

**MOLINO STEWART**  
ENVIRONMENT & NATURAL HAZARDS



**CWP Renewables**



**Taralga Wind Farm  
Construction Environmental  
Impact Audit Report**

*Final Report*





# **Construction Environmental Impact Audit Report**

FINAL REPORT

for

CWP Renewables

(Taralga Wind Farm Asset Manager)

by

Molino Stewart Pty Ltd

ACN 067 774 332

DECEMBER 2015


## DOCUMENT CONTROL

<b>Document Reference</b>	0339 Construction Environmental Impact Audit Report.docx
<b>Project</b>	Taralga Wind Farm Construction Environmental Impact Audit Report
<b>Document Type</b>	Final Report
<b>Author</b>	Shireen Baguley

## REVISION HISTORY

Date	Version	Name	Comments
12/8/15	1	S Baguley	First draft for review
15/12/15		S Baguley	Final report

## DOCUMENT APPROVAL

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# 1 INTRODUCTION

## 1.1 THE TARALGA WIND FARM

The Taralga Wind Farm (TWF) is located near the town of Taralga, in the southern tablelands of New South Wales (NSW). The Taralga Wind Farm generates up to 106.8 MW of electricity and consists of the following components:

- 51 wind turbine generators (WTGs) each consisting of a tower, nacelle and rotor with three fibreglass blades and hub heights of 80 m above ground level. There are three types of WTG:
  - 21 x Vestas V100 1.8 MW WTGs (100 m rotor diameter);
  - 21 x Vestas V90 2.0 MW WTGs (90 m rotor diameter); and
  - 9 x Vestas V90 3.0 MW WTGs (90 m rotor diameter).
- A substation to transform the electricity produced by the Taralga Wind Farm from 33 kV to 132 kV;
- A service compound located adjacent to the substation with the site office and workshop;
- Site access roads;
- WTG hardstands for WTG assembly and maintenance;
- Underground electrical and fibre optic cabling;
- A 33 kV overhead power line and an optical ground wire;
- Eight wind monitoring masts, each 80 m in height; and
- One digital television re-transmitter.

The site is shown in Figure 1.

During the construction phase, the provision of the following ancillary facilities also formed part of the site works:

- A site construction compound; and
- A concrete batching plant established west of tower 37.

## 1.2 CONSTRUCTION ENVIRONMENTAL IMPACT AUDIT REPORT

This construction environmental impact audit report is prepared to satisfy condition of consent 22, which says:

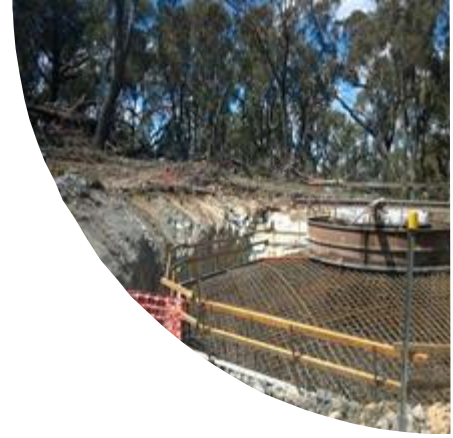
*a construction environmental impact audit report must be prepared and submitted to the Director-General within three months of construction completion, or at any other time interval agreed to by the Director-General. If requested, the environmental impact audit report- construction must be provided to other relevant government agencies. The construction environmental impact audit report must:*

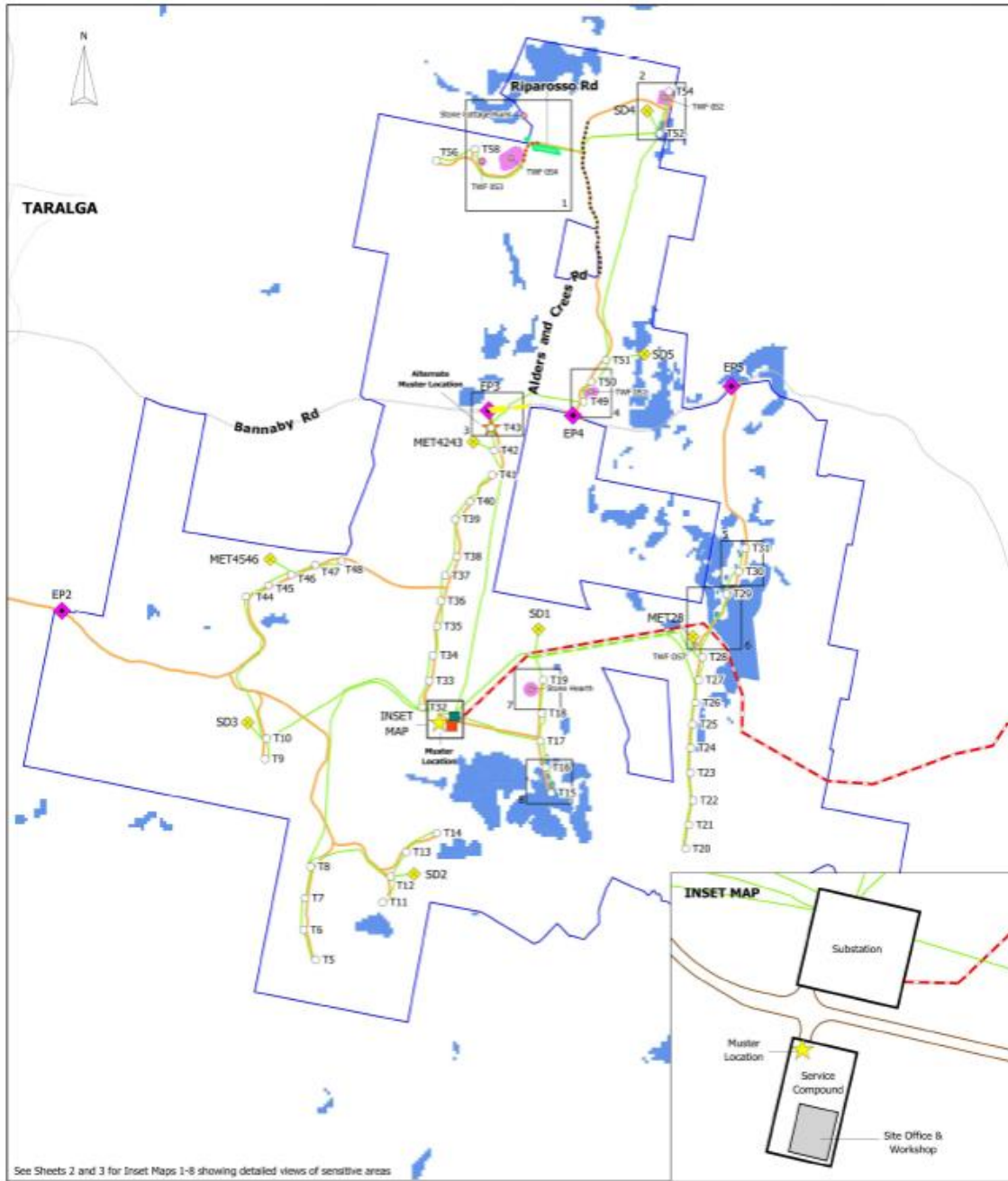
*(a) identify the major environmental controls used during construction and assess their effectiveness;*

