



**Planning &  
Infrastructure**



# **Compliance Audit Report**

## **Woodlawn Wind Farm**

**February 2013**

Cover Photograph: Turbines at Woodlawn Wind Farm

© Crown copyright 2013

Published February 2013

NSW Department of Planning & Infrastructure

[www.planning.nsw.gov.au](http://www.planning.nsw.gov.au)

**Disclaimer:**

While every reasonable effort has been made to ensure that this document is correct at the time of publication, the State of New South Wales, its agents and employees, disclaim any and all liability to any person in respect of anything or the consequences of anything done or omitted to be done in reliance upon the whole or any part of this document.

## FOREWORD

Wind farms will play an important part in the State's energy future. However, it is important the community has confidence these installations are operating in line with their consent conditions.

Although investigations conducted by the Department of Planning and Infrastructure to date have found the NSW Government approved wind farms to be complying with noise limits, the Department has continued to receive noise complaints from nearby residents.

In early 2012, the Minister for Planning and Infrastructure asked the Department to commission an independent compliance audit of operational wind farms in NSW, to gauge whether they are meeting their consent conditions.

The wind farm audits cover the Cullerin Range, Woodlawn and Capital wind farms in southern NSW, which are the State's three operational NSW Government approved wind farms.

An independent specialist noise consultant was commissioned to audit compliance against the noise limits and the Department's Compliance Unit audited compliance against other consent conditions including those relating to visual amenity, flora and fauna impacts, shadow flicker, community contributions and radio/television interference.

Key stakeholders were consulted as part of the audit process including local residents, local councils, the Environment Protection Authority and the wind farm operators. Consultation with local residents included the distribution of a survey questionnaire, meetings with residents and a telephone contact line.

A separate audit report has been prepared for each of the three wind farms and a fourth report prepared describing the community consultation undertaken in association with the audits. All the reports are publicly available on the Department's website at [www.planning.nsw.gov.au](http://www.planning.nsw.gov.au).

## **EXECUTIVE SUMMARY**

### **Wind farm compliance audits**

The NSW government commissioned independent compliance audits of the State's three government-approved wind farms that are currently in operation, namely Cullerin Range, Woodlawn and Capital, which are all located in southern NSW.

The compliance audits were conducted by the Department of Planning and Infrastructure. The purpose of the audits was to evaluate compliance of the wind farms with their respective approval conditions relating to wind farm operation. Compliance with conditions relating to design and construction of the wind farms is outside the scope of the audits.

Due to the highly specialised nature of monitoring wind farm noise and analysing noise monitoring data, the Department engaged the services of a specialist, independent acoustical consultant, Renzo Tonin & Associates, to audit compliance with the noise criteria.

The audits also addressed compliance with other operational conditions relating to issues such as visual amenity, flora and fauna impacts, aircraft movements, shadow flicker and television reception.

### **Woodlawn audit**

This report addresses the compliance audit of Woodlawn Wind Farm against the operational consent conditions in the then Minister's Development Consent (DA-250-10-2004-i) issued on 4 October 2005. Separate reports address the audits of the other two wind farms.

The audit findings are based on evidence gained during the audit, including through reviewing relevant documentation, noise monitoring and analysis by the acoustical specialist, a site inspection, interviews with the proponent's representatives and survey responses/interviews with nearby residents.

Continuous noise monitoring over a period of 4 weeks was undertaken at four locations in the vicinity of Woodlawn wind farm using unattended monitors. Further, shorter term attended monitoring was undertaken at three of those locations to supplement the unattended monitoring results.

### **Community Consultation**

The Department conducted active community consultation in association with the three wind farm audits, including the following activities:

- Placing information about the wind farm audits on the Department's website
- Issuing all land owners within 4km of a wind farm with a survey questionnaire relating to the operation and performance of the wind farm
- Conducting face-to-face meetings with those who indicated in their survey responses that they wished to speak with the auditors
- Reviewing responses to the surveys and reporting on the outcomes of the consultation.

Those matters raised by residents that fell within the scope of the audit are addressed in the audit findings.

A comprehensive report on the Department's community consultation has been published to complement the audit reports and is available at [www.planning.nsw.gov.au](http://www.planning.nsw.gov.au).

## **Audit findings**

The audit found Woodlawn wind farm to have a high standard of compliance with the key operational conditions of approval.

The independent acoustical specialist also found Woodlawn wind farm to be compliant with the noise criteria at all residential properties that were monitored during the period of the audit.

The audit identified one non-noise related non-compliance, relating to the public availability of documents.

The audit also made a number of observations and recommendations to improve environmental performance or community access to information. The observations addressed issues such as making documents available on the web, complaints management, noise mitigation for a new dwelling and energy efficiency.

## **Acknowledgements**

The auditors wish to acknowledge the residents in the vicinity of Woodlawn wind farm who allowed noise monitoring for this audit to be undertaken on their properties. The auditors also wish to acknowledge those residents who responded to the community survey questionnaire and who spoke candidly with the auditors under the community consultation activities associated with this audit.

