ARRAY.05.TR.170	Setout Modules	6	17-Jan-18	24-Jan-18	0
ARRAY.05.TR.180	Install Modules (Incl Connections)	9	19-Jan-18	31-Jan-18	0
ARRAY.05.TR.190	Module Install Verification (QA)	2	31-Jan-18	01-Feb-18	0
Strings		11	02-Feb-18	15-Feb-18	0
ARRAY.05.TR.230	Setout String Cables	5	02-Feb-18	08-Feb-18	0
ARRAY.05.TR.240	Install String Cables	5	08-Feb-18	14-Feb-18	0



Actual Work | Critical Remaining Work | Summary
Remaining Work | Milestone

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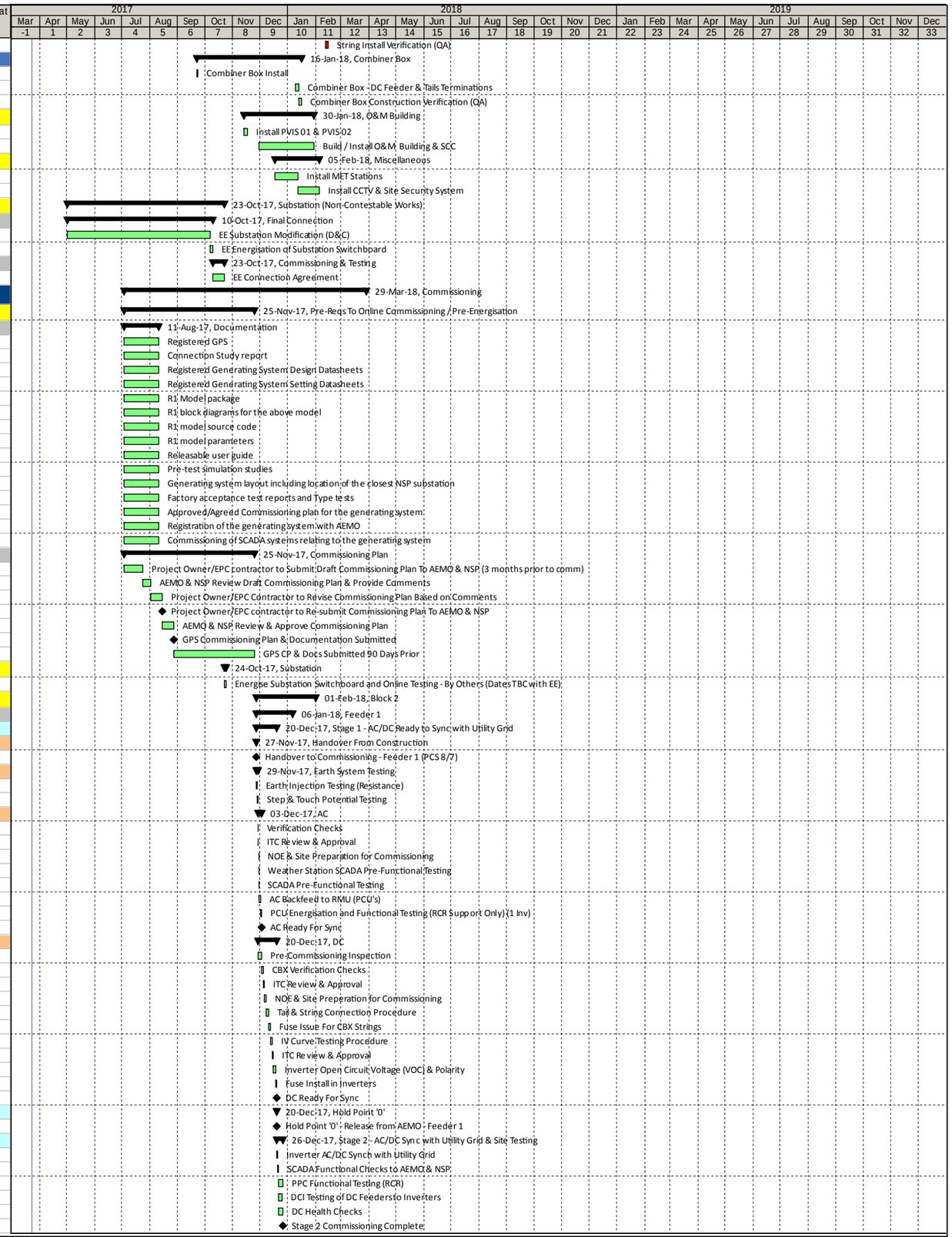
21-Apr-17	Manildra Baseline Rev 1	AM	BS