*(b) summarise the main environmental management plans and processes implemented during construction and assess their effectiveness;*

*(c) identify any innovations in construction methods used to improve environmental management; and*

*(d) discuss the lessons learnt during construction, including recommendations for future wind farm developments.*





See Sheets 2 and 3 for Inset Maps 1-8 showing detailed views of sensitive areas

LEGEND		COMPANY				
○ Wind Turbine	■ Sensitive Areas	<b>TARALGA WIND FARM PTY LTD</b> 				
■ Service Compound	■ NTG: River Tussock - Tall Sedge					
■ Substation	■ NTG: Snow Grass - Kangaroo Grass	<b>SITE PLAN</b>				
— 132 kV Transmission Line	■ Tableland Basalt Forest					
— Wind Farm Road	■ Heritage Zone	DATE: 22 JUNE 2015	SCALE: 1:25000	DRG NO: 1542	REV: A	VER: 2
— Geotextile Base	● Heritage Site	DATE: 22 JUNE 2015	SCALE: 1:25000	DRG NO: 1542	REV: A	VER: 2
— Underground Electrical Reticulation	★ Muster Location	DATE: 22 JUNE 2015	SCALE: 1:25000	DRG NO: 1542	REV: A	VER: 2
— 33kV Overhead Power Line	★ Alternative Muster Location	DATE: 22 JUNE 2015	SCALE: 1:25000	DRG NO: 1542	REV: A	VER: 2
◆ Permanent Met Mast	— Public Road	DATE: 22 JUNE 2015	SCALE: 1:25000	DRG NO: 1542	REV: A	VER: 2
◆ Site Entry Point (EP)	— Shared Public Road	DATE: 22 JUNE 2015	SCALE: 1:25000	DRG NO: 1542	REV: A	VER: 2
□ Wind Farm Boundary		DATE: 22 JUNE 2015	SCALE: 1:25000	DRG NO: 1542	REV: A	VER: 2

Source: Taralga Wind Farm OEMP, 2015

Figure 1: Taralga Wind Farm Site Layout



## 2 ENVIRONMENTAL CONTROLS

This section outlines the potential environmental impacts as identified for the construction period for the TWF and the major environmental controls used to manage these. In Section 2.3 their effectiveness is discussed.

### 2.1 KEY ENVIRONMENTAL IMPACTS

Key issues relevant to the proposed windfarm were identified by the TWF Environmental Impact Statement (EIS) Volumes 1 and 2 (Geolyse 2004). These were listed as:

- Cumulative impacts;
- Visual impacts;
- Land use;
- Noise;
- Heritage;
- Soil and water;
- Flora and fauna;
- Traffic and transport;
- Greenhouse and energy;
- Socio-economic impacts (land values);
- Infrastructure and utilities (TV reception);
- Hazards and risks; and
- Air quality.

### 2.2 REGULATORY ENVIRONMENT

#### 2.2.1 NSW Environmental Planning and Assessment Act 1979 Approval

Approval for the TWF was first granted under the *Environmental Planning and Assessment Act 1979* (EP&A Act) on 17<sup>th</sup> January 2006. This approval was appealed in 2006 and

subsequently determined by the Land and Environment Court of NSW on 23<sup>rd</sup> February 2007 (Court Order 11216), subject to conditions of consent (CoC).

Since the original court decision, eight modifications to the Wind Farm have been granted by the NSW Department of Planning and Environment (DPE) under the EP&A Act as detailed in Table 1.

Table 1 TWF Modifications

Modification	Approval Date	Description
1	20 <sup>th</sup> April 2009	Increase in the turbine size.
2	18 <sup>th</sup> June 2013	Reduction in the number of turbines from 61 to 51.
3	6 <sup>th</sup> November 2013	Relocation of the construction compound.
4	6 <sup>th</sup> November 2013	Inclusion of 13 wind monitoring masts. Amendments to the conditions regarding decommissioning.
5	11 <sup>th</sup> November 2014	Change to the electrical reticulation and some access track routes. Amendments to Conditions 83A, 86, 86A and 87.
6	20 <sup>th</sup> June 2014	Change to the heavy vehicle route through Goulburn.
7	13 <sup>th</sup> March 2015	Change to the underground reticulation route at Bannaby Road. Change to Condition 86 facilitating the construction of Row 12.
8	14 <sup>th</sup>	Minor amendments

	September 2015	to a number of conditions; additional minor site works
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The CoC as modified through the above approvals requires the development to be carried out in accordance with the documents listed in Table 2.

Responding to the issues identified in the EIS and by stakeholders, the CoC covered the following aspects:

1. General conditions, covering land acquisition, provision and protection of public infrastructure;
2. General conditions, covering environmental monitoring, environmental impact audits and compliance;
3. Environmental management;
4. Communication and consultation;
5. Visual amenity;
6. Noise and vibration;
7. Traffic;
8. Heritage;
9. Flora and fauna;
10. Physical issues, covering soil, water and riparian management, air quality and spoil and fill management; and
11. Miscellaneous requirements, covering aviation, hazards, telecommunications, wastewater management and decommissioning.

Through the CoC, where relevant the applicable legislation and guidelines were identified.

The environmental management conditions included in the CoC that were relevant within the construction phase were that the applicant:

- Prepare and implement a Construction Environmental Management Plan (CEMP); and
- Appoint an Environmental Representative (ER) throughout the life of the development.

The CEMP was the key document guiding the construction phase, and as such, it provided the framework to manage the majority of the issues listed in the eleven points above. The details are discussed further in Section 3.

## 2.2.2 Environment Protection Authority Regulation

The TWF is a scheduled activity under the *Protection of the Environment Operations Act 1997* (POEO Act). As such the NSW Environment Protection Authority (EPA) is the regulatory authority and the TWF is required to hold an environment protection licence (EPL). An EPL was issued to the TWF by the EPA on the 18th November 2014 (EPL number 20429).

