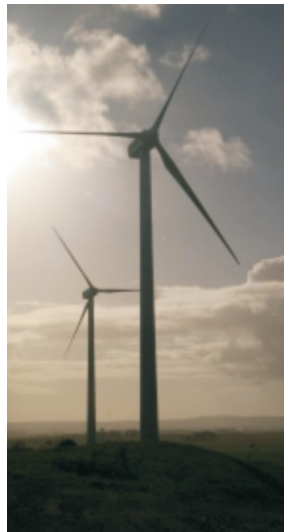


Woodlawn Wind Farm



Mitigation Measures

15

15. Mitigation Measures

15.1 Introduction

This chapter of the SEE provides a compilation of the proposed mitigation measures to be incorporated for the project implementation to achieve the required environmental performance in terms of the proponent's commitments, the existing development consent requirements and additional requirements for effective management of the implementation for the amended project.

The 2004 EIS set out mitigation measures for each of the phases of the project and the development consent lists the Ministers' conditions for the project implementation. This chapter provides detail of any additional measures and proposed changes to the current requirements arising from variations to the project.

15.2 Consent conditions

The following section addresses suggested changes to the existing consent conditions in respect of the amended project.

15.2.1 Schedule 1

Proposed revisions for aspects of Schedule 1 are set out below.

Table 15.1 – Proposed changes to Schedule 1

Development Application:	DA-250-10-1004-i	
Applicant:	Woodlawn Wind Pty Ltd	
Consent Authority:	Minister for Planning	
Wind Farm lands:	Lot	Deposited Plan
(The lands applicable for the amended project are listed in Table 2.1 of SEE and repeated here)	Lot 92	DP 754919
	Lot 91	DP 754919
	Lot 14	DP 754919
	Lot 94	DP 754919
	7002	DP 1029514
	Lot 21	DP 754919
	Lot 89	DP 754919
	Lot 27	DP 754919
	Lot 2	DP 114586
	Lot 3	DP 114586
	Lot 55	DP 754919
	Lot 28	DP 754919
	Lot 29	DP 754919
	Lot 2	DP 1020242
	Lot 2	DP 714090
	Lot 48	DP 754877
	Lot B	DP 370961
	Lot 18	DP 535179
	Lot 2	DP 1140319
	Lot 1	DP 1140319

Proposed Development:	Construction and operation of a wind farm consisting of 20 wind turbines (80 metre hub height and 88 metre blade diameter), two temporary and two permanent meteorological masts and associated infrastructure including a 12 kilometre 33 kV double circuit transmission line, underground cabling, tracks, strengthening of the Capital Wind Farm substation access road causeway, a public viewing area, temporary works (construction site office, laydown area and gravel pit) and augmentation of the Capital Wind Farm substation to enable grid connection of Woodlawn Wind Farm, as described in the Woodlawn Wind Farm Statement of Environmental Effects, prepared by Aurecon and dated January 2010
State Significant Development	Generally as per existing Consent instrument – but updated as deemed appropriate by Department of Planning
Integrated Development	Update by Department to be consistent with current statutes
Designated Development	Wording as specified by Department of Planning
Lapsing of Consent	Woodlawn Wind Pty Ltd seeks a one year extension of the date for lapsing of consent to be incorporated in the modified consent

15.2.2 Schedule 2

Schedule 2 provides a list of terms referred to in the consent document. Suggested changes are set out below.

Table 15.2 – Proposed changes to Schedule 2

SCHEDULE 2 (As per existing schedule excepting in the case of the terms listed below)	
In this Consent, except so far as the context or subject matter otherwise indicates or requires, the following terms have the meanings indicated	
Applicant	Woodlawn Wind Pty Ltd
DECCW (not DEC)	NSW Department of Environment, Climate Change and Water
EPA	NSW Environment Protection Authority (now incorporated in the DECCW)
Premises (<i>No longer applicable</i>)	Wind Farms are no longer scheduled premises and this term is not applicable for the revised consent
Relevant Government Agencies	To be updated by the Department of Planning
SEE (<i>Add this term</i>)	Statement of Environmental Effects, January 2010 prepared by Aurecon
Wind Farm lands (<i>Add this term instead of reference to Premises</i>)	Wind farm lands are those lands leased by Woodlawn Wind Pty Ltd for the project and as listed in Schedule 1

15.2.3 Conditions of Consent

The aim of the Conditions of Consent is to ensure that the Applicant implements all practicable measures to prevent and minimise any harm to the environment that may result from the Construction, Commissioning, Operation and Decommissioning of the Development.