Activity ID	Activity Name	Original Duration	Start	Finish	Total Float
ARRAY.05.TR.250	String Install Verification (QA)	3	12-Feb-18	15-Feb-18	0
Combiner Box		**80**	**22-Sep-17**	**16-Jan-18**	**24**
ARRAY.05.CB.100	Combiner Box Install	2	22-Sep-17	23-Sep-17	97
ARRAY.05.CB.110	Combiner Box - DC Feeder & Tails Terminations	3	10-Jan-18	13-Jan-18	24
ARRAY.05.CB.120	Combiner Box Construction Verification (QA)	2	13-Jan-18	16-Jan-18	24
O&M Building		**49**	**13-Nov-17**	**30-Jan-18**	**54**
MAN_SF_3350	Install PVIS 01 & PVIS 02	4	13-Nov-17	17-Nov-17	61
MAN_SF_3330	Build / Install O&M Building & SCC	35	30-Nov-17	30-Jan-18	54
Miscellaneous		**27**	**18-Dec-17**	**05-Feb-18**	**79**
MAN_SF_2440	Install MET Stations	10	18-Dec-17	12-Jan-18	96
MAN_SF_2510	Install CCTV & Site Security System	18	12-Jan-18	05-Feb-18	54
Substation (Non-Contestable Works)		**138**	**01-May-17**	**23-Oct-17**	**95**
Final Connection		**128**	**01-May-17**	**10-Oct-17**	**95**
MAN_SF_2190	EE Substation Modification (D&C)	127	01-May-17*	07-Oct-17	95
MAN_SF_2420	EE Energisation of Substation Switchboard	1	07-Oct-17	10-Oct-17	95
Commissioning & Testing		**10**	**10-Oct-17**	**23-Oct-17**	**95**
MAN_SF_2480	EE Connection Agreement	10	10-Oct-17	23-Oct-17	95
Commissioning		**203**	**03-Jul-17**	**29-Mar-18**	**10**
Pre-Reqs To Online Commissioning / Pre-Energisation		**116**	**03-Jul-17**	**25-Nov-17**	**54**
Documentation		**32**	**03-Jul-17**	**11-Aug-17**	**71**
COM.PR.100	Registered GPS	32	03-Jul-17	11-Aug-17	71
COM.PR.110	Connection Study report	32	03-Jul-17	11-Aug-17	71
COM.PR.120	Registered Generating System Design Datasheets	32	03-Jul-17	11-Aug-17	71
COM.PR.130	Registered Generating System Setting Datasheets	32	03-Jul-17	11-Aug-17	71
COM.PR.140	R1 Model package	32	03-Jul-17	11-Aug-17	71
COM.PR.150	R1 block diagrams for the above model	32	03-Jul-17	11-Aug-17	71
COM.PR.160	R1 model source code	32	03-Jul-17	11-Aug-17	71
COM.PR.170	R1 model parameters	32	03-Jul-17	11-Aug-17	71
COM.PR.180	Releasable user guide	32	03-Jul-17	11-Aug-17	71
COM.PR.190	Pre-test simulation studies	32	03-Jul-17	11-Aug-17	71
COM.PR.200	Generating system layout including location of the closest NSP substation	32	03-Jul-17	11-Aug-17	71
COM.PR.210	Factory acceptance test reports and Type tests	32	03-Jul-17	11-Aug-17	71
COM.PR.220	Approved/Agreed Commissioning plan for the generating system	32	03-Jul-17	11-Aug-17	71
COM.PR.230	Registration of the generating system with AEMO	32	03-Jul-17	11-Aug-17	71
COM.PR.240	Commissioning of SCADA systems relating to the generating system	32	03-Jul-17	11-Aug-17	71
Commissioning Plan		**116**	**03-Jul-17**	**25-Nov-17**	**54**
COM.MP.100	Project Owner/EPC contractor to Submit Draft Commissioning Plan To AEMO & NSP (3 months prior to comm)	16	03-Jul-17	24-Jul-17	59
COM.MP.110	AEMO & NSP Review Draft Commissioning Plan & Provide Comments	8	24-Jul-17	02-Aug-17	59
COM.MP.120	Project Owner/EPC Contractor to Revise Commissioning Plan Based on Comments	10	02-Aug-17	15-Aug-17	59
COM.MP.130	Project Owner/EPC contractor to Re-submit Commissioning Plan To AEMO & NSP	0		15-Aug-17	59
COM.MP.140	AEMO & NSP Review & Approve Commissioning Plan	10	15-Aug-17	28-Aug-17	59
COM.MP.150	GPS Commissioning Plan & Documentation Submitted	0		28-Aug-17	59
COM.MP.160	GPS CP & Docs Submitted 90 Days Prior	90	28-Aug-17	25-Nov-17	74
Substation		**1**	**23-Oct-17**	**24-Oct-17**	**95**
MAN_SF_2520	Energise Substation Switchboard and Online Testing - By Others (Dates TBC with EE)	1	23-Oct-17	24-Oct-17	95
Block 2		**40**	**27-Nov-17**	**01-Feb-18**	**57**
Feeder 1		**21**	**27-Nov-17**	**06-Jan-18**	**76**
Stage 1 - AC/DC Ready to Sync with Utility Grid		**19**	**27-Nov-17**	**20-Dec-17**	**54**
Handover From Construction		**0**	**27-Nov-17**	**27-Nov-17**	**54**
F1-COM.110	Handover to Commissioning - Feeder 1 (PCS 8/7)	0		27-Nov-17	54
Earth System Testing		**2**	**27-Nov-17**	**29-Nov-17**	**82**
F1-COM.120	Earth Injection Testing (Resistance)	1	27-Nov-17	28-Nov-17	82
F1-COM.130	Step & Touch Potential Testing	1	28-Nov-17	29-Nov-17	82
AC		**4**	**29-Nov-17**	**03-Dec-17**	**99**
F1-COM.140	Verification Checks	0	29-Nov-17	29-Nov-17	99
F1-COM.160	ITC Review & Approval	0	29-Nov-17	29-Nov-17	99
F1-COM.170	NOE & Site Preparation for Commissioning	0	30-Nov-17	30-Nov-17	99
F1-COM.180	Weather Station SCADA Pre-Functional Testing	0	30-Nov-17	30-Nov-17	99
F1-COM.190	SCADA Pre-Functional Testing	0	30-Nov-17	30-Nov-17	99
F1-COM.200	AC Backfeed to RMU (PCU's)	2	30-Nov-17	02-Dec-17	99
F1-COM.210	PCU Energisation and Functional Testing (RCR Support Only) (1 Inv)	1	02-Dec-17	03-Dec-17	99
F1-COM.220	AC Ready For Sync	0		03-Dec-17	99
DC		**21**	**29-Nov-17**	**20-Dec-17**	**82**
F1-COM.150	Pre-Commissioning Inspection	4	29-Nov-17	03-Dec-17	82
F1-COM.230	CBX Verification Checks	2	03-Dec-17	05-Dec-17	82
F1-COM.240	ITC Review & Approval	1	05-Dec-17	06-Dec-17	82
F1-COM.250	NOE & Site Preperation for Commissioning	2	06-Dec-17	08-Dec-17	82
F1-COM.260	Tail & String Connection Procedure	3	08-Dec-17	11-Dec-17	82
F1-COM.270	Fuse Issue For CBX Strings	2	11-Dec-17	13-Dec-17	82
F1-COM.280	IV Curve Testing Procedure	2	13-Dec-17	15-Dec-17	82
F1-COM.290	ITC Review & Approval	1	15-Dec-17	16-Dec-17	82
F1-COM.300	Inverter Open Circuit Voltage (VOC) & Polarity	3	16-Dec-17	19-Dec-17	82
F1-COM.310	Fuse Install in Inverters	1	19-Dec-17	20-Dec-17	82
F1-COM.320	DC Ready For Sync	0		20-Dec-17	82
Hold Point '0'		**0**	**20-Dec-17**	**20-Dec-17**	**82**
F1-COM.330	Hold Point '0' - Release from AEMO - Feeder 1	0		20-Dec-17	82
Stage 2 - AC/DC Sync with Utility Grid & Site Testing		**6**	**20-Dec-17**	**26-Dec-17**	**82**
F1-COM.340	Inverter AC/DC Synch with Utility Grid	1	20-Dec-17	21-Dec-17	82
F1-COM.350	SCADA Functional Checks to AEMO & NSP	1	21-Dec-17	22-Dec-17	82
F1-COM.360	PPC Functional Testing (RCR)	4	22-Dec-17	26-Dec-17	82
F1-COM.370	DCI Testing of DC Feeders to Inverters	3	22-Dec-17	25-Dec-17	82
F1-COM.380	DC Health Checks	4	22-Dec-17	26-Dec-17	82
F1-COM.390	Stage 2 Commissioning Complete	0		26-Dec-17	82



Actual Work | Critical Remaining Work | Summary
Remaining Work | Milestone

Date	Revision	Checked	Approved
21-Apr-17	Manildra Baseline Rev 1	AM	BS

Appendix L

COMMUNITY ENGAGEMENT PLAN

Manildra Solar Farm

Community Engagement Plan

FS-MANS1-GM-PL-002.E

First Solar

REVISION LOG

Revision Number	Revision Date	Reason for revision / Description of change	Prepared / Revised By	Approved By
A	15/6/2017	Issued for review	BS	
B	16/06/2017	Revised community complaints to comply with CEMP	BS	
C	26/06/2017	Include Indigenous Stakeholder engagement details	BS	
D	28/06/2017	Amendments to terminology in indigenous stakeholder engagement, contact details for TLO council and inclusion of table of statutory obligations	BS	
E	29/6/2017	Corrected table formatting and references in Indigenous Communities from Heritage Act 1977 to National Parks and Wildlife Act 1974		

Table of Contents

Contents

1.1. INTRODUCTION 5

1.2. COMMUNITY ENGAGEMENT BEST PRACTICE GUIDELINES 5

1.3. COMMUNITY ENGAGEMENT POLICY 6

1.4. PURPOSE OF THE COMMUNITY ENGAGEMENT PLAN (CEP) 7

1.5. COMMUNITY ENGAGEMENT PLAN OBJECTIVES 8

1.5.1 Key Messages 8

1.5.2 Indigenous Stakeholder Community Engagement 9

1.5.3 Ongoing Indigenous Stakeholder Engagement 9

1.6. HOW MANILDRA SOLAR FARM ACTIVELY PARTICPATES IN THE COMMUNITY 9

1.6.1 Community Consultation and Feedback 9

1.6.2 Communications and Media 10

1.6.3 Manildra Solar Community Website 10

1.6.4 Community Partnerships 10

1.7. STAKEHOLDER ANALYSIS AND ENGAGEMENT 11

1.7.1 Stakeholder Communication Strategy 11

1.8. ENVIRONMENTAL ASSESSMENT STAGE 16

1.9. PLANNING APPROVAL AND CONDITIONS OF CONSENT 16

1.10. MANILDRA SOLAR CONSTRUCTION STAGE 16

1.10.1 Project Construction Community Consultation 17

1.10.2 Communications Coordinator 17

1.10.3 Construction communication and consultation tools 17

1.10.4 Community Consultation Activities During Construction 17

1.10.5 ARENA Reporting Requirements 18

1.11. COMMUNICATIONS, RISKS AND OPPORTUNITIES 18

1.12. COMMUNICATIONS MANAGEMENT SYSTEM 22

1.12.1 Project Infoline, Email and Website 22

1.12.2 Project Contact Database 22

1.12.3 Stakeholder Database 22

1.12.4 Complaints Handling and Reporting 22

1.12.5 Complaint Escalation and Dispute Resolution 23

1.12.6 Construction Activity Complaints Handling - Alignment with CoA C13(i) 23

1.12.7 Media and Government Relations 25

1.13. INTERNAL COMMUNICATIONS 25

1.13.1 Communications Materials Approval 26

1.13.2 Site Inductions 26

1.14. ISSUES AND INCIDENT MANAGEMENT 26

1.14.1 Incident Management 26

1.15. MONITORING, EVAULATION AND REPORTING 27

1.15.1 Community Consultation Evaluation 27

1.15.2 Effective Community Liaison Activities 28

1.15.3 Evaluation Methods 28

1.1. INTRODUCTION

The Proponent has and will continue to meet and exceed both jurisdictional and voluntary best practice requirements to ensure that it maintains a good reputation and an ongoing positive relationship with the community.

The Project– The Proponent is developing the Manildra Solar Farm ("**Manildra Solar**") close to the town of Manildra in the Cabonne Local Government Area (**"LGA"**). The communities within this area have an existing positive relationship with the Manildra Solar Farm.

In the early stages of the development of Manildra Solar, the Proponent adopted Manildra Solar Farm's Community Engagement Policy (Section 2) to develop a Community Engagement Plan (**"CEP"**) specific to Manildra Solar. This sets out the key principles and goals Manildra Solar Farm has in place when engaging with its communities. During the public exhibition phase of the environmental assessment no submissions were received from the local community.