## 2.2.3 Construction Environmental Management Plan

CoC 25 required that the TWF *prepare and implement a Construction Environmental Management Plan (CEMP) in accordance with the Department's publication entitled Guideline for the Preparation of Environmental Management Plans (2004) or its latest revision. The Applicant must ensure that the mitigation and monitoring measures identified in the EIS and in these conditions of consent are incorporated into the CEMP. The CEMP must be prepared in consultation with the relevant government agencies and certified by the Environmental Representative...as being in accordance with the conditions of consent.*

The purpose of the CEMP was to ensure that the mitigation and monitoring measures identified in the EIS and the CoC were adhered to during the construction phase of the project. It was to ensure the project was constructed in accordance with relevantly applicable planning conditions; legal requirements, environmental standards and with the TWF Environmental Management System Manual. The CEMP defined and codified the management procedures that were used onsite during the construction phase of the project in order to minimise the potential for any adverse impact on the environment occurring as a result of the construction works.



## 2.2.4 Environmental Representative

CoC 27 required that prior to the commencement of construction, and in consultation with Council, the Applicant must nominate a suitably qualified and experienced Environmental Representative(s) whose appointment requires the approval of the Director-General. The Applicant must employ the Environmental Representative(s) on a full-time basis, or as otherwise agreed by the Director-General throughout the life of the development. The proponent must make the identity of the approved Environmental Representative publicly available. The Environmental Representative must be:

(a) the primary contact point in relation to the environmental performance of the development;

(b) responsible for all management plans and monitoring programs required under this consent;

(c) responsible for considering and advising on matters specified in the conditions of this consent, and all other licences and approvals related to the environmental performance and impacts of the development;

(d) responsible for receiving and responding to complaints in accordance with this consent; and

(e) 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.

The Applicant must obtain approval from the Director-General for any changes to the appointment of the Environmental Representative that may occur from time to time over the life of the development. Any changes to the appointment or responsibilities of the Environmental Representative approved by the Director General are to be made publicly available.

Table 2 Approval documents

<b>Item</b>	<b>EP&amp;A Act Approval framework</b>
(a)	Development Application No. DA-241/04 lodged with Upper Lachlan Council on 10 November 2004
(b)	Taralga Wind Farm Environmental Impact Statement (two volumes) prepared by Geolyse, dated November 2004
(c)	Proposed Taralga Wind Farm: Response to Department Questions, RES Southern Cross, dated 28 January 2005, 4 February 2005, 28 February 2005, 11 March 2005
(d)	Proposed Taralga Wind Farm: Response to RTA Questions, RES Southern Cross, dated 31 January 2005
(e)	Proposed Taralga Wind Farm: Response to Questions from Department of Lands, RES Southern Cross, dated 25 January 2005
(f)	Proposed Taralga Wind Farm: Response to DEC Questions, RES Southern Cross, dated 24 January 2005, 17 February 2005, 3 March 2005, 15 March 2005
(g)	Proposed Taralga Wind Farm: Amendment to Development Application, RES Southern Cross, dated 1 March 2005
(h)	Proposed Taralga Wind Farm: Additional Information on Amendment to Development Application, RES Southern Cross, dated 15 March 2005, 21 March 2005
(i)	Modification Application lodged with the NSW Land and Environment Court on 30 November 2007 and accompanied by a report prepared by the Applicant titled Taralga Wind Farm Project: Application for Modification of Development Consent DA 241/04 granted by the NSW Land and Environment Court 23 February 2007 pursuant to section 96(8) of the EP&A Act and dated 30 November 2007
(j)	Taralga Wind Farm Project: Application for Modification of Development Consent DA 241/04 granted by the NSW Land and Environment Court 23 <sup>rd</sup> February 2007 pursuant to section 96(8) of the EP&A Act, Supporting information for hazard lighting and noise assessment, RES Southern Cross, dated 13 March 2008
(k)	Amended application filed by the Applicant in Court on 7 August 2008
(l)	Taralga Wind Farm Modification Application dated 7 November 2012
(m)	Application for Modification of Development Consent DA241/04 granted on 24 February 2007 for Taralga Wind Farm pursuant to Section 75W of the Environmental Planning and Assessment Act dated 30 August 2013
(n)	Application for Modification of Development Consent DA241/04 granted on 24 February 2007 for Taralga Wind Farm pursuant to Section 75W of the Environmental Planning and Assessment Act (Mod 4) Meteorological Masts dated 30 August 2013
(o)	Response to Submissions contained in letter dated 15 October 2013 for Modification 3 Application for Relocation of Construction Compound
(p)	Response to Submissions contained in letter dated 21 October 2013 for Modification 4 Meteorological Masts
(q)	Section 75W Application for Modification of Development Consent DA/241/04 Modification 6 – Transport Route through Goulburn dated February 2014 and accompanied by a report titled Taralga Wind Farm Stage 3 – Traffic and Noise Assessment of New Vehicle Route Through Goulburn dated March 2014



(r)	Taralga Wind Farm: Response to Department's Questions for Modification 6 from Proponent dated 14 May 2014
(s)	Taralga Wind Farm: Modification to Development Consent DA 241/04 pursuant to Section 75W of the Environmental Planning and Assessment Act 1979 (Modification 5) from Applicant dated February 2014
(t)	Taralga Wind Farm Modification to Development Consent DA 241/04: Response to Office of Environment and Heritage questions dated 26 March 2014
(u)	Taralga Wind Farm: Bannaby Road Intersection – Addendum to Modification 5 dated 10 October 2014
(v)	The application to modify the development consent, dated 7 November 2014, and the documentation submitted to the Department in support of this application including the Environmental Assessment: Minor Modification 7 to Existing Wind Farm Consent (241/04) Prepared for Taralga Wind Farm dated November 2014, the report titled Taralga Wind Farm Modification to Condition 86 (Addendum to Modification 7) dated 30 October 2014, the report titled Taralga Wind Farm Further Addendum to Modification 7 DA 241/04 dated 10 December 2014, and the Taralga Wind Farm Response to OEH Mod 7 Queries – 10 February 2015
(w)	The Conditions of the Consent

Source: DPE, 2015

## **2.3 EFFECTIVENESS OF ENVIRONMENTAL CONTROLS**

The effectiveness, strengths and weaknesses of these environmental controls is discussed in Table 3.

Section 3 considers in more detail the environmental management plans and processes implemented during construction and assesses the effectiveness of those plans.



