

**Proposed development of the
Gullen Range Wind Farm
Southern Tablelands**



Submissions Report
November 2008

**Prepared for Gullen Range
Wind Farm Pty. Ltd.
a subsidiary of**

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1 Introduction

The Gullen Range Wind Farm is proposed in the Southern Tablelands on elevated ridges located approximately 25km west of Goulburn and 6km south of Crookwell. The proposal encompasses the construction and operation of up to 84 wind turbines, with associated substation and electrical infrastructure, onsite control room, maintenance facilities, access tracks and minor upgrades to adjacent roads.

The proposal is a Part 3A Major Project under the *NSW Environmental Planning and Assessment Act 1979* and therefore the consent authority is the Minister for Planning. The proposal is also consistent with the criteria of *Critical Infrastructure* as it is a power generator with the capacity to generate in excess of 250MW.

The Proponent for this proposal is Gullen Range Wind Farm Pty. Ltd. which is a wholly owned subsidiary of Epuron Pty. Ltd. Gullen Range Wind Farm Pty. Ltd. was established as a special purpose company for the Gullen Range wind project and all permits and approvals would sit with this company.

An Environmental Assessment (EA), prepared by **ngh**environmental, was submitted to the NSW Department of Planning and was placed on public exhibition from the 4th of August to the 5th of September 2008. During this period, submissions were sought from the local community, government agencies, interested parties and other stakeholders. The Department of Planning accepted submissions up to the 29th of September.

Key issues were identified in consultation with stakeholders (including the community, local Councils, agency representatives and the consent authority) and formalised in the Director General's Requirements for the preparation of the Environmental Assessment. Investigation of these issues formed the major part of the Environmental Assessment. These issues were investigated via specialist reports and by desktop assessment.

Specialist investigations were carried out in the key areas of:

Visual impacts	Operational noise impacts
Biodiversity impacts	Aboriginal archaeological impacts
Aviation hazard impacts	Communication impacts
Land value impacts	Traffic and transport impacts

These investigations are appended to the EA in full and are summarised in the body of the EA. They characterise the potential visual, noise, archaeological, biodiversity and traffic and transport impacts of the proposal and outline mitigation measures required to accompany the proposal to manage the identified impacts.

Additional issues were considered by desktop assessment and consultation in the EA. These included:

- Electromagnetic fields (EMFs)
- Hydrological impacts
- Economic impacts
- Lifestyle impacts
- Agricultural impacts
- Historic heritage
- Resource impacts
- Fire and bushfire impacts
- Mineral exploration impacts
- Community wellbeing
- Tourism impacts
- Health and safety impacts
- Physical impacts
- Cumulative impacts

These assessments indicate that potential impacts are manageable with the implementation of specific mitigation measures.

1.1 Purpose of this Report

The Department of Planning provided individual submissions from members of the public and government agencies and asked the proponent to respond to the issues raised in accordance with Section 75H of the *NSW Environmental and Planning Assessment Act 1979*.

This Submissions Report considers and responds to the issues raised in the submissions on the Gullen Range wind farm EA.

1.2 Summary of the Proposal

As presented in the EA, the proposal would involve the construction and operation of a medium scale wind farm in the Southern Tablelands region of NSW. The proposal includes:

- Up to 84 wind turbines, each with three blades mounted on a tubular steel tower
- Electrical connections between wind turbines using multiple step-up transformers and a combination of underground cable and overhead concrete or timber pole power lines
- A substation and transmission connection linking the wind turbines to the existing TransGrid 330kV transmission system located onsite
- An onsite control room and maintenance facilities
- Internal access tracks and minor upgrades to site access via Gurrundah Road, Range Road, Grabben Gullen Road, Bannister Lane, Prices Lane and Storriers Lane, required for the installation and maintenance of wind turbines and associated infrastructure

Additional temporary construction activities and infrastructure would be required during the construction and refurbishment or decommissioning phases, such as temporary site compounds and storage areas.

Wind turbines proposed have a nameplate capacity of up to 3.3 megawatts. Accordingly the project would have the capacity to generate up to 278 MW. A number of alternative turbines are being considered for the site within the broad physical parameters identified in the EA; including 135m maximum tip height and 3.3MW generation capacity. A range of turbines are being contemplated and the full list was presented in Table 3-1 of the EA. The final turbine selection would be carried out through a competitive tender process pending project approval.

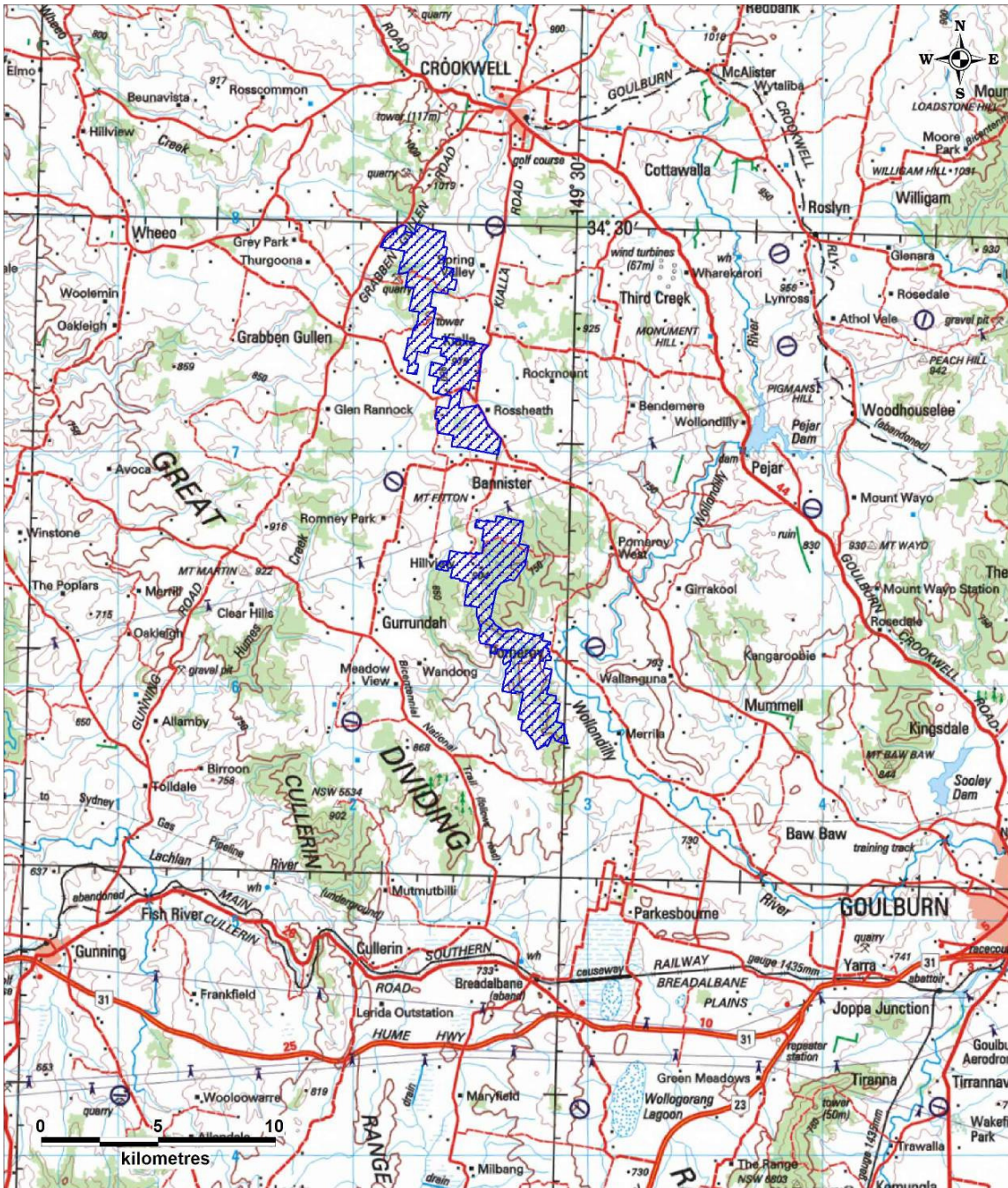


Figure 1-1 Site location

The site (hatched in blue) is located along a north-south running ridge system of the Great Dividing Range between Gunning, Crookwell and Goulburn in NSW's southern tablelands.

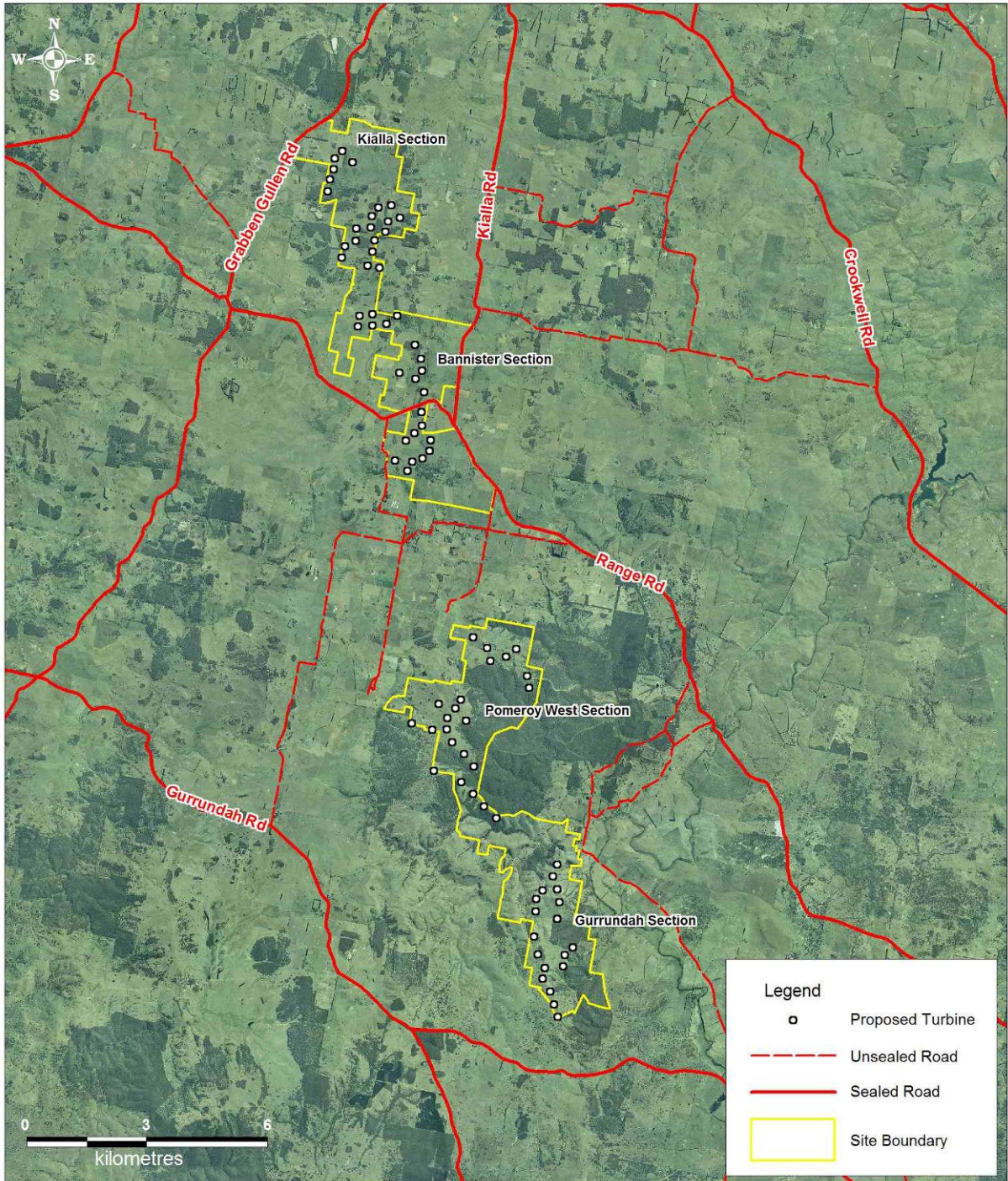


Figure 1-2 Site boundaries

The site involves four broad groupings of turbines located near the localities of Kialla in the north, Bannister, Pomeroy and Gurrundah in the south.

1.3 Project Benefits

The project would reduce the current dependency on the consumption of fossil fuels for electricity and would therefore reduce the impacts of climate change resulting from the emission of greenhouse gases. Within the electricity sector in NSW, approximately 90% of electricity is generated by fossil fuel power stations, primarily coal fired power stations. Greenhouse gas emissions from electricity generation in New South Wales grew by 44% between 1990 and 2002 (NSW Govt 2004).

Based upon an 84 turbine layout, the project offers the following broad benefits:

- Production of approximately 588,000 MWh of renewable electricity per annum, sufficient for the average consumption of up to 73,500 homes
- Reduction in greenhouse gas emissions of approximately 588,000 tonnes of carbon dioxide (equivalent) per annum, the equivalent of taking 117,600 cars off our roads
- Savings in water consumption of approximately 774 Million litres per annum of potable water (this is the amount of water required to produce the same amount of electricity from coal fired power stations)
- Annual savings in pollution from coal fired power stations of up to 3,150,000 kilograms of sulfur dioxide, 1,405,000 kilograms of nitrogen oxides and 88,200 kilograms of particulates
- Provision of a community fund of \$75,000 per annum for local community and environmental projects including a Clean Energy Program
- Provision of local jobs and injection of up to \$200 Million into the Australian economy and approximately \$60 - \$90 Million into the local economy
- Improved security of electricity supply through diversification

2 Consideration of Submissions

2.1 Exhibition Period and Location

The Gullen Range Wind Farm Environmental Assessment (including large format photomontages and selected large format figures from the EA) was on public exhibition from Monday 4th of August 2008 to Friday 5th of September 2008 at:

- Upper Lachlan Shire Offices, Crookwell;
- Crookwell Library, Crookwell;
- Goulburn Mulwaree Shire Offices, Goulburn;
- Nature Conservation Council, 301 Kent St, Sydney;
- Department of Planning, 23-33 Bridge St, Sydney.

Local residents were notified of the exhibition period through newspaper advertisements placed in the local papers by the Department of Planning, a newsletter sent to residents within 5km of the project or who had registered their interest in the project and via the general media following a media release issued by Epuron.

The Department of Planning extended the deadline for submissions until 29th of September 2008.

2.2 Responses received and analysis process

The Department of Planning received a total of 67 submissions prior to the deadline of the 29th of September 2008 and two following the deadline, resulting in a total of 69 submissions. Of the 69 submissions, 56 were from individual members of the public, 10 were from government agencies and 3 were from representative groups. In accordance with section 75H of the Environmental Planning and Assessment Act 1979, this section provides considered responses to the issues raised in submissions received in relation to the EA for the proposed Gullen Range Wind Farm.

The submissions were separated into those provided by community members and those provided by Government Agencies. The Government agency submissions have been addressed separately on an agency by agency basis as they reflect detailed and specific issues related to the particular technical expertise of the agency.

The issues raised in each submission were summarized and tabulated to identify the most frequently and infrequently raised issues. This matrix (attached as

Appendix 2) forms the basis of the structure of this response to submissions and the prioritization of issues as presented below.

2.3 Summary of Submissions

Total No. of Submissions	69	-
No. of Government Agency submissions	10	13%
No. of submissions representing groups	3	4%

The issues most commonly raised in the community submissions are summarized below:

Key Issues	Section where issue addressed	No. of submissions that raised the issue
Visual impacts	Section 3.1	40
Operational noise impacts	Section 3.2	33
Community impacts and community consultation	Section 3.3	29
Land value impacts	Section 3.4	27
Biodiversity (including flora and fauna impacts)	Section 3.5	23
Wind variability / efficiency (Project Justification)	Section 3.6	17
Traffic and transport	Section 3.7	16
Health impacts	Section 3.8	12
EA lacks specific details / not adequate	Section 2.4	11
Construction noise impacts	Section 3.9	10
Fire risks	Section 3.10	10
Hydrology (water, water quality and water-table impacts)	Section 3.11	9
Turbine layout unclear	Section 2.4 and See note 1 below	9
Size and extent of project	See note 1 below	9
Turbine size and capacity unclear	See note 1 below	8
Decommissioning	Section 4.6	9
Communications and telecoms	Section 3.12	8
Aircraft hazards / Aviation	Section 3.13	7

Note 1: These general issues raised in the submissions relating to the project size, turbine size, turbine capacity and layout are addresses in the specific sections related to the nature of the potential impacts such as visual, noise and traffic and transport.

2.4 Format and process of Part 3A Major Project assessment

A number of the submissions relate to the format of the EA, and argue that there is a lack of specificity in the EA and its assessment of impact.

It is acknowledged within the EA that the exact final layout of the proposed turbines, and selection of final turbines, can only be carried out after planning

consent is achieved. The '**development approach**' taken is a reflection of the development type. This has been essential so that the proponents maintain the flexibility that is required by wind farm developers in the selection of turbine model and final location.

The assessment has been designed in a manner that takes this requirement into account. To ensure that the assessment has been carried out to an appropriate level, a precautionary approach has been utilised. For example the visual assessment utilises a 'worst case scenario', and the biodiversity assessment relies on constraints mapping that identifies where turbines and associated infrastructure would be most appropriately located.

In key areas of noise impact, the process proposed requires submission of final analysis to demonstrate that the impacts are consistent with the impacts identified in the EA.

Practicalities of the development process dictate that a line must be drawn on the level of detail that can be achieved in the EA. The EA is an extensive document, that is augmented with a number of specialised reports. The document has the objective of providing the technical detail of key issues in the appendices while allowing for a more readable account of key findings in the body of the EA. The EA aims to uncover key constraints and identify whether they can be mitigated or not. The standard format for the assessment is:

- Explanation of approach, where specific methodology has been employed
- Discussion of the receiving environment
- Discussion of the impact types
- Relating the impact types to the receiving environment to evaluate the seriousness of the potential impacts
- Development of mitigation measures to ensure that impacts avoided or managed acceptably

With reference to what is acceptable, professional judgement, legislative requirements and industry guidelines have been sourced. Where policies have not been entirely met (for example, the Upper Lachlan Shire Development Control Plan for Wind Farms), justification has been provided.

Mitigation is set out as a series of commitments aimed at ensuring that key issues are considered during detailed planning and the construction, operation and decommissioning of the project. In cases where the final design-level detail of the proposal is not available, clear principles in relation to mitigation are specified as is the process for finalising the mitigation.. For example the:

- final noise modelling will follow final turbine selection and layout to ensure compliance; and
- final traffic mitigation measures would need to incorporate the transport contractor, selected in a competitive tender process, post-project approval.

It is acknowledged by the authors of the EA that environmental impact assessment is often carried out without full information and therefore professional judgement must be used and a precautionary approach adopted to ensure that unacceptable impacts are avoided. This has been the approach adopted in the assessment of this proposal.

It is further acknowledged that environmental impacts accompany wind farm development and that these should be assessed thoroughly and mitigated where possible and appropriate. Most of the impacts identified are highly manageable. It is also recognised that some members of the of public are concerned in relation to this type of infrastructure, a proportion of this is likely to relate to the newness of the technology in Australia.

The assessment also recognises that in relation to other electricity generating works, wind farms have several environmental advantages (reduced water consumption, reduced emissions, reduced development footprint), as well as extending broad benefits to the community in the form of renewable electricity generation, local jobs and investment.

3 Proponent’s response to community submissions

Community submissions have raised a number of recurring themes in relation to the development. In order to form a response that is coherent and of relevance to the largest audience, the responses are not made to individual submissions but to these recurring themes. However, as much as possible, where specific concerns have been raised these have been specifically addressed in the response.

The Submission Number refers to a unique identifying number assigned to each submission and therefore this submissions report does not specifically identify any individual community responses to protect their confidentiality.