The auditors also wish to acknowledge the co-operation afforded to them by the proponent, Infigen Energy, during the audit process.

## ABBREVIATIONS

Department	Department of Planning and Infrastructure
Director-General	Director-General of the Department of Planning and Infrastructure
EA	Environmental Assessment
EPA	Environment Protection Authority
EP&A Act	<i>Environmental Planning and Assessment Act 1979</i>
Minister	Minister for Planning & Infrastructure
OEMP	Operation Environmental Management Plan
Proponent the Act	Infigen Energy <i>Environmental Planning and Assessment Act 1979</i>

## Table of Contents

<b>FOREWORD</b> .....	iii
<b>EXECUTIVE SUMMARY</b> .....	iv
<b>ABBREVIATIONS</b> .....	vi
<b>1 INTRODUCTION</b> .....	1
1.1 Background .....	1
1.2 Description of Project .....	1
1.3 Statutory framework .....	2
1.4 Key issues .....	3
<b>2 AUDIT PROCESS</b> .....	4
2.1 Objectives .....	4
2.2 Scope .....	4
2.3 Methodology .....	4
2.4 Audit criteria .....	6
2.5 Audit team .....	6
<b>3 COMMUNITY CONSULTATION</b> .....	7
<b>4 WIND FARM GUIDELINES</b> .....	7
<b>5 AUDIT FINDINGS</b> .....	8
5.1 Presentation of audit findings .....	8
5.2 Overview of findings .....	9
5.3 Compliance with noise criteria .....	9
5.4 Findings related to non-noise conditions .....	13
5.5 Summary of findings .....	15
<b>6 PROPONENT'S COMMENTS ON DRAFT AUDIT REPORT</b> .....	18
 <b>APPENDIX A: PHOTOGRAPHS</b>	
 <b>APPENDIX B: AUDIT CHECKLIST</b>	
 <b>APPENDIX C: NOISE COMPLIANCE REPORT</b>	
 <b>APPENDIX D: OATH OF INDEPENDENCE</b>	
 <b>APPENDIX E: COMMUNITY SURVEY</b>	
 <b>APPENDIX F: PROPONENT'S COMMENTS ON DRAFT AUDIT REPORT</b>	
 <b>APPENDIX G: CONSENT CONDITIONS</b>	





# **1 INTRODUCTION**

## **1.1 Background**

For projects approved by the Minister administering the EP&A Act, the Department is responsible for monitoring compliance with, and enforcement of, the Minister's conditions of approval. The Department's compliance activities are carried out in accordance with its Compliance Policy and associated guidelines, available on the Department's website.

Compliance auditing is one of a number of methods used by the Department to monitor compliance. This report addresses the recently completed compliance audit of Woodlawn Wind Farm.

This is one of three compliance audits of the State's operational NSW government approved wind farms, all in southern NSW. The other two wind farms audited under this campaign were Capital and Cullerin Range.

The audit evaluated compliance of Woodlawn wind farm against the conditions of approval relating to its operation. The audit paid particular attention to evaluating compliance with noise criteria, but also addressed other operational requirements including visual impacts, flora and fauna impacts, aircraft movements and television reception.

This report has been prepared to present the findings of the compliance audit described herein and no responsibility is accepted for its use in any other context or for any other purpose.

## **1.2 Description of Project**

### **1.2.1 Location**

The Woodlawn Wind Farm is located on the Great Dividing Range, within the Southern Tablelands of NSW approximately 50 kilometres north-east of Canberra and approximately 37 kilometres south of Goulburn, NSW. The nearest town is Tarago about 7 kilometres to the east of the wind farm site.

The Woodlawn Wind Farm is adjacent to the Woodlawn Bioreactor waste management facility.



**Figure 1. Location of Woodlawn Wind Farm** (Source: Woodlawn Wind Farm Modifications – Supplementary Statement of Environmental Effects, Chapter 1, August 2010)

### 1.2.2 Operation

The Woodlawn Wind Farm consists of 23 wind turbines, each with an external kiosk transformer nearby and is capable of generating up to 48.3 megawatts (MW) of electricity.

An aerial photograph showing the locations of the wind turbine structures and the noise monitoring points used in this audit is provided at Figure 1 of the Noise Compliance Report in **Appendix C**.

The electricity generated by Woodlawn Wind Farm is exported via a double circuit 33 kV transmission line to the Capital Wind Farm substation.

The wind farm commenced operation in 2009.

## 1.3 Statutory framework

The Woodlawn Wind Farm was approved by the then Minister for Planning on 4 October 2005, pursuant to section 80 of the *Environmental Planning and Assessment Act 1979* ("the Act") subject to conditions.

A copy of the development consent is provided at **Appendix G**. The consent and assessment reports are available on the Department's website at:  
[http://majorprojects.planning.nsw.gov.au/index.pl?action=view\\_job&job\\_id=4073](http://majorprojects.planning.nsw.gov.au/index.pl?action=view_job&job_id=4073).