Table 3 Project controls

Control	Scope	Effectiveness	Basis	Strengths	Weaknesses
<p><i>EP&amp;A Act approval: Taralga Wind Farm Conditions of Consent</i></p>	<p>This is understood to cover all documentation guiding the development under the conditions of consent.</p>	<p>High</p>	<p>Only one technical non-compliance was recorded during the project's construction phase.</p>	<p>The conditions of consent provided a comprehensive framework within which the project was implemented. The conditions addressed how all potential impacts should be managed.</p>	<p>Due to the complexity of the conditions, there were some which were in conflict with the on-ground conditions. As such, the conditions did not permit the development to proceed without modifications to either the development or the conditions. Examples of instances where this occurred are discussed further in Section 2.3.1.</p> <p>The conditions also required a significant number of documents in addition to the conditions of consent to be complied with. This results in an extensive and complex framework within which the project was to be implemented.</p> <p>There was ambiguity in a couple of instances, relating to timeframes and conditions that did not align with the linear nature of the development and the discrete time intervals between construction, commissioning and operations. For example: 'operational noise' occurring during the commissioning period; and timeframes relating to resolving television reception matters that arose during commissioning (refer Section 3.9).</p>





<b>Control</b>	<b>Scope</b>	<b>Effectiveness</b>	<b>Basis</b>	<b>Strengths</b>	<b>Weaknesses</b>
<i>Environment Protection Licence</i>	EPL number 20429 issued to Taralga Wind Farm by the EPA on the 18th November 2014.	Low	The licence had only minimal implications given the length of time it was active during the construction phase.	The PoEO Act has strong powers to enforce compliance with the EPL controls.	The licence covered construction matters but was not issued until construction was well progressed. This is in part due to this being a recently introduced regulatory requirement.
<i>Construction Environmental Management Plan</i>	CEMP covering the construction of the TWF	High		The CEMP provided a comprehensive set of plans and processes. These are discussed in more detail in Section 3.	<p>Can be a complex document, not easily accessible to all construction personnel.</p> <p>Integration of 'sub-plans' is necessary, and as such the document preparation needs to be well managed.</p> <p>Integration of modifications into the document needs to be well managed.</p> <p>Measures need to be tailored to the site specific conditions.</p> <p>Responsibility for the implementation of the CEMP needs to be well managed.</p> <p>Reliant on having good induction procedures and ongoing compliance by site staff.</p> <p>Refer Section 3 for further discussion.</p>
<i>Environmental Representative (ER)</i>	Appointed ER Taralga Wind Farm for construction	High	Only one technical non-compliance was recorded during the project's construction phase. Matters raised during	An independent role, responsible for and with the ability to monitor the project's environmental performance	<p>Project's management hierarchy needs to be structured to ensure ER is working with personnel with the relevant level of authority and site control.</p> <p>The ER role needs to be integrated into</p>

<b>Control</b>	<b>Scope</b>	<b>Effectiveness</b>	<b>Basis</b>	<b>Strengths</b>	<b>Weaknesses</b>
			<p>audits dealt with promptly.</p> <p>Complaints managed and DPE kept informed as necessary.</p> <p>Relevant plans reviewed and certified.</p>		<p>site's environment management documentation.</p> <p>The ER role needs to remain independent, contained largely to an auditing and compliance role.</p> <p>Potential risk of issues to arise when ER off-site may not be addressed in a timely manner.</p>

### 2.3.1 Conflicts within the CoC

As noted in Table 3, due to the complexity of the conditions, there were some which were in conflict with the on-ground conditions. As such, the conditions did not permit the development to proceed without modifications to either the development or the conditions.

An example of where the CoC did not permit the construction of the project was in relation to Natural Temperate Grassland. CoC 86, required the TWF to *design, construct operate and maintain the development in a manner that avoids damage to or loss of suitable habitat for Natural Temperate Grassland and the orchid, Diurus aequalis.*

This condition specified that where Natural Temperate Grassland was found to occur, *the area must be fenced during construction and that component of the development (including construction components) must be relocated at least 50 metres from the grassland but no more than 250 metres from the original location of that component.*

At two locations within the development, the site constraints were such that it was not possible to relocate the components 50m away from the Natural Temperate Grassland. Two modifications of the CoC were necessary to allow works to proceed in these locations.

In another case, CoC 86A required the TWF to *design, construct, operate and maintain the development in a manner that either avoids damage to and/or loss of the Tablelands Basalt Forest Endangered Ecological Community or provides suitable compensation for its loss To ensure compliance with this condition, the Applicant must engage a suitably qualified person(s) who must receive prior approval of the Director-General Secretary, to undertake a detailed survey..... to determine the presence of this community so as to enable the Applicant, in consultation with the DEC OEH and the Department, to:*

*(a) relocate that component of the development (including construction components) at least 50 metres*

*from important stands of this community, but no more than 250 metres from the original location of that component; or*

*(b) provide suitable compensation for the loss of the community where the Applicant is unable to avoid damage to and/or loss of the community.*

*Construction of the relevant component(s) of the development must not commence until the Secretary has confirmed the results of the survey and approved the position of any relocated development component.*

The application of the 50 metres buffer within this condition to the development effectively created pinch points where the overlap of the 50m buffer for patches of Tablelands Basalt Forest prevented the construction of an access track and turbine hardstands that were to sit between but were set back from these patches. The ensuing negotiations with DPE and OEH were protracted.

The combination of the above issues caused significant delays to the project and ultimately, demobilisation of the civil construction subcontractor.

This demobilisation heightened the risks in relation to other environmental issues, namely there were many kilometres of unfinished tracks. These were unable to be completed as the works relied on being able to access material from locations beyond the Tablelands Basalt Forest 'pinch points'. The Natural Temperate Grassland constraint meant that an intersection with Bannaby Road could not be completed. Heavy rainfalls experienced during the demobilisation period meant that there were issues with the erosion and sediment control. The resolution of these issues was complicated by the fact that all machinery had been removed from the site. Placing additional erosion and sediment controls and the maintaining of the existing controls all needed to be done by hand or light equipment.

### 3 ENVIRONMENTAL MANAGEMENT PLANS

This section summarises the main environmental management plans and processes implemented during the construction of the TWF and assesses the effectiveness.

The construction phase of the TWF was managed through the CEMP. To manage key issues, CEMP contained the following sub-plans:

- Noise & vibration management plan;
- Construction traffic management plan;
- Soil and water management plan;
- Flora & fauna management plan;
- Bird and bat adaptive management program;
- Riparian vegetation management plan;
- Bushfire fighting management plan;
- Heritage management plan; and
- Stakeholder management and community consultation plan.

#### 3.1 CONSTRUCTION ENVIRONMENTAL MANAGEMENT PLAN

Throughout the construction period, there was a CEMP in place. Ultimately, there were five stages of construction and as such, five versions of the CEMP were issued. The key components of this document are discussed below.

##### a) Approvals, Permits and Licences

In addition to the EPL (refer Section 2), this section identified additional approval requirements. In particular it noted requirements in regards to:

- where a permit was required under the Fisheries Management Act,
- a Controlled Activity Approval was required under the Water Management Act 2000,

- consents and licence requirements in relation to works on public roads Crown roads; and
- oversize overmass permit requirements.