The following table sets out the proposed revisions of the existing Conditions of Consent.

Table 15.3 – Proposed revisions of the existing Conditions of Consent

Conditions of Consent	Clause Number	Proposed change
GENERAL CONDITIONS		
Obligations to Minimise Harm to Environment	1	No change
Scope of Development	2	The applicant shall carry out the development in accordance with the following documents. (a) Application for Modification of development Consent January 2010 (b) Woodlawn Wind Farm Amendment Statement of Environmental Effects prepared by Aurecon and dated January 2010 (c) As per previous 2004 EIS, etc (Not including revised transmission line option 11/2/2005 –no longer applicable)
Statutory Requirements	3	No change
Dispute Resolution	4	No change
Provision of Public Infrastructure	5	No change
Compliance		
General	6, 7 & 8	No change
Pre-Construction Compliance Report	9	No change
Construction Compliance Report	10	No change
Pre-Operation Compliance Report	11	No change
Construction and Part 4A Certification	12	No change
Environmental Monitoring		
General Monitoring requirements	13	No change
	14 & 15	Replace DEC with DECCW
Environmental Impact Audits		
Environmental Impact Audit - Construction	16	No change
Environmental Impact Audit - Operation	17	Replace EIS with SEE
Annual Performance Reporting	18	Delete
Environmental Management		
Construction Hours	19	Amend condition to allow turbine erection to occur out of hours. Any reference to DEC should be Department of Planning.
Blasting and Vibration	20	Reference to 'Premises' be changed to 'Wind Farm lands'
	21	No change except that 'DEC' be varied to 'Department of Planning'
	22	DEC be changed to 'Department of Planning'
Environmental Representative	23	No change

Conditions of Consent	Clause Number	Proposed change
Greenhouse and Energy Management Strategy	24	Reference to 'EIS' be clarified as the '2004 EIS'
Air Quality Management Strategy	25	Reference to 'EIS' be clarified as the '2004 EIS'
Construction Environmental Management Plan	26	Update as measures identified in the 2004 EIS and additional measures as indicated in Chapter 15 of the 2010 SEE.
	27	Amend DEC as Department of Planning
Traffic and Transport Management Sub Plan	28	Mitigation measures as per 2010 SEE
Flora and Fauna Management Sub Plan	29	Delete reference to DEC and amend to address mitigation measures in SEE
Construction Soil and Water Quality Management Sub Plan	30	delete item (c)
	31	Amend as follows: <i>In the event of the ER identifying significant erosion that is being inadequately managed, the proponent will engage an appropriately qualified soil scientist to advise on the corrective measures to be implemented to repair the erosion and prevent recurrence.</i>
	32	Amend reference to Rivers and Foreshores Improvement Act
Operation Environmental Management Plan	33	No change
	34	Change DEC to Department of Planning
Operation Flora and Fauna Management Sub Plan	35	Minor change – delete (ii)
Operation Soil and Water Management Sub Plan	36	Delete reference to report entitled <i>Assessment of Revised Transmission Line Option: Woodlawn Wind Farm</i>
Bird and Bat Adaptive Management Plan	37, 38 & 39	No change
Off Site Landscape Sub Plan	40	No change
COMMUNICATION AND CONSULTATION		
Information on the Development	41, 42 & 43	No change
Complaints Management System	44	Change DEC to Department of Planning
	45	Change DEC to Department of Planning
VISUAL AMENITY		
General	46	Update in respect of this SEE
Signs	47	No change
Lighting	48	Delete reference to CASA