At the time of the audit, the wind farm was not required to have an environment protection licence issued by the Environment Protection Authority (EPA).

## **1.4 Key issues**

The principal environmental issue for wind farm operation is noise impacts on neighbouring land uses. Wind turbine noise is generated primarily from the movement of turbine blades through the air, but may also arise from mechanical noise in the gearbox or bearings of the nacelle. Further noise can be emitted as a "hum" from the electrical substation associated with the wind farm.

Other environmental issues associated with wind farm operation can include visual amenity impacts of the turbine structures, birds and bats being struck by the turbine blades, shadow flicker where the turbine blades come between the sun and a receiver when the sun is low in the sky, and telecommunications interference.

All the above potential environmental impacts are covered by this audit because they are addressed by conditions of the Woodlawn wind farm project approval.

## **2 AUDIT PROCESS**

### **2.1 Objectives**

The objectives of this compliance audit were to:

- evaluate the project's compliance with the audit criteria (operational compliance against the Minister's conditions of approval and the proponent's Statement of Commitments);
- present the findings of the audit;
- make recommendations in response to any non-compliances found or observations made by the audit.

### **2.2 Scope**

The scope of the audit is limited to evaluating compliance of the Woodlawn wind farm with the audit criteria. The audit findings are only made in respect of verifiable evidence obtained during the audit process. Any aspects associated with the wind farm which are outside the audit criteria are not addressed in the audit findings.

The audit findings are made only in respect of verifiable evidence obtained during the audit process. Any allegations made to the auditors during the audit process are not addressed in the audit findings unless those allegations were within the scope of the audit and were verified by audit evidence.

The audit period, i.e., the period over which compliance was evaluated, varies depending on the audit criteria. For noise compliance, the audit period was the period during which noise monitoring data was obtained during the audit. For compliance with non-noise conditions, the audit period was the period covered by the audit evidence and may be any time between commencement of operation and the completion of the audit.

The scope of this compliance audit does not extend to the investigation of alleged non-compliance. Any alleged non-compliance found by the audit would be assessed and, if necessary, investigated outside the audit process in accordance with the Department's published Compliance Policy and Breach Management Guidelines.

### **2.3 Methodology**

The methodology employed by the Department's compliance audits is consistent with the auditing principles set out in the relevant Australian and New Zealand Standard: *AS/NZS ISO 19011:2003 Guidelines for quality and/or environmental management systems auditing*.

The methodology for this compliance audit involved the following key tasks:

- Tender process and engagement of independent acoustical specialist
- Information and documentation review
- Noise monitoring and analysis
- Site inspection and meetings with proponent
- Evaluation of compliance against the audit criteria
- Preparation and review of draft report.

These tasks are described below.

### **2.3.1 Independent acoustical specialist**

In recognition of the need for specialist acoustical expertise to evaluate compliance with the noise criteria, the Department conducted a NSW Government e-tendering process for an independent specialist with the necessary expertise to conduct the required noise monitoring, data analysis and evaluation of compliance.

The successful tenderer was Renzo Tonin & Associates, a company that demonstrated complete independence from the three wind farms to be audited and their operators, together with the required level of expertise to conduct the audits with a high degree of competence and integrity.

The acoustical specialist reviewed noise data and wind farm operational records that had been provided by the Proponent, conducted (attended and unattended) noise monitoring at five monitoring locations, analysed the noise monitoring data and evaluated compliance with the noise criteria.

The work of the acoustical specialist was conducted in close consultation with, and overseen by, the Department's Technical Specialist on noise.

Further, the acoustical specialist's principal, Mr Renzo Tonin, signed an oath confirming his independence (see **Appendix D**).

### **2.3.2 Information and documentation review**

The independent acoustical specialist reviewed noise compliance monitoring provided by the proponent, prior to conducting its own monitoring.

To support the noise monitoring conducted under the audit, the acoustical specialist obtained and reviewed all relevant wind farm operating data for the period during which noise monitoring was undertaken, together with operating data for other times to gauge whether the wind farm was operating normally during the monitoring period.

To assist evaluation of compliance with non-noise approval conditions, the Department obtained relevant reports and information from the Department's files or the proponent.

### **2.3.3 Noise monitoring and analysis**

The independent acoustical specialist conducted the following activities relating to noise monitoring and analysis:

- reviewed noise data and wind farm operational records that had been provided by the Proponent on request
- conducted continuous noise monitoring over a period of 4 weeks from Tuesday 19 June 2012 to Monday 16 July 2012 inclusive, at the four residential locations in the vicinity of the wind farm to which the noise criteria in the consent apply (Kildare, Glendale, Bonnie Doon and Torokina) using unattended monitors
- conducted further short term attended noise monitoring at above four locations to supplement the unattended monitoring results
- analysed the noise monitoring data and evaluated compliance with the noise criteria.