It described which of the sub-plans to the CEMP were applicable for guidance on each of these aspects.

##### b) Project description

This section set out the project, the existing environment and timing and scheduling of the project. This was supported by a number of plans and maps showing the layout, staging and sensitive environmental areas. This was a standard and straight forward section.

##### c) Responsibilities, organisation structure and reporting protocols

This section set out who was responsible for which aspects of the environmental management of the project. Through to January 2015, CBD Energy was the proponent and the development project manager, Vestas the engineering, procurement and construction (EPC) contractors and a number of other sub-contractors were engaged by Vestas. For the purposes of the CEMP, Downer EDI was a key contractor being responsible for the civil works. In January 2015, CWP Renewables was appointed as the development project manager and CBD ceased being involved with the project.

While the management structure was documented in the CEMP, in practice through contractual arrangements for the project, there was a cascading delegation of environmental management conditions between the owner/project manager, the site manager and the civil contractors. On a number of occasions, there were issues where a party that should have been responsible for certain aspects of the CEMP implementation did not take perform the necessary functions. This was compounded by the managing party/ies involved prior to January 2015 not having the capability or the capacity to enforce the relevant contractual conditions.



As a consequence, where there were issues such as the conflicting CoC or where there were additional consents and licenses required, despite these matters being flagged in a timely manner by the civil contractor and/or the ER, corresponding timely action was not taken. This was a significant issue for this project, particularly when the issues involved protracted negotiations. As noted in Section 2.3.1, a consequence of this action was demobilisation of the majority of the construction workforce and a halt to all construction work for over six months while negotiations continued with the relevant government agencies. This had ramifications for the risk to other environmental issues.

The contractual arrangements implemented during the project created some ambiguities and difficulties, including how the ER role functioned during the early stages of the project. That is, prior to the demobilisation of the project. When the ER was on site, there was no liaison with the TWF EPC contractor or the project manager. The site was in effect being managed by the civil contractor. While the civil contractor had the contractual responsibility to undertake the works, it had but no authority or responsibility to resolve the matters relating the conflicts in the CoC or ensuring relevant approval and permits were in place.

#### **d) Training and inductions**

This set out the training and inductions requirements. Inductions were undertaken as a routine part of the site management. There were two levels of inductions, both of which were site specific. Downer EDI had a comprehensive induction presentation that covered off all CEMP requirements. From late 2014, Vestas established a site presence and inducted all site personnel. Downer EDI continued to use its induction program for the civil contractors' training and induction.

#### **e) Environmental management measures**

These listed in which environmental management plans the key environmental management measures could be found, linking back to the CoC. This was a standard and straight forward section.

#### **f) Risk assessment**

The risk assessment included in the early versions of the CEMP was prepared by CBD Energy and considered high level project risks. In a separate process, Downer EDI held a risk workshop for the civil works on the project site. During this a separate risk assessment was undertaken. There was a disconnect between these two risk assessments, given the role and responsibilities of each organisation. However both had relevance for the implementation of the project. In later versions of the CEMP, it was requested that the Downer EDI risk assessment was incorporated into the document to better reflect the risks associated with the project construction.

#### **g) Environmental management system (EMS) documentation**

This was a standard and straight forward section that set out the project manager's systems and work instructions, providing the framework and hierarchy for the CEMP documentation.

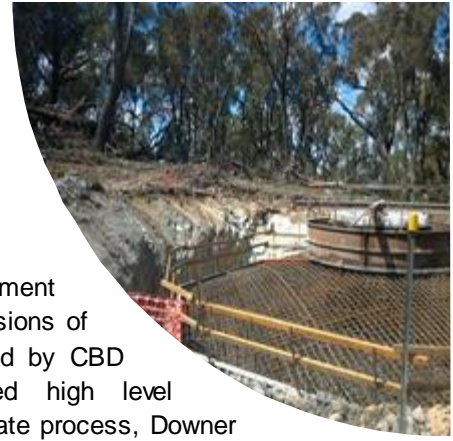
#### **h) Work method statements (WMS)**

This section set out which WMS were required and the responsibilities for the preparation, implementation and compliance thereof.

The WMS required covered off the key environmental management issues. This section also documented the chain of command set by the contractual arrangement that were in place for the project for some environmental management aspects. This was successful in managing those matters that were clearly the responsibility of the civil contractor. However, the responsibilities allocated within this section did not overcome the weaknesses discussed in c) above.

#### **i) Compliance and monitoring procedures**

This section set out inspection, auditing and monitoring requirements. It allocated responsibility for the required environmental monitoring that was required in accordance with the CoC.





There were some issues here, the basis of which relates back to the project weaknesses identified in c) above. As such, while the project contractual arrangements and the CEMP documented what was required, this was not implemented in accordance with this documentation and this issue was compounded by the managing party/ies prior to January 2015 not having the capability or the capacity to enforce these requirements.

### 3.2 NOISE & VIBRATION MANAGEMENT PLAN

A Noise and Vibration Management Plan (NVMP) was included as part of the CEMP. It set criteria for construction noise and vibration, and documented the results of ambient and background noise monitoring.

The NVMP included procedures and responsibilities for:

- Monitoring of construction noise;
- Consultation with property owners and the local community before work commenced and during the construction phase;
- Investigation of any complaints and implementing ameliorative measures; and
- Implementation of mitigative measures.

Mitigation strategies included restricting construction activity to approved hours, training and induction for construction staff in relation to noise management responsibilities; the use of approved heavy vehicle access routes that avoided movements through the village; equipment maintained in good working order and fitted with the appropriate silencers, mufflers or acoustic covers; and stationary noise sources being sited away from residences. These were all adhered to.

The elements required for community consultation as part of the NVMP were integrated into the Stakeholder Management and Community Consultation Plan (CCP), (discussed further in Section 3.8). The consultation mechanisms included notification of planned construction activities and a complaints forum.

There were no particular issues that occurred in relation to construction noise during the construction phase of TWF and no blasting was required therefore mitigation measures around this aspect were not required. However, the matters discussed in relation to responsibilities also impacted the correct party taking responsibility for and the timely commissioning of noise monitoring during construction.

### 3.3 CONSTRUCTION TRAFFIC MANAGEMENT PLAN

A Traffic Management Plan (TMP), formed part of the CEMP. This document set out the management strategies for all traffic related issues. As the TWF site sat within the Upper Lachlan local government area (LGA) and was serviced by the local road network, the TMP was prepared in consultation with the Upper Lachlan Shire Council's (ULSC) Traffic Management Committee.