3.1 Visual Issues

Submission No.	Issue	Response
1, 3, 7, 8, 10, 11, 12, 13, 14,15, 18, 20, 21, 23, 26, 27, 29, 30, 33, 34, 36, 38, 42, 45, 46, 48, 49, 50, 51, 52, 55, 56, 57, 58	Wind turbines are visually intrusive and will impact the amenity of a rural environment, dominate or destroy the landscape or create an industrial landscape.	<p>This was the most common issue raised with 65% (34) of the submissions from community recording an objection based on the grounds of impacts to the visual amenity. This issue encompassed a number of related and recurring themes:</p> <ul style="list-style-type: none"> • Wind turbines are ugly • Wind turbines will dominate the landscape • Wind turbines degrade the scenic qualities of the landscape • Wind turbines will create an industrial landscape <p>The Landscape and Visual Impact Assessment (LVIA) methodology is based on the <i>Wind Farm and Landscape Values – National Assessment Framework</i> AWEA and Australian Council of National Trusts). The LVIA describes the:</p> <ul style="list-style-type: none"> • visual components of the proposed wind farm; • describes peoples’ perception of wind farms in the landscape; • defines the viewshed and Zone of Visual Influence (ZVI); • describes the landscape characteristics within the viewshed; • assesses impacts of the proposal from public viewpoints; • examines the potential impact on residential properties; • examines potential mitigation measures;

		<ul style="list-style-type: none"> • analyses potential cumulative visual impacts; and • describes the potential impact of night lighting. <p>This methodology responds to the relevant sections of the ULSC Wind Power Generation DCP and considers Auswind’s <i>Best Practice Guidelines for the Implementation of Wind Energy Projects in Australia</i> (2006).</p> <p>The visual impact of a wind farm ultimately depends on the opinion of the viewer and therefore viewer perception is an important consideration of the assessment. Perception studies undertaken in Australian continually show that 60 -70% of people find wind turbines an attractive element in the landscape. A social research study to ascertain the regions views towards wind farms was conducted in the Goulburn – Crookwell – Yass region in 2007. The results of this study show that 67% of respondents who had seen a wind farm found them visually appealing, 89% supported wind farms in the Southern Tablelands and 71% supported a wind farm within 1km of their resident. The entire Perception Study is presented in the EA as Appendix 2.3. Furthermore, the Upper Lachlan Shire Council conducted a poll during the 2008 Council elections that confirmed that 70% of residents support the development of wind farms in the ULSC. The conclusion is that many people find wind turbines attractive and support the development of wind farms near their residences, and therefore the visual impact is not a negative impact. It is also acknowledged that some people in the community do not find wind turbines attractive and do not support the development of wind farms (5% opposed wind farms in the Southern Tablelands).</p> <p>The proposal is for a wind farm on an elongated north – south ridge in a landscape containing undulating hills that is traditional farming and grazing country. The LVIA describes the existing landscape in the viewshed as consisting of four landscape units:</p> <ul style="list-style-type: none"> • Gently undulating farmland – man-modified landscape containing infrastructure (farm sheds, power lines) and is not topographically dramatic; • Hilly farmland – man-modified landscape with steeper slopes and contains dams. • Vegetated areas – remnant vegetation generally on steeper slopes; and • Rural townships – villages and towns in the viewshed. <p>The landscape surrounding the wind farm is highly modified and contains man-made structures, including sheds, power lines, roads and residential dwellings. There is also a 330kv transmission line that bisected the wind farm. The landscape is a working landscape that regularly undergoes visual change through farming, grazing and cropping practices and is a constant reminder of the human influence on this landscape.</p> <p>The LVIA discussed 13 publicly accessible viewpoints, to demonstrate the likely range of available</p>
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		<p>views and visual impact from the landscape surrounding the proposed wind farm. The analyses of these viewpoints (discussed in detail in the LVIA) considers the sensitivity of the landscape units, the number of viewers and the visual influence base on the parameters of the human vision. The LVIA determined that there were no publicly accessible locations that would have a high level of visual impact.</p> <p>At the township of Grabben Gullen it was assessed that the proposed wind farm would have a low to moderate level of visual impact.</p> <p>The conclusion is that:</p> <ul style="list-style-type: none"> • Perception studies demonstrate there is a high level of support for wind farms in this area; • The proposal is located within a human-modified landscape consisting of agriculture activity that regularly undergoes seasonal visual change; • There are existing structures and other signs of human intervention that already exist in the landscape; • The landscape can absorb the visual change proposed by the Gullen Range Wind Farm; • There are no publicly accessible locations (roads, villages, public locations) that have a high level of visual impact • the proposed wind farm would have a low to moderate level of visual impact at Grabben Gullen; and • The cumulative visual impact is considered to be low. <p>While it is acknowledged that the proposal will have an impact on the visual environment of Gullen Range, it has been assessed that the proposed Gullen Range wind farm would be compatible with the existing surrounding landscape. The proposed wind farm is not considered to be an industrialization of the landscape.</p>
<p>6, 15, 30, 41,</p>	<p>Methodology of Visual Impact Assessment is flawed. Visual Impact Assessment has reached incorrect conclusions.</p>	<p>The landscape and visual impact assessment has been based upon the <i>Wind Farm and Landscape Values – National Assessment Framework</i> AWEA and Australian Council of National Trusts. The methodology adopted for the LVIA has also been used for many projects throughout Australia and overseas.</p>
<p>11, 15, 20</p>	<p>Visual assessment considers impacts on residences, but farmers work outdoors on the property and those working</p>	<p>Visibility of the proposed wind turbines will depend on the orientation of the viewer (looking towards or away from the wind farm) availability of views based on topography and the presence of intervening vegetation.</p> <p>When there are available views or the viewer is oriented towards the proposed wind turbines there</p>

	<p>outdoors will be more significantly impacted and for long periods of time.</p>	<p>are other factors that influence visibility.</p> <p>The landscape surrounding the subject site ranges from flat to undulating, and contains many instances of vegetation both remnant and planted as wind breaks, hedgerows or bush land. Areas that contain greater topographical variation often have reduced visibility both through the screening affect afforded by topography and the availability of views as one navigates the meandering roadways through these landscapes. The effect of topography can be appreciated on examination of the Seen Area Analysis Studies contained within the LVIA. Vegetation that is often found within paddocks, along creeklines, roadside reserves and around residential dwellings also assists to filter and fragment available views, including those towards the proposed wind farm.</p> <p>It is also important to acknowledge that some people value the landscape from places other than their residences, including farmers who have developed close attachments to views from other places on their properties.</p> <p>In the case of the Gullen Range wind farm, the perception survey confirms that wind farms are supported by the majority of residents of the Southern Tablelands. From this it is surmised that the majority of people are unlikely to consider that a wind farm is likely to result in a high negative impact. Additionally, farmers are constantly moving around their properties, experiencing changing views, perspectives and focusing on a range of different tasks. It is anticipated that any views to the wind farm would not occur over extended periods of time and that the constantly changing views that occur within an agricultural landscape will, over time allow local landholders to accept the visual change associated with wind turbines. Consistent with this argument, perception studies in Scotland (Warren <i>et al</i> 2005) confirm that attitudes of local people become more favourable towards wind farms after construction.</p> <p>The proposal is located on land zoned (1A – rural), wind farms are a permissible use and are consistent with the objectives of this zone. The predominate use of the surrounding land is agriculture, including grazing, cropping and intensive agriculture (such as poultry farming). The existing landscape reflects these varied and dynamic land uses. As the rural zone is primarily for agriculture production, there is an implied focus on production rather than the protection of visual amenity. This issue has been explored at length in Victorian Panel Hearings where visual impacts to parts of working agricultural properties are considered largely immaterial.</p>
<p>9, 39</p>	<p>A specific turbine has not been selected, therefore the visual assessment is not valid or should be done on</p>	<p>Section 3.2.2 (page 24) confirms that the visual assessment was undertaken using the largest turbine under consideration (GE Wind 2.5xl), with an 85m hub height and tip height of 135m on the maximum 84 turbine layout. The visual assessment therefore reflects worst case visual impact. The selection of any other turbine under consideration will be physically smaller and will therefore</p>

	the most visually intrusive turbine.	have a lesser impact than that assessed.
8, 18, 20, 30, 40, 46,	It is proposed that the turbines will be lit with aviation warning lights. This will have a visual impact on the night sky and result in visual impacts 24 x 7.	<p>Section 10 of the LVIA explores and assesses the issue of the impact of proposed aviation on hazard obstacle lighting.</p> <p>CASA has guidelines (Advisory Circular 139-18(0)) recommending the installation of aviation warning lighting on wind turbines (Section 7.6 of the EA refers) to minimize the hazard to aircraft. It is assumed that aviation warning lights will be required on approximately 20 – 40 turbines in accordance with the CASA requirements.</p> <p>The EA concludes that the types of lights used do make a difference to the visual impact and refers to an assessment of the Mt Millar wind farm in South Australia. This project uses flashing red medium intensity LED lights that are baffled to minimize the spread of light from the horizontal (3 degree spread of light). The night lighting trial at Wonthaggi gave an acceptable level of visual impact and in comparison, the Planet venus and car lights at the same distance were greater than the hazard lighting. The lighting at Mt Millar supports that night lighting would create a low visual impact.</p> <p>While the Gullen Range site has areas where a number of existing light sources such as house lights, vehicles and other structures, it is acknowledged that night lighting would introduce an obvious element to the night panorama surrounding the site. The aviation hazard lighting is considered more of a nuisance to the viewer rather than detracting from the landscape or view. The lights may remind residents, who do not like the presence of wind turbines, of the turbines. If aviation hazard lighting is required by CASA, the visual impact would be low based on the type of lights available (subject to CASA approval) and the night time environment of the area that already contains multiple existing light sources.</p>
1, 12	Individual residences not assessed for visual impacts.	<p>Impacts on residential property is assessed in Chapter 8 of the LVIA. Although there were no individual residential properties assessed, there were a selection of viewpoints on which the visual impacts on residential properties were assessed. These viewpoints were selected from locations where there were groups or clusters of residences or at locations that were expressed as having a concern in the community consultation program.</p> <p>In each case the locations for these views were chosen where there were unobstructed views to the proposed wind turbines to demonstrate a worst case scenario.</p> <p>Two submissions (1 and 12) made particular reference to their residences (B29 and B55 respectively) being closer to the wind turbines than the location of the nearest photomontage. Both</p>

		<p>of these residences are to the east of Grabben Gullen and, the location of the photomontage shown in figure 7.45 of the LVIA. The photomontage was taken from an exposed location in Grabben Gullen. The LVIA concluded that a moderate level of visual impact would be afforded from the Grabben Gullen township.</p> <p>These residences are surrounded by significant vegetation including mature trees that would assist to filter views towards the proposed turbines from each of these dwellings.</p>
<p>1, 12, 23, 37, 40, 48</p>	<p>Impacts on individual properties, residences. No compensation offered for visual impacts on property.</p>	<p>The LVIA discusses the Landscape Mitigation in section 8.4 of the LVIA.</p> <p>The LVIA suggests that <i>“Planting can be undertaken on residential properties within 3 km of the wind farm, after consultation and agreement with affected landowners. Any such offer should remain in place for a period of 1 year after construction, to allow people time to either adjust or to decide that landscape filtering or screening is warranted”</i>.</p> <p>The proponent has agreed to offer landscaping at houses within 3km of a turbine as mitigation measure to minimize impacts.</p> <p>In terms of the case for compensation for properties affected by visual impacts, the Taralga LEC judgment (<i>Taralga Landscape Guardians Inc v Minister for Planning and RES Southern Cross Pty Ltd</i>.) provides some appropriate guidance.</p> <ul style="list-style-type: none"> • There are elements of public interest and public policy associated and to be considered in relation to the proposed wind farm; • The concept applies where significant visual impacts to dwellings occur resulting in significant restriction to the amenity, including any screening that would enclose a dwelling. In the Taralga case, there was also the impact of potential noise at the residences that contributed to reduced amenity. • Creating a right for compensation would strike at the basis of the conventional framework for land use planning and would be contrary to the relevant objective of the Act (Section 5(a) (ii)); <p>The Honourable CJ Preston concluded that in cases where properties are sufficiently impacted, and cannot be effectively mitigated, then the mechanism is to place a condition of compulsory acquisition of the property on the proponent.</p> <p>The circumstances at Gullen Range differ significantly from the situation faced at Taralga:</p> <ul style="list-style-type: none"> • The LVIA concludes moderate impacts to some residences without screening; • The Statement of Commitments (SoC 1) incorporate the offer of landscaping to residents within 3km of turbines to further reduce and mitigate visual impacts; and • The noise impacts will comply with the SA Guidelines (SoC 8) and are therefore

		<p>considered acceptable.</p> <p>Therefore based on the precedent of the Taralga LEC Judgment it is considered that compensation is not an appropriate consideration and compulsory acquisition is not required based on the level of predicted impacts.</p>
11, 18, 20, 46,	Screening offered as mitigation is ineffective given size of turbines.	<p>The LVIA discusses the Landscape Mitigation in section 8.4 of the LVIA as an option to screen or significantly reduce the visual influence of wind turbines from fixed locations such as houses. It is acknowledged that landscape mitigation needs to be determined on a case by case basis and in consultation with the landowner because of the individual characteristics of any particular residence and considering the wishes of the landowner. This is committed to in SoC 1.</p>
8, 20, 46	Visual impact of above ground electricity lines not assessed. Put electricity lines underground to minimize visual impacts.	<p>The EA proposes to install medium voltage (33kV) power lines underground were practical. The section between Gurrundah and Pomeroy and for an option that connects Kialla to the Bannister section of the site via Kialla Road may contain 33kv overhead transmission lines. These will be visually similar to the existing 11kv and 22kv transmission lines already found in the surrounding landscape which occur within farms and along road reserves.</p> <p>There is also an existing 330kv overhead transmission line that bisects the proposed wind farm.</p> <p>The visual impact of above ground power lines is addressed in Section 2.6 of the LVIA.</p> <p>It has been assessed that the proposed transmission lines associated with the Gullen Range Wind Farm will not provide an un-acceptable visual impact.</p>
46	Visual impacts of substation and maintenance building are significant and should be screened.	<p>Submission 46 refers to two residences on the property PW5 and PW36 that are about 850m and 700m (respectively) from the location of the proposed substation. While there is some existing vegetation, it is likely that the substation would be visible from these dwellings. Landscaping is proposed around the perimeter of the proposed substation buildings to assist in reducing visual impact.</p> <p>It is however recognised that trees and high voltage power lines do not generally co-exist because of safety and operational considerations. Therefore planting would be subject to approval from Transgrid.</p> <p>Notwithstanding the agreement to plant screening trees around the substation (where practical and safe), the residences PW5 and PW36 would be eligible for landscape screening in accordance with SoC 1. This would be offered in consultation with the landowner, the local landcare group and a local horticulturist to determine the best solution to address the landowners concerns.</p>

11, 20	Movement of turbines by 250m may result in clustering and have greater visual impact than has been assessed.	Section 3.3 of the EA describes the requirement and justification for minor relocation of infrastructure, including turbines. The legislation allows minor infrastructure modifications provided it is consistent with the consent without an application for modification. The 250m distance is presented as guidance for what is considered an acceptable relocation distance. A 250m relocation of turbines would have a negligible impact on visual impacts. Because of the required cross-wind and down-wind spacing between turbines to minimise turbulence and wake losses, turbine “clustering” would not occur.
30, 46	There are a number of wind farms proposed in the Southern Tablelands and therefore cumulative impacts should be assessed.	<p>The cumulative visual impact has been assessed in Section 9 of the LVIA (by ERM). It considers all the existing, approved and planned wind farms in the area. The assessment notes that there may be sequential or simultaneous views of multiple wind farms from certain locations. However the landscape is dominated by topographical features such as ridges and vegetation and this limits the potential for cumulative visual impacts.</p> <p>The LVIA concludes that <i>there would be minimal cumulative visual impact and that the changes to peoples’ perception of the surrounding area would not be significantly changed by the presence of multiple wind farms in the locality.</i></p> <p>In relation to the specific comments from the owners of “Mount Fitton” (Submission 46) relating to cumulative visual impacts from multiple projects (Crookwell 1 and 2, Gunning, Cullerin and Gullen Range). “Mount Fitton” is approximately 10km from the proposed Gunning proposal and approximately 11km from the existing Crookwell 1 and proposed Crookwell2 wind farms. There may be distant views to these wind farms and as a result cumulative impacts that are considered to be relatively minor. The Cullerin wind farm (now under construction) is approximately 21km from “Mount Fitton” and is therefore outside of the viewshed.</p>

3.2 Operational Noise Issues

Submission No.	Issue	Response
1, 8, 10, 13, 17, 21, 22, 25, 26, 27, 29, 33, 34, 37, 42, 45,	Noise from turbines is constant and will disturb peace and quiet of rural area. Residents will be affected by noise produced.	<p>The issue of noise impacts was the second most common issue raised with 53% of submissions from community agencies recording an objection based on the grounds of operational noise impacts.</p> <p>The EA assessed the proposal in accordance with the South Australian EPA Environmental Noise</p>

<p>48, 49, 51, 56, 58</p>		<p>Guidelines (2003) in accordance with the DGR's. The assessment used the ISO9613 noise propagation model which is considered a robust and relatively conservative model for wind farm assessment in the Southern Tablelands. The model assumes downwind propagation of sound which is analogous to moderate temperature inversion conditions. In addition, the assessment uses background noise data from winter, which is also considered worst case (lowest). Therefore the model is considered appropriate for this site.</p> <p>The SA EPA Guidelines have been developed to protect the amenity of the receiving environment noting that wind farms are often in rural areas with low ambient noise. The SA Guidelines establish a base limit of 35dB(A) which is 5dB(A) less than the equivalent New Zealand criteria (as used in Victoria). The guidelines also consider that noise impacts are marginal and acceptable if the noise generated does not exceed the background by 5dB(A).</p> <p>The Gullen Range proposal does not identify a specific turbine model, but rather lists a range of turbines under consideration. To simplify the environmental assessment, a single layout has been proposed that accommodates each of the turbines under consideration. Minor flexibility in infrastructure layout is sought to respond to a number of potential factors that could effect infrastructure location (in accordance with Section 3.3 of the EA).</p> <p>The noise assessment considers both the MM82 and MM92 turbines, being turbines that are indicative of the range of turbines under consideration in terms of physical size, power output and noise characteristics. The MM82 and MM92 turbines are being installed on the Cullerin site to the south of Gullen Range.</p> <p>The MM82 was fully compliant with the SA guidelines on the 84 turbine layout and the MM92 was marginally compliant, with exceedances between 0.6 – 1.6 dB(A) at 6 receivers. These exceedances were within the stated accuracy of the model and below the threshold of a perceptible noise increase of 3dB(A).</p> <p>The Proponent commits to achieving the SA guidelines at each nearby non-involved receiver. This can be achieved for each turbine through a range of mitigation measures including minor relocation of turbines, removal of turbines or the use of active noise control functions. Statement of Commitments 8 (SoC 8) is a commitment to undertake a final noise modeling on the turbine ultimately constructed and the final layout (including any minor relocations) to ensure compliance with the noise criteria.</p> <p>The Statement of Commitments also include an Operational Noise Compliance Testing program</p>
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		<p>(SoC 9) to monitor compliance with the SA Guidelines. Additionally mitigation measures are proposed (SoC 10) should the Noise Compliance Program identify exceedances to ensure the amenity of the dwellings is not adversely affected.</p> <p>Therefore based on the noise assessment, noise impacts to nearby residents predicted by appropriate and conservative models will comply with the SA EPA Guidelines. This will ensure the acoustic amenity of nearby residences will be maintained.</p>
6, 9, 11, 15, 20, 25, 30, 39, 41, 46	<p>The noise assessment is based on 2MW turbines, not the largest 3.3MW turbines proposed. Therefore the noise assessment is not accurate unless undertaken on actual turbine to be used.</p>	<p>The noise assessment was undertaken on the MM82 and MM92, being indicative turbines of the range of turbines under consideration. Additional analysis also presented potential worst case noise impacts based on the turbine with the highest sound power curve (noisiest turbine), the V90 3MW.</p> <p>In any case, the proponent commits (in Statement of Commitment 8) to undertake further noise assessment on the turbine ultimately selected for construction and on the final layout to ensure compliance with the SA EPA Guidelines.</p>
15, 20	<p>Turbines assessed are 121m and 126m high. Tallest proposed turbine is 135m, but this was not assessed for noise impacts.</p>	<p>Section 8.5 of the Noise Assessment presents a sensitivity analysis of the impact that physical dimensions of the turbines have on the modelling of noise impacts around the site. This analysis modelled an MM92 on a 90m tower (higher than proposed) with a tip height of 136m (again higher than proposed) and demonstrated that the noise propagation was not significantly different to the MM92 assessed (80m hub and 126m tip height).</p> <p>In any case, the proponent commits (in SoC 8) to undertake further noise assessment on the turbine ultimately selected for construction and on the final layout to ensure compliance with the SA EPA Guidelines.</p>
11, 15, 30	<p>Relocation of turbines by up to 250m could effect noise levels at nearby houses.</p>	<p>The proponent commits (in SoC 8) to undertake further noise assessment on the turbine ultimately selected for construction and on the final layout to ensure compliance with the SA EPA Guidelines. The final layout will incorporate any minor turbine relocations and therefore they will be modelled and comply with the noise criteria.</p>
15, 18, 20	<p>Farmers work outdoors, but noise impacts on people outside of residences was not assessed.</p>	<p>The various noise guidelines (including the SA EPA Guidelines, NZ 6808 and the WHO Guidelines) are all based around protecting the amenity of people's houses and particularly avoiding disturbance to people's sleep. The SA Guidelines make particular reference to property boundaries not necessarily being valid measuring locations unless someone would regularly be there (any area within 20m of a house would be a valid measuring position). Similarly, the NSW Industrial Noise Policy is only applied to particular noise sensitive receivers.</p> <p>In terms of outdoor activities including agricultural work, higher background noise levels occur during the day. Farming activities usually involve machinery that produce far greater noise relative</p>