The wind farm audits were timed to ensure noise monitoring occurred during the cooler months of the year as these months generally present worst case conditions for noise impacts on residences from the operation of wind turbines.

The duration of 4 weeks was chosen for the continuous noise monitoring on the basis that the independent specialist required at least 2 weeks' of data to conduct a meaningful assessment of compliance with the noise criteria.

#### **2.3.4 Site inspection and meetings with proponent**

The Department conducted a site inspection and held meetings with the proponent on 3 July 2012. The inspection included a full inspection of the entire wind farm site together with an inspection of the office, control room and substation. Meetings were held with the proponent on the day of the inspection and an audit checklist subsequently completed by the proponent.

The site inspection included an inspection of the noise monitoring equipment and locations used for the audit and visits to several residences in the vicinity of the wind farm turbines.

#### **2.3.5 Evaluation of compliance against the audit criteria**

Compliance with the audit criteria was evaluated in two ways. Evaluation against the noise criteria was conducted by the acoustical specialist following analysis of the noise monitoring data obtained during the audit.

For evaluation against the non-noise conditions, the Department completed an audit checklist, which is provided at **Appendix A**.

#### **2.3.6 Preparation and review of draft report**

The draft audit report was forwarded to the proponent for comment on matters of fact and these comments (see **Appendix F**) have been considered in finalising the audit report.

### **2.4 Audit criteria**

The audit criteria for this audit are the conditions of approval (DA-250-10-2004-i) relating to the operation of Woodlawn Wind Farm. A copy of the approval is provided at **Appendix G**.

It should be noted that Condition 2 of the approval requires the project to be carried out generally in accordance with the project's development application, environmental impact statement, noise assessment and a number of reports addressing fauna assessment. These documents were therefore taken to form a component of the audit criteria and were reviewed as appropriately related to the audit scope.

### **2.5 Audit team**

The team for this audit consisted of the following Departmental officers:

- Rob Sherry – Lead Auditor
- John Sparkes – Auditor

Representatives from Palerang Shire Council and Goulburn Mulwaree Council and the EPA were invited to be Observers. Representatives from the EPA attended however the other stakeholders were unavailable at the time of the audit.

The noise compliance monitoring, analysis and evaluation were conducted by the following staff from the acoustical specialist:

- Renzo Tonin
- William Chan
- Ariel Michael

The noise compliance monitoring, analysis and evaluation were overseen by the Department's Technical Specialist for noise, Jeff Parnell.

### 3 COMMUNITY CONSULTATION

The Department undertook community consultation as part of the audit process. Community consultation included the distribution of community survey questionnaires to all land owners within 4km of a wind turbine and providing the opportunity for questionnaire recipients to meet with the audit team to discuss compliance related issues.

Of the 49 survey questionnaires sent to residents within 4km of Woodlawn wind farm, 12 were completed and returned. It should be noted that a wide range of issues were raised in the questionnaire responses and subsequent face to face discussions with the auditors – many falling outside the scope of the audit. Those matters that fell within the scope of the audit and are addressed in the audit findings (Section 5) relate to:

- Television and radio interference
- Complaints management

A separate report has been prepared that describes the community consultation undertaken by the Department in association with the three wind farm audits, the range of issues raised by community members and the Department's responses to the issues raised. See the Department's publication *Community Consultation associated with Compliance Audits of Cullerin Range, Woodlawn and Capital Wind Farms* which is available on the Department's website.

### 4 WIND FARM GUIDELINES

The Department has prepared the Draft NSW Planning Guidelines: Wind Farms to ensure effective consultation with local communities and to deliver improved consistency, transparency and rigour in the planning assessment process.

Information collected during the wind farm audits has been considered in the finalisation of the Draft Guidelines.

## 5 AUDIT FINDINGS

### 5.1 Presentation of audit findings

#### 5.1.1 Categories of findings

This report categorises the audit findings as either **compliant** or **non-compliant**. In addition, for some items that were otherwise found to be compliant, the auditors identified potential opportunities for improved environmental performance or community access to information – these items are identified as **observations**. The audit report includes required actions for the proponent to address any non-compliances and recommended actions to address any observations.

#### 5.1.2 Significance-rating of non-compliances

The level of significance of non-compliances found by the Department's audits are estimated as high, moderate or low according to the following qualitative risk assessment process.

Non-compliances are assessed against two criteria: the "likelihood of impact occurring" and the "estimated level of impact".

The *likelihood of impact occurring* is assessed as "almost certain", "likely" or "unlikely" by considering factors including the past performance of the project (from recent audits, inspections and reports from other authorities), monitoring and reporting conducted by the proponent as required by conditions of approval and the general performance of the project measured by this audit.

The *estimated level of impact* is assessed by considering the nature and scale of the potential impact with level of sensitivity of the receiving environment to the impact.

After these assessments are made, the information is transferred into the significance-rating matrix shown in **Table 1**.