The delivery of equipment with over dimensional loads (size and/or mass) was a key issue during the wind farm construction. This CEMP included comprehensive community consultation strategies, linked to the stakeholder management and community consultation plan, to cover off this aspect. These were all adhered to.

The TMP was prepared by and the transportation of the majority of the over dimensional loads was managed by a transport contractor. The contractor was responsible for all aspects of equipment haulage to site, including liaison with authorities, obtaining overmass and oversize permits, haulage routes, modes of operation and timetable, and modifications to infrastructure.

Many of the large turbine components were transported to site from Port Botany through from Victoria. Once leaving the Hume Highway, the over dimensional loads needed to pass through Goulburn Mulwaree LGA. During consultations with Goulburn Mulwaree Council requested that the heavy vehicles used a transportation route other than the



route that had been approved. The new route was an improvement in terms of ease of access and negated the need for modification to road infrastructure. However, it necessitated a modification to the CoC. This resulted in time and cost penalties for project implementation, which could have been avoided with earlier identification of the preferred route.

TWF entered into agreements with the relevant road authorities on responsibilities for maintaining public roads in a safe condition, including Section 94 Contributions for rectification of any impacts on the road infrastructure.

Road inspections were undertaken with the relevant road authorities prior to works commencing, and ongoing monitoring was undertaken during construction so as safe conditions were maintained. When it had concerns, ULSC raised these with TWF and they were dealt with promptly.

Specified TMP controls were implemented to manage traffic on and off-site to minimise impacts on local traffic and the level of road service. These controls included measures such as designated routes, speed limits, scheduling, consultation, signage, wheel cleaning grates and road maintenance

The process of consultation was also maintained with the local community using of the public roads impacted during construction. This was particularly the case for Alders and Crees Road, which was used to access a number of rural properties not associated with the development.

There were minimal issues during the project in relation to traffic management. Given this is a key factor in the construction of a wind farm; this is evidence that the measures implemented were effective.

### **3.4 SOIL AND WATER MANAGEMENT PLAN**

#### **a) Soil and Water**

A Soil and Water Management Plan (SWMP) was prepared for the project. This analysed the soil type, the risk of erosion across the TWF site, and detailed recommendations for a

range of erosion and sediment control measures.

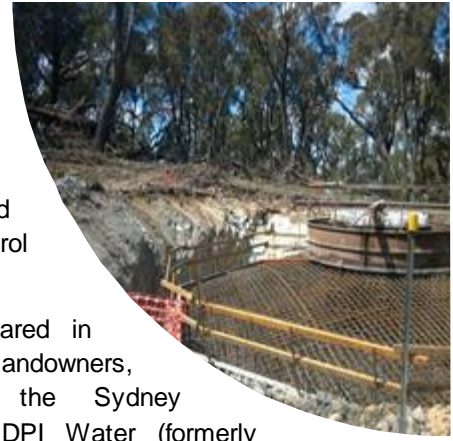
The SWMP was prepared in consultation with landowners, WaterNSW (formerly the Sydney Catchment Authority), DPI Water (formerly NSW Office of Water) and OEH.

This was used by the contractors undertaking site works to formulate site specific erosion and sediment control plans. It also provided advice on where it was necessary to obtain controlled activity approvals from DPI Water.

The measures recommended in the SWMP included diversion drains, banks, sediment traps, sediment filters, fencing and batter stabilisation and the plan provided details of these controls. A seed mix was specified for use in rehabilitation and revegetation and criteria set to allow measurement of when the rehabilitation could be deemed to be achieved. Maintenance requirements were prescribed until the areas are satisfactorily stabilised and restored. Timeframes were set as to how quickly sites needed to be stabilised and rehabilitated.

Being a linear infrastructure project, there were many kilometres of tracks constructed all of which involved soil disturbance. These tracks were constructed through working farms, predominantly sheep and cattle grazing properties. The site is also located within the tablelands, at elevations of approximately 800m above mean sea level and, as the nature of the project would suggest, in a high wind environment. As such, it was difficult to rehabilitate many areas across the site. After being shaped and dressed with topsoil, the exposed areas were reseeded with the recommended seed mix. In many locations obtaining a good rehabilitation outcome was difficult due to the harsh environmental conditions and what grass did grow could then be grazed by livestock or pests.

In the colder months there was little or slow vegetative growth hampered by cold and frosty conditions. Rehabilitation undertaken in summer was hampered by hot dry winds and often accompanied by low rainfall. During dry weather, supplementary watering was undertaken however any vegetative growth



was still subject to persistent grazing. Fencing out the affected areas was not feasible given they were long narrow corridors and passing through working farms.

Different seed mixes were trialled, based on recommendations from the local produce store's agronomists. A local 'Taralga mix' proved more successful but rehabilitation was still difficult to achieve given the environmental conditions. In many areas, reseeded was undertaken many times.

Throughout most of the project site, the use of native grasses in a rehabilitation mix would not have been practical. Native grasses do not provide the adequate level of coverage in the short timeframe that introduced species can (should conditions be favourable). Further, the areas in which works were being undertaken were highly disturbed due a long history of grazing and the pastures through which the access tracks and cabling passed having been 'improved' with introduced species. The grazing paddocks were generally set stocked, and native species do not stand up well to such grazing conditions. Setting these factors aside, even if the native grasses were able to establish, the thin corridors of these grasses would have been quickly out-competed by the presence of the surrounded introduced species.

The exception to this was the rehabilitation works for the construction of tracks and turbine hardstands within the areas remnant bushland on Track 11. Within this area, the seed mix was varied to allow quick cover with a sterile species and then native grass cover to establish. This was to minimise the risk of introducing exotic species into this area.

The seed mix for this area was 20 kg/ha sterile rye corn (SRC) in a mix with 5 kg/ha Wallaby Grass. This was spread in mid-2015. Both grasses have germinated but to date, there is very little SRC in the area but an extensive but thin cover of Wallaby Grass across the whole area. The main area where the SRC has been success has been around T23 where there is different topsoil. This could be a reflection of the adaptation of native species versus introduced species in the poorer soil in this location. This will continue to be monitored.

## b) Spills

The SWMP also covered the storage of any chemicals or hazardous materials and the containment of any spills. This was done effectively on the site, with much of the risk management through avoidance, minimising the quantities of fuel and other chemicals kept onsite.

## c) Air

Air quality protection was effectively managed through the measures within the SWMP relating to dust control. These included wetting down work areas, stabilising topsoil stockpiles; restoration of disturbed areas as soon as possible; and where practical, placement of stockpiles in sheltered locations to minimise dispersal by high winds.

All vehicles carrying loads that could generate dust were covered when they were travelling through the site.