Conditions of Consent	Clause Number	Proposed change																																																																					
NOISE																																																																							
Operational Noise Criteria	49	Table of operational noise criteria modified to remove values for wind speeds of 2 m/s and 3 m/s.																																																																					
The consent conditions state “Noise generated from the Development must not exceed at the identified properties the equivalent noise level ($LA_{eq, 10}$) adjusted for any tonality as presented in the table below”. The noise limits were applied to the Kildare, Glendale, Bonnie Doon and Torokina. Approved Operational noise criteria (4m/s to 15m/s) <table><tr><th rowspan="2">10 metre (height) wind speed (m/s)</th><th colspan="4">Noise level L_{Aeq} (10 minute) – 24 hours a day (dBA)</th></tr><tr><th>Property described in the EIS as Kildare</th><th>Property described in the EIS as Glendale</th><th>Property described in the EIS as Bonnie Doon</th><th>Property described in the EIS as Torokina</th></tr><tr><td>4</td><td>35</td><td>35</td><td>35</td><td>35</td></tr><tr><td>5</td><td>35</td><td>35</td><td>35</td><td>35</td></tr><tr><td>6</td><td>35</td><td>35</td><td>35</td><td>35</td></tr><tr><td>7</td><td>35</td><td>35</td><td>35</td><td>36</td></tr><tr><td>8</td><td>36</td><td>35</td><td>35</td><td>37</td></tr><tr><td>9</td><td>36</td><td>35</td><td>35</td><td>38</td></tr><tr><td>10</td><td>37</td><td>36</td><td>35</td><td>39</td></tr><tr><td>11</td><td>38</td><td>36</td><td>35</td><td>39</td></tr><tr><td>12</td><td>38</td><td>37</td><td>35</td><td>40</td></tr><tr><td>13</td><td>39</td><td>37</td><td>35</td><td>41</td></tr><tr><td>14</td><td>39</td><td>38</td><td>35</td><td>41</td></tr><tr><td>15</td><td>40</td><td>39</td><td>36</td><td>42</td></tr></table>			10 metre (height) wind speed (m/s)	Noise level L_{Aeq} (10 minute) – 24 hours a day (dBA)				Property described in the EIS as Kildare	Property described in the EIS as Glendale	Property described in the EIS as Bonnie Doon	Property described in the EIS as Torokina	4	35	35	35	35	5	35	35	35	35	6	35	35	35	35	7	35	35	35	36	8	36	35	35	37	9	36	35	35	38	10	37	36	35	39	11	38	36	35	39	12	38	37	35	40	13	39	37	35	41	14	39	38	35	41	15	40	39	36	42
10 metre (height) wind speed (m/s)	Noise level L_{Aeq} (10 minute) – 24 hours a day (dBA)																																																																						
	Property described in the EIS as Kildare	Property described in the EIS as Glendale	Property described in the EIS as Bonnie Doon	Property described in the EIS as Torokina																																																																			
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5	35	35	35	35																																																																			
6	35	35	35	35																																																																			
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14	39	38	35	41																																																																			
15	40	39	36	42																																																																			
Operational Noise Criteria	50	The noise limits applied to the four properties identified in Condition 49 must be applied to all residences that were identified as being ‘representative’ as described in Section 2, Volume 2 of the 2004 EIS or Section 7.5 of the SEE.																																																																					
	51 & 52	Change ‘Premises’ to ‘Wind Farm lands’.																																																																					
Noise compliance during operation	53 & 55	No change																																																																					
	54	Change DEC to Department of Planning																																																																					
Noise Mitigation	56	No change																																																																					
HERITAGE																																																																							
Indigenous Heritage Management	57	A Cultural Heritage Management Sub Plan must be prepared as part of the CEMP. The sub plan must incorporate the mitigation measures identified in: - Section 8 of the report entitled <i>Archaeological sub-surface testing of the proposed Woodlawn Wind Farm, Tarago, New South Wales</i>, dated July 2005 - The measures identified in Section 9.6 of this SEE																																																																					
Salvage of Aboriginal artefacts	58	A ‘Consent to Destroy and Permit to Salvage’ (Permit/Consent # 2288 and 2289) was granted on September 2005 that enabled salvage of recorded Aboriginal objects from sites on the Woodlawn Wind Farm Site. Prior to construction the proponent is to arrange the conduct of the activities defined under the Permit/Consents																																																																					