		<p>to receiver location than turbines (e.g. tractors, 4WD's and motorbikes) or in the presence of stock.</p> <p>Therefore assessment of noise impacts outdoors is not required in accordance with the SA Guidelines that considers noise sensitive relevant receivers. Farming activities undertaken outdoors are not considered noise sensitive. In any case farming occurs in environments with more significant background noise and in that context, noise impacts from wind turbines are anticipated to be negligible.</p>
15, 18, 20, 30, 31	<p>Effects of meteorological events, such as temperature inversions or Van Den Berg effects was not adequately considered. NSW INP ignored in relation to investigating temperature inversions</p>	<p>Section 8.10 of the Noise Impact Assessment explores meteorological conditions including atmospheric stability and wind profile, the van den Berg effect and temperature inversions.</p> <p>The NSW INP has been referenced for guidance when considering temperature inversion effects. Table E3 from the INP indicates that for a moderate Class F inversion to occur, the wind speed required is below the cut-in wind speed for the assessed turbines (3-5ms⁻¹).</p> <p>The hub height assessment was performed to assess the impact that hub height wind speeds would have on receiver noise levels. Wind speeds were converted from 10m AGL to hub height using a roughness length of 0.05m. The assessment indicated that at hub height wind speeds, receivers close to the limit still complied with noise criteria. It is recognised that an assessment based on the wind shear for each site would assess the effect of atmospheric stability on receiver noise levels.</p>
18, 25, 46	<p>Noise produced by wind turbines can have annoying characteristics. This was not considered or assessed.</p>	<p>The annoying noise characteristics of turbines were assessed in accordance with Sections 4.5 and 4.6 of the SA Guidelines and no penalty was applied to predicted results due to wind generator annoying characteristics including infrasound and tonality. This is presented in Section 8.9 of the Noise Impact Assessment.</p>
8, 15, 20, 22, 30	<p>Noise from turbines may cause health implications (turbine syndrome) in people.</p>	<p>At receiver locations, any modern wind turbine generator system does not emit sufficient sound power to cause health effects such as have been claimed to be associated with them, including Vibro-Acoustic Disease (VAD), which is incorrectly referred to by one submission as "turbine syndrome". Calculations have shown that to be exposed to conditions similar to those referred to in papers on VAD1, a receiver would have to be located within several metres of the blade tip of a turbine, and that this exposure would need to be continuous for ten years. Furthermore, no reputable published studies have shown any causal link between ill health effects and infrasound emitted by turbines. It should be noted that there have been no health-related complaints in South Australia related to wind turbine operation.</p>

		<p>1: Aviat Space Environ Med. 1999 Mar;70(3 Pt 2):A46-53.Related Articles, Links Echocardiographic evaluation in 485 aeronautical workers exposed to different noise environments.</p> <p>Marciniak W, Rodriguez E, Olszowska K, Atkov O, Botvin I, Araujo A, Pais F, Soares Ribeiro C, Bordalo A, Loureiro J, Prazeres De SÃ; E, Ferreira D, Castelo Branco MS, Castelo Branco NA.</p> <p>Cardiology Department, Central Hospital of Military School, Warsaw, Poland.</p>
15, 20	Background noise monitoring should have been done over all seasons.	The background monitoring was conducted in the winter months to establish worst case (lowest) background curves. This provides a conservative basis for the noise assessment and development of compliance curves.
25, 30	The models used for predicting noise levels at receivers are not accurate.	The stated accuracy of the ISO9613 algorithm is +/-3dBA. ISO9613 has been found to be reliable and robust in predicting noise from wind farms overseas. The SA Guideline requires that compliance testing be conducted in order to verify that operational noise levels comply with predetermined noise limits and SoC 9 commits the Proponent to compliance monitoring.
30	The EA argues for a breach of conditions, because mitigation measures are proposed of exceedences.	<p>The EA presents a noise assessment, in accordance with the DGR's and DECC's advice, that demonstrates compliance with the SA Guidelines is achievable (as shown by the MM82 turbine). The EA makes further commitment to ensure compliance with the SA Guidelines by undertaking further noise modeling of the turbine ultimately selected on the final layout.</p> <p>Contingency mitigation measures are included in the EA, in accordance with the DGR's, to demonstrate that additional noise attenuation is achievable should noise exceedences occur following commissioning of the wind farm.</p>
38	Clarify noise compliance at residences.	<p>Submission 38 relates to predicted noise levels at two proposed (DA approved) residences near the site. The two receivers are coded B121a and B122a.</p> <p>The noise assessment confirms compliance at these two residences for the MM82 and marginal compliance within the error limit of the model (1.6dB(A)) using the MM92. Further background monitoring is proposed at these residences (along with B18a) to confirm existing ambient background noise levels at these locations.</p> <p>Noise agreements have been discussed with the owners, but in the absence of a noise agreement, the proponent confirms that the ultimately selected turbine on the final layout will comply with the SA Guidelines in accordance with SoC 8.</p>

46	Clarify and confirm noise compliance at low wind speeds (4m/s)	<p>The initial prediction of receiver noise level is always done at maximum (loudest) sound power level for each turbine (typically at 9m/s or so). The cut-in wind speed is the speed at which a turbine begins to generate electricity and in the case of the MM82 and MM92 is 8.5 & 7.8 RPM respectively. At cut-in wind speed the turbine will be emitting less noise than at rated wind speed. It is not possible for a turbine to reach its rated operational RPM at cut-in due to the fact that the wind speed will be too low. It should be clarified that the rated speed of the MM82 and MM92 is 13 & 11 m/s (metres per second) wind speed and not RPM as suggested by submission 46. Furthermore, as wind speed increases so too does background noise level and thus noise limit. It is a requirement that the wind farm will be fully compliant with SA Guidelines at all operational wind speeds.</p> <p>It should be clarified that infrasound and “swoosh” are two separate characteristics. Infrasound is defined as soundwaves having frequency below the human audible range (below 20Hz). Historically, turbine design located the rotating blades downwind of the tower, with the turbulence created by the tower being cut through by the blades, resulting in increased low frequency noise. Modern turbine designs have located the blades upwind of the tower and as such exhibit infrasound levels significantly lower than the old downwind design, with measured levels below the threshold of human hearing. The SA EPA has completed an extensive literature search and is not aware of infrasound being present at any modern wind farm site. Furthermore, the SA Guidelines have been developed with the fundamental characteristics (including “swoosh” or “swish”) of noise from a wind farm taken into account.</p>
46	Clarify substation noise (100Hz) at nearby residences.	<p>The substation is proposed on the Pomeroy West section near the existing 330kV transmission line that crosses the site in this area. The proposal, and noise assessment considers that the substation will contain dual 33-330kV transformers. The Noise Assessment (Section 8.7) notes the strong tonality these transformers display at 100Hz.</p> <p>With respect to substation noise, our predictions indicate that noise levels at 700m from the source will be approximately 23dBA. Table 4.1 of the NSW Industrial Noise Policy states that where a noise source contains tonality, a modifying factor should be added to the predicted level. This modifying factor accounts for the fact that a noise which is tonal in nature is perceived as being more annoying. Therefore, the predicted level at 700m from the substation, adjusted for tonality in accordance with INP, will be 28dBA. This level is below the INP night-time intrusiveness noise limit of 35dBA in addition to being below the night-time amenity noise limit of 40dBA. It should be noted that these noise limits were derived from noise measurements conducted during winter months.</p>

3.3 Community impacts and community consultation

Submission No.	Issue	Response
8, 9, 12, 18, 19, 42, 51, 55, 57	<p>The wind farm is divisive, has damaged relations with neighbours. Community division should be considered a major impact.</p>	<p>The EA acknowledges that wind farm development can be divisive and that a proportion of the local community is unconvinced of their value and are opposed to their development.</p> <p>The EA takes seriously the potential to affect local community wellbeing, which includes the relationships between members of the community. This issue was investigated (Sections 8.2 and 8.6) with recourse to the make-up of the local community and the experiences of other communities with wind farms.</p> <p>Admittedly, the ability of the Proponent to manage or mitigate these impacts is limited. However, suggestions have been made, both in the body of the EA and as Statements of Commitment, to reinforce the drivers of community wellbeing. The key features contributing to ill feeling were identified as the secrecy surrounding wind farm developments and the inequitable distribution of benefits. Mitigation was designed around these factors (SoC. 93-95). Furthermore, the consultation process has endeavoured to address the features of wind farm development that can exacerbate tensions:</p> <ul style="list-style-type: none"> • The Open House day at Grabben Gullen sought to inform the community about wind farm development and the results of specialist investigations, to dispel myths about wind farm impacts • The Proponent established communications with residents within 5km of this sites to provide direct contacts with residents • With input from the local community, the Proponent developed a Community Enhancement Program, aimed at distributing the benefits of the development to non-involved residents in the local area (a voluntary program to be funded by a share of the profit from the project) <p>It should also be noted that wind farm development is supported by a large proportion of the local population, as evidenced at the Open House day and local surveys, and that the proposal offers local and broad-scale community benefits (set out in Sections 4.3 and 4.4).</p>
8	<p>Involved land owners not allowed to discuss details of contracts and not concerned about</p>	<p>There is a requirement for confidentiality during land owner lease agreements. This can result in suspicion and ill-feeling in neighbours. To address this, regular updates were disseminated to the community, even before specific proposal details such as turbine number were known. In person contact was established for the closest landowners, generally those within 2km of selected sites.</p>

	neighbours	<p>Media releases, newsletters and editorials were also distributed to the broader community. Considerable thought is given to the affects of the development on bordering non-involved land owners:</p> <ul style="list-style-type: none"> • Visual impacts are assessed with consideration of the surrounding landscape context (Section 7.2) • Noise impacts are studied and assessed using noise loggers on neighbouring properties and noise impacts are modelled to ensure compliance can be achieved (Section 7.3) • Easements for electricity and vehicle access are often negotiated with neighbours <p>It is an unfounded assumption to imply that involved landowners enter into lease agreements lightly, purely for financial gain or without consideration for their neighbours. The leases are long-term commitments and lease negotiations occur over several months or even over years, as the finer detail of the proposal is developed. As well as giving consideration to their own families and the positive affect of combining a drought-proof income stream with their agricultural land management, the lessees are often convinced by the broader-scale environmental and community benefits.</p>
9	Not even a marginal benefit will occur for the local community of reduced global greenhouse emissions as a consequence of this project (stated in reference to EA Section 4.4.1)	The EA states the local climate change benefits will be marginal, acknowledging the global scale of the problem. The respondents comment is discouraging and disappointing as it ignores the significance that initiatives implemented by industry have the ability of resulting in positive steps towards a more sustainable renewable-based energy future, critical to addressing climate change.
12, 15, 20, 21, 36, 39, 54, 57	Community consultation not adequate, not in the spirit of genuine consultation	<p>Community consultation was completed in accordance with a Community Consultation Plan prepared specific to the proposal early in the planning process. It was prepared by nghenvironmental and peer reviewed by Twyford Consulting (specialists in the field of community consultation and engagement) to ensure adequacy. The plan described the social context of the proposal, identified risks to effective consultation and outlined activities to be carried out in conjunction with the development of the proposal (EA Attachment 2.1). Landholders were identified in consultation with local Council and although every effort was made to the contrary, some residents were not identified in this process.</p> <p>Community consultation activities included meetings with land holders surrounding the proposal area, an Open House forum, community questionnaires, newsletters, media releases and a regularly updated website.</p> <p>The aim was to inform the community as well as seek feedback to improve the assessment</p>

		process (ie. seeking local information and identifying key concerns). All feedback was incorporated into the assessment process (refer to summary of submissions, EA Section 6.2.2).
17, 19, 21, 37, 40	No compensation for non-involved properties. No benefit in the Community Enhancement Program	<p>The Community Enhancement Program of \$75,000/annum (adjusted annually in accordance with CPI) was developed by Epuron as a means to broaden the benefits of wind farm development within the community. It is voluntary action on the part of the Proponent.</p> <p>The program aims to support the installation of residential clean energy improvements and would provide funds to undertake initiatives which provide direct benefit to the local community. It would be funded by project revenues. It is in no way linked to the retail electricity price, which Epuron has no part in setting. It would not be associated with any government subsidies.</p>
7, 8, 12, 14, 15, 17, 28, 39, 30, 36, 50, 51, 52, 56, 58	Inappropriate location: too close to residences, farms, subdivision development. Detracts from enjoyment of the property / lifestyle.	<p>The EA does not dismiss the concerns of surrounding residents. Wind farm development is relatively novel in Australia and the scale of the infrastructure can exacerbate concerns. In many ways however, the development of wind farms is compatible with the surrounding land uses, as discussed in the EA. It is within the aims of the LEP's 1(a) zone which include to maintain the rural character of the area, encourage the use of rural land for agriculture and other forms of development which are associated with rural activity or which require an isolated or rural location, and to protect natural resources including prime crop and pasture land.</p> <p>Concerns have been raised by members of the local community including that the development precludes subdivision, other residential development or the enjoyment of outdoor spaces. In Europe, where higher density populations have co-existed with wind farm development for longer periods of time, specific issues have been identified which need to be investigated and mitigated. The EA considers such impacts specifically (visual impacts, noise, land value, agriculture and community wellbeing for example) and commits to measures to ensure that impacts are managed with respect to surrounding properties.</p> <p>The EA considers the site and infrastructure proposed specifically hence, set back distances have not been adopted from the Upper Lachlan DCP for Wind Farm Development, but are instead based on site-specific noise modelling to ensure compliance with the SA guidelines.</p> <p>While some people may prefer not to buy into subdivisions within close proximity of wind turbines, available evidence is not sufficient to suggest that this behaviour is universal, and many people accept and even appreciate the look of wind turbines and their contribution toward a more sustainable future. Wind turbine development does change the character of an area. This change has been considered acceptable by the EA on the basis of broad scale benefits to the wider community.</p> <p>It is stated in the EA '...that the land surrounding the proposal site is zoned 1(a) Rural Zone ...</p>

		<p>Lots within this zone, for the purpose of erecting a dwelling, can be no less than 40ha (Mulwaree LEP) or 80ha (Gunning and Crookwell LEPs).’ However, it is noted that one submission was from a residential property (4.4ha) and it is agreed that much of the EA generalizes impacts assuming larger property holdings.</p>
36, 49	<p>Potential to create stress, health disorders, fear of ongoing financial hardship</p>	<p>The EA takes seriously the potential to affect the health and well being of the local community. These issues were investigated (Sections 8.2 and 8.6) with recourse to the make up of the local community and the experiences of other communities with wind farms.</p> <p>Admittedly, the ability of the Proponent to manage or mitigate these impacts is limited. However, suggestions have been made, both in the body of the EA and as Statements of Commitment, to reinforce the drivers of community wellbeing. The key features contributing to ill feeling were identified as the secrecy surrounding wind farm developments and the inequitable distribution of benefits. Mitigation was designed around these factors (SoC. 93-95).</p>
10, 45	<p>Impact on tourism and tourism strategy</p>	<p>The EA considered the potential to affect tourism both during the construction and operation of the wind farm (Section 8.4). The context of the site, while having historic and recreational appeal, did not indicate that the impacts would be high; the sites are not located on designated tourist drives or formalized nature-based recreational areas. Furthermore, the development provides an opportunity to increase tourism, through the promotion of the site, if this is desired by involved land owners and the local community.</p> <p>Mitigation strategies focus on liaison with tourist information centres to minimize the impact of the development on special events.</p>
9	<p>Community Perceptions Report not relevant to support the case for the proposed Gullen Range Wind Farm as no questions asked of the Gullen Range Wind Farm specifically.</p>	<p>The report was commissioned by the proponent to undertake a community perception study of the Southern Tablelands, not specifically of the proposed Gullen Range Wind Farm. The broad focus of the study area is indicated clearly in the report’s title Report on Community Perceptions towards Wind Farms in the Southern Tablelands, New South Wales and throughout the report in the descriptions used (for example Section 3.2.8).</p> <p>It is held that the report is applicable in discussing the community attitudes of the proposed Gullen Range Wind Farm as the region surveyed does encompass the Gullen Range area. Further, the survey described three Wind Farm sizes and respondents were asked to comment on their perceptions towards these differing sizes. The results of these discussions can be used to inform</p>

		discussion of attitudes and opinions of the Southern Tablelands community towards the proposed Gullen Range Wind Farm, as the Wind Farm falls into one of these three sizes.
9	The proponent has attempted to avoid carrying out a survey of public opinion for each individual Wind Farm by commissioning one for the whole region.	<p>As stated above, the proponent was seeking to ascertain the attitudes of those in the Southern Tablelands.</p> <p>The Upper Lachlan Shire Council also ascertained the opinion of shire by a poll conducted with the Council election in September 2008 that resulted in 70% of voter supporting the continued development of wind farms in the Upper Lachlan Shire.</p>
9	The Victorian and Overseas studies cited within the Community Perception Report do not give size of the proposed Wind Farms, nature of the landscape, number of people surveyed, validity of questionnaire format, those that were surveyed in proximity to the Wind Farm, or their understanding of the impacts of Wind Farms. None of the surveys relate to an actually built Wind Farm and largely reflect perception of the 'idea' of Wind Farms in general. Therefore the validity of the Victorian studies and the relevance of the proposed Gullen Range Wind Farm cannot be assessed.	<p>The Wind Farm industry is still developing, unlike coal plants or other similar energy industries. Wind farms and particularly Wind Farms in Australia, are a more recent phenomenon. For example, Crookwell is the only established Wind Farm in the Southern Tablelands.</p> <p>The Victorian and overseas studies cited within the report are provided to comment on the growing body of information on people's perceptions towards Wind Farms. The studies cited are not absolute, in the sense that over time this body of information will grow as more Wind Farms are constructed and more research undertaken. The studies within the report do however provide an insight to other publically available information. The report describes the various studies approach, that is what was the goal of the research was and furthermore were referenced to allow individuals who desired more information on these studies to tools to locate this information.</p> <p>Due to the size and scope if this study it is simply not feasible to include information on the size of the proposed Wind Farms, nature of the landscape, number of people surveyed, validity of questionnaire format, those that were surveyed in proximity to the Wind Farm, or their understanding of the impacts of Wind Farms.</p> <p>It is noted that at the time or the report's commissioning there was no Australian information specifically available on community perceptions of Wind Farms once they had been constructed and operational. However, the overseas studies, in particular the United Kingdom section of the report cites thirteen studies undertaken from 1990 to 1996 and documents peoples attitudes post Wind Farm construction.</p>
9	The region surveyed was far larger than the area expected to be effected by the Gullen Range Wind	As noted above, the Community Perceptions Report was commissioned to undertake a community perception study of the Southern Tablelands, not specifically of the proposed Gullen Range Wind Farm, therefore the region surveyed was not centered around the Gullen Range

	Farm.	Additionally, the Upper Lachlan Shire Council ascertained the opinion of shire by a poll conducted with the Council election in September 2008 that resulted in 70% of voters supporting the continued development of wind farms in the Upper Lachlan Shire																																										
9	Sample size of 300 inadequate for the population of the area, therefore the confidence level is in error.	<p>It was determined that a sample size of n =300 be used in the NSW Southern Tablelands study. A survey estimate of 50% of a sample of n = 300 will have a sampling precision (or confidence interval) of 50 ± 5.7% at the 95% confidence level, see table below for a summary of the confidence level.</p> <hr/> <p>Expected Sampling Error (Plus or Minus) at the 95% Confidence Level (Simple Random Sample)</p> <p>Percentage of the sample or sub-sample giving a certain response or displaying a certain characteristic for percentages near:</p> <table border="1"> <thead> <tr> <th>Size of Sample or Subsample</th> <th>10 or 90</th> <th>20 or 80</th> <th>30 or 70</th> <th>40 or 60</th> <th>50</th> </tr> </thead> <tbody> <tr> <td>300</td> <td>3.4</td> <td>4.5</td> <td>5.2</td> <td>5.6</td> <td>5.7</td> </tr> <tr> <td>200</td> <td>4.2</td> <td>5.6</td> <td>6.4</td> <td>6.8</td> <td>6.9</td> </tr> <tr> <td>150</td> <td>4.8</td> <td>6.4</td> <td>7.4</td> <td>7.9</td> <td>8.0</td> </tr> <tr> <td>100</td> <td>5.9</td> <td>7.9</td> <td>9.0</td> <td>9.7</td> <td>9.8</td> </tr> <tr> <td>75</td> <td>6.8</td> <td>9.1</td> <td>10.4</td> <td>11.2</td> <td>11.4</td> </tr> <tr> <td>50</td> <td>8.4</td> <td>11.2</td> <td>12.8</td> <td>13.7</td> <td>14.0</td> </tr> </tbody> </table> <hr/> <p>The population size within this context is not a variable in determining confidence level. The precision of a survey estimate (Standard Error) is a function of the variability of the estimate and the size of the sample (Variance).</p>	Size of Sample or Subsample	10 or 90	20 or 80	30 or 70	40 or 60	50	300	3.4	4.5	5.2	5.6	5.7	200	4.2	5.6	6.4	6.8	6.9	150	4.8	6.4	7.4	7.9	8.0	100	5.9	7.9	9.0	9.7	9.8	75	6.8	9.1	10.4	11.2	11.4	50	8.4	11.2	12.8	13.7	14.0
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9	Demographic characteristics of the people surveyed not detailed therefore unknown if the people surveyed are representative of the region.	<p>The survey data was post-stratified by Age and Gender based on the most recent Australian Bureau of Statistic (2006) census estimates for the defined survey area. This is evidenced through the weighted base section located within each of the tables contained within the report.</p> <p>The Age and Gender data as provided by the Australian Bureau of Statistics is shown below:</p>																																										

		2006 Census of Population and Housing Postcodes: 2580, 2581, 2582, 2583, 2584, 2586		
		Male	Female	Total
		18-24 1,796	1,545	3,341
		25-39 3,940	3,990	7,930
		40-54 5,095	4,896	9,991
		55+ 6,240	6,689	12,929
		-----	-----	-----
		17,071	17,120	34,191
		%	%	%
		18-24 5.25%	4.52%	9.77%
		25-39 11.52%	11.67%	23.19%
		40-54 14.90%	14.32%	29.22%
		55+ 18.25%	19.56%	37.81%
		-----	-----	-----
		49.93%	50.07%	100.00%
9	The use of the Crookwell Wind Farm within the Community Perceptions Report implies that the respondents would understand what the Gullen Range Wind Farm would involve. Further, that Crookwell has been used to describe a 'typical Wind Farm'.	The Crookwell Wind Farm was discussed within the Community Perceptions Report as it was the only constructed (not just received planning approval) Wind Farm within the Southern Tablelands and consequently provides a useful reference point in terms of discussing perceptions. It is noted that in the description given of the Crookwell Wind Farm the report states 'that it was constructed in 1997 and has only 8 wind turbines'. In terms of discussing Wind Farm size the report describes small (up to 15 turbines), typical (15 to 80 turbines) and large Wind Farms (80-120 turbines). Therefore, based on the description given within the report (see Sections 3.3.16 and 3.3.17), Crookwell falls into the 'small' Wind Farm category, not the 'typical' category.		
9	It is not legitimate to separate questions (Table 3.25) about whether respondents would favor a Wind Farm at various distances from their homes from information of the size of the Wind Farm proposed.	This section of the Community Perceptions Report (Table 3.25) focused on attaining perceptions of Wind Farms in relation to their immediate personal space, their home. This section of the report was not undertaken to determine the size of Wind Farms in relation to personal space. Subsequent sections of the report describe Wind Farms of varying sizes and perceptions in relation to their local rural area (Sections 3.3.16, 3.3.17, 3.3.18).		