## 3.5 BIODIVERSITY PLANS

There were three plans in place during the project construction period. These were:

- Flora and fauna management plan (FFMP)
- Bird and bat adaptive management program (BBAMP)
- Riparian vegetation management sub-plan (RVMP)

### 3.5.1 Flora & fauna management plan

The alignment of the tracks and micro-siting of the turbines were designed to minimise the clearing of vegetation, however some clearing was necessary. The impacts were managed and minimised through the FFMP.

The FFMP included requirements regarding vegetation pre-clearance surveys, micro-siting of exact turbine locations to minimise clearing or location of turbines in proximity to stock dams, minimising disturbance to rocky





outcrops, delineation of areas to be avoided during construction due to environmental sensitivity, weed control and measures to prevent the introduction of invasive species.

While habitat compensation was provided during construction by way of relocation of woody debris and provision of nesting boxes, the FFMP referenced the Biodiversity Offset Package which is managing the provision of habitat offsetting required by OEH/DPE.

Beyond noting that it would have been appropriate to have all CoC revegetation requirements captured by the Biodiversity Offset Package, this package is not considered further here as it is being prepared separately and has not yet been approved by OEH/DPE.

For the most part, the construction phase was well handled. The clearing of native vegetation was minimised and the mitigation measures set out within the FFMP were implemented.

While there were issues for the project in relation to biodiversity, these arose from the nature of the conditions and project management. These matters are discussed elsewhere.

It was however noted that there could have been better integration between the SWMP and the FFMP measures. In particular, along Track 11 where it passed through undisturbed areas on Crown Land, there had been clearing of native vegetation required. The felled trees were placed within the areas remnant bushland on either side of Track 11. Separately, rehabilitation and revegetation needed to be undertaken for the disturbed batters/drains along the newly constructed access track. This work was being undertaken along a narrow rocky ridgeline, in an exposed location with poor soils. It would have been better use of some of the cleared vegetation to have chipped it and spread it across the exposed areas to have provided immediate ground cover.

Further, the local Rural Fire Service (RFS) consider this location to be a high risk in relation to bushfire hazard. With a narrow one-way access track servicing this area, it may have been preferable to not have the potential increased in fuel load created by retaining a significant amount of woody debris along either side of the access track.

### **3.5.2 Bird and bat adaptive management program**

CoC 93 required that prior to the commencement of construction a BBAMP must be prepared and undertaken. The elements of the program that were required to be undertaken in relation to monitoring, mitigation measures and reporting were set out.

As required, this plan was prepared and submitted to the DPE for approval.

A weakness of the CoC was that it only required the BBAMP to be part of the Operations Environment Management Plan (OEMP). However, the TWF incorporated it into the CEMP and when there was an eagle strike during turbine commissioning, the BBAMP was activated and processes followed.

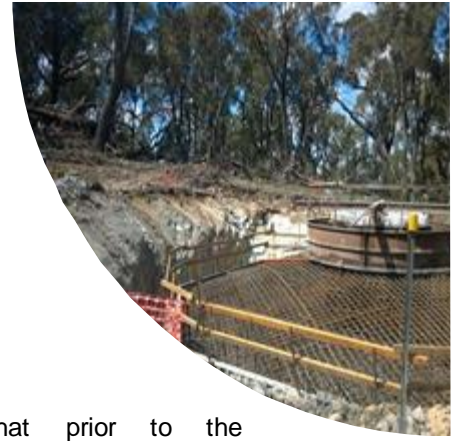
### **3.5.3 Riparian vegetation management plan.**

The RVMP to some extent contained similar information to the SWMP, in that it documented the locations where controlled activity approvals were potentially needed. It included mitigation measures relevant for works within riparian corridors.

During construction, consultation was undertaken with DPI Water. Where DPI Water advised a controlled activity approval was necessary, it was obtained prior to commencement of works and complied with. DPI Water clearances were obtained for all work completed.

## **3.6 BUSHFIRE FIGHTING MANAGEMENT PLAN**

A bushfire management plan was included within the CEMP and it provided the management strategies for preventing fires igniting during construction activities. These included:



- Prohibition of work involving risk of ignition during total fire bans;
- Availability of fire suppression equipment; and
- Storage and maintenance of fuels and other flammable materials

The TWF consulted with the local RFS in periods of high fire danger, and the RFS inspected the site to familiarise key personnel with the layout and potential risks.

Relevant requirements were complied with and there were no incidences during the construction of the wind farm.

### 3.7 HERITAGE MANAGEMENT PLAN


A heritage management plan formed part of the CEMP. This outlined management strategies to protect Aboriginal and non-Aboriginal heritage during the construction works.

Consultation was undertaken with the Gundungurra Tribal Council Aboriginal Corporation, the registered Native Title Claimant, to permit use of portions of vacant Crown Land for four turbines. This was consistent with the requirements of the Commonwealth's Native Title Act, 1993.

When design refinements (approved through modifications) altered the alignments of access tracks, cables and turbines to be located outside the areas originally surveyed for indigenous heritage. These were subsequently assessed with representatives of the Aboriginal community prior to finalising detailed design.

Prior to works being undertaken, no-go areas were established and all construction personnel were familiar with and respected the exclusion zones. 'Stop work' procedures were in place; however these were not activated and no incidences occurred during the construction works.

An observation was that there were two locations where there were recorded sites and there were protected with 30m buffer zones however the overall environmental outcomes of this mitigation measure was questionable.



At Turbine Row 10 a 30m buffer was fenced around the open site (OS1) from the beginning of the eucalyptus copse and the southern-most turbine (T49). To maintain this 30m buffer and provide the design level for the platform for T49 meant that a high and quite steep batter was required. This created other environmental ramifications. This could have been avoided by either modifying the mitigation strategy for OS1 or possibly, re-siting T49.

The construction technique for the access to Turbine Row 12 was required to ensure there was no stripping of the ground for 100m either side of the Crees Creek crossing. The construction method that was used involved laying geofabric across this 200m stretch and placing a thick layer of rock over the top of this, effectively creating a raft. As the track needed to be able to withstand overmass vehicles transporting turbine components across it, this required a massive amount of rock to be transported to this location to build this length of road. It could have been a better environmental outcome to have sought a Aboriginal Heritage Impact Permit to undertake the excavations necessary to investigate the potential archaeological deposit present within this locality, or the required track works using the same method as elsewhere as alternative solutions.

### 3.8 STAKEHOLDER MANAGEMENT AND COMMUNITY CONSULTATION PLAN

A community consultation program was established as part of the CEMP, and this was documented within the CCP. This program was initiated prior to works commencing and was maintained for the duration of the works (continuing into the operational phase).

The CCP tools included pre-construction Information, information sessions, the Community Consultative Committee, advertising, the project website, fact sheets, project newsletters, community open days, community notifications and signage.