**Table 1: Significance-rating of non-compliances**

<b>Likelihood of impact occurring</b>	<b>Estimated level of impact</b>		
	<i>High</i>	<i>Moderate</i>	<i>Low</i>
<i>Almost certain</i>	High	High	Moderate
<i>Likely</i>	High	Moderate	Low
<i>Unlikely</i>	Moderate	Low	Low

A non-compliance rated as high significance (red code) suggests that it is associated with a high impact risk and needs to be addressed as a priority. A non-compliance rated as moderate significance (orange code) may still carry a significant impact risk but can be given a lower priority than a highly significant matter. A non-compliance of low significance (yellow code) will still need to be addressed on a routine basis.

Some non-compliances relate to administrative and reporting matters with little direct impact on the environment or communities, but are still important to the integrity of the regulatory system. Non-compliances in this category are given a blue code.



## 5.2 Overview of findings

The audit found Woodlawn wind farm to have a high standard of compliance with the key operational conditions of approval.

The independent acoustical specialist also found Woodlawn wind farm to be compliant with the noise criteria at all residential properties monitored during the period of the audit. A copy of the Noise Compliance Report prepared by the independent specialist is provided at **Appendix C**.

Overall, the audit identified one non-compliance, relating to the public availability of documents (blue code).

The audit also made four observations, with recommendations to improve environmental performance or community access to information.

The findings are further detailed in the following sections.

## 5.3 Compliance with noise criteria

### 5.3.1 Noise criteria

The operational noise criteria are specified by Condition 49 of approval, as follows:

*Noise generated from the Development must not exceed at the identified properties the equivalent noise level ( $L_{Aeq, 10}$ ) adjusted for any tonality as presented in the table below.*

10m (height)wind speed (m/s)	Noise level $L_{Aeq, 10}$ (10 minute) – 24 hours a day			
	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
2	35	35	35	35
3	35	35	35	35
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

However, there are two key factors relating to the noise criteria that present difficulties for measuring compliance. These are:

- The noise criteria in the approval relate to noise from the development. It is not possible to directly measure noise from the development because the total noise level measured includes noise from other sources, particularly noise from wind blowing through vegetation (wind noise). There is also a noise contribution from Capital wind farm at three of the four monitoring points (Glendale, Bonnie Doon and Torokina).
- The noise criteria relate to wind speed measured at 10m height, however the approval has no requirement to measure wind speed at 10m height. The wind farm's

meteorological mast has anemometers at 80m and 36m heights, therefore the wind speed at 10m for the purposes of compliance assessment needs to be extrapolated and at best the result will be approximate only.

A further difficulty arises from limitations with the 2004 baseline noise survey used to predict noise impacts from the project, including a lack of information on the contribution of wind noise and level of wind screening of the microphones, whether wind and rain noise had been removed from the analysis, and the precise locations at which noise measurements were made. The independent specialist's report indicates that as the analysis for the audit depends critically on the accuracy of the baseline survey, these factors precluded a definitive conclusion to be made of compliance. Despite these limitations, for all monitoring points, a reasonable assessment could be made by examining the results at lower wind speeds where wind noise is expected to be at a minimum.

Because of the above mentioned difficulties, any compliance assessment against the noise criteria cannot be definitive and an approximation only. This compliance audit used methodologies for approximation of wind speed and adjustment of the measured noise levels to estimate compliance with the noise criteria. However it would be reasonable to place a higher level of certainty concerning compliance on the noise levels for lower wind speeds of 4-5m/s rather than the estimated levels at higher wind speeds.

Further discussion of the methodologies for estimation of compliance is provided in the Noise Compliance Report at **Appendix C**.

### **5.3.2 Unattended monitoring**

The primary source of noise data for this audit came from monitors placed at each monitoring location for a period of four weeks. These monitors recorded noise levels continuously and were therefore "unattended".

The unattended monitoring was conducted from Monday 18 June 2012 to Monday 16 July 2012, at the four properties identified in the approval, being Kildare, Glendale, Bonnie Doon and Torokina. Photographs of the noise monitors set up at these locations are provided in **Appendix A** and in the Noise Compliance Report at **Appendix C**.

All of these monitoring locations are on properties that are not associated with the wind farm. The monitoring locations together with the wind turbine locations are shown in **Figure 2**.

### **5.3.3 Attended monitoring**

Noise data and observations from attended monitoring are able to supplement the data gained from the continuous, unattended monitoring. An advantage of attended monitoring is that the attendant can gain an appreciation of the acoustic environment and note the prevalence of non-wind farm noise such as barking dogs, birds, insects and traffic and train noise. Importantly, the attendant can also note the level of audibility of the wind turbines.

Attended noise monitoring was also used to determine whether the measured noise levels needed to be modified (increased) because of tonality or low frequency noise. Condition 52 of the approval requires such adjustment to the measured noise levels in accordance with the *NSW Industrial Noise Policy (NSW EPA, January 2000)*.