The CEP is developed in accordance with the requirements of the Development Approval with the Conditions of Approval relevant to the CEP including and outlined in ***Table 1***;

Table 1: Conditions of Approval

CoA No	Condition Requirements	Document Reference / Action
C7	Prior to the commencement of construction, the Proponent shall prepare and implement a Community Information Plan which sets out the community communication and consultation process to be implemented during construction and operation of the project. The Plan shall include but not be limited to:	
	(a) Procedures to inform the local community of planned investigations and construction activities, including blasting works (if any)	Section 1.8 and Section 1.12
	(b) Procedures to inform the relevant community of construction traffic routes and any potential disruptions to traffic flows and amenity impacts	Section 1.10 and Section 1.12
	(c) Procedures to consult with local landowners with regard to construction traffic to ensure the safety of livestock and to limit disruption to livestock movements	Section 1.10.4 and Section 1.12
	(d) Procedures to inform the community where work outside the construction hours specified in Condition PART CD1 in particular noisy activities, has been approved; and	Section 1.10.4 and Section 1.12
	(e) Procedures to inform and consult the affected landowners to rehabilitate impacted land Note: All development is within the approved footprint. Rehabilitation of impacted land will only occur once the plant is decommissioned in 30 yrs. This process will be addressed under Part G – Decommissioning / Post Operations	Not required until after plant decommisisoning (30yrs)

1.2. COMMUNITY ENGAGEMENT BEST PRACTICE GUIDELINES

Manildra Solar Farm is committed to implementing the Community Engagement Best Practice Guidelines for the Wind Industry (**"Guidelines"**) released by the Clean Energy Council in 2013. The Guidelines outline a framework within which to apply the community engagement principles for wind and other renewable energy projects. The framework provides a set of ideas and practices to help put into action the Guidelines' central goal: to earn and maintain the renewable energy industry a social license to operate. This framework has been adapted for the Proposed Project.

The framework used by the Guidelines was developed by the International Association for Public Participation "(**IAP2**"). The IAP2 Public Participation Spectrum ("**Spectrum**") outlines different levels of engagement to suit varying degrees of impacts in the community. Where impacts are less significant, for

example, the Spectrum suggests approaches such as 'Inform' and 'Consult'. Greater impacts on communities require approaches such as 'Involve', 'Collaborate' and 'Empower'.

The objectives, activities and outcomes of implementing the Spectrum are presented in Table 2 below. Manildra Solar Farm strives for greater participation levels to produce greater community trust and ensure that decisions are not the result of developers' internal processes alone but also reflect stakeholders' active contributions.

All points of the engagement should be based on the principles of openness, inclusiveness, responsiveness and accountability. The Spectrum is also used when developing and implementing community engagement activities related to conditions of project approval as outlined in ***Table 2***

Table-2 Public Participation Spectrum

	Standard level		**High level of engagement and community-developer relationship**		**Community initiation**
	Inform	**Consult**	**Involve**	**Collaborate**	**Empower**
Objective	Provide balanced & objective information Assist community in understanding problems, alternatives and/or solutions	Obtain feedback on plans, options & decisions	Work directly with the community throughout the process, from feasibility through operations & decommissioning Ensure concerns & aspirations are consistently understood & considered	Partner with community in each aspect of planning, development & decision-making including the development of alternatives & the identification of the preferred solution	For the community to lead the development of the project Place final decision-making in the hands of the community
Activities & techniques	Advertising and PR Website and social media Manildra Solar Farm blog Information days Open days Frequently Asked Questions Page	Stakeholder briefing & meetings Information sessions & collecting feedback	Feedback mechanisms Community key messages Addressing of concerns Negotiation using Fisher's core concerns framework Community funds	Community committees Fundraising Local community relations	Community recommended projects
Outcomes	Planning approval		Community surveys Project champions in the community		Working together on community projects

1.3. COMMUNITY ENGAGEMENT POLICY

The principles of community engagement were formalised as a policy following the launch of the Guidelines. Manildra Solar Farm aims to sustain the quality of life and wellbeing of individuals and communities touched by its activities through the following Community Engagement Principles:

- **Keeping an open dialogue with our communities.** Our aim is to build strong relationships through transparent communication with communities during all aspects of development, construction and operation, whilst respecting the diverse cultures, views and needs of these communities. Manildra Solar Farm has established efficient, non-threatening, fair and accessible mechanisms for dealing with any concerns raised by the community. These are set out in the conditions of planning approval for operating assets and in the comprehensive consultation process for development projects.
- **Fostering local relationships.** Manildra Solar Farm aims to foster lasting relationships with non-profit organisations by supporting local community initiatives; however Manildra Solar Farm does not normally sponsor any partisan political activities or religious groups.
- **Seeking to source locally.** Manildra Solar Farm will seek to source materials and services

from locally based suppliers to support the local economy, enhance community engagement, and to reduce its impact on the environment from transportation.

- **Raising awareness about renewable energy.** Manildra Solar Farm promotes renewable energy using factual and scientific data, and advocates for regulation that delivers increased policy predictability for the renewable energy industry. Manildra Solar Farm's parent company is a member of Australia's Clean Energy Council.
- **Community Engagement Register:** Manildra Solar Farm has developed a Community Engagement Register to monitor and track financial and other in-kind support that Manildra Solar Farm provides to local communities.

1.4. PURPOSE OF THE COMMUNITY ENGAGEMENT PLAN (CEP)

Manildra Solar Farm is committed to community and social inclusion. It will follow the strategies of the Community Engagement Plan ("**CEP**") to develop and implement a series of community consultation and stakeholder engagement activities for the Proposed Project. This will ensure broad community and stakeholder interaction through the initial site investigations, the development stage of the project, and will ensure continuing consultation during the construction and operation of Manildra Solar and deployment of ACT Storage.

The purpose of the CEP is to provide the most effective tools and methodologies to:

- Provide information to the community and stakeholders about the development stage, why consultation is being undertaken and how the results will be used by the Proposed Project team.
- Provide information to the local and broader community about the Proposed Project to ensure awareness of the development process, timing, parameters and constraints so there can be informed views and input to the project team at the development stage.
- Demonstrate how the community can provide comment and feedback about the Proposed Project and how this will be considered by the Proposed Project team.
- Report the results of consultation in an easily accessible format.
- Manage expectations with honesty and openness.
- Demonstrate commitment to communities' wellbeing.
- Become an active member of the communities, capable of creating trust and constructive relationships.
- Strengthen collaboration through relevant partnerships.
- Build community support for the Proposed Project.
- Assess community attitudes towards the Project at each stage, identify how attitudes and issues can be managed, and ensure the most appropriate tools and methodologies are used for further consultation and engagement activities.
- Assess how any stakeholder and/or community concerns and issues could affect the delivery of the Proposed Project and identify strategies to manage these.

The CEP also sets out the protocols and procedures for:

- Developing and distributing information about the Proposed Project that is relevant and easily accessible to stakeholders, local communities, businesses, and other interested parties.
- Identifying stakeholders and organising project briefing sessions or meetings.
- Advertising community consultation activities such as public meetings and information sessions.
- Communicating clearly and concisely the likely impacts from construction activities in terms of noise, dust, increased traffic, timing and duration of the Proposed Project construction and implementation at all consultation activities.
- Ensuring all communications and consultation activities include information on how to access further information about the Proposed Project and how to contact the Project team
- Encouraging community and stakeholder feedback throughout the development, construction and operation stages of the Proposed Project.
- Taking, recording and responding promptly to all community feedback, enquiries and complaints.
- Reporting the outcomes of all consultation activities and stakeholder interactions
- Handling media and government enquiries.

1.5. COMMUNITY ENGAGEMENT PLAN OBJECTIVES

The main objective of this Community Engagement Plan (CEP) is to provide overarching communications and consultations strategies, methodologies and tools to effectively inform and engage the community and stakeholders throughout the life of the Project. Achieving this objective will underpin the successful delivery of the Proposed Project. The CEP aims to:

- Enable the Proposed Project to be an active and visible member of the community capable of creating trust and constructive relationships.
- Explain the strategic approach to communications and community consultation tasks at each stage of the Proposed Project.
- Provide a preliminary assessment of potential project stakeholders.
- Outline a framework for coordinating and managing stakeholder engagement and community consultation activities.
- Identify potential risks and opportunities.
- Identify and define the roles of the Proponent's community engagement team and their relationship with subcontractors, stakeholders and the community.
- Detail communication tools and methodologies.
- Clearly articulate the approval processes and timelines, and any necessary protocols for production of communications collateral and community consultation activities.
- Describe the controls and systems in place to ensure this plan's procedures are followed, reviewed and measured.
- Gather opinions and expectations about the Proposed Project and address any questions about it.
- Maintain communication channels for communities to raise questions and to answer them.