9	Format of question, positive statements of Wind Farms used to solicit positive responses in relation to 'seeing a Wind Farm built on farmland where I live'.	As stated earlier, the format of the questions are based on the format of earlier studies such as the Lowy Institute for International Policy (Macintosh and Downie 2006) and the Department of Natural Resources and Environment (Kantos and Quint 2000) so this study can contribute to growing area of information based on similar circumstance. The statements used were done so to establish the respondents 'positioning' in relation to Wind Farms in relationship to personal space, and asked whether they either 'strongly agree, agree, disagree or strongly disagree'. It is noted here that repeated negative statements of Wind Farms are also used in the report (see section 3.2.5).
9	The phrase used in the report of 'near where I live is too subjective'	It is noted that there is self determination within this question, that is to state, it is up to the individual to gauge the word 'near'. However, the word is used within the context of the respondent's individual space 'near to where I live' which is the focus of this particular section of the report. To suggest a distance may disqualify what a respondent may consider is near, for example 'would you like to see a Wind Farm built within five kilometers of where you live?' the respondent may not consider this distance 'near' to their personal space. By keeping the question in a self determining manner ensures that the respondent is answering in relation to what they consider near to them.
9	'DO NOT ROTATE STATEMENT ORDER" shows the survey authors recognise that they have built in bias	The statement of order is to guide those conducting the telephone interviews so that each respondent is asked the same question in the same order- thus a 'level playing field' in collating and analysing the survey results.
9	Percentage of people living within 1km of Crookwell are the only people with any direct experience of living within the proximity of a Wind Farm, and their responses are statistically insignificant due to the small number.	As stated earlier this Community Perceptions Report is on community perceptions of Wind Farms within the Southern Tablelands, therefore the study encompasses a larger area than Crookwell and Gullen Range. The Crookwell Wind Farm was the only constructed and operational Wind Farm within the survey area. If the survey had been limited to those living within a 1 km the established Wind Farm it would not be reflective of a perceptions study of Wind Farms for the Southern Tablelands. It is important to note, respondents of this survey were not restricted to those individuals who live within 1 km of a Wind Farm, their perceptions may be based upon traveling past Wind Farms in the course of their daily commute, weekly shop and so on.
9	Factual statements and value judgements (Table 3.14)	This section of the Community Perceptions Report was seeking to ascertain from respondents when faced with choosing landscape appeal or a clean energy source. The phrase 'some people say they (turbines) detract from the landscape' needed to be open rather than 'factual' as one could not state 'wind turbines detract from the landscape' as this is dependent on a number of factors

		including the type of landscape, population density, previous disturbance of the area (including farming) and so on.
9	Crookwell only example of a Wind Farm in area. Respondents would not have seen a Wind Farm of 84 turbines. Therefore respondents not informed.	As the Crookwell Wind Farm (containing 8 turbines) was the only constructed and operational Wind Farm within the survey area, it is agreed that few respondents would have seen a Wind Farm containing 84 turbines or more. However, as this was a perception study, respondents were asked to envisage 80 to 120 turbines in operation, respondents were not disqualified from providing their responses based on whether they had seen a large Wind Farm.
9	The use of 'Typical Wind Farm' as a description.	The term 'typical Wind Farm' was a qualified description, that is to state, parameters were set that 15-80 in this report's context.
9	Order of the response categories 'strongly in favor' through to 'strongly oppose' should have been rotated half way through the questionnaire.	Consistency has been kept throughout the questionnaire to assist the respondent. Rotating the response categories would risk confusing the responded or receiving responses which do not reflect the individual's attitudes.

3.4 Land Value Impacts

Submission No.	Issue	Response
1, 6, 8, 11, 13, 14, 15, 21, 23, 26, 27, 30, 34, 36, 37, 38, 39, 40, 41, 46, 48, 49, 50, 56	Wind farm will result in property devaluation or discourage future buyers of property close to the wind farm.	<p>The concerns raised in the submissions are two fold, firstly the presence of a wind farm may reduce the value of local properties and secondly the presence of a wind farm may reduce the ability to find a buyer. The Environmental Assessment (Section 7.9) addresses the issue by reviewing published literature as well as including a specialist study that EPURON had commissioned in relation to land values around the Crookwell 1 wind farm.</p> <p>The studies examined provide quantitative data on the trends related to property values in the vicinity of wind farms in Australia and elsewhere in the world. While the available data is relatively limited, the body of information suggests that there is no evidence to support the claim wind farms devalue nearby property and factors other than the location of wind farms have a more significant effect on property prices. Evidence also demonstrates that the agricultural component of land value is not affected by wind farms.</p>

		<p>Land values are influenced by a range of factors including prevailing and permitted land uses, soils and improvements, supply and demand of property, economic conditions, access and proximity to markets as well as a range of other factors.</p> <p>The report by Henderson and Horning Property Consultants assessed the impact of the Crookwell 1 wind farm (the only operating wind farm in the area) on local property prices by examining property transactions in the vicinity of Crookwell 1 over a 15 year period including before and after its construction. This is considered a relevant study because of the proximity to the Gullen Range site and the similar socio-geographic setting. The report concluded no measurable reduction in values of properties that have a line of sight to the wind farm and that other factors (such as access, soils and infrastructure) were more important drivers than the visual amenity of the wind farm. This finding was consistent with the international studies exploring the same issue.</p> <p>Many claims by opponents that wind farms devalue nearby property are unsubstantiated or opinions and are not supported by quantitative data or sale evidence.</p> <p>While the proposed Gullen Range wind farm will introduce a new feature into the landscape, the visual impacts have been assessed as being acceptable and the noise impacts are minimal as the project will be fully compliant with the guidelines.</p> <p>Therefore considering the minimal and acceptable impacts from the proposal and the available quantitative data suggesting that there is no conclusive evidence to support the claim wind farms devalue nearby property, there is no reason to presume that property devaluation would result from the proposal.</p>
6, 25, 30, 41	<p>The proposal will have an impact on the future subdivision potential of adjacent land and therefore an impact on the value of that property.</p>	<p>The potential noise and visual impacts of the project have been assessed, with the assessment considering existing and known proposed residences, including those in nearby subdivisions. These assessments provide an indication of likely impacts in different areas around the site including noise contours, for example. Future residences can be constructed close to the wind farm with consideration to the utilization of location, orientation and building materials that reduce acoustic impacts.</p> <p>The rights of land owners adjoining the site will not be affected by the proposal. These land owners are still entitled to construct and subdivide their land subject to local planning instruments.</p> <p>Additionally, social research shows that attitudes of local people become more favourable towards</p>

		<p>wind farms after construction and that living near a wind farm dispels fears of exaggerated perceptions of likely impact from the planning phase. Therefore negative perceptions of land value are likely to decrease following construction.</p> <p>While some short term risk to future value of sub-dividable property in the immediate vicinity of the proposal cannot be discounted, quantitative studies into property values around wind farms provide no evidence for this. Furthermore, by minimizing and mitigating impacts from the proposal in relation to visual impacts, the likelihood of impacts is further reduced.</p>
<p>1, 12, 37,</p>	<p>Impacts to rural-residential property more greatly affected than larger rural properties.</p>	<p>The impacts to land values are addressed in Section 7.9 of the EA.</p> <p>The conclusion from a range of studies is that agricultural land is not likely to be effected by the proximity of a wind farm because the agricultural capacity of the property, being the predominate driver of land value, is unchanged. Therefore large agricultural properties are unlikely to be impacted from a proximal wind farm proposal.</p> <p>In relation to rural-residential properties, the concern is that visual and acoustic amenity from the rural setting contributes to the overall property character and therefore its value. The concern is potential impacts to the visual and acoustic amenity by the proposal may reduce the value of nearby rural-residential property. It is acknowledged that rural residential lots are being created and sold as lifestyle blocks in the general area of the proposal and across the Southern Tablelands.</p> <p>In exploring this issue, there are two aspects. Firstly the impacts in relation to visual and acoustic amenity from the proposal and secondly the impacts of the proximity of a potential wind farm on property values.</p> <p>In relation to the visual impacts and noise impacts on rural residential property, the EA has assessed all existing and known proposed residences and found acceptable impacts. These conclusions were:</p> <ul style="list-style-type: none"> • Moderate visual impacts to some residences without screening with a commitment to offer landscaping to residents within 3km of turbines to further reduce and mitigate visual impacts; and • Noise impacts will comply with the SA Guidelines and are therefore considered acceptable. <p>As mentioned above, the available quantitative data suggesting that there is no conclusive evidence to support the claim wind farms devalue nearby property, there is no reason to presume</p>

		<p>that property devaluation would result from the proposal.</p> <p>It is accepted that devaluation of rural residential property that has a strong lifestyle and amenity component is a valid concern of local residents. However the EA predicts minimal and acceptable impacts from the proposal in terms of visual and acoustic amenity on nearby residences and quantitative analysis of property data around existing wind farms provides no evidence of property devaluation in the vicinity of wind farms.</p>
<p>6, 30, 37, 40, 41, 48</p>	<p>Compensation should be considered / offered where property values decrease as a result of the proposal.</p>	<p>The issue of compensation has been addresses previously in relation to visual and noise impacts that create a significant restriction on the amenity of a particular property. The concern of property devaluation is a consequence of perceived visual and noise impacts from the proposal.</p> <p>In terms of the case for compensation for properties affected by visual impacts, the Taralga LEC judgment (<i>Taralga Landscape Guardians Inc v Minister for Planning and RES Southern Cross Pty Ltd</i>), provides some appropriate guidance.</p> <ul style="list-style-type: none"> • There are elements of public interest and public policy associated and to be considered in relation to the proposed wind farm; • The concept applies where significant visual impacts to dwellings occur resulting in significant restriction to the amenity, including any screening that would enclose a dwelling. In the Taralga case, there was also the impact of potential noise at the residences that contributed to reduced amenity. • Creating a right for compensation would strike at the basis of the conventional framework for land use planning and would be contrary to the relevant objective of the Act (Section 5(a) (ii)); <p>In relation to the impacts to properties amenity, the EA has found acceptable impacts to neighbouring properties, including:</p> <ul style="list-style-type: none"> • Moderate visual impacts to some residences without screening; • The Statement of Commitments (SoC 1) incorporate the offer of landscaping to residents within 3km of turbines to further reduce and mitigate visual impacts; and • The noise impacts will comply with the SA Guidelines (SoC 8) and are therefore considered acceptable. <p>In terms of impacts on property values from wind farms, the available quantitative data identifies that there is no conclusive evidence to support the claim wind farms devalue nearby property, there</p>

		<p>is no reason to presume that property devaluation would result from the proposal.</p> <p>Therefore it is considered that compensation is not an appropriate consideration based on the low level of predicted impacts from the proposal and the hard data that suggests property devaluation is an unlikely consequence.</p>
25	<p>The EA uses the existing Crookwell 1 as a basis for comparison of property prices, before and after a wind farm is constructed. This is not a valid comparison because of the size and scale of Crookwell 1 in relation to the proposed Gullen wind farm.</p>	<p>The report by Henderson and Horning Property Consultants assessed the impact of the Crookwell 1 wind farm on local property prices by examining property transactions in the vicinity of Crookwell 1 over a 15 year period including before and after its construction. This report concluded no measurable reduction in values of properties that have a line of sight to the wind farm and that other factors (such as access, soils and infrastructure) were more important drivers than the visual amenity of the wind farm.</p> <p>The Crookwell 1 wind farm was chosen as the basis for this report because it is the only operating wind farm in the area and has been operating since 1998, therefore providing a reasonable duration for sales data to be assessed prior to and after construction.</p> <p>The report on Crookwell 1 was undertaken on the basis that it is the only wind farm in the area that can provide relevant data on this issue. The assessment considers local land use practices, experiences and cultural factors that are directly relevant to the current proposal. It is acknowledged that the Crookwell 1 turbines are smaller than the proposed Gullen Range turbines, but the perceived general impacts of turbines, including visual, noise and shadow flicker, are considered to be the same general issues for any wind farm proposal regardless of turbine size.</p>
37	<p>Further analysis of land value impacts required, based on comparable sales of property. Assessment should be independent of the proponents.</p>	<p>The EA addresses the issue land value impacts by reviewing published literature as well as including a specialist study that EPURON had commissioned in relation to land values around the Crookwell 1 wind farm. The specialist study was undertaken by a professional land valuer in the local NSW property industry and combines expert analysis with quantitative sales data from the vicinity of the Crookwell 1 wind farm over a period of 15 years. The report also refers to similar overseas studies where quantitative analysis of property data was undertaken, showing similar trends.</p> <p>It is considered impractical to undertake further analysis until another, larger wind farm has been constructed and has operated in the local area for a reasonable amount of time. It is also considered unnecessary for an independent assessment because of the consistent conclusions from a number of unrelated quantitative assessments into land value impacts.</p>
39	<p>Potential impact of land devaluation on community viability.</p>	<p>As discussed previously, there is no conclusive evidence to support the claim wind farms devalue nearby property and there is no reason to presume that property devaluation would result from the proposal. Therefore no impacts on community viability are anticipated.</p>

<p>28</p>	<p>Approved subdivision on King property was not taken into consideration in the EA and the proposal is insensitive to the future context of the subdivision.</p>	<p>The Gullen Range project was publicly announced in July 2007 and the Project Application submitted to the Department of Planning in August 2007 which predates the lodgement of the King subdivision application in October 2007.</p> <p>In July 2007 the Proponent contacted the King family to discuss the wind farm proposal in relation to their property, and no mention of the proposed subdivision was made by the King family in that discussion. In February 2008, the Proponent contacted the ULSC seeking details regarding any subdivisions in the vicinity of the site which could be affected by the development prior to finalising the EA. Therefore despite reasonable efforts, the Proponent was not aware of the proposed King subdivision prior to lodging the EA.</p> <p>While the DA for the subdivision has since been approved by Council, the subdivision has not occurred and it is not known to the proponent when or if the subdivision will occur. Further, construction of dwellings requires development approval and it is not known that the houses which could be affected by the wind farm will ultimately be built.</p> <p>The King subdivision as approved includes a number of dwelling locations which are closest the wind farm boundary and may potentially be affected by wind farm noise and visual impacts. The King subdivision does not take into account noise likely to be created by the wind farm, however there is scope to amend this subdivision proposal to relocate the proposed dwellings to alternative locations with lower noise and visual impacts. There is also scope to design dwellings to take into consideration likely noise impacts of the wind farm and with a viewshed away from the proposed wind farm. Accordingly, should construction of dwellings be proposed, there is scope to mitigate all impacts of the wind farm on the proposed subdivision.</p> <p>Epuron has taken into consideration the potential for new subdivision in the vicinity of the site in developing the EA. Epuron considers that the proposed King subdivision would be treated as any other future subdivision in the context of the proposal in accordance with the principals set out in the Taralga LEC judgment and using the consent conditions from the Black Springs wind farm.</p> <p>It is proposed that a consent condition be included to provide reasonable and feasible noise mitigation measures to achieve a noise criterion (LAeq (10-minute) of 30dB(A) inside bedrooms (as outlined in the Guidelines for Community Noise (WHO, 1999) for no more than one dwelling on each parcel of land that:</p> <ul style="list-style-type: none"> • Is not associated with the project; • Was lawfully in existence at the date of the approval; • Was lawfully permitted to be developed for the purpose of a residential dwelling at the date
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		<p>of the approval;</p> <ul style="list-style-type: none"> • Is or was the subject of a valid construction certificate for a residential dwelling, lodged with the consent or a certifying authority within three years of the date of approval; and • Would, but for the requirements of this condition, experience noise contributions from the project at the approved location of the residential dwelling in excess of the noise limits recommended in the SA EPA guidelines. <p>New SoC 139 added to include the mitigation measures mentioned above.</p>
30	Assessment of sub-division not properly undertaken for EA.	<p>Section 7.9 of the EA (Land Value Impacts) addresses potential impacts on future rural subdivision.</p> <p>As discussed previously, the potential noise and visual impacts of the project have been assessed and consider existing and known proposed residences, including those in nearby subdivisions. These assessments provide an indication of likely impacts in surrounding areas, and includes noise contours. Future residences can be constructed close to the wind farm with consideration to the utilization of location, orientation and building materials that reduce acoustic impacts and minimize any unwanted views.</p> <p>It is not possible to detail the impact of the proposal on potential future subdivision as there is no certainty that subdivision will occur, and the location of future potential house sites is not known.</p> <p>The rights of land owners adjoining the site will not be affected by the proposal. These land owners are still entitled to construct and subdivide their land subject to local planning instruments.</p>

3.5 Biodiversity

Submission No.	Issue	Response
6, 11, 15, 20, 41	<p>A turbine is located in an area identified as Grassland Earless Dragon habitat, at Gurrundah.</p> <p>Track located on the edge of threatened reptile habitat at Bannister, leading to deaths and destruction of habitat.</p>	<p>The Biodiversity Assessment follows the avoid, minimize and offset approach. A constraints map is provided to ensure that impacts are avoided in areas identified as having or potentially having high conservation value. A precautionary approach is used where information is lacking, ie. if the habitat appeared suitable, the area is protected regardless of whether threatened species currently utilise the habitat. In SoC 14, the Proponent commits to avoiding these areas in the final infrastructure layout.</p> <p>An area at Gurrundah was identified as potential habitat for the Grassland Earless Dragon even though no Grassland Earless Dragons were found during the survey. As a precautionary measure, this area was considered a potential constraint in relation to the development in the early planning stages, resulting in survey work. This included a more detailed investigation of the identified area and more accurate map of the extent of the potential habitat. A modified layout is proposed that would allow infrastructure on the periphery of the identified area and thereby minimize loss and fragmentation of potential habitat.</p> <p>The Bannister site similarly identifies exclusion zones for potential threatened reptiles, as a precautionary approach (no threatened reptiles were identified at any of the sites) and aims to minimize impacts to these areas. A track on the periphery is considered acceptable, in terms of the risk posed to threatened reptiles.</p>
6, 8, 20, 30, 41, 45	<p>Impacts on vegetation of conservation significance (Endangered Ecological Communities)</p>	<p>These areas were included on the constraints maps in Section 6 of the Biodiversity Assessment and also within the EA, Section 7.4.</p> <p>Assessments of Significance have been undertaken to ensure that direct and indirect impacts would not affect the integrity of these sites.</p> <p>One area of Tableland Basalt EEC may be cleared at Pomeroy (approximately 0.5 ha) which would require an offset (one of two options being considered for a powerline easement). Mature trees can be avoided. Equivalent vegetation is present at Pomeroy which could form an offset for this clearance, if required.</p>

		The Proponent has now committed to follow Option 2 and avoid the EEC along the powerline route between Gurrundah and Pomeroy - modified SoC 12 refers
8, 15, 42	Affect on indigenous flora and fauna of clearing and vehicle access to 84 turbine sites.	In general the sites of the proposed turbines and the majority of associated infrastructure are suitable because they provide large cleared areas dominated by exotic species in areas of high wind speed. Mitigation measures have been formulated and accompany the proposal in order that direct and indirect impacts are avoided where possible and minimised where avoidance is not feasible. Offsets would be secured to compensate for direct loss of habitat (SoC 16 of the EA).
10, 49, 54	Environmental assessment only looks at host area, not impact on surrounding areas.	The EA considers that the nature of wind farm development requires that the surrounding areas are considered, not only the immediate area that would host the turbine. Examples of this consideration in the EA are as follows: <ul style="list-style-type: none"> • Regional context provided in Biodiversity Assessment, as background to the existing environment and therefore an important part of the impact assessment. • Regional context provided in the EA • In most key issues (Section 7) the existing environment is detailed first, to allow a context to understanding specific impacts on the site and the potential to impact broader values.
10, 15, 17, 20, 26, 34, 42, 45	Risks to birds and bats	Risk to birds, particularly those moving within the potential rotor sweep area of turbines, has been identified in the Biodiversity Assessment. While the open habitats where infrastructure would be placed provide for less diverse and abundant bird and bat guilds than the adjacent woodlands, risks remain. Risk assessments were carried out for species of concern. Information presented in the biodiversity assessment provides that the site would be unlikely to present an unacceptable risk to birds and bats. A monitoring program, as outlined in the EA and Biodiversity Assessment would have greater benefits than merely mitigating against unanticipated impacts at the Gullen Range Wind Farm. It could also address the paucity of information available in an important area, given the expansion of the industry in NSW.
15, 21, 26, 34	Lack of detail in biodiversity mitigation measures (ie controlling prey near	Mitigation is set out as a series of commitments aimed at ensuring that key issues are considered during detailed planning and the construction, operation and decommissioning of the project. The Biodiversity Assessment investigated measures that have worked at other wind farms that should