Conditions of Consent	Clause Number	Proposed change
Historical relics	59	No change
MISCELLANEOUS REQUIREMENT		
Spoil and Fill Management	60	No change
Road Dilapidation Report	61	Change reference to Collex to Crisps Creek
Aviation	62	Add - Prior to commencement of turbine erection, the proposed coordinates of turbines and dimensions of structures will be provided to CASA.
	63 & 64	No change
Hazards – Bushfire	65	No change
	66	Reference to 'EIS' be clarified as the '2004 EIS
Hazards – Safety management system	67	No change
<i>Electromagnetic interference</i>		
Television interference	68 & 69	No change
Radio Communication	70 & 71	No change
Community Contributions	72	No change
Waste management and recycling	73	No change
Decommissioning	74	Delete “the substation” from “including, but not limited to, the substation”
	75 & 76	No change

15.2.4 Attachment A – Aboriginal Cultural Heritage

Based on the findings of the sub-surface testing undertaken by Biosis for the original Aboriginal assessment, Biosis recommended that the proponent seek a Consent to Destroy under Section 90 of the NPW Act 1974 for those archaeological sites to which impact cannot be avoided. It was recommended that the Section 90 must contain a component of archaeological salvage for the sites that will be impacted with salvage involving the collection of surface artefacts prior to and during impact and the storage and suitable display of the artefacts in the Woodlawn Bioreactor education centre.

Based on this recommendation, the Consent Conditions included Attachment A – General Terms of Approval in relation to Aboriginal Cultural Heritage including conditions relating to a Section 90 Consent to Destroy and Section 87 Permit to Salvage, specific and special conditions applying to Consent and Permit to Salvage and General Terms and Conditions. Attachment A is unchanged and will be addressed in conjunction with amended conditions 57 and 58.

Woodlawn Wind Pty Ltd has commenced planning for the salvage work and has contacted Biosis to provide a proposal to undertake the required salvage. The site work will be scheduled to be completed prior to commencement of construction.

15.3 Additional measures to be incorporated in Consent Conditions

Section 22 of the 2004 EIS provides a summary of the mitigation measures proposed for the Woodlawn Wind Farm site. It is proposed that these mitigation measures are mostly implemented with variations as indicated in the following sections including deletion or variation of several items and addition of new items for the amended project.

15.3.1 Mitigation measures to be excluded

The items listed in Table 15.4 are mitigation measures that were included in the 2004 EIS but which are no longer applicable to the amended project.

Table 15.4 – Mitigation measures listed in 2004 EIS that are no longer applicable

Mitigation Measure	Response
Landscape and visual	
Design and construct site control room to fit in with rural nature of locality	The proposed variation to Woodlawn Wind Farm includes a 33 kV overhead transmission line from Woodlawn to the Capital Wind Farm substation negating the need to build the substation. This is no longer applicable.
Establish screen planting around substation	As above. Screening has been setup in the vicinity of the Capital Wind Farm substation
Hydrology and Water Quality	
Substation design to allow for rainfall collection to provide internal supplies. Overflow from the water supply tank to be directed to avoid scouring.	Not applicable. Grid connection via the existing Capital Wind Farm substation.
If required, an additional non-potable water source would supplement the supply with treated water from the swales running from the peaks on both the northern and southern sides of the substation. This would require an underground rainwater tank.	Not applicable. Grid connection via the existing Capital Wind Farm substation.

15.3.2 Mitigation measures to be varied for the amended project

The items listed in Table 15.5 are mitigation measures that were included in the 2004 EIS but which need to be varied or updated for the amended project.