This CEP addresses communication and consultation for both the development and construction stages of the Project.

1.5.1 Key Messages

It is imperative to provide consistent key messages at each stage of the Proposed Project. Key messages are:

- Commitment to ongoing local community participation
- Commitment to the Government's Renewable Energy Target scheme to provide renewable and sustainable clean energy.
- Commitment to communication and consultation processes that are open, transparent and effective.
- Respect for local heritage, community icons, community identity and indigenous history
- Respect for the environment.
- A construction program which will be developed to minimise disruption to the community throughout construction activities.
- Benefits of the project to increase renewable energy level in the National Electricity Market
- The possibility of local employment opportunities during construction, and other positive economic benefits for rural communities.
- Construction activities on Manildra Solar will be planned with the aim of minimal impact on the local and wider community, with construction activities complying with the NSW Department of Planning and Infrastructure's Planning Approval Conditions of Consent.
- The Proposed Project team are available to respond to public's concerns 24x7.
- All community feedback is respected.
- The community will be notified about the Proposed Project's progress and construction impacts.

Project contact details will be listed on all communication material and placed on the Proposed Project webpage on the Manildra Solar Farm website, and Manildra Solar Farm's social media channels.

1.5.2 Indigenous Stakeholder Community Engagement

The Manildra Solar Farm, defined as a Major Project (Critical Infrastructure) under Part 3A of the Environmental Planning and Assessment Act 1979, conducted an Indigenous archaeological and heritage assessment under consultation with the Aboriginal communities and in accordance with the guidelines established by the DPE.

On behalf of the project, NGH environmental, through their subcontractor, New South Wales Archaeology Pty Ltd and in consultation with the Orange Local Aboriginal Land Council, undertook a site survey and study to define the archaeological significance of the site and identify potential impacts on areas of cultural interest.

Mitigation and management strategies to minimise disturbance were presented for DPE approval undercover of the Environmental Assessment in the NGH archaeological assessment report dated 4 November 2010.

1.5.3 Ongoing Indigenous Stakeholder Engagement

There is an unlikely possibility of unexpected finds of cultural significance occurring through the construction phase. In the event of such a find, the Contractor delivering the work will enact their Unanticipated Finds protocol in accordance with the Construction Environment Management Plan (CEMP)

This process will see all work within the immediate area of the find ceasing, with the Office of Environment and Heritage (OEH) notified in accordance with the National Parks and Wildlife Act 1974.

If the find is deemed of significance by the OEH, the OEH may, at its discretion, instruct the Proponent to contact the Orange Local Aboriginal Land Council who may make further contact with the RAP and TLO, as necessary.

Orange Local Aboriginal Land Council –
42 Dalton St
Orange, NSW

Tel (02) 6361 4742

1.6. HOW MANILDRA SOLAR FARM ACTIVELY PARTICPATES IN THE COMMUNITY

Manildra Solar Farm works diligently to maintain its good reputation and a positive relationship within the community. A budget of $4,000 is allocated for community initiatives each year and $3,000 of this budget goes directly to local sponsorships. This budget will be increased when the project moves into construction an operation phases. Manildra Solar Farm has budgeted $10,000 per year for community initiatives in Manildra during operation.

1.6.1 Community Consultation and Feedback

It is important for Manildra Solar Farm to engage with and support the communities in which it operates. Engagement with the community during development, construction and operation is an ongoing priority for Manildra Solar Farm employees. Feedback mechanisms include face-to-face interaction at community events, Manildra Solar Farm’s website, the project specific complaint email, a 24x7 dedicated complaints line set up at (02) 9002 7733. Any concerns raised via feedback mechanisms or made directly to the project or site managers, are assessed and reported to Manildra Solar Farm's Asset Manager.

Manildra Solar Farm has been involved with the local community during the planning and development stages of the project, and this will continue through the life of the solar farm. At the early stages of development Manildra Solar Farm hosted community meetings and invited members of the public to

attend to learn about and ask in relation to the proposed development. Manildra Solar Farm staff and third party experts are present to provide information to the community.

A community information day was held for the Manildra Solar project on 3 August 2010 at Manildra Memorial Hall during public exhibition of the Environmental Assessment for Development Approval. The register from the day records positive and supportive responses from 20 community member attendees. Following this information day, a number of local business contacted Manildra Solar Farm to offer services such as accommodation and earthworks. Following the completion of the consultation and exhibition of the Environmental Assessment (EA), **no community submissions were received.** This demonstrates the strong support and acceptance of the project from the local community. Open community meeting are held on an ongoing basis. The most recent meeting was held on 5th August 2015 to inform the community about the project's recent modification in tracking technology, answer general project questions and consult with and involve community in planning of upcoming community activities, including Raising awareness of renewable energy through school outreach programs and sponsorship opportunities. Manildra Solar Farm also launched its new Manildra Solar community website as an additional medium for information, consultation and feedback.

At the commencement of operation of Manildra Solar, Manildra Solar Farm will support the formation of a Cabonne Community Fund Committee (**"CCFC"**) made up of community members to administer a $10,000 community fund. Applications for funding will be considered from organisations that:

- Deliver social or environmental projects or services to residents in the community
- Have a proven track record of achievement and sound project management, or are otherwise able to show the capacity to achieve their stated aims and objectives
- Have similar objectives as the CCC that are in line with socially and environmentally responsible practices

1.6.2 Communications and Media

Manildra Solar Farm communicates and invites feedback through a variety of mediums. Project details are regularly updated on Manildra Solar Farm's website, and the page includes videos, links to photos, project documents, fact sheets, media releases and newsletters. Each quarter during operation, Manildra Solar Farm Energy issue will issue community updates in the form of newsletters that are posted on the website and emailed to regional newspapers.

The purpose of the newsletter is to inform the community of any changes that have been made at our operating assets and includes general information and project updates..

Fact sheets provide consistency of information released to the public and will continue to be developed for the Project as it progresses and construction milestones are achieved. Fact sheets will be prepared on issues expected to be of wide interest, and may include stages of construction, construction methods, noise impacts, safety, environmental safeguards, sustainability initiatives, traffic impacts, and compliance with Conditions of Approval.

1.6.3 Manildra Solar Community Website

In July 2015, Manildra Solar Farm launched new Manildra Solar community website as an additional medium for information, consultation and feedback. This website will be a portal of information about Manildra Solar and renewable energy in Australia, provide case studies demonstrating benefits and opportunities for community stakeholders in renewable energy projects.

It will also be a medium of two way dialogue for community groups and members to provide suggestions and feedback to the project and apply for sponsorship and in-kind support for community initiatives. Manildra Solar Farm will gather feedback from the community on how community members would like to use this website and adjust it accordingly. This is a new initiative Manildra Solar Farm is launching to inform, engage and empower the Manildra community to be part of the solar farm development.

1.6.4 Community Partnerships

NSW Regional Clean Energy Program

Manildra Solar Farm has been working with the Regional Clean Energy Program ("***RCEP***") of the NSW OEH, and the South East Regional Coordinators to create opportunities for communities throughout NSW to fully participate in local renewable energy initiatives. Manildra Solar Farm and RCEP have worked together to present and develop the following community events:

Promotion of renewable energy through facilitating community open days

Raising awareness and building relations though regular coordinated site visits

Engineers Without Borders Australia

In 2015, Manildra Solar Farm is partnering with Engineers Without Borders Australia and schools in Cabonne LGA to develop and run High School Outreach ("**HSO**") modules within the Cabonne region. The HSO modules with focus on renewable energy technology and the role it plays in Australia's electricity mix. The modules will link back to the Manildra Solar development and other energy infrastructure in the community and highlight career paths to renewable energy engineering. Students and teachers will have the opportunity to talk with university students and Manildra Solar Farm staff throughout the program. The result of this initiative is that community members will have greater understanding of the project and the benefits it brings including employment and community input opportunities.

1.7. STAKEHOLDER ANALYSIS AND ENGAGEMENT

1.7.1 Stakeholder Communication Strategy

The stakeholder communication strategy engaging with stakeholders is to outlined in ***Table 3***.

Table-3 Communication strategy

Inform	Consult	Collaborate
Stakeholders who are not directly affected, but require factual and transparent information to help them understand any problems, alternatives, opportunities and solutions (e.g. via advertising, newsletters, website).	Stakeholders who may be directly affected or have a greater influence on, or are impacted by, project outcomes. We will consult with them to understand their concerns, and where appropriate, consider their input and feedback in planning, analysis, options development and decisions (e.g. via project briefings, submissions, surveys, meetings).	Stakeholders where approval may be required or who hold ultimate responsibility for a decision (e.g. design and construction approvals, permits, legislation). We will identify and engage with these stakeholders early to understand and address any key issues, to maximise mutual opportunities and provide stakeholders with all information to enable them to provide timely approvals (e.g. via briefings, workshops, interface meetings, compliance reporting).