	<p>turbines, minimizing perching opportunities etc.)</p>	<p>be incorporated into the design stage (ie turbine selection and construction to minimize perching opportunities) to minimize bird and bat collisions. These measures are feasible and practical. For example, turbines with lattice structures will not be used, minimizing perching opportunities. Guy wires would be reduced where possible. Overhead electricity lines will be fitted with bird-safe devices (marker balls, wire insulation etc.).</p> <p>For the operational phase, the fine detail of the mitigation has not been provided, a consequence of several factors:</p> <ul style="list-style-type: none"> • Commitment of resources; the development of a monitoring program requires significant financial commitments and would not be appropriate to commence prior to project approval • Site specific mitigation actions; monitoring mitigation should respond to the specific findings onsite, hence this level of detail would be developed in tandem with the operational wind farm. <p>A monitoring program to manage operational impacts to birds and bats is included as a Statement of Commitment in the EA (SoC. 23). Specific management responses would need to reflect the detected nature and scale of identified impacts. The type of actions that would be considered are included (relocation of dams, modification of habitat, turning turbines off for limited periods). Detailed triggers and actions would be determined as part of the monitoring program, as outlined in Section 9.3 of the EA.</p>
<p>18, 21, 42</p>	<p>Indirect impacts to threatened flora and fauna</p>	<p>Habitat 'degradation' (as opposed to 'loss') is the term used in the EA to talk about the indirect impacts to flora and fauna. These would be most acute during the construction phase and may include habitat loss from erosion, site avoidance by fauna during construction as a result of activity and dust, impact on movement of fauna from creation of tracks, dust impact on flora and fauna, and potential changes in hydrology.</p> <p>Section 7.4 of the EA states that:</p> <p><i>Habitat degradation resulting from the construction of the project is readily avoided and controlled using standard best-practice mitigation methods (sediment and erosion controls, noise controls, weed controls).</i></p> <p>It is also noted that:</p> <p>The sites contain livestock and their current management involves the operation of machinery and vehicles in largely cleared areas. The increased noise, vehicle emissions and dust expected during the construction phase are not anticipated to be cause for concern for fauna onsite. Adhering to predetermined access routes and low speeds (max. 40km/hr) would reduce the risk of vehicles</p>

		<p>colliding with stock or native fauna onsite.</p> <p>A further issue regarding indirect impacts to fauna is the potential for mobile species to avoid the site and habitat resources therein on account of the noise or movement of operational wind turbines. This has been addressed in Biodiversity Assessment, Section 7.2.2.</p> <p>It is also worth noting the environmental benefits of the proposal in relation to the reduction of greenhouse gas emissions by 588,000 tonnes CO₂ are significant and will ultimately provide positive biodiversity outcomes.</p>
20	<p>Large turbines can force warm air downward causing greater evaporation at ground level. This would cause a loss of suitable habitat for threatened reptiles around the area of BAN 14</p>	<p>A key benefit of wind farm development is its ability to address climate change, a process that has been verified as a key threatening process to biota in NSW (Scientific Committee Determination), by reducing the proportion of greenhouse gases emitted through electricity generation.</p> <p>While a small temperature increase has been documented in studies of operational wind farms (approximately 0.7°C increase at ground level; Baidya, et al. 2004) that could be assumed to lead to higher evaporation rates, the author knows of no studies suggesting this amount of change would adversely affect reptile habitat.</p> <p>Substrates such as rocks, arthropod burrows and grass tussocks provide substrate for reptiles due to their ability to regulate extremes of temperature. Quality habitat has been included in the Biodiversity Constraints mapping and would be avoided (SoC 14).</p>
21, 52	<p>Destruction of current ecosystem</p> <p>Environmental vandalism</p>	<p>Since European settlement, agriculture has had the largest impact by area on the devastation of Australian ecosystems. While the Gullen Range sites retain agricultural value and support native biota, past clearing and agricultural activities, likely with the assistance of drought, have created large areas of exotic dominated grassland, with scattered remnants across the majority of the proposed development envelope which could certainly be considered a poor representation of the pre-agricultural native ecosystem.</p> <p>The Biodiversity Assessment documents in detail the existing values of the sites, including the much greater values of adjacent vegetation, which could still be considered regrowth from past clearing activities. Further, it sets out measures to preserve habitat onsite.</p> <p>There is no evidence to support the assertion that wind farm development would lead to the destruction of the remaining habitat values at Gullen Range. In fact, the authors feel that the proposal offers many benefits that would see the overall improvement of the environmental functioning of the site. Specifically, these include a drought-proof income stream that would afford land owners the ability to graze less intensively, formalised feral control (SoC 22), identification and protection (including suggested management actions) have been afforded to areas of high</p>

		<p>biodiversity value (SoC 14), the Proponent has committed to securing offsets to ensure long-term assurance of the 'improve or maintain' biodiversity test applied to development proposals (SoC. 16).</p> <p>The threat of population level impacts to birds and bats provokes emotional responses when viewed outside a broader environmental context. This context must include the past land management of the site, potential for future deterioration through over grazing in poor years, the positive contribution that the development would have toward regional renewable energy production and the potential to manage this impact through ongoing adaptive management monitoring (to which the Proponent commits SoC. 23). It is now recognised that one of the greatest risks to biodiversity in NSW is climate change. The development of renewable energy infrastructure has a goal of reducing NSW's green house gas emissions.</p>
30,39	<p>The flexibility of turbine movement of 250m would mean a turbine could be placed in areas identified as of conservation significance.</p> <p>Turbines would impact on identified potential Grassland Earless Dragon habitat. The size of the footings required mean that even with a turbine on the periphery, unacceptable impact on the area would result.</p>	<p>Although turbine flexibility is retained through the 'development envelope approach', the Statements of commitment in Section 9 of the EA ensure that habitat values are protected. Specific to threatened species habitat and woodland, these include:</p> <p>SoC. 11(Mod) Infrastructure (including turbines, powerlines, access roads, construction works areas and crane pads) would be located to avoid dense woodland/forest, impacts to woodland/forest in all other cases would be minimised through rigid site controls established in the CEMP to minimise clearing. Any loss of native vegetation would be offset in accordance with SoC16.</p> <p>Avoidance of woodland appears feasible in all areas with the exception of the electricity easement at the southern tip of the Pomeroy site. Specific mitigation has been included for this area:</p> <p>SoC 12(Mod). The Proponent would locate the electricity corridor required at the Gurrundah property using Option 2 (as shown in figure 7-10 of the EA). The width of the corridor would be minimised and impacts to native vegetation offset in accordance with SoC16</p> <p>Furthermore,</p> <p>SoC14. The final infrastructure layout would avoid areas identified as constraints (refer to constraints maps, Figures 7-6 – 7-9 this EA, and Attachment 3.3).</p> <p>These areas include all identified areas of potential threatened reptile habitat.</p>
30	<p>Impacts on Tableland Basalt Forest EEC and other vegetation between</p>	<p>Between the commencement and finalisation of the Biodiversity Assessment, Tableland Basalt Forest was listed as an EEC. To reflect this, prior to the finalisation of the assessment, an additional biodiversity site visit was conducted to inspect the route and the vegetation structure</p>

	<p>Pomeroy and Gurrundah inadequately assessed.</p>	<p>again. Then, an assessment of significance was completed, pursuant to the Threatened Species Conservation Act 1995, to characterise the impact of clearing an area 250m x 20m of this EEC. The assessment concluded that impacts could be managed to avoid significant impact on this community, by routing the powerline through a previously thinned area, avoiding mature trees.</p> <p>Between the commencement and finalisation of the Biodiversity Assessment, the development envelope was increased to include turbines in the area south of Pomeroy, on the existing clearing between Pomeroy and Gurrundah, proposed originally only for electricity connections. Having surveyed the northern and southern areas (Pomeroy and Gurrundah, respectively) the authors felt confident to determine no potential for EECs existed in this area and that the following mitigation would manage impacts of development in this area:</p> <p>SoC 11 (Mod). Infrastructure (including turbines, powerlines, access roads, construction works areas and crane pads) would be located to avoid dense woodland/forest, impacts to woodland/forest in all other cases would be minimised through rigid site controls established in the CEMP to minimise clearing. Any loss of native vegetation would be offset in accordance with SoC16.</p> <p>SoC 12(Mod). The Proponent would locate the electricity corridor required at the Gurrundah property using Option 2 (as shown in figure 7-10 of the EA). The width of the corridor would be minimised and impacts to native vegetation offset in accordance with SoC16</p> <p>SoC 15. A flora assessment would be conducted as part of the construction environmental management plan, to microsite infrastructure such as tracks away from better quality patches of understorey.</p> <p>SoC. 20 (Mod) Final site inspections would be undertaken for the electricity corridor between Pomeroy and Gurrundah to allow micro-siting of the corridor in areas of least vegetation. If the alternative access off Prices Lane to Pomeroy becomes the preferred option and also if the western access option (a paper road) to Gurrundah becomes the preferred option final inspections would also be undertaken in these areas.</p> <p>The approach of the assessment has been to avoid, minimise and then mitigate, where avoidance is not possible. The measures are designed to achieve a maintain or improve environmental outcome. The quantum of Tableland Basalt EEC vegetation outside the development envelope at Pomeroy has been suggested as an offset to ensure this outcome:</p> <p>SoC. 16 The Proponent would commit to offsets determined by suitably qualified experts on the basis of the quantum of vegetation to be removed, pending development of the final infrastructure layout. The offset plan would be established in perpetuity</p>
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39	<p>Impacts on 'locally endangered' Wedged-tailed Eagle.</p> <p>Feasibility of carrion removal and prey control.</p> <p>Raptor prey control – wallabies and kangaroos.</p>	<p>The risks and mitigation of impacts to Wedge-tailed Eagles are discussed within the Biodiversity Assessment. This species is not listed as threatened, either at a species or local population level, but is known to be a species of concern due to features of its ecology (Appendix F of the Biodiversity Assessment: Bird Risk Assessment, where it was rated a moderate risk).</p> <p>The development of pest animal control programs and the removal of carrion beneath turbines are techniques recommended at other wind farms, to reduce the attractiveness of ridges to raptors. Rabbit control is a measure currently undertaken onsite and so is considered highly feasible. Removal of carrion would accompany the bird and bat monitoring program, to assess its effectiveness. The idea is not to eliminate rabbits or remove all food sources but to be able to monitor their influence on collisions and increase the intensity of actions if dictated by monitoring results.</p> <p>Control of native species has not been recommended and would not form part of the proposal.</p>
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3.6 Project Justification –inefficiency and reliability of wind energy

Submission No.	Issue	Response
7, 10, 13, 15, 45	<p>Wind is a variable, intermittent source and therefore the figures related to the average houses that can be supplied or the greenhouse gas benefits cannot be relied upon. Because the wind is an intermittent source, the wind farm will not operate for significant periods and is therefore inefficient.</p>	<p>Section 4 of the EA presents the basis and justification for the proposal in the context of the need for wind energy generation in Australia to combat climate change impacts from greenhouse gas emissions, the regulatory framework encouraging additional wind energy generation and how wind energy fits into Australia's power generation mix.</p> <p>The proposed site is located in the Southern Tablelands and has excellent wind speeds and has the necessary transmission infrastructure for connection to the national grid. However because wind is a variable resource and therefore there is variability in the amount of electricity produced and exported to the National Electricity Market (NEM) at each instant in time. This has led to two common claims in submissions from the community – that wind farms are inefficient, and unreliable and that coal generators will continue to generate as much electricity as before, negating any greenhouse gas benefit. These claims are incorrect.</p> <p>Efficiencies of both wind farms and modern coal fired power stations (as used in NSW) are in the order of 35 - 45%. That is, they can theoretically turn 35-45% of the energy available (i.e. wind or</p>

		<p>coal) into useful electricity. However, the effectiveness of wind farms is measured by their average annual output. Over a typical year, the Gullen Range wind farm will produce around 588,000 Megawatt-hours of electricity, enough for the average consumption of 73,500 homes.</p> <p>Reliability of wind farms is very high. Wind turbines typically have an availability of above 97%, that is, they are available to operate almost the entire year. Only a few days maintenance are required for each wind turbine to keep them operating at their optimum over their life.</p> <p>Variability of the output from wind farms exists because of variability of the wind resource. Wind farms, like hydro power generators and coal fired generators, do not operate at 100 per cent capacity 100 per cent of the time. In addition to this, there is considerable inherent variability in supply and demand of electricity across the NEM minute by minute, day to day and across the seasons of the year. The electricity consumption in NSW is constantly changing. This variable supply and demand is managed in the NEM to ensure sufficient power generation is available at each instant in time to meet the consumption required.</p> <p>Wind energy is an efficient and reliable player in our energy mix. The presence in the generation mix of hydro and gas fired power stations (several are already operating in NSW, with more under construction) to complement wind energy production results in a very clean, reliable and cost effective generation system.</p> <p>The claim that the Gullen Range Wind Farm will not reduce greenhouse gas emissions in NSW is incorrect. Every unit of electricity produced from wind farms displaces electricity and greenhouse gases from fossil fuel burning power stations. In a typical year this project alone will save around 588,000 tonnes of CO₂e from hitting the environment- this is equivalent to taking 117,000 cars off the road.</p>
7, 15, 17, 21	The project will not result in the closure of any baseload or coal fired power station.	The EA does not claim that wind energy will result in the closure of a coal fired power station (Section 4.3.1, p61 does not infer nor purports that wind energy will replace conventional generation). Wind energy, however, is an important part of the generation mix as we transition into a carbon constrained economy. The wind farm would provide renewable, non-greenhouse gas producing generation that will help to meet increasing demand.
9, 21	The EA does not compare wind to alternative sources of electricity, including renewable, non-renewable and programs such as energy efficiency.	The federal Renewable Energy Target (RET) is the market based regulatory mechanism that requires electricity retailers to source a certain percentage from renewable energy sources. The RET is technology neutral and provides the lowest cost generation of renewable electricity into the National Electricity Market. It is in this context that wind energy was successful in the previous MRET program because wind provides the lowest cost generation of the new renewable technologies.

		<p>The table below was compiled from a number of sources including the Garnaut Review, the Owen Report, and other reports. It excludes technologies that are not yet considered commercially viable, including wave and tidal, Biomass methane and carbon capture and storage. This table compares the available renewable generation technologies with coal and natural gas.</p> <table border="1" data-bbox="730 423 1591 959"> <thead> <tr> <th></th> <th>Technical maturity</th> <th>Co₂ Intensity (kg/MWh)</th> <th>Water use (l/MWh)</th> <th>Cost (\$/MWh)</th> </tr> </thead> <tbody> <tr> <td>Coal</td> <td>Mature</td> <td>969</td> <td>1,300,000</td> <td>31 – 40</td> </tr> <tr> <td>Natural Gas</td> <td>Mature</td> <td>500</td> <td>~ 260,000 - 520,000</td> <td>37 - 44</td> </tr> <tr> <td>Hydro</td> <td>Mature</td> <td>4 - 10</td> <td>Significant enviro issues</td> <td>27 - 282</td> </tr> <tr> <td>Wind</td> <td>Mature</td> <td>7</td> <td>Nil</td> <td>75 - 90</td> </tr> <tr> <td>Solid Biomass</td> <td>Mature</td> <td>Poss. Negative under some circumstances</td> <td>~ 2000 (wet) ~ 700 (dry)</td> <td>47 - 120</td> </tr> <tr> <td>Solar thermal</td> <td>Demo</td> <td>~ 3</td> <td>~ 2000 (wet) ~ 150 (dry)</td> <td>120 - 150</td> </tr> <tr> <td>Solar PV</td> <td>Mature</td> <td>~ 3</td> <td>Nil</td> <td>400 - 800</td> </tr> <tr> <td>Geothermal</td> <td>Research</td> <td>~ 3</td> <td>high</td> <td>Large range</td> </tr> <tr> <td>Nuclear</td> <td>Mature</td> <td>~ 3</td> <td>1,100 – 1,850</td> <td>50 - 80</td> </tr> <tr> <td>Ultra Clean Coal</td> <td>Demo</td> <td>770 - 825</td> <td>unknown</td> <td>unknown</td> </tr> </tbody> </table> <p>Energy efficiency can and should play a significant role in helping to achieve reductions in greenhouse gas emissions and reducing electricity consumption. There are both federal and State based energy efficiency initiatives that improve the efficiency with which electricity is used, for example improved lighting in commercial buildings and improved industrial processes. Energy efficiency will work hand-in-hand with the penetration of renewables and new gas in the electricity generation mix in a low carbon environment to avoid the need for additional coal fired generation in NSW.</p>		Technical maturity	Co ₂ Intensity (kg/MWh)	Water use (l/MWh)	Cost (\$/MWh)	Coal	Mature	969	1,300,000	31 – 40	Natural Gas	Mature	500	~ 260,000 - 520,000	37 - 44	Hydro	Mature	4 - 10	Significant enviro issues	27 - 282	Wind	Mature	7	Nil	75 - 90	Solid Biomass	Mature	Poss. Negative under some circumstances	~ 2000 (wet) ~ 700 (dry)	47 - 120	Solar thermal	Demo	~ 3	~ 2000 (wet) ~ 150 (dry)	120 - 150	Solar PV	Mature	~ 3	Nil	400 - 800	Geothermal	Research	~ 3	high	Large range	Nuclear	Mature	~ 3	1,100 – 1,850	50 - 80	Ultra Clean Coal	Demo	770 - 825	unknown	unknown
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9	Because the public is paying the additional cost of renewable energy, it should be ensured that it is the best value for money in	As mentioned previously, the federal Renewable Energy Target (RET) is the market based regulatory mechanism that requires electricity retailers to source a certain percentage from renewable energy sources. The RET is technology neutral and provides the lowest cost generation of renewable electricity into the National Electricity Market. It is in this context that wind energy was successful in the previous MRET program because wind provides the lowest cost																																																							

	terms of greenhouse gas reduction.	generation of the new renewable technologies and offers the best value for money in terms of greenhouse gas abatement.
9	Information about the variability of wind is needed to estimate energy production and the cost of electricity generated. This should be compared to other sources.	EPURON has been monitoring the wind on the site since 2002 and has four wind monitoring towers across the site. Therefore EPURON has an excellent on-site data record encompassing 6 years with multiple masts that have been correlated with the long term Bureau of Meteorology station at Goulburn to provide long term wind speed statistics. This data has been used calculate yields for particular turbines. The production of approximately 588,000MWh per annum from the proposed wind farm considers and incorporates on-site variability in wind speeds. The comparison of wind to other technologies is compared above.
9	The EA should provide the financial value of subsidies or carbon credits received over the life of the project and the effect on electricity prices.	<p>The proposal will not receive any subsidies from the government.</p> <p>The EA describes the regulatory mechanism (RET) that provides transitory support to renewable electricity generation until the carbon pollution emissions trading scheme fully incorporates the cost of pollution into price of electricity generated from fossil fuel generators.</p> <p>Renewable energy targets were introduced to assist the development of the renewable industry in Australia to reduce greenhouse gas emissions. The COAG Working Group has issued a discussion paper on the "Design Options for an Expanded Renewable Energy Target". This discussion paper presents the various design considerations including target profile, eligibility, eligibility of existing generators, period and shortfall charge. When the design details are finalized, economic modeling can provide forecasts of impacts on electricity prices. However given the relatively small percentage of electricity generation that will come from renewables under the scheme, the cost impact is expected to be low.</p> <p>In terms of providing a guide of the potential impact on electricity prices, the NSW Government's own analysis of the proposed NRET (NSW RET) indicated a likely average weekly cost of \$0.30 per household or \$15.00 per annum per household. This is based on a NSW target of 10% by 2010 and 15% by 2020.</p> <p>Additionally, the economic benefit of decisive action on climate change must be considered in the analysis of the impact of the RET scheme.</p>
9	The future NSW generation system will have an increasing proportion of gas generation. The estimates of savings should be based on the future composite of	<p>The greenhouse gas reductions from the project are discussed in Section 4.3.2 of the EA.</p> <p>In NSW approximately 90% of electricity is generated by fossil fuel power stations, primarily coal and grew approximately 44% between 1990 and 2002.</p> <p>The greenhouse gas emissions reduced by the proposal has been calculated considering the</p>

	gas and coal.	<p>greenhouse gas emission co-efficient for the NSW electricity system based on figures from the NSW Greenhouse Office. Therefore the figures presented in the EA are based on current, actual data.</p> <p>The future mix of NSW electricity generation is likely to include a greater proportion gas and renewables as the generation industry transitions to lower carbon pollution emissions in accordance with State and Federal policy. It is not possible to accurately predict the proportion of the future mix of electricity generated in NSW, but the coefficient would be lower than today.</p>
9, 56	The EA should contain a cost – benefit study in which environmental and social costs and benefits are assigned a monetary value.	<p>There is no requirement in the DGR's to undertake a cost – benefit analysis of the project.</p> <p>However the EA does provide a justification of the project in terms of the significant environmental and economic benefits that will flow from the project. This includes the reduction in greenhouse gas emissions by approximately 588,000 tonnes of CO₂ every year, creation of local jobs, injection of between \$60 - \$90 million into the local economy and the \$75,000 per annum community program. The EA also assesses impacts from the proposal including those relating to the natural, physical, cultural and social environmental factors. The EA also presents proposed mitigation measures to minimize the potential for adverse impacts from the proposal and commits to the development and implementation of the Project (Construction and Operation) Environmental Management Plan. Therefore adverse impacts from the proposal are minimized where possible and mitigation measures will further reduce impacts. In this context the impacts from the proposal are considered minimal and acceptable.</p> <p>The EA presents a clear case that the proposal will provide a significant overall benefit to the environment and local community.</p>
9	The \$75,000 community contribution is too small.	<p>The community enhancement program is a voluntary commitment from the proponent to broaden the benefits of the wind farm within the local community.</p> <p>The program will provide an annual allocation of \$75,000 per annum from the commencement of operations until decommissioning, indexed with CPI from the commencement of the wind farm operation. Section 4.4.2 of the EA discusses the community enhancement program in greater detail.</p> <p>This contribution is the largest recurring voluntary contribution from a wind farm in Australia and is significantly larger than contributions from much larger wind farms elsewhere in Australia. The quantum of the community enhancement program is considered generous in relation to other wind farm contributions, the economic fundamentals of the Gullen Range proposal and in the context that it is an entirely voluntary program.</p>