### **5.3.4 Findings of noise monitoring**

Following analysis of the noise monitoring data, the independent specialist found that the estimated noise levels at all the above monitoring locations demonstrated compliance with the consent conditions.

A full report on the independent specialist's noise monitoring, assessment and findings on compliance is provided at **Appendix C**. A summary of the findings for each monitoring point is provided below.

### Kildare

Kildare is located to the east of the wind farm near the Bungendore Road, approximately 2.7 km from the nearest turbine. The noise criteria for this location are provided in **Table 2**, together with the measured total noise levels and the estimated levels of noise from the wind farm for the purpose of compliance assessment.

**Table 2: Kildare compliance assessment**

10m Wind Speed m/s	2	3	4	5	6	7	8	9	10	11	12	13	14	15
Criteria	35.0	35.0	35.0	35.0	35.0	35.0	36.0	36.0	37.0	38.0	38.0	39.0	39.0	40.0
Measured (total noise)	26.0	27.6	29.4	31.2	33.0	34.7	36.5	38.1	39.7	41.1	42.3	43.4	44.2	44.8
Estimated Woodlawn noise	26.0	27.6	29.4	31.2	32.7	32.7	33.2	33.7	33.7	33.7	33.7			

The "Measured" row represents the sum of the noise level from the turbines and the wind related noise from vegetation and therefore cannot validly be compared with the "Criteria" which excludes wind noise.

The independent specialist stated that a reasonable assessment of compliance can be made at the lower wind speeds of 4-5 m/s where wind noise is expected to be at a minimum. The measured levels at these speeds were therefore not adjusted. For wind speeds above 5m/s, the measured noise levels were adjusted by the increases in noise levels with increasing wind speed predicted by the project's environmental assessment.

The resulting "Estimated" row can then be compared with the "Criteria" to assess compliance, with the finding that compliance is demonstrated at all wind speeds.

Two attended noise surveys were undertaken at Kildare, the first between 10.51pm and 11.10pm on Monday 18 June 2012 and the second between 9.40pm and 9.50pm on Monday 2 July 2012. Wind noise from nearby trees dominated the first survey and the onset of cricket noise in the second survey prevented more than one measurement being taken. Both surveys found no requirement for tonality or low frequency corrections to the measured noise levels.

### Glendale

Glendale is located to the SSE of the wind farm, approximately 2.3 km from the southern-most wind turbine. Noise measured at this location was impacted by wind noise and also by noise from Capital wind farm. The noise criteria for this location are provided in **Table 3**, together with the measured noise levels and the noise levels reduced for the estimated contributions of wind noise and Capital wind farm noise.

**Table 3: Glendale compliance assessment**

10m Wind Speed m/s	2	3	4	5	6	7	8	9	10	11	12	13	14	15
Criteria	35.0	35.0	35.0	35.0	35.0	35.0	35.0	35.0	36.0	36.0	37.0	37.0	38.0	39.0
Measured (total noise)	26.8	28.8	31.0	33.2	35.4	37.6	39.7	41.7	43.4	45.0	46.2	47.1	47.5	47.5
Estimated total turbine noise	26.8	28.8	31.0	33.2	34.7	34.7	35.2	35.7	35.7	35.7	35.7			
Estimated Woodlawn noise			30.5	32.7	34.2	34.7	34.7	35.2	35.2	35.7	35.7			

Adjustments were made to the measured noise levels for wind speeds above 5 m/s as previously explained for Kildare. Therefore the noise levels in the “Estimated total turbine noise” row represent cumulative total noise from Woodlawn and Capital wind farms. From this a correction value is subtracted for the Capital wind farm contribution, arriving at the estimated noise from Woodlawn wind farm in the bottom row. This row can then be compared with the “Criteria” to assess compliance, with the finding that, with the exception of an insignificant exceedance of 0.2 dB(A) at a wind speed of 9 m/sec, compliance is demonstrated at this location for all wind speeds.

An attended noise survey was undertaken at Glendale between 10.10pm and 10.20pm on Monday 2 July 2012. The occurrence of increased animal noise prevented more than one measurement being taken. Low level turbine hum could be heard together with crickets, animal noise and some traffic. Analysis of the results found that no correction factor was applicable for low frequency noise or tonality.

#### *Bonnie Doon*

This location is to the WSW of Glendale and approximately 2.5km SSW of the southern-most turbine. It is actually located closer to Capital wind farm, being approximately 2km NE of the nearest turbine. Noise measured at this location was impacted by wind noise and also by noise from Capital wind farm. The noise criteria for this location are provided in **Table 4**, together with the measured noise levels and the noise levels reduced for the estimated contributions of wind noise and Capital wind farm noise.