The following listed stakeholders have been identified as having an interest in the Proposed Project and will be consulted as required. The Proponent will continue to expand the list of stakeholders throughout the life of the project and update and maintain the information on a database, along with any issues or queries that are raised. The stakeholders and issues included in the database will then provide a key communications tool for the Proposed Project and assist with identification of issues trends and subsequent management strategies.

Table 4 Project Stakeholders Of The Proposed Project

Stakeholder	Concern or Interest	Management Strategy
Federal, State and Local Government		
Federal and State Member	• Access to information • Community concerns	• Initial project briefing as required • Project updates • Project website and social media • Open days
Local Councils	• Access to information • Community concerns and interest • Impacts to council assets • Consultation during development process • Effect on local employment and business • Construction status	• Initial project briefing as required • Project updates • Project website and social media • Open days
Government Agencies		
NSW Office of Environment and Heritage	• Access to information • Pollution control including noise, water, air, land and waste • Community impacts and disruption • Consultation during the development process	• Environmental Management Plan • Heritage Management Plan • Project updates • Enquiries and Complaints Management • Infoline contact • Project website
NSW Department of Planning and Environment	• Access to information • Construction impacts • Operational impacts • Consultation during the development process • Community access to information	• Project briefing/meeting • Environmental Management Plan • Infoline contact • Project email • Project website
NSW Office of Communities - Aboriginal Affairs	• Access to information • Heritage • Employment opportunities • Consultation during the development process	• Environmental Management Plan • Infoline contact • Project email • Project website
NSW Department Primary Industries	• Access to information • Pasture protection • Construction impacts • Operational impacts • Weed/noxious plant control • Pest control	• Environmental Management Plan • Infoline contact • Project email • Project website

Stakeholder	Concern or Interest	Management Strategy
NSW Trade and Investment	• Access to information • Employment opportunities	• Infoline contact • Project email • Project website
NSW Environmental Protection Authority	• Access to information • Construction impacts • Operational impacts (particularly noise) • Consultation during the development process • Community access to information	• Project briefing/meeting • Environmental Management Plan • Infoline contact • Project email • Project website
Traffic and Transport		
Local Councils Roads and Maritime Services	• Access to information • Community concerns and interest • Impacts to council assets • Consultation during development process • Project awareness • Construction status • Delivery timings	• Environmental Management Plan • Initial project briefing as required • Project updates • Project website and social media • Open days
Emergency Services		
Police Ambulance Rural Fire Services State Emergency Services – Bungendore unit	• Access to information • Road and traffic impacts • Changes to property access • Construction status	• Project briefings and ongoing consultation • Traffic management plans • Delivery and/or construction hours/activities • Project and construction updates • Infoline contact • Project website and social media
Local, Community and Interest Groups		
Landowners/tenants adjacent to Manildra Solar Landowners of ACT Storage	• Access to information • Impacts on property values • Damage to boundary fencing, stock grids, gates • Damage to trees/shrubbery • Noise/pollution during construction	• Personal consultation • Project and construction updates (notifications) • Information sessions and feedback forms • Enquiry and complaints management • Infoline contact • Project email • Project website and social media • Newsletters

Stakeholder	Concern or Interest	Management Strategy
Local communities	• Access to information • Employment opportunities • Economic benefits • Local business support • Local resource provision	• Project updates (notifications) • Advertising and media releases • Information sessions and feedback forms • Enquiry and complaints management • Infoline contact • Project email • Project website and social media • Open days • Community events • Newsletters • Sponsorships
Interest groups • Agricultural associations • Agricultural show societies • Progress/business associations • Tourism associations (e.g. Capital Region Living) • Aboriginal Land Councils • Local heritage groups and historical societies • Agricultural field days (e.g. Australian National Field Days Assoc.) • Shires association	• Innovation • Community/regional benefits • Impacts/risk to historical icons • Asset protection • Access to information • Environmental impacts • Local area promotion • Benefits local businesses	• Briefings/meetings (as required) • Project updates (notifications) • Advertising and media releases • Infoline contact • Enquiry and complaints management • Project email • Project website and social media
Schools and kindergartens	• Education opportunities about renewable energy • Project participation activities	• Post construction information sessions at schools • Enquiry and complaints management • Infoline number • Project email • Project website and social media • Design and painting activity for the Project promotion (optional) • Education program • Open days

Stakeholder	Concern or Interest	Management Strategy
Media		
WIN TV Corporation Prime Television Local and regional newspapers The Land Community Radio ABC TV and radio	• Community benefits • Road and traffic impacts • Environmental impacts • Construction impacts • Employment opportunities • Tourism promotion • Access to information	• Media releases • Project a updates (notifications) • Infoline contact • Enquiry and complaints management • Project website and social media • Project email

1.8. ENVIRONMENTAL ASSESSMENT STAGE

The following community consultation process was undertaken during the Manildra Solar environmental assessment stage.

The public consultation for Manildra Solar commenced with the submission of the Preliminary Environmental Assessment to the NSW Department of Planning and Infrastructure ("**DoPI**") (now NSW Department of Planning and Environment ("**DPE**") in July 2010. Manildra Solar Farm has a policy to directly notify all existing landowners residing within a 3km radius around the project area; to inform the immediate community of the Proposed Project and stage of the project development; to give them opportunity to go over any questions or concerns; and to inform them of the planned community information day. Community consultation for Manildra Solar during the development phase was completed through the following means:

- An information day hosted by the Proponent on 3 August 2010 at the Manildra Memorial Hall
- Telephone discussions with the public and various government authorities
- Presenting a digital presentation outlining the background and experience of the Proponent and scope of the project
- Follow up emails with project specific details including additional requested information
- One-on-one meetings with the public and government authorities
- Ongoing consultation meetings with various stakeholders throughout the project planning and life cycle

Following the submission of the draft Environmental Assessment, the EA was formally exhibited by the DoPI between 11 November 2010 and 13 December 2010.

During the exhibition period, submissions were invited from relevant agencies and members of the public. **No submissions were received from the community** and four submissions were received from government agencies on the exhibited EA. A Submissions Report was prepared by Manildra Solar Farm and made public. Project approval was subsequently granted by the Planning Assessment Commission of New South Wales on 3 March 2011.

1.9. PLANNING APPROVAL AND CONDITIONS OF CONSENT

In March 2011 the project approval and conditions for consent were received for Manildra Solar. Part C of those conditions (prior to construction) includes conditions for community and agency consultation, including

- Office of Environment and Heritage
- Cabonne Council
- Roads and Traffic Authority
- Local community and general public
- NSW Office of Water

These conditions include making documentation available for public inspection on request, setting up and maintaining a project information website, preparing and implementing a community information plan and ensuring a complaints management procedure is in place. This will be implemented in parallel with Engineering, Procurement and Construction Contract negotiations.

1.10. MANILDRA SOLAR CONSTRUCTION STAGE

Community consultation and stakeholder engagement will continue during the construction, deployment and operation stages of the Project, with activities and events scheduled to align with project milestones.

1.10.1 Project Construction Community Consultation

Community consultation and stakeholder engagement will continue during the construction stage of the Project, with activities and events scheduled to align with project milestones. These may include a sod turning ceremony, installation of the first/last solar Panel, commissioning or other notable stages of construction. During the construction stage of the project, the Proponent will ensure the activities detailed in this plan are implemented. It will be essential to continue to provide information to the communities throughout construction; and establish relationships and mechanisms for stakeholder engagement that will continue to be used throughout the remaining operational lifetime of the Project.

1.10.2 Communications Coordinator

The Communications Coordinator will:

- Be responsible for providing strategic planning and management of stakeholder briefings/meetings
- Liaise with the construction site manager and other relevant project personnel
- Lead stakeholder briefings/meetings and community consultation activities
- Develop media releases and media kits, as required
- Participate in community and public meetings or forums, including business functions or community interest group meetings
- Field and respond to project specific stakeholder or community enquiries and complaints
- Ensure feedback, enquiry and complaints management strategies and processes are rigorously adhered to

1.10.3 Construction communication and consultation tools

During the construction stage of the Project, community consultation will focus more on engaging the community, providing information about key construction activities, handling enquiries and complaints, encouraging project championing and celebrating project milestones. Please refer to 0 following, for information on communication and consultation tools.

1.10.4 Community Consultation Activities During Construction

The following activities will be undertaken during the construction phase of the project

At notice that project will proceed to construction –

Strategic media placement e.g. local media, including the Manildra Matters newspaper and by community letter drop

Share local employment opportunities through the ICN and other local employment agencies.