Table 15.5 – Mitigation measures listed in 2004 EIS that need to be varied

Seek a "Consent to destroy with Salvage" from the NEW DEC for Aboriginal archaeological sites WL1, WL5, WL6, WL8, WL9, WL12, WL13, WL14.	Change 'Seek' to ' <i>Prior to construction, comply with 'Consent to Destroy and Permit to Salvage' (Permit/Consent # 2288 and 2289) issued on 12 September 2005</i> ', that enables salvage of recorded Aboriginal objects from specific sites on the Woodlawn Wind Farm Site.
Design and construct 33 kV transmission line to avoid any area of archaeological significance or appropriate mitigation measures to be put in place to avoid impacts.	The proposed 33 kV transmission line from the Woodlawn Wind Farm to the Capital Wind Farm substation will be implemented generally as described in this SEE and with avoidance of the areas of sensitivity indicated in this SEE and the controls applicable for the project generally. Particular aspects to be addressed are as follows: • Route generally as shown in this SEE • Construction to address the recommendations of the Aboriginal Archaeological and Cultural Heritage Assessment, undertaken by Austral, dated December 2009. These are addressed in Section 15.3.3 below.

15.3.3 Additional measures

Based on the amended layout of the wind farm, Woodlawn Wind Pty Ltd identified the need for additional assessments. These are described below:

- A further noise assessment was undertaken by Vipac Engineers & Scientists in late 2009 (Appendix D) to take into account the proposed variations including the reduced number of turbines and the assessment of the cumulative impacts of the now operational Capital Wind Farm.
- A 33 kV overhead transmission line from Woodlawn to the Capital Wind Farm substation has been proposed as part of the amendments. This required additional flora and fauna (Appendix E) and heritage assessments (Appendix F) to be undertaken along the proposed transmission route.
- Lawrence Derrick & Associates further assessed telecommunications services likely to be impacted as a result of the variations proposed particularly in relation to the revised turbine sites and changes to heights of structures (Appendix G)

These assessments have recommended additional measures which will be taken into account during the construction and operation of the Woodlawn Wind Farm. In some cases these more closely reflect the form of the amended project and will replace the measures proposed in the 2004 EIS. The mitigation measures arising from the 2010 SEE are addressed in this section.

Noise mitigation measures

The following mitigation measures have been recommended for possible noise impacts

- Predicted noise levels (L_{Aeq}) for the seven representative relevant receiver sites at different wind speeds indicate that no exceedances of noise criteria have been predicted at neutral or worse case meteorological conditions.
- If a noise nuisance is reported by a relevant receiver after the wind farm is commissioned, Woodlawn Wind will review the nature of the noise impact and assess the potential sources. If necessary, the equipment supplier will be required to perform testing to confirm that equipment performance is in accordance with the required noise specification.
- If any noise exceedance is shown to be occurring at a relevant receiver due to the turbine operation, Woodlawn Wind can vary operation of the relevant turbine(s) to achieve noise compliance. In addition, Woodlawn Wind may consult with any affected landowner in regard to other measures such as installation of double glazing or other forms of sound insulation.

- A Construction Noise Management Plan will be implemented as part of the project Environmental Management Plan for the construction stage of the project to mitigate potential adverse noise impacts that could affect nearby residents.

Flora and fauna mitigation measures

The transmission line has been designed to be primarily located in cleared grazing land that generally has little remnant native vegetation. Having regard to the recommendations of KMA (2009) it is proposed to adopt the following measures to protect the few remaining traces of native vegetation and significant habitat and to assess potential impacts on aerial fauna:

- Access tracks will as far as possible be located on existing tracks and cleared areas where feasible to avoid clearing woodland.
- When constructing the access tracks, care will be taken to ensure that the construction activities do not cause excessive erosion. Permanent tracks will be stabilised and temporary tracks rehabilitated.
- The northern part of the transmission line near turbine 11 will be strung above the stand of *Eucalyptus radiata* woodland directly below the hill to avoid the area being cleared. Due to the height and steepness of the hill, this outcome is likely to be achievable.
- The transmission line will avoid the patches of woodland at the southern end of the Woodlawn property and will transverse the almost totally treeless land.
- A broad patch of woodland (some of this fenced off) is located at the boundary of the Woodlawn land. It is intended that the line will avoid this area, either by going around it to the north or east.
- The *Nardoo* property is almost treeless and the grassland is of low importance as habitat for native species. Scattered granite outcrops occur in the paddock north of Taylors Creek Road; these have some local value as reptile habitat. The rock outcrops will be avoided where possible.
- Weed control on the properties traversed is not the responsibility of the operator or contractors associated with the project; however measures will be taken to ensure that the construction of the line does not exacerbate the weed problem on the properties involved. This is particularly important in regard to the spreading of invasive weeds to new locations. Measures will be incorporated in the project to minimise the introduction and establishment of invasive species at the site. Earthmoving vehicles will be washed down before being brought onto site and prior to departure. Weeds will be monitored on disturbed sites and controlled if necessary.
- The valley north of the Capital Wind Farm substation contains some patches of native grassland, albeit of low to moderate quality. Disturbance there will be kept to a minimum.
- A soil and water management plan will be prepared for the entire wind farm project, including the transmission line, and will be developed in consultation with the Department of Planning.