A complaints and enquiries register documenting all contacts was maintained, with a version available on the TWF website. During construction there were intermittent enquiries and complaints received, which were dealt with promptly. The issue of single most concern for the community during the construction of the project was the impact on television reception. Commissioning for the first two groups of turbines started in late 2014, and there was a spike in complaints in late December 2014/early January 2015.

To resolve the matter in the short-term, the TWF installed 'VAST systems' for affected properties. More recently, a re-transmission tower was commissioned (as per the EIS commitment) and the TWF worked with affected properties to retune their antennae.

### 3.9 OTHER CONTROLS AND PROCESSES

CoC 109 required the TWF to undertake an assessment of the existing quality of the television transmission available at a representative sample of residential dwellings located within five kilometres of a wind turbine.

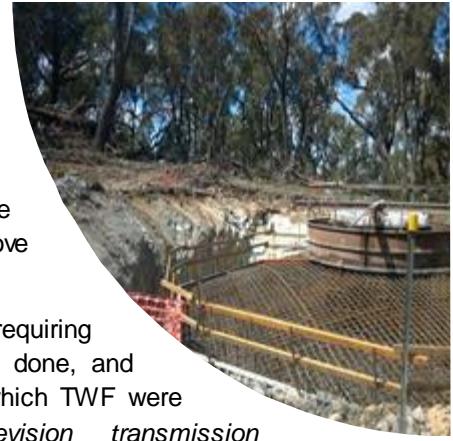
This survey was completed well prior to the erection of any wind turbines on site, as required. However, when issues arose, as documented in Section 3.8, other factors had also changed in the intervening period, namely the re-stacking of the broadcast frequencies at towers transmitting the signals picked up in the Taralga locality. It was also a different time of year from when the survey had been completed, thus different climatic conditions would likely have given rise to different survey result. As such, even if a full re-survey of the representative properties was undertaken, it would have been difficult if not impossible to use this data to ascertain the extent to which the commissioning of two groups of turbines had contributed to the reception issues being experienced by the community.

A further complicating factor was that only two groups of turbines were being commissioned. The project manager for TWF had intended to wait until all towers were installed and then undertake an 'after' TV signal survey, which could have allowed the full extent of the wind

farm to be assessed (the factors above notwithstanding).

In this regard, while requiring the before survey to be done, and setting a timeframe in which TWF were to 'rectify any television transmission problems reasonably attributable to the development' the CoC were silent on if, or when, an 'after' TV signal survey should be conducted.

Thus, while the conditions were prescriptive in relation to what was required before construction and the timeframes to resolve matters that were reasonably attributable to the development, it did not provide a clear path for what was required in relation to timing for assessing the impacts. While it may have been reasonable to wait until the wind farm was fully operational, this would not have been acceptable to the community. Should a suitable short-term solution not have been available and the TWF have not put in place, the lack of clear guidance in the conditions could have necessitated an escalation of this matter.



## 4 INNOVATION IN CONSTRUCTION METHODS

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The TWF project was generally located within rural properties used for grazing sheep and cattle. The challenge with this particular construction site was that it was both very large (more than 40km of access tracks and underground cabling) and most of site was being actively grazed during construction.

The civil contractor found that the interaction between the civil works and the grazing activities proved particularly problematic for the installation and ongoing maintenance of erosion and sediment controls. The main issue was animals, particularly the cattle, damaging the silt fences that were installed. There was no practical way of keeping livestock away from the erosion and sediment control devices.

During the early construction period the contractor found maintenance was taking up to three hours per day for two labourers reinstating and repairing silt fencing and this was predicted to increase over the duration of the project as more work areas commenced.

A number of alternative techniques were investigated. Straw bales proved ineffective as these were eaten or damaged. Solutions that were the most effective were those that relied on the use of rock. One of these was the rock check berm, and this control was successfully used in lieu of traditional staked silt fencing.

This control comprised the combination of a drain with berm placed adjacent on the 'downhill' side of the drain. The drain and berm were lined with jute mesh so that the drain itself did not generate dirty water and the rock scattered on top slowed the velocity of water running through the drain. The rock also deterred livestock from walking and lying within the control.

The rock check berms were observed to be at least as effective as silt fencing during rain events on site. These controls also provided a conducive environment in which to achieve grass strike and other vegetation regrowth, which reduced their visual impact, increased their filtration function and allowed full

rehabilitation of the disturbed area. They withstood the trampling by cattle and are an effective reuse of excess rock from on site.





## 5 RECOMMENDATIONS

Based on the above consideration of matters arising during the construction, the following recommendations are made for future wind farm developments.

### 5.1 GENERAL

#### 5.1.1 Conditions

- If a project is approved, the CoC should allow the project to be constructed in that the conditions are a consistent reflection of the environmental constraints and the proposed development. Where necessary, clear mechanisms and timeframes for how impacts are to be managed or offset are needed.
- The CoC should be structured to better recognise the staged nature of both the construction and the commissioning phases.
- The CoC should be structured to better recognise the commissioning phase and that some of the requirements applicable to operations may become relevant at this point.
- Documentation of processes, milestones and timeframes should be done and approved prior to construction to outline an agreed process to resolve any issues with television reception. The baseline 'before' survey in this instance did not provide a useful comparative mechanism.
- Aligning the CoC and other key elements, such as the environment protection licence provides clarity and allows a streamlined approach to manage issues such as noise.

#### 5.1.2 Environment plans

- A clear allocation of roles and responsibilities and enforcement of these is needed.
- Good integration of the sub-plans within the CEMP is necessary.
- The control measures in the various plans should be tailored to a particular project site.

### 5.2 HERITAGE

- In some instances, a better environmental outcome may be achieved by seeking an Aboriginal Heritage Impact Plan to permit investigation by excavation and/or other relevant mitigation measures if artefacts were present, rather than trying to manage potential constraints through other means.

### 5.3 BIODIVERSITY

- The CoC should clearly require the Bird and Bat Adaptive Management Program (BBAMP) to become a part of the CEMP, to be activated once commissioning commences.
- A nuanced application of rehabilitation and revegetation strategies for wind farm developments is recommended. This would apply appropriate conditions and measures that recognise that much of a wind farm is located within working farms but not discounting there may also be development within areas that are previously undisturbed.
- The use of a biodiversity offset mechanism should be applied to offset all biodiversity impacts and the implementation of this plan clearly defined.

### 5.4 SOIL AND WATER

- Integration with the other plans and tailoring to the site would have provided improved environmental measures earlier in the project.
- Controls should be suited to the nature of the site and make use of the materials available on a site.



## 6 REFERENCES

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(2015) Schedule 1 Taralga Wind Farm  
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