Prior to start of Construction –

Direct contact by Contractor informing Manildra residents of community website, construction activities, construction traffic routes and any potential disruptions to traffic flows and amenity impacts and setting out project timeline and details of Community Information Day.

Community Information Day with representatives from Manildra Solar Farm Pty Ltd and the appointed construction contractor available to answer questions and explain project details. This Information Day will provide details of

- Construction activities e.g. construction timeline, staging of construction activities, expected milestones
- Construction Traffic routes e.g. maps with routes highlighted
- Details of how to provide feedback or make complaints
- Layout and general arrangement of solar farm

During Construction –

- Periodic updates of the community website and social and/or traditional media explaining contruction progress and any key activities completed or about to commence e.g. delivery of equipment, first generation etc
- Direct correspondence with local community in the event of any construction work that has been approved by DPE outside of specified construction hours (if applicable) Communication related to out of hours work (OOHW) will be delivered to community members at least 48hours in advance and be compliant with the Development Approval.
- Public and stakeholder-specific meetings
    - Meeting with individual community members or groups as requested if appropriate
    - Information Days, presentation days and meetings as appropriate
    - The typical agenda for these meetings will be include:
        - Introduction to project and participants
        - Update on project status, timeline to completion and explanation of next month of construction activities
        - Summary of any complaints and feedback and resulting actions taken by Manildra Solar or contractor, if appropriate
        - Meeting/stakeholder-specific topics
        - Opportunity for questions or discussion
        - Details of how to provide feedback or make complaints

  If catered, best endeavours will be taken to use local catering services. Attendees will be required to sign into the meeting, minutes wil be taken (including any questions and answers and any follow up to be taken). Minutes will be published on the Manildra Solar Farm website and distributed to attendees upon request if appropriate. Attendees will be added to the Community Enagement Register.
- Participate in community events
- Maintain Complaints Register and comply with Complaints procedure

At End of Construction –

- Transition to operation stage – communication activities to be addressed under the Operational Environment Management Plan.

Community will be informed of Community Information Day and any public meetings or presentations through the Manildra website and through an advertisement in a newspaper circulating in the area e.g. Manildra Matters, Central West Daily or Molong Express (chosen based on appropriateness of distribution timing).

1.10.5 ARENA Reporting Requirements

Manildra Solar will provide regular reports to ARENA, including a summary of community engagement activities undertaken in accordance with its obligations under the ARENA funding agreement. As part of this reporting, Manildra Solar will provide to ARENA notification of all submissions, complaints and questions arising from community consultation and responses provided to any submissions, complaints or questions arising from the community consultation. .

1.11. COMMUNICATIONS, RISKS AND OPPORTUNITIES

Manildra Solar Farm's Communication Process involves identification of risks/ opportunities, risk assessment and implementation of mitigation strategies. The process is linked to all other activities and reporting requirements of the Project. The communications risk analysis process covers five basic steps which are required to ensure that an effective approach is adopted to manage relevant risks. These basic steps are:

Planning – including clear information about scope, the Proponent's organisation, context of the Project and communications procedures.

Identification – of risks and opportunities.

Assessment – and analysis of those risks and opportunities, both qualitatively and quantitatively.

Management – including assignment of responsibility, timing and response to communications issues.

Review and reporting – of the results, including analysis of performance and communication of those results.

THE PROPOSED PROJECT RISKS AND OPPORTUNITIES

Table 5 provides an initial list of the possible issues and risks and the Proponent's strategies to manage each issue. The table also highlights potential communications opportunities.

Table -5 Risk and Opportunity Matrix

Issue	Who is affected?	Risks and opportunities	Management strategy
Environmental Incident	• The Proponent • Project delivery team • Local environment • Local residents	**Risks:** • Soil contamination • Weather • Geotechnical discovery **Opportunities:** • Incident free delivery • Improved reputation	• Environmental Management Plan • Incident communication protocols
Poor workforce behaviour	• The Proponent • Project delivery team • Local community	**Risks:** • Complaints from local community • Damage to public and private roads • Negative media coverage • Lack of community support for project • Project delays **Opportunities:** • Adherence by all team members and subcontractors to Proponent's code of conduct to minimise incidents and complaints • Community as project champion	• Staff inductions/tool box talks • Infoline cards to give to anyone asking questions or complaining direct to project team members or site personnel • All interaction with community and media to be led by Communications Coordinator • Monitoring social media and addressing relevant issues raised
Graffiti and/or vandalism	• The Proponent • Project delivery team • Local Community	**Risks:** • Increased project costs • Negative local media coverage • Damage to property **Opportunities:** • Community champions the project and supports "watching over" the Project site for suspicious or untoward activity	• Construction Management Plan • Site security

Issue	Who is affected?	Risks and opportunities	Management strategy
Aboriginal Cultural Heritage	• The Proponent • Local indigenous groups • Aboriginal Land Council • Department of Communities- Aboriginal Affairs • Local community	**Risks**: • Issues with Council and/or Heritage Groups and/or Land Council **Opportunities:** • Involve local school students in heritage identification/protection plan	• Site induction includes awareness of procedures if possible Aboriginal objects or relics are uncovered
Community safety	• The Proponent • Community • Site visitors • Site workers • WorkCover	**Risks:** • Injury to member of public or visitor • Property damage • Negative media coverage **Opportunities:** • Involve local school primary students in project safety campaign	• Site areas kept secure • Safe Work Method Statement for all works • Safety Management Plan • Safety signage • Appropriate site security • Community information campaign about safety when visiting the site and about site security • Inductions for staff, subcontractors and site visitors • Appropriate PPE for construction team and site visitors
Lack of community support for the project	• The Proponent • Project delivery team	**Risks:** • Complaints • Issues raised with local MP • Delays to project • Negative media • Protests **Opportunities:** • Creating a local Project presence in the local community before major construction works begins	• Clear messages about Project benefits to the local and wider community • Personal consultation with adjacent landowners/residents/tenants • Early consultation with stakeholders • Hosting open days • Swift and effective response to complaints and enquiries • Update key stakeholders and local media throughout the life of the project

1.12. COMMUNICATIONS MANAGEMENT SYSTEM

A comprehensive comprehensive database is used to to record, monitor and report on all interactions with all stakeholders, community and other interested parties. The elements of this system will include:

- Information phone number (Infoline)
- Email and Website
- Social media
- Project contact database

1.12.1 Project Infoline, Email and Website

A dedicated project information number (Infoline) is established to provide a central point for taking all enquiries and complaints for the Project. The Infoline phone number will be will be included on the project website, all notifications, advertising and signage and any other information in the public domain relating to the Project. All calls regarding the Proposed Project dedicated Infoline will be directed to a Project team member or Site Manager, who will answer and determine whether the call is an enquiry or complaint. In the case of complaints, the team member will determine which of the Project contractors should be contacted to investigate the matter, or whether it needs to be forwarded to the Communications Coordinator. All enquiry calls to the Infoline or email require a verbal response within 48 hours during times when construction is being undertaken or the next working day (unless the contact agrees otherwise). All calls, both enquiries and complaints, are logged, tracked and closed out on project contact database.

1.12.2 Project Contact Database

A contact database will be used as the main reporting and monitoring tool for project communications activities. In addition to managing interaction with the community and key stakeholders, the system will be utilised to record progress of interactions with any other parties.

- Record all community and stakeholders' contacts and interaction.
- Record the issue and distribution of letterbox drops, project updates and notifications.
- Be the management tool for recording all complaints, enquiries, issues and responses.
- Provide monthly reports on stakeholder and community contact and issues management.
- Be utilised to identify issue and opportunity trends through key word referencing.

1.12.3 Stakeholder Database

A database will be established to manage all stakeholder information including contact details and area of concerns or interest. The database will be maintained by the community relations team over the life of the project, but only be used to facilitate ease of contact with stakeholders. The information in the database will not be provided to any other person or agency.

1.12.4 Complaints Handling and Reporting

The procedure for complaints handling is as follows:

- All complaints received during business hours will be investigated and responded to within 48 hours of receipt where practical.
- Complaints received overnight or on weekends will be responded to within 48 hours unless otherwise agreed with the complainant, but no later than the following business day.
- Written correspondence regarding the Project will be answered within seven working days of receipt.

Experience has revealed that some complainants merely want to voice their concerns immediately and be listened to, and once they have lodged their complaint, they prefer to be called back in business

hours, if at all. A detailed written response will be provided to any complainant who gives their details, within fourteen calendar days to close out the complaint.

It is possible that false or negative statements associated with the Project are made on social media channels. Social media channels will be monitored for such statements. If detected, Manildra Solar Farm's Communication Manager will consider the strategy of response to either direct the complainant to publically available correct information or gather more information to address the complaint.