**Table 4: Bonnie Doon compliance assessment**

10m Wind Speed m/s	2	3	4	5	6	7	8	9	10	11	12	13	14	15
Criteria	35.0	35.0	35.0	35.0	35.0	35.0	35.0	35.0	35.0	35.0	35.0	35.0	35.0	36.0
Measured (total noise)	27.3	28.9	31.0	33.3	35.9	38.5	41.1	43.6	45.8	47.8	49.3	50.2	50.6	50.2
Estimated total turbine noise	27.3	28.9	31.0	33.3	34.3	34.8	35.3	35.3	35.3	35.3	35.3			
Estimated Woodlawn noise			24.5	26.8	27.8	28.8	28.8	29.3	29.3	29.3	29.3			

Adjustments were made to the measured noise levels for wind speeds above 5 m/s as previously explained for Kildare. Therefore the noise levels in the “Estimated total turbine noise” row represent cumulative total noise from Woodlawn and Capital wind farms. From this a correction value is subtracted for the Capital wind farm contribution, arriving at the estimated noise from Woodlawn wind farm in the bottom row. This row can then be compared with the “Criteria” to assess compliance, with the finding that compliance is demonstrated at this location for all wind speeds.

An attended noise survey was undertaken at Bonnie Doon between 11.10pm and 11.30pm on Monday 2 July 2012. Weather conditions were calm and animal noise and the Capital turbines to the south were audible. Analysis of the results found that no correction factor was applicable for low frequency noise or tonality.

#### *Torokina*

Torokina is located to the west of Woodlawn wind farm, approximately 2.6km from the nearest turbine. As with Bonnie Doon, it is actually closer to Capital wind farm, being approximately 2.4km from its nearest turbine. Noise measured at this location was impacted by wind noise and also by noise from Capital wind farm. The noise criteria for this location are provided in **Table 5**, together with the measured noise levels and the noise levels reduced for the estimated contributions of wind noise and Capital wind farm noise.

**Table 5: Torokina compliance assessment**

10m Wind Speed m/s	2	3	4	5	6	7	8	9	10	11	12	13	14	15
Criteria	35.0	35.0	35.0	35.0	35.0	36.0	37.0	38.0	39.0	39.0	40.0	41.0	41.0	42.0
Measured (total noise)	26.4	27.3	28.4	29.6	30.9	32.2	33.6	35.0	36.4	37.7	38.9	39.9	40.7	41.4
Estimated total turbine noise	26.4	27.3	28.4	29.6	31.1	31.1	31.6	32.1	32.1	32.1	32.1			
Estimated Woodlawn noise			25.9	27.1	28.6	29.1	29.6	29.6	29.6	29.6				

Adjustments were made to the measured noise levels for wind speeds above 5 m/s as previously explained for Kildare. Therefore the noise levels in the “Estimated total turbine noise” row represent cumulative total noise from Woodlawn and Capital wind farms. From this a correction value is subtracted for the Capital wind farm contribution, arriving at the estimated noise from Woodlawn wind farm in the bottom row. This row can then be compared with the “Criteria” to assess compliance, with the finding that compliance is demonstrated at this location for all wind speeds.

No attended survey was conducted at this location as it was not possible to enter the property at night and measurement on its access road would not have been of benefit due to its significant distance from the dwelling and proximity to the Capital wind turbines.

## 5.4 Findings related to non-noise conditions

This section addresses only those matters where the audit found non-compliance, made observations or considered the matter significant enough to warrant a comment. Matters addressed by the audit but not described in this section were found to be compliant and satisfactorily managed by the proponent.

All matters addressed in the non-noise component of this audit are detailed in the Audit Checklist at **Appendix B**.

### 5.4.1 Communication and consultation

Condition 41 of the consent requires the Proponent to make all documents relevant to the consent, with the exception of that information that may be legitimately claimed as of a confidential commercial nature, publicly available at a location on the development site convenient for inspection by visitors.

The audit found that some documents were available for inspection by the public at the front counter of the Capital substation office, however this arrangement was not convenient for inspection by visitors. This is because the access to the site is prohibited by a sign at the gate from the Tarago Road and there was no telephone number provided to effect entry to the site. This arrangement was found to place the Proponent in **non-compliance** with condition 41. Upon returning to the site 4 weeks later, the auditors found there was still no telephone number provided on signage at the front gate. The audit requires that convenient access be made available for visitors to inspect publicly available documents, within one month from the date of this report.

This non-compliance was assessed in accordance with the significance-rating procedure described in Section 5.1. The assessment considered this to be largely an administrative matter, giving it a blue code rating.

The auditors also made an **observation** that public access to relevant documents could be improved by posting them on the project’s web site. A recommendation has been made that

all documents relative to the consent except those of a confidential commercial nature, be posted on the project's web site within one month from the date of this report.

#### **5.4.2 Complaints management**

Condition 45 addresses the need for the Applicant to keep a complaints register which records details of complaints and any action taken by the Applicant including any follow-up contact with the complainants.

The complaints register was sighted by the auditors, who found that actions recorded against a number of complaints was "responded by email" or "added to complaint register" with no indication of the nature of any action taken specific to the complaint.