<p>9, 39</p>	<p>There is no basis for the claims regarding the amount of money injected into the Australian and Local economies.</p>	<p>Section 4.4.3 of the EA addresses the jobs, investment and economic benefits of the proposal. In this section the basis for calculated jobs and economic benefits is derived from two reports:</p> <ol style="list-style-type: none"> 1. <i>Driving Investment, Generating Jobs</i>. A report by Dr Passey who is a specialist in energy policy research and analysis. He has worked in the Energy Policy Group of the Australian Cooperative Centre for Renewable Energy. This report draws on recent Australian and international analyses and Australian case studies to determine estimates for the financial and employment outcomes of Australian wind farms. His analysis considers a range of factors including economies of scale, local manufacturing and technological improvements. 2. <i>Jobs and Investment Potential of Renewable Energy: Australian Wind Energy Scenarios</i>. Dr. Ian MacGill and Dr. Muriel.E. Watt. Dr. MacGill is a UNSW academic (School of Electrical Engineering) who researches widely on renewable energy. He is a Director of the Centre Energy and Environmental Markets (CEEM). The report presents findings of the Australian CRC for Renewable Energy (ACRE) estimating possible growth and job outcomes for a range of industry growth scenarios for the Australian grid-connected wind industry. <p>The estimates that appear in the EA were calculated on the assumption of 84 turbines of 2MW capacity, assuming approximately 50% Australian content and 20-30% of capital costs regionally sourced. This is in accordance with the findings of the two reports identified above.</p>
<p>9</p>	<p>The EA states that the project will support 600 direct jobs in Australia. How many jobs will be overseas?</p>	<p>The construction phase of a wind farm is labour intensive and generates significant jobs. Approximately 6.6 times as many manufacturing and installation jobs are created for wind energy than for a coal-fired power plant.</p> <p>The estimate of jobs created by the project was calculated in accordance with the Passey (2003) and MacGill and Watt (2002) reports.</p> <p>In terms of overseas jobs supported by the project, this is not provided in the available literature. The calculations of economic benefits from the project have assumed 50% of the total capital costs being Australian content (towers, site preparation, construction etc) and the remainder being imported turbines, blades and other components.</p>
<p>10, 45, 56</p>	<p>The benefits of wind farms in relation to greenhouse gas emissions are outweighed by the carbon costs of constructing towers, blades and</p>	<p>A life cycle and embodied energy assessment of the manufacture, transport, operation, decommissioning and disposal of wind turbines is presented in Sections 4.3.1 and 8.9 of the EA. It shows that the energy payback is approximately 6.6 months for a V90 – 3MW turbine, that is the turbine needs to operate for 6.6 months to payback the energy required to manufacture, transport, install, operate, decommission and dispose the turbine. The turbine has an operating design life of 20 – 30 years.</p>

	<p>concrete used in footings, as well as impacts to residents and wildlife.</p>	<p>The EA assesses the impacts from the proposal including biodiversity and social impacts. The EA also presents proposed mitigation measures to minimize the potential for adverse impacts from the proposal and commits to the development and implementation of the Project Environmental Management Plan. Therefore adverse impacts from the proposal are minimized where possible and mitigation measures will further reduce impacts. In this context the impacts from the proposal are considered minimal and acceptable. The environmental benefits include reducing greenhouse gas emissions by 588,000 tonnes of carbon dioxide (equivalent) per year, reducing consumption of potable water by 774 million litres per year and saving pollution in comparison to energy generation of coal fired power stations.</p> <p>The benefits to the local community include the injection of approximately \$60 – \$90 million into the local economy, the creation of jobs and the provision of a voluntary community fund of \$75,000 per annum.</p> <p>The proposal will therefore provide a significant overall benefit to the environment and local community.</p>
<p>17</p>	<p>Because of intermittency in the production of electricity, the wind farm cannot produce baseload power.</p>	<p>As previously mentioned, wind farms because of the variable nature of wind produce intermittent electricity. However this greenhouse gas free electricity does play an extremely important role to meet future electricity demand in NSW and to reduce carbon emissions from the electricity sector.</p> <p>The perception that wind energy does not produce baseload power is factually incorrect and is based on flawed assumptions about the operation of a range of generation types in the electricity market.</p> <p>The fundamental premise is that a baseload power station (generally coal or nuclear) is available 24/7 and operates most of the time at full power and supplies reliable power for consumers. However in reality no power station, be it gas, hydro or coal, operates at 100% of capacity, a 100% percent of the time. Additionally there is considerable inherent variability in supply and demand of electricity across the NEM minute by minute, day to day and across the seasons of the year. The electricity consumption in NSW is constantly changing (see Figure 4-7 in the EA). This variable supply and demand is managed by the National Electricity Market Management Company (NEMMCO) to ensure sufficient power generation is available at each instant in time to meet the consumption required. Therefore the concept of “baseload power” is fundamentally inconsistent with the mechanics of the existing generation and electricity markets. This is a complex topic and Dr. Diesendorf has written a paper titled “The base load fallacy” that explores the issues related to baseload power in relation to wind generation in greater detail.</p>

		Wind energy is an efficient and reliable player in our energy mix that contributes to meeting demand for electricity. The presence in the generation mix of hydro and gas fired power stations (several are already operating in NSW, with more under construction) to complement wind energy production results in a very clean, reliable and cost effective generation system
21, 31	Because of intermittency in the production of electricity, the wind farm requires back-up by fossil fuel generators.	<p>Please refer to the response above in relation to the role wind plays in the generation mix. The electricity grid is a dynamic system, designed to ramp up or down to respond to changing demand, and with the ability to provide back-up for all types of generation including wind, hydro, gas or coal.</p> <p>The NEM is designed to be sufficiently robust to overcome even the unplanned loss of the biggest generator unit online due to maintenance or faults. The NEM is capable of dealing with, responding to and managing a range of fluctuations, including the variable output of wind farms.</p> <p>There will always be a range of different generator types in the electricity mix and because wind complements both hydro and gas, wind generation can be quickly replaced by either hydro or gas. Gas turbines can be switched on and off quickly and new peaking gas plants are proposed at Marulan to feed into the same transmission network.</p>
51	Wind is not the long term answer to the problems related greenhouse gas emissions.	Please refer to the responses above
6, 7, 20, 30, 39, 41	Wind energy cannot be considered Critical Infrastructure. Because of the variation of generation from the turbines under consideration, the project may or may not exceed the 250MW threshold	<p>New power stations with capacity greater than 250MW would be declared 'critical infrastructure' in accordance with the gazettal on the 26th of February 2008, under section 75C of the Environmental Planning and Assessment Act 1979 by the Minister for Planning.</p> <p>While this proposal is to be assessed as a Part 3A Major Project, under the NSW Environmental Planning and Assessment Act 1979, it is also considered Critical Infrastructure under this Act as it is a power generator with capacity to generate in excess of 250 megawatts and is the subject of an application lodged under section 75E of the Act</p> <p>It is the wording of the gazettal, a power generator with capacity to generate in excess of 250 megawatts that results in the proposal being considered a Critical Infrastructure project. The Gullen Range wind farm proposal has the capacity to generate in excess of 250MW.</p>
3, 6, 7, 15, 20, 30, 39, 41	Energy output and greenhouse gas emission calculations are incorrect or	The energy production of the Gullen Range wind farm is considered in Section 4.3.1 of the EA. It is recognized that a range of potential turbines are under consideration and these have a range of rated capacity.

	<p>don't specify the exact turbine and capacity used</p>	<p>Investigations were carried on a wide range of turbines using the wind turbine analysis tool Windographer™ producing consistent results with the analysis undertaken by Garrad Hassan. This provided a broad range of energy yield estimates based on the range of turbines under consideration.</p> <p>On the basis of these studies energy production estimates (on a sent – out basis) for the Gullen Range wind farm are in the range of 5.5 to 8.5 GWh per turbine per annum depending on final turbine selection and turbine layout. This calculation is based on a predicted typical year, with variations around this average of in the order of 10-20% likely for any single year.</p> <p>Predictions used in the EA are therefore presented on the basis of an average figure of 7.0 gigawatt-hours (GWh) per turbine per annum. On this basis the wind farm is expected to produce in the order of 588 GWh per annum. Further figures in the EA are based on this production estimate.</p> <p>In terms of reductions to greenhouse gas emissions, the most recent greenhouse gas emissions coefficient for the NSW electricity system is the NSW Annual Pool Value for 2006 of 0.969 Tonne CO2e/MWh (NSW Greenhouse Office 2006). This means that for each megawatt-hour of electricity consumed in the NSW electricity pool, approximately 1,000 kilograms of greenhouse gases are emitted, primarily from coal fired power stations. Therefore 588,000MWh per annum will reduce greenhouse gas emissions by approximately 588,000 Tonnes CO2e per annum.</p>
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3.7 Traffic and transport

<p>9</p>	<p>More detailed information on vehicle movements (including expected bottlenecks) required Mitigation measures indefinite (stated as 'would be considered')</p>	<p>The Traffic Impact Study: <i>"...provides a technical appraisal of the traffic and safety implications arising from the proposal. The report also develops measures and makes recommendations for the minimisation of traffic impacts..."</i> Recommendations are not definitive, at this stage. Further work is required to plan, in association with the road authority and residents, the final details of haulage, including exact transport routes, roads to be maintained, dust suppression and haulage timing.</p> <p>Detailed traffic and transport planning must involve a transport contractor. The details of the final planning will depend on this contractor who would be engaged post-project approval.</p> <p>The Traffic Management Plan (outlined in SoC. 42) includes a Community Consultation component, in recognition of the importance of involving affected residents in making the final decisions about issues such as sealing and managing the haulage volumes.</p>
<p>1, 9, 45, 51, 53, 58</p>	<p>Structural impact on local roads that are not built for the loads.</p>	<p>The study recognises that the local roads were not constructed for high volumes of heavy traffic. Issues relating to structural impact on local roads included within the Traffic Impact Study included;</p> <ol style="list-style-type: none"> 1. Failing pavement sections of sealed lengths under heavy loads 2. Deterioration and pot-holing of gravel road surfaces under increased traffic loads 3. Structural damage potentially occurring to some culverts and concrete causeway crossings 4. Potential deterioration of constraints identified as requiring special consideration included 'structurally deficient structures' <p>A number of Statements of Commitment have been developed in relation to managing, protecting and restoring the conditions of the roads and associated 'furniture' to their original conditions, and in some instances improving the existing condition (refer to SoCs 42, 43, 46, 47, 48, 49, 53, 58, 59, 60).</p>
<p>9</p>	<p>Reports referenced in Traffic Impact Study should be included as attachments</p>	<p>It is not standard practice to include referenced reports in full.</p>

21, 53	Improper use of local country roads	<p>The loss of amenity to other road users including local residents and tourists would be a high, although temporary impact. The number and type of vehicles would certainly be out of character with the existing road usage.</p> <p>Key impact areas requiring consideration to address this impact relate to road condition and road-user safety. Measures to address these areas are included as Statements of Commitment within the proposal.</p>
21, 9, 15, 20, 23, 36, 45, 46, 53	<p>Impact of construction traffic through Goulburn, Crookwell and Grabben Gullen.</p> <p>Close proximity of sensitive receptors (schools, hospitals, recreational facilities etc.)</p> <p>Safety issues of construction traffic</p>	<p>The Traffic Impact Study considers use of the smaller local roads and state roads and concludes that while the former roads carry relatively small traffic volumes, that these roads vary significantly in their ability to safely cater for concentrated volumes of large vehicles. Where possible therefore, preferred access would be via the State Roads (Crookwell Road and Grabben Gullen Road) to Grabben Gullen because of the higher standard of construction and therefore improved safety on these State Roads. This will necessitate travel through Goulburn, Crookwell and Grabben Gullen.</p> <p>Road-specific mitigation measures for these routes have been outlined within the Traffic Impact Study, and developed into Statements of Commitment in the EA, these include:</p> <p>SoC. 42. <i>Development of a Traffic Management Plan to include scheduling of deliveries, managing timing of transport through Goulburn and Crookwell to avoid peak hours (beginning/end of the school day), limiting the number of trips per day, undertaking community consultation before and during all haulage activities (including with neighbouring landowners and landowners adjoining access roads), designing and implementing temporary modifications to intersections and street furniture , restoring all changes to their original condition and managing the haulage process</i></p> <p>SoC. 41. <i>Use of a licensed haulage contractor with experience in transporting similar loads, to be responsible for obtaining all required approvals and permits from the RTA and Councils and for complying with conditions specified in the approvals</i></p> <p>SoC. 56. <i>The business owners, retailers etc in the main street of Crookwell would be made aware of the timing for heavy, overmass and over-dimensional vehicles</i></p> <p>Provided safety measures are included, as outlined in the Traffic Impact Study, use of these roads to facilitate the construction and operation of this project is not seen as incongruous with the purpose of the local road network.</p>

<p>1,9,15,18,20,23,36,46,48</p>	<p>Impact on residents: quality of life, congestion, pollution, impact of night deliveries on residents</p>	<p>It is certain that, during construction, the amenity of local roads and residents on the transport route will be impacted. The degree of impact will be determined by several factors; the closeness of residences to the haulage route, the amount of screening (either by landforms or vegetation) afforded to the residences and the frequency of trips taken by the residents along the haulage route. Additionally, some routes will be used temporarily during construction while others will be in use for the entire construction period (i.e. <i>enroute</i> to or from concrete batching plants).</p> <p>These type of impacts relate to many large infrastructure projects. Use of the road network is required but should be demonstrated not to present unacceptable or unmanageable risks. The Traffic Impact Study demonstrates the types of degrees of impacts to be within manageable limits and provides an outline for their management. Commitments made to manage these impacts include:</p> <p>SoC. 44. <i>Providing a dedicated telephone contacts list to enable any issues or concerns to be rapidly identified and addressed</i></p> <p>SoC. 51. <i>A procedure would be established to monitor the traffic impacts during construction, such as noise, dust nuisance and travel times and work methods modified to reduce the impacts</i></p> <p>SoC. 52. <i>A procedure would be established to inform vehicle operators on the precise timing of school buses</i></p> <p>SoC. 62. <i>Bannister Lane, Storriers Lane, Prices Lane: A program would be established to consult with all of the road users and residents in the area particularly those living in the residences close to the roads</i></p> <p>Note: An argument can be made to increase the days per week and hours per day of permissible construction haulage to minimise the duration of the construction phase, and thereby reduce the impact on neighbours. Similarly, deliveries at night may avoid traffic and be a safer alternative. However, for the purpose of the Traffic Impact Assessment, normal working hours were assumed.</p>
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9	Shadow flicker discussed in only cursory manner	<p>Shadow flicker occurs when moving blades create moving shadows as viewed from a stationary position. Shadow flicker is not considered an issue from a moving vehicle because roadside trees filter light and moving vehicles are subject to the same effect as shadow flicker. In any case, the route was assessed for potential to generate shadow flicker affecting motorists. Only one location conformed to the conditions required to produce this effect (within 500m of a turbine, diminishing until 1000m) and at this location only for a limited duration annually (when the sun is directly behind the wind turbines, and therefore only by westbound vehicles during the late afternoon in winter immediately prior to the crest). Furthermore, the manageability of this effect was noted in the Traffic Impact Study:</p> <p><i>'It is considered that a small amount of road side planting may be required at this one location' (on Range Road).</i></p> <p>And the relevant recommendation of the Traffic Impact Study was carried over into the EA:</p> <p>SoC. 61. <i>The shadow flicker effects would be monitored following commission and any remedial measures to address concerns would be developed in consultation with the Council and the Department of Planning</i></p>
9	Impact of turbines and oversize vehicles on driver distraction not adequately considered.	<p>The issue of 'driver distraction' was discussed with the RTA during the preparation of the Traffic Impact Study. Traffic signs and road-side advertising rely on drivers being able to divert their attention whilst driving safely. Distraction is not on its own considered by the consultant to present an unacceptable risk. However, several Statements of Commitment are made with the objective of reducing risks to drivers during the construction phase.</p>
9	No mention made of use of Leary's Lane. Will it be used or not?	<p>This lane was not assessed as part of the Traffic Impact Study, in terms of it forming a part of the haulage route however it is considered likely to experience increased traffic during the construction phase because of usage by contractors going to or from the site. Issues of safety and nuisance caused by increased usage could be dealt with via the complaints mechanisms outlined for the Traffic Management Plan (SoC 42.).</p> <p>If this lane is required to be used as part of the haulage route, it would be assessed prior to construction, as part of the Construction Environmental Management Plan. This plan would require approval from the Department of Planning. An additional SoC is now proposed:</p> <p>SoC 144 (new) <i>If haulage is proposed on routes that have not been assessed as part of the EA, assessment would be undertaken, in consultation with the Department of Planning, the roads authority and Council, prior to its inclusion in the haulage route. This would be completed as part of the Construction Environmental Management Plan.</i></p>

9,15,20,36	Feasibility of negotiating tight turns, dips and roundabouts located on the route.	Section 5 of the Traffic Impact Study identifies: <i>'Intersections inadequate for manoeuvring of the haulage vehicles along the route...'</i> as a constraint to several of the roads on the over mass / over dimensional haulage route. Within the scope of the study (that is, excluding routes covered by referenced reports, identified in Section 1.1 of the Traffic Impact Study), road-specific mitigation measures are outlined in the study and reiterated as Statements of Commitment, in the EA. These are not detailed remedies but will provide guidance to the haulage contractor as the detailed transport program is developed, pending project approval. Further, they demonstrate the feasibility of the roads investigated to serve as part of the haulage route.
9	Derivation of existing traffic volumes not adequately assessed.	Preliminary traffic counts on minor roads indicated a lengthy assessment using installed traffic counters was not justified. Information on traffic peaks (ie during festivals, harvests, special events etc) will be required in the development of the Traffic Management Plan. The haulage program will be required to take into account such events. Community consultation is a component of the Traffic Management Plan (SoC. 42) and a means to achieve this.
9	Calculation of predicted construction traffic volumes not transparent.	Traffic volumes were estimated based on the author's experience with large scale construction projects and the description of works provided by the Proponent. The author has prepared several similar Traffic Impact Assessments and has experience in similar large scale civil works. Rates used related to the maximum traffic generating activities and potential for overlap, and are therefore considered precautionary, as stated in the caption for Table 4-1: <i>'Calculations are based on the maximum traffic generation at one site during concrete pouring. Considering the location and capacity of the concrete batch plants (assumed to be Crookwell, Pomeroy and Gurrundah) and the road network, vehicle traffic should not exceed the numbers stated in Table 4-1. The approximate duration of activities was derived considering similar scale projects. The maximum number of trips per day is highest for the foundation construction, calculated using the turbine footing dimensions (assuming a construction rate of one footing per day). Assuming the worst case scenario, where all these activities overlap, the total number of maximum trips is the sum of these activities, 296.'</i> The figures were found to agree well with the Crookwell II calculations, a project of similar type and scale.