1.12.5 Complaint Escalation and Dispute Resolution

When a complaint is received, there will be occasions where a satisfactory resolution cannot be immediately agreed with the complainant. Should this be the case, Manildra Solar Farm will follow an internal complaints escalation process and will seek further dialogue with the complainant to negotiate a successful outcome and resolve the complaint. If the complaint is still not able to be resolved to the satisfaction of the complainant, a staged dispute resolution process will be implemented and the complainant will be able to request intervention and mediation by an Independent Community Liaison Representative.

1.12.6 Construction Activity Complaints Handling - Alignment with CoA C13(i)

Requirement

The Minister's Condition of Approval C13(j) states that the Construction Environmental Management Plan (CEMP) shall include:

> a complaints handling procedure during construction.

CoA C8 requires

> Prior to the commencement of construction, the Proponent shall ensure that the following are available for community complaints for the life of the project (including construction and operation) or as otherwise agreed by the Secretary:
>
> (a) a 24 hour telephone number on which complaints about construction and operational activities at the site may be registered;
>
> (b) a postal address to which written complaints may be sent; and
>
> (c) an email address to which electronic complaints may be transmitted.
>
> The telephone number, postal address and e-mail address shall be advertised in a newspaper circulating in the area on at least one occasion prior to the commencement of construction; and at six-monthly intervals during construction and for a period of two years following commencement of operation of the project. These details shall also be provided on the Proponent's internet site required by condition C6. The telephone number, the postal address and the email address shall be displayed on a sign near the entrance to the construction site(s), in a position that is clearly visible to the public.

Responsibilities

MSFPL

Under the contract with RCRI, MSFPL has responsibility to ensure the following are available prior to the commencement of construction, for community complaints, for the life of the project.

- a postal address to which written complaints may be sent;
- an email address to which electronic complaints may be transmitted; and
- advertising the telephone number, postal address and e-mail address in a newspaper circulating in the area, at six-monthly intervals for a period of two years following commencement of operation of the project; and providing these details on the MSFPL internet site required by condition CoA C6.

RCRI

Under the contract with MSFPL, RCRI has responsibility to ensure the following are available prior to the commencement of construction, for community complaints, for the life of the project.

- a 24 hour telephone number on which complaints about construction and operational activities at the site may be registered; and
- advertising the telephone number, postal address and e-mail address in a newspaper circulating in the area on at least one occasion prior to the commencement of construction; and at six-monthly intervals during construction; and displaying these details on a sign near the entrance to the construction site in a position that is clearly visible to the public.

Procedure

From MSFPL

RCR will, upon notification and details of any written or electronic complaint received by MSFPL, immediately investigate the cause of the complaint and identify actions required to avoid a recurrence.

This investigation and reporting back to MSFPL will be completed within 48 hours of the notification and will be fully documented.

Documentation will include RCR updating its Complaints Register and completing an internal Complaint Record. A copy of these will be provided to MSFPL with 48 hours of RCRI being advised of the complaint.

The complaint investigation and documentation will be the responsibility of RCRI's SCECO.

RCRI will exercise this responsibility to cover any and all complaints that arise from the conduct of construction activity by any of its sub-contractors.

Other Sources

It is possible that RCRI will receive complaints through other means than notification from MSFPL. That is, complaints may be made direct to RCRI through the telephone contact number, or one of its contractors, and not come through the MSFPL's community complaints system.

In this circumstance, the SCECO will immediately notify MSFPL of the complaint.

RCRI will then implement the same procedure for the investigation and documentation of the complaint. Specifically, the SCECO will:

- update its Complaints Register;
- complete an internal Complaint Record; and
- provide a copy of these to MSFPL with 48 hours of RCRI receiving the complaint.

Complaints Register

Any complaint received through either of the above means will be recorded on an updated Complaints Register and the details recorded in a Complaint Record.

The Complaints Record will record:

- the date and time of the complaint;
- the means by which the complaint was made (telephone, mail or email);
- any personal details of the complainant that were provided, or if no details were provided, a note to that effect;
- the nature of the complaint;
- any actions taken in relation to the complaint, including timeframes for implementing the action; and
- if no action was undertaken in relation to the complaint, the reasons why no action was taken.

A copy of the updated Complaints Register and specific Complaints Record will be provided to MSFPL for any complaint received and made available for inspection by DPE and Cabonne Council upon request.

Complaint Resolution

The timeframe for providing an initial response to any complaint is within 48 hours of RCRI being made aware of a complaint.

Additional Information

If and as required, RCRI will prepare and submit any detailed response or action to MSFPL within two weeks of the complaint being received.

1.12.7 Media and Government Relations

Media enquiries are defined as enquiries from journalists and other personnel with the intention of creating mass communications (principally newspapers, radio, television and blogs) to distribute to the public. Enquiries may be received via the Infoline, face-to-face contact, email, letter, fax or meeting.

Media enquiries will be managed by Manildra Solar Farm's communication unit. Manildra Solar Farm's communication unit will be immediately informed of any media or Government request received by site personnel or any subcontractor. Only the communications unit will provide a statement (written or verbal), photographs or illustrations to the media or elected officials, unless there is formal delegation of this function to another area within the project team.

The following protocols will be observed when any member of the project team is approached with a media or government enquiry:

- Always be polite and courteous.
- Do not attempt to answer the enquiry.
- Indicate that you are not authorised to speak to the media, obtain details of the enquiry and advise that the Project Communications Director or representative will respond to the enquiry.
- Do not engage in any 'off the record' conversations.
- Refer the enquiry to the site supervisor who will pass the enquiry to Manildra Solar Farm Energy's communication unit.

These protocols will be included in the induction process to ensure all Project team members and subcontractors comply with the protocols so as to respond appropriately to any media or government enquiry.

1.13. INTERNAL COMMUNICATIONS

Internal communications across all members of the Project team will be vital to the success of this project. Communications will be managed through the Communications Coordinator. Internal communications activities aim to create an organisational culture across all the organisations working on the Project, whether directly employed or employed as subcontractors, and reinforce principles of:

- Employee engagement and outcomes focus.
- A culture of performance on the outcomes of both what we do, and how we do it.
- A shared set of values is the core of successful project outcomes and communication across all disciplines of the project team, the community and stakeholders. Included in the values will be those of safety, respect, honesty, focus and recognition.

Manildra Solar Farm considers behaviour deliverables as equally important to other deliverables of the Project. Performance of the construction team will be measured, not just by what the team delivers, but how they do it. All team members and subcontractors involved in the Project will be encouraged to

exhibit positive, supportive and tolerant behaviour and play a role in the project goal of being a “good neighbour” to the local communities.

1.13.1 Communications Materials Approval

All written materials will be submitted to the Communications Manager for approval, prior to printing and distribution. This includes advertising, notifications, posters, fact sheets, briefing notes, presentations, letters and web updates.

1.13.2 Site Inductions

The site induction process for all permanent and temporary staff and subcontractors of the Proposed Project includes a safety induction. The safety inductions form the basis of the Project’s code of conduct and the Proponent’s commitment to positively engaging with and minimising disruption to the community, property owners, businesses and all transport and road users. This commitment underpins instructions and messages to all new staff during their mandatory Project safety inductions.
As part of the induction process, all employees and subcontractors will be made aware of the requirements under the code of conduct and the CEP. This includes a commitment to keeping the community informed by delivering timely, clear and concise information about the Project. At the commencement of each shift, a tool box talk will be conducted by the site manager with construction personnel and any relevant subcontractors. Tool box talks will reinforce safety procedures and the Proponent’s code of conduct and advise the site crew and subcontractors of exceptional circumstances that may be encountered during that shift.

1.14. ISSUES AND INCIDENT MANAGEMENT

The Project will undoubtedly attract a degree of public interest, some positive and some negative, and/or stakeholder dissatisfaction about the project, the construction, disruptions to amenity, traffic and business and long term implications for the local and regional areas.

Key issue management principles include:

- Reviewing all issues for their status – major, intermediate or minor – based on the risk to the Project (and therefore, the Proponent).
- Ensure the local community and relevant stakeholders are informed of the progress of construction and advised of any actions to pre-empt or respond to issues.
- Evaluating community enquiry/complaint outputs from the contact database on a regular basis to identify any emerging issue trends.
- Evaluating participation and feedback from information session feedback forms to gauge community interest and identify constant or emerging or issue trends.
- Timely response to all issues, both internal and external.

1.14.1 Incident Management

Managing and reporting incidents is critical to the successful delivery of the Project. Process controls will be in place to ensure stakeholder issues or incidents that can attract media attention; threaten the Project or Proponent; disrupt the community; and result from natural events or criminal incidents; are effectively managed. Judgment will be exercised by Manildra Solar Farm’s communications unit in consultation with the Project team regarding the category level of the incident, to determine whether it is minor, intermediate, or major. Major incidents are capable of affecting the daily management of the Project or damaging the reputation of the Proponent, even in the short-term. All incidents will be reported within the timeframe identified in the table below.