The audit has made an **observation** in relation to this issue, with a recommendation that the management of complaints be reviewed to ensure complaint details, any action taken, any follow-up contact with the complainant and any reasons for no action taken be fully recorded in the complaints register.

The Department's community consultation also received some responses indicating that it was difficult to find the 24-hour telephone contact line required by Condition 44. However, the audit found the appropriate contact details on the Infigen Energy website, accessed by typing Woodlawn Wind Farm into an internet search engine.

#### **5.4.3 Noise mitigation – vacant lots**

Condition 56 requires the Proponent to provide noise mitigation measures to no more than one residence built on any vacant lot legally existing at the time of the consent, upon which a residential dwelling would be permissible at the same date, if noise levels from the wind farm at the residence would exceed the SA Guidelines.

The Proponent advised the auditors it was aware of a dual occupancy constructed since development of the wind farm and that it would review the dwelling against the condition and advise accordingly.

Compliance against this condition was not able to be determined, pending the Proponent's review of the situation against the condition. This matter is therefore recorded as an **observation** with a recommendation that the Proponent assesses the dwelling and provides the Department with a timetable for installation of noise mitigation measures if required under the condition, within three months from the date of this report.

#### **5.4.4 Greenhouse and energy management**

Condition 24 requires preparation of a greenhouse and energy management strategy to minimise the use of non-renewable energy sources in construction and operation. The strategy so produced included the use of energy saving light bulbs. The audit noted that fluorescent tubes in the storage areas of the site compound were not of the energy efficient variety. Since fluorescent tubes are not technically light bulbs, no non-compliance was found against this condition, however an **observation** was recorded with a recommendation to ensure all fluorescent tubes and light bulbs be of energy efficient varieties within three months from the date of this report.

## 5.5 Summary of findings

### 5.5.1 Non-compliances

The audit found one non-compliance with the project approval, summarised in **Table 2**.

**Table 2:** Non-compliances and required actions

Reference No.	Condition	Non-compliance	Required Action
N1	41	The arrangement for documents to be available for inspection by the public at the front counter of the Capital substation office was not convenient for visitors. This is because the access to the site is prohibited by a sign at the gate from the Tarago Road and there was no telephone number provided to effect entry to the site.	Make convenient access for visitors to inspect publicly available documents.  <i>Due date:</i> One month from the date of this report.

### 5.5.2 Observations and recommended actions

The audit made four observations in relation to matters that were otherwise compliant but with the potential for improved environmental performance or community access to information. A list of the observations is provided in **Table 3**.

**Table 3: Observations and recommended actions**

Reference No.	Condition	Observation	Recommended Action
O1	41	Public access to relevant documents could be improved by posting them on the project's web site.	Post all documents relative to the consent except those of a confidential commercial nature, on the project's web site.  <i>Due date:</i> One month from the date of this report.
O2	45	On the project's complaints register, actions recorded against a number of complaints was "responded by email" or "added to complaint register" with no indication of the nature of any action taken specific to the complaint.	Review the management of complaints to ensure complaint details, any action taken, any follow-up contact with the complainant and any reasons for no action taken be fully recorded in the complaints register.  <i>Due date:</i> Immediately from the date of this report.
O3	56	The Proponent advised the auditors it was aware of a dual occupancy constructed since development of the wind farm and had not addressed its potential for noise mitigation measures to be provided under this condition.  The Proponent further advised it would review the dwelling against the condition and advise the Department accordingly.	Assesses the dwelling and provide the Department with a timetable for installation of noise mitigation measures if required under the condition.  <i>Due date:</i> Three months from the date of this report.
O4	24	Fluorescent tubes in the storage areas of the site compound were not of the energy efficient variety.	Ensure all fluorescent tubes and light bulbs are of energy efficient varieties  <i>Due date:</i> Three months from the date of this report.



### **5.5.3 Summary of actions arising from the audit**

The actions arising from this audit are summarised as follows.

#### *Public availability of documents*

- N1: Make convenient access for visitors to inspect publicly available documents within one month from the date of this report.
- O1: Post all documents relative to the consent except those of a confidential commercial nature, on the project's web site, within one month from the date of this report.

#### *Complaints management*

- O2: Review the management of complaints to ensure complaint details, any action taken, any follow-up contact with the complainant and any reasons for no action taken are fully recorded in the complaints register, immediately from the date of this report.

#### *Noise mitigation for new dwelling*

- O3: Assesses a dual occupancy dwelling constructed since development of the wind farm and provide the Department with a timetable for installation of noise mitigation measures if required under the condition, within three months from the date of this report.

#### *Energy efficiency*

- O4: Ensure all fluorescent tubes and light bulbs are of energy efficient varieties, within three months from the date of this report.

## **6 PROPONENT'S COMMENTS ON DRAFT AUDIT REPORT**

The proponent was forwarded the draft audit report to provide comments on matters of fact and on any progress with the draft recommended actions. A copy of the proponent's comments, together with the auditors' responses, is provided at **Appendix F**.