9,40	Calls into question the methodology, assumptions and conclusions of the Traffic Impact Study.	<p>As for other specialist studies sourced in the EA, consultants with experience sufficient to assess and advise on impacts were selected. The author's methodology and conclusions are underwritten by his qualifications and experience, and were considered by the authors of the EA to describe adequately for their purpose the proposal's key traffic and transport issues requiring mitigation.</p> <p>The study was carried out with the best information available at the time. If the additional information calls these findings into question, we would be pleased to discuss this information and revise the report's recommendations if required.</p>
15,20	Implications of low power lines on Kialla Road. How will these be avoided?	<p>Low power-lines are a factor to be considered by the haulage contractors. Adjustments to the lines can be undertaken with the cooperation of the power authority, if required.</p>
15,20	Road closure of Kialla Road would create a 'a real and dire safety issue ... as no emergency vehicle could make its way to any property between Crookwell and Kialla, or to any property in the Kialla district and residents would be cut off from access to Crookwell District Hospital.'	<p>No road closures have been suggested in the Traffic Impact Study or the EA.</p> <p>In response to preliminary traffic constraints (the proposal has been designed iteratively, concurrent with input from the specialist studies), access to the Kialla and Bannister sites was relocated via Grabben Gullen Road in order to minimise traffic movements along Kialla Road (refer to EA p.79).</p> <p>The obstacle created along the haulage route by construction traffic would need to be managed so that, in the event of emergencies, emergency vehicles are not impeded by construction traffic. This could be incorporated into the Traffic Management Plan.</p> <p>Road and junction upgrades in many areas will facilitate the transit of all vehicles, including emergency vehicles, may in some cases have a beneficial impact on emergency response times.</p>
36	Construction traffic a hindrance / safety risk to training horses	<p>Horse rider impacts were considered in the EA with respect to hazards posed by operational turbines and construction traffic to riders on the Bicentennial Trail and local roads around the turbines. Signage to warn horse riders forms a Statement of Commitment for the Bicentennial Trail.</p> <p>Construction traffic was not assessed specifically for the risks posed to horses and horse riders on properties on the haulage route. Liaison with property owners on haulages routes forms a Statement of Commitment and may assist in managing this risk. While the construction traffic may remain an inconvenience or even a safety issue for these properties, it is considered manageable, as the haulage schedule can be made available to these properties in advance of works. The input of residents, such as this respondent, will be important to minimising traffic impacts.</p> <p><i>SoC. 42. Development of a Traffic Management Plan to include ..., undertaking community consultation before and during all haulage activities (including with neighbouring landowners and landowners adjoining access roads)</i></p>

40	Cumulative impact of the construction of multiple large scale projects in the region not considered	Cumulative impacts are assessed in Section 8.10 of the EA which states, specific to traffic impacts, that there is low potential for cumulative impacts during the construction phase, as no similar large scale developments are anticipated at the time of writing to be constructed at the same time as the proposal. To guard against the unforeseen however, a Statement of Commitment is provided by the Proponent: SoC. 137 <i>If an additional project proposed concurrent construction timing on access routes nominated by the Gullen Range wind farm, the Proponent would enter into liaison to ensure that additional traffic and transport issues were addressed</i>
54	Potential to develop non-constructed crown roads, currently utilised in a working property. Prices Lane and Storriers Lane are "NO THROUGH ROADS".	The final haulage route has not been determined at this stage. To retain flexibility in the final selection of haulage routes and subject to negotiation with landowners, several options were investigated in the Traffic Impact Study. At this stage, our investigations indicate development of Prices and Storriers Lanes would be permissible and have therefore been included as options.

3.8 Health impacts

Submission No.	Issue	Response
8, 15, 20, 22, 25, 30	Noise from turbines may cause health implications in people.	<p>The EA assessed the proposal in accordance with the South Australian EPA Environmental Noise Guidelines (2003) in accordance with the DGR's. The SA EPA Guidelines have been developed to protect the amenity of the receiving environment noting that wind farms are often in rural areas with low ambient noise. The SA Guidelines establish a base limit of 35dB(A) which is 5dB(A) less than the equivalent New Zealand and Victorian criteria. The guidelines also consider that noise impacts are marginal and acceptable if the noise generated does not exceed the background by 5dB(A).</p> <p>As discussed in Section 8.6.4 of the EA, the criteria utilised in the SA guidelines is below the limits identified by the World Health Organisation (WHO) as guidelines for acceptable community noise. The WHO identifies 45dB(A) outside a bedroom (with an open window) as the threshold for when sleep disturbance could occur. Additionally, a wind turbine does not emit sufficient sound power to cause health effects such as have been claimed to be associated with them, including Vibro-Acoustic Disease (VAD), which is incorrectly referred to by one submission as "turbine syndrome".</p>

		<p>Calculations have shown that to be exposed to conditions similar to those referred to in papers on VAD1, a receiver would have to be located within several metres of the blade tip of a turbine, and that this exposure would need to be continuous for ten years.</p> <p>The SA guideline, to which the proposal will comply, are based on protecting amenity of the receiving environment and are below levels where the onset of health effects (physical and psycho-physiological) are likely to occur.</p>
8, 38	Shadow flicker may cause health implications to people, especially those suffering epilepsy.	<p>The complete shadow flicker assessment is located at Appendix A.1 of the Landscape and Visual Impact Assessment (LVIA) and it is summarized at Section 8.6.2 of the EA. The health effects from shadow flicker are discussed.</p> <p>In terms of epilepsy, shadow flicker frequencies of between 8 – 30 hertz can trigger seizures. The frequency range that can trigger flicker vertigo is 4 – 20 hertz. The maximum frequency of shadow flicker from the current proposal is 1 hertz, which is well outside the frequency range associated with photosensitive epilepsy and flicker vertigo.</p> <p>Therefore wind turbines are unlikely to represent a health risk to local residents in relation to flicker vertigo and photosensitive epilepsy. The Proponent has incorporated SoC 109 as a commitment to avoid shadow flicker impacts by pre-programming the control system to automatically shut down individual turbines whenever conditions that lead to shadow flicker nuisance exist.</p>
8, 9, 18, 36, 46	Decreased air quality from dust and pollutants may result in health impacts. Dust and pollutants may end up in peoples drinking water.	<p>Section 8.8.2 of the EA addresses air quality impacts from dust and other emissions that are likely to be generated primarily during the construction phase (12 – 24 months) of the project. Dust could be generated during access track construction, concrete batching, rock crushing (if required) and during the transport of equipment to the site. It is noted, however, that the construction program is not static and infrastructure would be progressively installed and impacts would not be continuous at one place during this period.</p> <p>The EA presents mitigation measures that will be established to minimize dust generation in accordance with a Construction Environmental Management Plan that includes protocols for site restoration following construction. Additionally, dust suppression will be used when necessary during construction activities and stockpiled material will be covered to minimize dust generation.</p>
15, 18	Electromagnetic fields from the proposed infrastructure can have acute and chronic health implications and cause cancer.	<p>Transmission lines, wind turbines and substations generate a 50Hz electric and magnetic fields and these electromagnetic fields, at particular limits, can acute and chronic health impacts as presented in Section 7.8 of the EA.</p> <p>Electric fields can be reduced by shielding and with distance from receivers; magnetic fields are</p>

		<p>reduced more effectively with distance.</p> <p>The EA shows the expected levels of electric and magnetic from transmission lines, wind turbines and the substation from the proposal as being significantly below the interim NHMRC guidelines (as currently used by ARPANSA) for exposure to 50/60Hz electric and magnetic fields. Refer to Section 7.8 of the EA for more detailed information.</p>
15, 20	<p>Farmers working outdoors may be exposed to turbine noise over long periods and this may have OH&S implications.</p>	<p>The various noise guidelines (including the SA EPA Guidelines, NZ 6808 and the WHO Guidelines) are all based around protecting the amenity of peoples' houses and particularly avoiding disturbance to peoples sleep. The SA Guidelines make particular reference to property boundaries not necessarily being valid measuring locations unless someone would regularly be there. Similarly, the NSW Industrial Noise Policy is only applied to particular noise sensitive receivers.</p> <p>In terms of outdoor activities including agricultural work, higher background noise levels occur during the day. Farming activities usually involve machinery that produce far greater noise than turbines (e.g. tractors, 4WD's and motorbikes) or in the presence of stock.</p> <p>Therefore assessment of noise impacts outdoors is not required in accordance with the SA Guidelines that considers noise sensitive relevant receivers. Farming activities undertaken outdoors are not considered noise sensitive. Also farming occurs in environments with more significant background noise and in that context, noise impacts from wind turbines are anticipated to be low.</p>
24	<p>Turbines may collapse and pose a risk to people and assets on adjoining properties. Turbines should be located greater than the turbine height from a property boundary.</p>	<p>Wind turbines are extremely safe and reliable with a history of independent certification and compliance of over 25 years. Wind turbines supplied by leading global manufacturers, including those under consideration for this project, are designed and built to international standards, including IEC (International Electrotechnical Commission) and are certified by independent certifiers. This type certification process establishes safety and reliability of the design and validates supporting calculations used.</p> <p>SoC 111 is to minimize risks by obtaining and implementing sound geotechnical and engineering advice during construction, choosing a reliable turbine and in relation to the proper installation and maintenance of the turbine.</p>
23, 24	<p>It is reported that residents are suffering stress and depression at the anticipated impacts that the turbines will have on their</p>	<p>The EA takes seriously the potential to affect the health and well being of the local community. These issues were investigated (Sections 8.2 and 8.6) in the context of the local community and the experiences of other communities with wind farms.</p> <p>However, a Project Application has been made for a wind energy proposal that is permissible in</p>

	lives.	<p>accordance with Local and State Planning Regulations. As with any proposed development, there is a requirement to follow planning process and for the consent authority to determine the application on its merits.</p> <p>While it is regrettable that the proposal and the uncertainty of the project is reportedly causing stress on local residents, the planning process is being followed, as it would be with any other proposed development.</p> <p>An independent study (Warren <i>et al.</i>, 2005) used face-to-face questionnaire surveys of 115 random people around 4 wind farms in Scotland and Ireland to explore perceptions before and after wind farm construction. The study confirmed:</p> <ul style="list-style-type: none"> • Attitudes of local people become more favourable towards wind farms after construction. Opposition is greater at proposed sites than operational ones. • Attitudes of local people are more favourable with proximity to wind farms. • The NIMBY syndrome does not adequately explain public attitudes to wind farms. <p>The results of this study support other work which has found opposition to wind farms arises in part from exaggerated perceptions of likely impact, and that living near a wind farm dispels those fears.</p>
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3.9 Construction Noise Impacts

Submission No.	Issue	Response
1, 18, 21, 45	Noise generated from construction activities will impact local residents.	The construction of the Gullen Range wind farm will occur over a period of approximately 12 – 24 months. As the wind farm covers a large area, it is anticipated that intensive works would occur for a relatively short period of time in any part of the site. Based on the proposed duration of works and the nature of construction activities, the construction noise was assessed in accordance with the EPA's Environmental Noise Control Manual as required by the DGR's.

		<p>Construction noise has been predicted at each receiver location and is shown to comply with noise limits set in accordance with the DECC Environmental Noise Control Manual. Mitigation measures (SoC 2 – 7) have been developed to minimize construction noise impacts. These include:</p> <p>SoC 2: Limit hours of noise generating activities; SoC 3: Establish communication with relevant authorities and local residents; SoC 4: Appoint a site representative responsible for noise and vibration issues; SoC 5: Select appropriate machinery with low inherent potential for noise generation; SoC 6: Where necessary, erect barriers around potentially high noise generating areas including generators and compressors; and SoC 7: Appropriate siting of noisy machinery.</p> <p>To minimize the impact of construction hours on nearby residents, no work is proposed on Sundays and public holidays and Saturday work is proposed to cease at 4pm. The proposed Saturday work represents an extension to the 1pm cessation of works described in the Noise Control Manual, but the noise assessment shows this will have a negligible impact on nearby residents and will serve to minimize the overall construction program. A Noise Management Plan will be developed and implemented as part of the CEMP.</p> <p>It is also noted that the draft DECC Construction Noise Guideline do allow for construction outside of current Environmental Noise Control Manual periods with more stringent noise emission criteria</p> <p>Therefore, while construction noise may be audible to nearby residents, it will comply with the limits in the DECC Noise Control Manual. Mitigation measures will be implemented to minimize noise construction impacts to nearby residents.</p>
<p>1, 9, 18, 46, 58</p>	<p>Noise generated from traffic and heavy vehicles around the site will impact local residents.</p>	<p>During construction activities, vehicles including conventional cars, 4WD's and trucks will be moving around the site on the network of public roads. All vehicles will be registered and will comply with Australian Vehicle Standards. These vehicles are unlikely to be noisier than existing vehicles using the roads, however traffic volumes will increase temporarily during the construction phase.</p> <p>A Traffic Management Plan (SoC 42) will be developed to schedule deliveries to minimize overall impacts to towns, schools, traffic and residents along the haulage routes. Consultation with the community will be undertaken prior to the commencement of haulage activities. This management plan will be developed in conjunction with the RTA and Local Councils to provide specific mitigation measures to reduce impacts.</p>

<p>9, 15</p>	<p>It is suggested in the EA that heavy vehicles may arrive at the site in the night. This would create noise impacts to local residents and in nearby towns (such as Crookwell and Grabben Gullen).</p>	<p>A Traffic Management Plan (SoC 42) will be developed to schedule deliveries to minimize overall impacts to towns, schools, traffic and residents along the haulage routes. Consultation with the community will be undertaken prior to the commencement of haulage activities.</p> <p>It is considered that some deliveries may occur outside of normal hours to minimize impacts to road users, towns and schools and ensure safe transport operations. The consequence of this is that some noise may be produced as vehicles move through nearby towns.</p> <p>Equipment haulage is not a continuous program so any impacts would be temporary and would be managed through specific mitigation measures developed and implemented in conjunction with the RTA and Local Councils.</p>
<p>36, 46</p>	<p>Noise from heavy vehicles may affect livestock, including horses or lambing.</p>	<p>There is very little literature available on this issue. It was explored during the Macarthur Wind Farm Panel Hearing, and the Panel heard from an expert witness (Mr. Hayes) who identified, based on animal studies and experience, that adverse impacts would not be anticipated. A second submitter, with academic experience in animal production, advised he would not anticipate any adverse consequences on animal husbandry in the vicinity of the proposed wind farm. The Panel concluded that there is no evidence to support the concern of adverse impacts to farm animals as a result of heavy vehicles.</p> <p>It is not anticipated that there would be a high level of impact on farm animals or their behaviour as a result of heavy vehicles from the proposal. Noise levels are relatively low and not inconsistent with noise associated with normal farming operations (motor bikes, trucks and tractors). Livestock tend to avoid areas where work is taking place and communication / consultation with nearby farmers during particular activities would assist in minimizing any impact.</p> <p><i>Macarthur Wind Farm: Permit Application PL – SP/05/0283 Panel Report May 2006</i></p>
<p>30</p>	<p>A blasting assessment was not done as part of the noise assessment, this should be done.</p>	<p>Section 5.4 and 9.5 of Noise Impact Assessment addresses potential blasting, should bedrock be encountered during excavation for footings.</p> <p>Noise control in relation to blasting is covered by the ANZEC guidelines that provides criteria for times of day blasting is permitted, air-blast overpressure level and ground vibration peak particle velocity limits.</p> <p>A full assessment was not possible because the nature of the rock at the site or the site specific blasting data is not known. However using the minimum distance a residence is from a turbine (550m) the acoustic consultant has calculated that a maximum instantaneous charge (MIC) of 15 –</p>

30	The EA proposes Saturday work to extend to 4pm which is beyond the limit in the Noise Control Manual. This should not be allowed.	<p>18kg is unlikely to exceed the ANZEC guidelines.</p> <p>Construction hours for Saturdays are proposed to be from 7am to 4pm. The Noise Control Manual sets construction hours for Saturdays as 7am – 1pm.</p> <p>The longer hours on Saturday are proposed to allow reasonable efficiencies of effort (i.e. utilise a work force to achieve a meaningful amount of work) and minimize the overall construction duration. This would lessen prolonged construction noise impacts on nearby residents.</p> <p>The Noise Assessment shows that the L10 levels predicted at each receiver are significantly below the noise level criteria and therefore the extended construction hours will have a negligible impact.</p> <p>It is also noted that the draft DECC Construction Noise Guideline do allow for construction outside of current Environmental Noise Control Manual periods with more stringent noise emission criteria.</p> <p>The extension to Saturday working hours would have a negligible impact and provide significant benefits to the construction program. It would also reduce the duration that nearby residents are exposed to construction noise.</p>
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3.10 Fire Risk

Submission No.	Issue	Response
10, 13, 18, 23, 26, 42, 45, 51, 56	The proposed wind poses a fire threat that could result in risk to residents, stock and houses.	<p>The RFS has been consulted about the proposal and was present at the proposed site during the Planning Focus Meeting. The level of consultation reflects the serious consideration that this issue has been given.</p> <p>The representative identified that the development was in an area considered to be a relatively low bushfire risk and with the implementation of appropriate fire management planning and strategies that from a bushfire risk perspective it would be unlikely that there would be any significant concerns.</p> <p>Section 7.11 of the EA addresses potential fire and bushfire impacts. The main potential causes of turbine ignition are internal electrical or equipment failure, bushfire and lightning strike. A turbine</p>

		<p>ignition risk exists, but the overall risk is assessed as low.</p> <p>The EA makes the point that fires due to electrical or equipment failure are very rare in modern wind turbines. Turbines are designed to shut down automatically if ambient temperatures exceed the safe operating range, or if components overheat.</p> <p>Turbines can also be shut down following notification of a bushfire in the locality or in the event of extreme fire conditions.</p> <p>The turbines will be fitted with lightning protection, which is designed to effectively earth any lightning strike. The presence of lightning rods on the turbines would in fact reduce the general risk of wildfire at the site caused by lightning strikes. Relatively minor damage to turbines is expected from lightning strike. At Crookwell, east of the site, a direct strike resulted in damage to one of the turbine blades, which was able to be repaired onsite. No fires were ignited. The risk of fires being caused by lightning strikes to turbines is remote.</p> <p>The NSW Fire Brigade, RFS and Council would be consulted regarding safety, communication, site access and response protocols in the event of a fire originating in the wind farm infrastructure, and also in the event of an external wildfire threatening the wind farm.</p> <p>The EA contains a number of SoC's (65 – 73) that minimize risk and provide procedures that adequately provide bushfire prevention, management, communication and response protocols should a fire originate or threaten the proposed wind farm. It is considered that these commitments are adequate and reasonable measures to address the fire issue.</p>
38, 51, 56	A wind farm results in surrounding property becoming ineligible for fire insurance.	<p>The wind farm operator will be adequately insured for all risks associated with wind farm construction and operation activities including fire damage to wind farm infrastructure and public risk liability.</p> <p>Wind turbines are mature technology that have been designed and installed in great numbers in many jurisdictions to international and domestic standards. The insurance industry look to claims records to evaluate risk exposure and the occurrence of fires resulting from wind farms are extremely low around the world in relation to the number of installed turbines. Additionally wind turbines are designed and installed to standards that limit risks to insurers and contain fire safety mechanisms (high temperature shutdown controls, for example).</p> <p>Based on inquiries to reputable providers of farm and rural fire insurance, there appears to be no awareness that properties adjacent to wind farms are ineligible for insurance, attract higher premiums or have any particular insurance requirements. On the basis that the occurrence of fires from wind farms are extremely low and there is no reason to believe wind farms pose a significant</p>

		fire risk, it was considered by the insurers that the presence of a wind farm would not even need to be disclosed when seeking insurance on a neighbouring property.
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3.11 Hydrology (Water, Water Quality and Water-table Impacts)

Submission No.	Issues / Comments	Response
6,29,30, 37,41	Proximity of infrastructure to local rivers and creeks (Heffernan's Creek, Wollondilly River): contamination threat	The EA recognises the potential for indirect impacts including sediment laden run off and chemical spills to impact on waterways in the vicinity of the proposal. No works are proposed in close proximity to these waterways and it is considered that mitigation measures including the preparation of a sediment and erosion control plan (SoC 82), water management strategy (SoC 83) and a site restoration plan (SoC 84) would reduce the potential risk of contamination to nearby waterways to an acceptable level.
9	Impact on Sydney Water Catchment and Upper Lachlan catchment: contamination threat	As per comment above
9	Not sufficient detail on the estimated run off and erosion volumes	This is not provided in the EA, and would be the subject of an erosion and sediment control plan (SoC 82).
17	Effect of footings on water table	These impacts are considered remote and are therefore not normally assessed. Geotechnical investigations would be carried out prior to footing design and construction. The turbine footings are typically located on ridge tops and topographical high points and high water tables are not anticipated. Should excavation occur into the water table, the laying of mass concrete footings should not impact on the water table.
17,19	Amount of water required not available in drought conditions	The EA identifies that approximately 5.6 ML of water would be required for construction. Further, the sustainable yield from the bore at Pomeroy has been estimated 22 kL/hr. SoC 83 identifies that need for a water management strategy to reduce the use of water as far as practicable, including water recycling. Water use during operation of the wind farm would be extremely low.
19, 36	Effect of dust on local waterways and rainwater collection from roofs.	The EA acknowledges the potential for off site impacts as a result of dust emissions. It is considered that SoC 115 -123 would minimise any potential impacts.
50	Amount of water required for construction not feasible	Sections 3.4.1 and 7.12 of the EA addresses potential sources of water for construction activities including the bore at Pomeroy, on-site dams or other suitable water sources with agreement from relevant Authorities (including Council). It is considered that there is an adequate supply of water

		for the respective construction activities over the duration of the construction duration.
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3.12 Communications and Telecoms