Table 5 – Incident management reporting

Degree of Incident	Description	Action required
Minor	Any minor issue/incident that may at some point attract the attention of the media, any MP, local council or the broader community – including but not limited to industrial, community impact, legal, and commercial issues.	Verbal notification to the within 24 hours.
Intermediate	Any issue / incident that is likely in the short-term to attract the attention of the media, any MP, local council or the broader community – including but not limited to environmental, industrial, community impact, legal, and commercial issues.	Same-day (24h) verbal notification. Note: for environmental, one hour verbal notification required. Report detailing the incident to be issued within 24 hours of incident, wherever practical.
Major	Any issue/incident that that has attracted or will imminently attract the attention of the media, any MP, local council or the broader community – including but not limited to environmental, industrial, community impact, legal, and commercial issues.	Immediate verbal notification from the construction manager within 10 minutes (wherever practical) to the Proponent's Asset Manager and Communications Manager. Report detailing the incident to be issued within four hours, wherever practical.

1.15. MONITORING, EVAULATION AND REPORTING

Monitoring, evaluation and reporting on the effectiveness of the communications activities for the project will be undertaken:

Daily	via	- complaints and enquiry recording in contact database - occurrence reporting (incident reporting) - media monitoring
Monthly	via	- project internal monthly report - KPI audits and performance reviews
Quarterly	via	- develop CEP scope of works for the next 3 months
6 monthly	via	- CEP document review
As required	via	- Project internal peer audits - community and stakeholder feedback - Minutes of meetings.

As required, reports on communications and consultation activities will be provided to other key groups (government or non-government) nominated by the Commonwealth to ensure improvement of community engagement.

1.15.1 Community Consultation Evaluation

Evaluation enables continuing improvements to our community consultation activities. It also enables more efficient use of resources through screening or improving activities less successful or popular with communities. The communication unit will evaluate individual activities, as well as the whole program of consultation and engagement, throughout the life of the project.
Each community consultation activity is evaluated as soon as it occurs and the results used to modify the overall CEP if necessary. The plan is also evaluated at key stages/milestones of the Project to see if objectives and strategies are still relevant, and at the end of the project to determine its success.

1.15.2 Effective Community Liaison Activities

Measuring the effectiveness of community consultation activities will be against the Proponent's desired outcomes of:

Participation: Involving a wide cross-section of views and interests of the local and wider communities in activities where appropriate. Allowing realistic opportunities for participation and giving everyone involved adequate information and sufficient time to participate.

Transparency: Making sure all processes are open and clearly understood by all parties and that community information is freely available to all.

Integrity: All communications having integrity and respect for all parties. This will be demonstrated by encouraging and developing trust between the community and the Proposed Project, and ensuring the issues and complaints handling process is adhered to and is fair.

Cost-effectiveness: Choosing those activities that work best for the best relative cost. Expenditure on community consultation activities can make the overall Project achieve higher cost-effectiveness through better outcomes and smoother project delivery, without time lost resolving issues or fighting community objections.

1.15.3 Evaluation Methods

Methods of evaluating community consultation plans and activities range from quick, individual, qualitative self-assessments to feedback, questionnaires and/or surveys. Some of the factors which will be taken into account when evaluating the CEP and its effectiveness are:

The number of participants in CEP activities and feedback from participants

Whether participation increased over the life of the Project construction period

Table 6 Project Life Community Engagement Activities

	Standard level of engagement		High level of engagement and community-developer relationship		Community initiation
Purpose	**Inform**	**Consult**	**Involve**	**Collaborate**	**Empower**
Engagement objective	• Provide balanced and objective information. • Assist community in understanding the problems, alternatives and/or solutions. • Reduce community stress and concerns.	• Demonstrate how the community can provide comment and feedback about the project and how this will be considered by the project team. • Obtain feedback on plans, options and/or decisions.	• Work directly with the community throughout the process, from feasibility through operations and decommissioning. • Ensure concerns and aspirations are consistently understood and considered.	• Partner with community in each aspect of planning, development and decision-making including the development of alternatives and the identification of the preferred solution. • Become an active member of the community capable of creating trust and constructive relationships.	• Encourage community to lead the development of the project. • Place final decision-making in the hands of the community.
Engagement activities	**Advertising and PR** Article on the proposed development supplied to the regional newspapers. The project received coverage in the Central Western Daily. **Community Information Days** Manildra Memorial Hall, 3 August 2010 Manildra Bowls Club (Pre-construction information day, 30 May 2017) Manildra Bowls Club (Pre-mobilisation information day, 4 July 2017) **Open Days and Site Visits** Free guided tours of Manildra Solar Farm. **Website and social media** Project details are on the Manildra Solar Farm website at: Manildra Solar Farm | First Solar **Fact sheets** A copy was distributed throughout the local community. The final project overview will be made available once project notice to proceed is announced.	**Stakeholder briefing and meetings** Continuous consultation is undertaken with neighbours and landowners, and other relevant stakeholders, particularly with regard to construction traffic to ensure the safety of livestock and to limit disruption to livestock movements. Details of the ongoing consultation are recorded in the consultation register. **Information sessions and collecting feedback** An information session was held at the Manildra Memorial Hall on 8th August 2015. A Visitor Register was kept. Interested attendees signed up the the Manildra Community Website. An information session was held at the Manildra Bowls Club on 30 May 2017 to update the community on pre-constructin activities planned before the full site mobilisation. A visitor register was kept.	**Feedback mechanisms** • Complaints Register • A 24x7 dedicated Operations Control Centre Infoline set up at (02) 9002 7733 **Addressing of concerns** Issues/concerns raised via feedback mechanisms or made directly to the project or site managers are assessed and reported to Manildra Solar Farm's Asset Manager.	**Cabonne Community Fund Committee** From the commencement of operation, the committee will be formed by local community members and meet quarterly. Its purpose is to recommend community sponsorships and projects, and make suggestions to improve community engagement. The meetings of the Committee are facilitated and sponsored by Manildra Solar Farm. The Communications Coordinator's responsibility is to follow up on the committee's feedback. **Renewable Energy Celebration fundraising opportunity** Building on the success of Run with the Wind at Manildra Solar Farm's Capital Renewable Energy Precinct, an event will be identified and sponsored by Manildra Solar Farm to promote Manildra Solar Farm as a tourism destination, support local businesses and raise funds for local community organisations. This will occur during following commencement of operation.	**Community empowering projects** Manildra Solar will seek to provided opportuniites for community to fully understand renewable energy to enable deeper participation in the project. In 2015, Manildra Solar partnered with Engineers without Border and local schools to deliver primary and high-school workshops to develop local knowledge of renewable energy and its role and impact in supply ing electricity . **Community recommended projects** Through consultation with the Cabonne Community Fund Committee and the Cabonne council, Manildra Solar

	Standard level of engagement		High level of engagement and community-developer relationship		Community initiation
	Display boards Utilised during the information sessions to provide a clear overview of the project. **Letter Drops** Prior to commencement of construction to notify local community of planned construction activitie and any changes to construction hours.				Farm will explore how best to contribute $10,000 annual investments in community activities and recreation facilities.
Engagement outcomes	**Project approval** • Planning approval from NSW Department of Planning & Infrastructure in March 2011. • Approval to allow solar tracking was approved in March 2015. • Continuous monthly reporting and meeting compliance regulations. • Following the completion of the consultation and exhibition of the EA – no public submissions were received, and four government agency responses were received. Full details of the submissions and responses are available at: http://majorprojects.planning.nsw.gov.au/index.pl?action=view_job&job_id=4077	**Perception and feedback** Manildra Solar Farm is experienced in developing harmonious relationships with the community. A level of trust has been built through annual landowner events and community sponsorships. Throughout the development period of Manildra Solar, briefings and meetings were held with all relevant stakeholders.	**Community acceptance surveys** The register from the information day and Manildra Memorial Hall, 3 August 2010, indicated broad based support from the 20 attendees on the day. An addition, following the completion of the consultation and exhibition of the EA, no public submissions were received.	**Community partnership** Manildra Solar is in the process of developing local partnerships with community groups and stakeholders. Manildra Solar has partnered with the Manildra and District Improvement Society and was a major sponsor for their 2015 Manildra Christmas Party.	The project has not yet activated initiatives that enable implementation of what community decides. The project has begun education projects to empower the community to understand how to participate in the project.
Status	Development Phase – **Complete.** Construction stage - **Ongoing**	**Complete and ongoing.**	Development stage – **partial**. Constructions, operations and decommissioning stage - **to be measured**.	Development stage – **partial**. Constructions, operations and decommissioning stage - **to be measured**.	**Planning underway to achieve during operations phase.**