In addition to the above, Turbine site 19 is located close to the remnant native vegetation and to reduce impact on that vegetation it is proposed that an ecologist assist the siting of Turbine 19.

In addition, the following monitoring requirements proposed by KMA will be adopted:

- An environmental officer will be appointed for the construction phase of the project, whose role will be to implement the above measures.
- The Australian Wind Energy Association (Auswind) has developed a set of interim guidelines for surveying wind farms for victims of blade-strike. A monitoring program for birds and bats will be developed for the Woodlawn Wind Farm project, based on the Auswind document. These matters will be addressed by the Bird and Bat Adaptive Management Plan referred to in Conditions 37 to 39.
- Woodlawn Wind Pty Ltd will conduct performance audits of the construction stages to ensure that the identified mitigation measures are rigorously pursued by the site works contractor.



Heritage

Implementation of the project as amended will include the following measures to mitigate the potential impacts on indigenous heritage values for the areas to be disturbed by the project construction works.

- Salvage and care of surface artefact items at the wind farm site as per the Permit/Consents # 2288 and 2289. The proponent is currently planning for this work to be undertaken prior to commencement of construction activities.
- Review of the proposed transmission line route to avoid potential archaeological deposit WLTL-C PAD 3. This can be achieved by relocating the line route slightly to both avoid an area of woodland mapped by KMA that is to the northeast of WLTL-C-PAD 3 and to cross Taylors Creek at the northern end of WLTL-C-PAD 3 avoiding the need to locate pole structures within the area of the PAD. The deviation of the line is a minor change to the overall route but avoids two areas of identified sensitivity.
 - Elsewhere the poles for the 33kV overhead line will be located to avoid identified PADs and sites that have been identified by the 2009 Austral assessment.
- No mitigation measures are required for the section of 33kV line within the area of the Capital Wind Farm that has been previously assessed by Austral in 2005.

Telecommunications mitigation measures

The following mitigation measures were recommended by Lawrence Derrick & Associates

For individuals experiencing degraded FM or television broadcasting service due to identified interference from the wind farm, possible techniques to reduce the interference to acceptable limits include:

- Replacement of receiving antenna system with a higher gain more directive model
- Repositioning of the antenna in height or horizontally on the dwelling
- Installation of an antenna elsewhere on the property and cable to dwelling
- Change the orientation of antennas to receive an alternative station if available. For example, point the aerial to Illawarra or Goulburn instead of Canberra
- Use available digital television channels instead of analogue. This would require a digital Set Top Box or digital television set
- Provision of an alternative satellite service eg, Free to Air or Austar pay television service.
- Where feasible, consideration could be given to the installation of a television or FM repeater station to provide service to groups of residents in a shadow zone.

Potential point to point system and mobile base coverage conflicts are not predicted with turbines being located with recommended clearance zones from radio sites or point to point ray lines. There is only one identified link passing the turbines and final micro siting adjustments of one turbine would avoid any impacts.

Any minor near field effects to medium frequency broadcasting would occur within tens of metres of the turbines only and with a buffer zone of at least 500 metres to any dwelling, no corrective action will be required.

15.4 Compliance reviews

Compliance review is adequately covered in the existing Consent Conditions and is deemed to be applicable to the amended project.