Submission No.	Issue	Response
1, 8, 18, 42	TV, radio and mobile phone reception is currently poor and any interference will impact on residents quality of life.	<p>Section 7.7 of the EA addresses potential impacts to telecommunications services arising from the proposed wind farm.</p> <p>The EA investigated possible impacts on the four most common communication services, namely TV, radio, mobile phone and air craft navigation services.</p> <p>TV interference is dependent on a range of factors, and their complex interactions, including topography, signal strength, transmitter type, receiver type and wind farm design factors. Due to the variability of local conditions and characteristics of antennae used in particular installations, there is a degree of uncertainty regarding predicted levels of interference. Therefore it is difficult to assess individual house locations until the wind farm is operational.</p> <p>A small number of mobile phone base stations exist in the surrounding. No significant impact is anticipated on base station coverage beyond normal operational performance because of the geographic separation between base stations and the proposed wind turbines.</p> <p>Given the difficulty in predicting likely impacts from the proposal, a range of mitigation measures were proposed to ensure local residents would not be significantly impacted by interference to TV, radio or mobile phone services. SoC 36 has been amended to assess representative residences prior to the commencement of construction.</p> <p>Television and radio broadcast Mitigation Measures</p> <p>Prior to the erection of any wind turbine generators on the site, the Proponent will undertake an assessment of the existing quality of the television/radio transmission available at a representative sample of residential dwellings located within five kilometres of a wind turbine.</p> <p>The Proponent will undertake further assessment of television/radio reception following</p>

		<p>commencement of operation to determine any loss in television signal.</p> <p>Should investigations determine that the cause of the interference can be reasonably attributable to the wind farm; the Proponent would put in place mitigation measures at each of the affected receivers in consultation and agreement with the landowners.</p> <p>Specific mitigation measures may include:</p> <ul style="list-style-type: none"> • Modification to, or replacement of receiving antenna • Provision of a land line between the effected receiver and an antenna located in an area of favourable reception • Improvement of the existing antenna system • Installation of a digital set top box or • In the event that interference cannot be overcome by other means, negotiating an arrangement for the installation and maintenance of a satellite receiving antenna at the Proponents cost <p>Mobile phone (and wireless broadband) services Recommendations from telecommunications companies have been incorporated into the planning of the project.</p> <ul style="list-style-type: none"> • Mobile phone services in the area are not expected to be impacted by the wind farm or its operation • The Proponent appreciates the importance of Wirefree (now Cirrus) broadband to the local community and commits to work with Wirefree (now Cirrus) to avoid any impact on the service <p>These technical solutions provide satisfactory mitigation measures to ensure there is no significant deterioration in TV and radio in the vicinity of the wind farm.</p>
<p>11, 27, 28, 40</p>	<p>Mitigation measures are not adequate and should be provided prior to construction to ensure residents are not affected or testing should be undertaken prior to commencement of</p>	<p>The Proponent proposed, in accordance with SoC's 35 and 36, to offer mitigation to residents should interference to TV or Radio be experienced.</p> <p>It is not possible to mitigate potential impacts of TV / radio signal interference prior to wind farm construction because of the complex nature of radiofrequency propagation, complex interaction between signal propagation and physical characteristics of the area and the largely unknown impact that the wind farm will have.</p>

	construction.	It is, however, considered appropriate given the nature of the submissions to conduct a representative sample of nearby existing residences to establish TV/radio reception quality prior to the commencement of construction. SoC 36 has been amended accordingly.
11	Not stated who will decide on the range of possible mitigation measures presented in the EA.	Advice would be sought from local technicians on the suitable technical solutions to avoid interference problems. The solution decided as the most appropriate that would be ultimately implemented would follow consultation with the landowner, technician and Proponent.
28	Future dwellings need to be eligible for mitigation measures.	Future dwellings located in the vicinity of the wind farm will need to install appropriate TV antennas to receive TV signals. These antennas will be designed to consider the local physical and environmental conditions and the signal strength / direction from the transmitter. The local conditions would incorporate existing wind farm(s) and therefore there is no requirement for the Proponent to offer mitigation for future dwellings.
11	Wireless broadband provider, WireFree has been bought by Cirrus Communication since the EA was finalised. Need to consult to minimize impacts.	The Proponent consulted with WireFree, the local provider of wireless broadband, during the development of the proposal and agrees to work co-operatively with them during the construction to avoid impacts to local subscribers. Subsequently, Cirrus Communications has purchased WireFree, however the service continues to operate and the commitments remain the same.

3.13 Aircraft hazards and Aviation

Submission No.	Issue	Response
8, 16, 24, 34, 39, 55, 59	Concerns raised that responsible authorities (eg. CASA or ULSC) may undertake due diligence to avoid an Aviation Accident and prevent the inadvertent and consequential closure of a very valuable asset to Crookwell and the Upper Lachlan Shire	<p>None of the submissions justify why the aerodrome would need to be closed or indicate the likely cause/s of an accident arising from the Proposal that could not be reasonably avoided by a competent aircraft operator.</p> <p>CASA has no authority to close the aerodrome, because, as it states in the letter dated 18 Aug 08, the aerodrome is neither Registered nor Certified, and therefore is not subject to CASA regulatory oversight. CASA has stated that it has no further comments to offer on the Proposal, other than in relation to the obstacle marking and lighting of the wind farm as previously discussed. As Crookwell Aerodrome is not regulated by CASA, accident prevention is primarily the responsibility of aircraft operators who operate on and in the vicinity of the aerodrome. Aircraft operators are required to maintain adequate separation with obstacles as explained in Section 3.9.2 of the Aviation Hazard</p>

		Assessment. There are no regulatory obstacle separation requirements for aircraft actually taking off or landing at an aerodrome.
24, 59	The Crookwell Aerodrome is an asset that enables pilots and passengers to visit Crookwell (and surrounds). It is also used as a weather alternate (for safety of life), used for flight instruction (as a challenging aerodrome), and for emergency services such as fire-fighting and air ambulance	The Aviation Hazard Assessment shows that the aerodrome will still be available for visits to Crookwell, for use as a weather alternate and for flight instruction activities, and to support the operation of emergency services, as concluded in the Aviation Hazard Assessment at Section 3.9.2.
16, 59	Attachment A: Wind turbine separation The Respondent argues that wake turbulence created by the wind turbines could induce a significant reduction in airspeed and flying conditions that might easily cause an aircraft to tip and stall.	<p>The submission argues that wake turbulence behind a wind-turbine may extend as far as 16 times the blade diameter behind the wind-turbine and this constitutes a danger to aircraft operations. Studying the many references listed by the respondent there are two main conclusions that may be drawn:</p> <ol style="list-style-type: none"> 1) The Near Wake Field, which exhibits the greatest turbulence, extends to approximately 5 to 7 blade diameters behind the wind-turbine. This is consistent with wind farm design recommendations to provide a minimum distance between wind-turbine rows of 5 blade diameters. 2) The Far Wake Field, say 7 blade diameters or more behind the wind turbine, has been shown through experiment and measurement to have significantly less turbulence than the Near Wake Field. At 10 blade diameters or more behind the wind turbine, turbulence levels are similar to that which would be experienced by aircraft during any normal flight. <p>All structures or geographic features including terrain, mountains, trees, man-made obstructions, including buildings, towers, masts, wind turbines etc contribute to or create wind turbulence to some degree. Turbulence can be generated by weather phenomena such as storms, microbursts etc, and can also be encountered in clear air (called Clear Air Turbulence) beyond the obvious influence of vertical features or obstructions. Pilots are taught in ab-initio training to avoid situations where turbulence might be encountered, such as in the lee of vertical obstructions on windy days, and therefore prevent the induction of a stall. In the unlikely event that a stall situation is encountered, they are also taught to recover from a stall. These basic elements of pilot competency are accepted</p>

		<p>treatments for the risk of encountering a stall situation, whether induced by natural or man-made objects or by other weather phenomena.</p> <p>The submission attempts to draw a comparison between aircraft wake turbulence and wind-turbine wake turbulence to highlight the very ‘real’ danger to aircraft operations. The wake turbulence behind large aircraft is a very different phenomenon compared to the wake turbulence created behind wind-turbines. The wake turbulence behind aircraft is well researched and understood and should in no way be compared to the current studies into wind farms.</p>
<p>16, 59</p>	<p>Submission 59 Attachment B: Generic Circuit</p> <p>Circuit patterns should have been derived from typical aircraft performance.</p> <p>Report should not have nominated a circuit that avoided obstructions, but rather should have checked whether typical aircraft circuit patterns would not be obstructed.</p> <p>The “Generic Circuit” is neither Generic, nor achievable under recommended guidelines.</p> <p>The resultant extent of this circuit, and the Aviation Hazard report, leads the reader to conclude that aircraft can maintain a horizontal separation of between 475.3 to 764.5</p>	<p>The aerodrome has significant terrain at each end of the runway which anecdotally imposes significant restrictions to normal operations. Local procedures have been developed, but not published, to deal with these restrictions, as described in Section 3.8.1 of the Aviation Hazard Assessment.</p> <p>Anecdotal information from local operators including Mr Hutson who resides at and operates from the aerodrome indicated that aircraft can and do operate from both ends of the runway and can turn either left or right after takeoff to avoid existing obstacles, subject to environmental conditions and aircraft flight characteristics and performance limitations. He has also stated “it has always been known that our airstrip is marginal”, without further explanation.</p> <p>Aircraft operators are required to maintain adequate separation with obstacles as explained in Section 3.9.2 of the Aviation Hazard Assessment. There are no regulatory obstacle separation requirements for aircraft actually taking off or landing at an aerodrome.</p> <p>A standard (generic) circuit flight path is described in Section 3.5 of the Aviation Hazard Assessment.</p> <p>A study was conducted to ascertain whether a low-performing aircraft could perform a circuit at the aerodrome without safety being compromised by the installation of wind turbines as per the Proposal. It was found that a circuit could be safely performed (refer to Sections 3.6 and 3.7 and Appendix D). This study was presented as one of many possible means of conducting flying operations at the aerodrome, but not necessarily the only way. In fact, it is likely that most operations will be individual departures or arrivals, rather than continuous take offs and landings (circuits), in which case the argument regarding varying aircraft performance and safe separation from the turbines when flying the generic circuit is largely irrelevant.</p> <p>Note that the most critical circuit direction was studied. Subject to environmental conditions and aircraft flight and performance limitations, a circuit could equally be performed with a right hand turn</p>

	<p>metres from the three obstructions in immediate question, without consideration to aircraft performance, turbine wake-turbulence and the performance of aircraft using the Aerodrome.</p> <p>The separations derived from a poorer performance aircraft, namely 475.3, 529.9 and 764.5 metres are misleading and subject to error.</p> <p>Submission 16 Describes a notional 2.5nm radius circuit area, and states that 21 turbines within the existing Crookwell Aerodrome circuit would prevent safe flying operations. Also raises the issue of the generic circuit in relation to varying aircraft performances.</p>	<p>instead of a left hand turn, or alternatively, a climb straight ahead to circuit height or a safe height above the turbines through the low terrain between the two ridgelines to the west could be performed before turning to join the circuit to land. A takeoff could also be performed to the east before turning either left or right, subject to prevailing wind conditions.</p> <p>The flight paths of aircraft with higher performance or different handling characteristics would need to be modified according to their specific requirements to assure adequate terrain and obstacle separation. This is required under present conditions, and will require consideration when the turbines are installed, and happens as a matter of course in all properly conducted flying operations, whether from small unregulated aerodromes such as Crookwell or from major aerodromes such as Cairns, Canberra and Hobart, where departure procedures have been specifically developed because of the location and height of surrounding terrain.</p> <p>The Aviation Hazard Assessment concluded at Section 3.8.1 that local knowledge should be formalised and provided to users of the aerodrome. This guidance should incorporate consideration of the location of turbines when constructed.</p> <p>In relation to submission 16, there is no defined circuit area at Crookwell Aerodrome, nor is it defined by any regulatory authority, including CASA. The dimensions of a circuit area are based on aircraft flight and performance characteristics. The submission has not identified the 21 turbines to which he refers.</p> <p>The Proponent, with assistance from its specialist aviation consultant is prepared to assist the aerodrome operator and/or local aircraft operators to develop or amend procedures for safe operations on or within the vicinity of the aerodrome, taking into account the location of the turbines.</p>
16	<p>Assertion that no insurance company when provided with the submitter's information will provide public liability insurance, and therefore the Council would have to close the airport. Assertion</p>	<p>No evidence is provided that public liability insurance would not be available if the wind farm is constructed as planned. CASA has no authority to advise on matters relating to public liability insurance. Upper Lachlan Shire Council has not expressed any concern regarding public liability insurance.</p> <p>The assertion that Council would be forced to close the aerodrome is without basis.</p>

	that CASA representative advised that insurance would not be forthcoming if requested.	
16, 24	Argument that an aircraft could hit a tower due to low visibility or bad weather and the potential for reduced margin of safety	<p>The requirement for aviation hazard marking and lighting has been addressed in the EA and the specialist aviation report, including consultation with CASA. The wind farm will be marked and lit in recognition of published guidance and consultation with CASA.</p> <p>If a pilot is forced lower than 500 ft AGL due to the stress of weather then the aircraft may be exposed to a variety of relatively high obstacles that include communication towers, power-lines and their supports, terrain or wind turbines (there are many other wind farms across the country, including a number in close proximity to the proposed wind farm). In this situation, the pilot must take the responsibility to be aware of such obstacles and manage the risk of collision accordingly. The in-flight visibility and height above ground level determines the level of risk but this is no different for wind turbines as it is for other obstacles.</p> <p>Under current CASA regulations, an aircraft flying under night visual flight rules (night VFR) is required to operate at a height of at least 1000ft higher than the highest obstacle within 10nm of the aircraft. An aircraft should not be operating at a height where it relies on the light on top of a turbine to assure safe flight.</p> <p>Section 3.9 of the Aviation Hazard Assessment refers to obstacle visibility and clearance.</p>
24	Argument that an aircraft could hit a tower due to proximity to Crookwell Aerodrome	<p>A study conducted by the Australian Transport Safety Bureau titled <i>CFIT: Australia in context 1996 to 2005</i> was reviewed to determine the likelihood of a fatal collision with an obstacle such as the turbines in the proposed wind farm.</p> <p>The study investigated controlled flight into terrain, water or obstacles. Collisions involving intentional low-level operations, such as aerial agriculture, aerial mustering, aerial work, and low flying were not defined as CFIT for the purpose of the report, as the aircraft operators were deliberately exposing themselves to an increased risk of collision, and would need to implement risk mitigation strategies appropriate to their operations.</p> <p>In the 10-year study period there were five accidents involving collision with obstacles. All five accidents occurred during daylight with clear visibility, and all were caused by wire strikes on take off or landing.</p> <p>It can therefore be concluded on the basis of this study, that the likelihood of collision with an obstacle such as a wind turbine is very remote.</p> <p>Notwithstanding the very low likelihood of collision with a wind turbine, the Proponent, with</p>

		assistance from its specialist aviation consultant is prepared to assist the aerodrome operator and/or local aircraft operators to develop or amend procedures for safe operations on or within the vicinity of the aerodrome, taking into account the location of the turbines.
24	Hinted closure of Goulburn Airport and the argument that Crookwell Aerodrome will be the only available alternate from Canberra	<p>Goulburn Airport is being sold by Goulburn Mulwaree Council, but a condition of sale is that it continues to operate as an airport. The imminent closure hinted for Goulburn Airport and the argument that Crookwell Aerodrome will be the only available alternate from Canberra is factually incorrect and without basis.</p> <p>Refer to Information Memorandum Goulburn Airport Windellama Road, Goulburn by Colliers Investment Sales, September 2008</p>
16	Assertion that there is no need to provide operational information at present, and that construction of the wind farm will require adoption of special procedures	<p>The Aviation Hazard Assessment concluded at Section 3.8.1 that local knowledge should be formalised and provided to users of the aerodrome.</p> <p>The provision of documentary procedures and/or guidance is an accepted and recommended means of recording and communicating important safety information for the benefit of uninformed or less experienced aircraft operators. It should not be seen as an admission of increased risk; rather it should be embraced as a means of reducing the likelihood of an incident or accident.</p> <p>The assertion that “There is just no need to [<i>provide operational information</i>] now” conflicts with submission 16’s other statements regarding local conditions, including; wind shear and lee rotors caused by westerly winds, easing around to the left towards the lower height of the gap (rather than straight ahead on take off to the west), the proximity of a ridgeline to the west impacting on the ability to assure safe separation from terrain during departure, and the statement that “it has always been known that our strip is marginal”.</p> <p>It was these and similar comments during the discussion between the Respondent and the Proponent’s specialist aviation advisor that led to the recommendation that local knowledge should be formalised and provided to users of the aerodrome.</p> <p>It would be inappropriate to argue against taking the opportunity to document safe procedures for the benefit of all aerodrome users. This applies equally to current operations as well as when the wind farm is constructed.</p>

3.14 Submissions supporting the proposal

Submission No.	Issue	Response
4, 5, 22, 35,	The climate of the Southern Tablelands has changed noticeably since the 1980's, with droughts, feeding stock, failed crops and a shortage of water. The country has been in drought since 2000. Need to take action in relation to climate change.	Climate change is likely to have adverse impacts on farmers because of their reliance rainfall and temperature for grazing and cropping activities. The observation that farming on the Southern Tablelands is more difficult because of reduced rainfall and increased drought frequency is a concern and underlines the importance of Australia taking action on climate change.
2, 4, 5, 22	Because of droughts, farming is not profitable and additional income and industry is important to local farmers and the region. The community will benefit from projects such as this.	Benefits of the project to the local economy include direct payments to the involved landowners, the provision of a community fund and injection of \$60 - \$90 million into the local economy. Therefore it is considered that the local community will benefit from the project.
4, 5, 22, 43	Important to use renewable energy to reduce harmful emissions that cause climate change. Farmers are the most affected by climate change.	Farmers are exposed to impacts from climate change because of their dependency on the weather cycle in relation to cropping, grazing and the impacts of droughts, pests and diseases. Increased temperature, reduced rainfall and the increased occurrence of extreme weather are likely to have a negative impact on Australia's farming production and have economic consequences in rural areas.
2, 4, 5, 35	Have seen large wind turbines in Victoria and believe they are visually and aesthetically pleasing.	The perceptions study (Appendix 2.3 to the EA) surveyed 300 residents in the Southern Tablelands and 67% of those who had seen a wind farm (90% had) found them visually appealing.
2, 4, 35	Have been to a large wind farm in Victoria and don't believe noise or land devaluation is a concern and the local residents	A common theme in the social research into wind farm development is that people are most concerned with a "threat" of a wind farm and acceptance levels within communities increase following construction. The perception study, undertaken in the Southern Tablelands, supports the view that familiarity does not increase opposition to a wind farm, but rather increases acceptance and support for wind turbines in the landscape.

	seem pretty happy.	
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4 Response to Government agency submissions

4.1 A1 - CASA

Issue	Response
<p>Civil Aviation Safety Regulation 1998 (CASR) Part 139, subpart 139.E Obstacles and Hazards is legislation under which the operator of a Registered or Certified aerodrome is required to monitor the vicinity of the aerodrome for any infringement of the Obstacle Limitation Surface (OLS) by any building, obstacle or structure. The aerodrome operator is required to notify CASA of such development. The Crookwell airstrip is neither a Certified nor a Registered aerodrome and therefore this requirement is not triggered.</p>	<p>The Crookwell Aerodrome is not Certified or Registered by CASA and the operator is the Upper Lachlan Shire Council, which also owns the land on which the airstrip is located. The Council has been consulted regarding the proposal as presented in Section 2.3 of the Aviation Hazard Assessment.</p> <p>Goulburn Aerodrome is the nearest Aerodrome that has an OLS and subject to the requirements of CASR Subpart 139.E. Crookwell Aerodrome is approximately 41km from Goulburn Aerodrome, and therefore well outside its OLS.</p>
<p>Under CASR 139 Subpart 139.E, a person who proposes to construct a building or structure, the top of which will be 110m or more above ground level is required to notify CASA of such development.</p>	<p>CASA has been notified and consulted with since the project development process was commenced in July 2007.</p>
<p>CASA has published an advisory circular AC 139-18(0) titled Obstacle Marking and Lighting of Wind Farms to provide advice on how the potential risks that wind farms pose to aviation can be reduced.</p>	<p>The requirement for aviation hazard marking and lighting has been addressed in the EA and the specialist aviation report, including consultation with CASA.</p> <p>Since the EA exhibition period and the correspondence from CASA dated 18 August 2008, CASA has withdrawn the advisory circular. However the issue remains that safety risks to aviation operations must be considered and therefore it is proposed that aviation lighting would still be required for the proposed development. Further consultation between CASA, the Proponent's specialist aviation consultant and the Proponent is considered appropriate under the</p>

<p>Apart from drawing your attention to the above, CASA has no comments to offer on the proposal.</p>	<p>circumstances.</p> <p>The Proponent has consulted with CASA and has engaged a specialist aviation consultant to undertake an assessment of the proposal on aviation compliance, operations and safety. The assessment shows there is no reason why aircraft (including fire fighting and other emergency aircraft) would not be able to continue to safely take off and land at the Crookwell airstrip if the wind farm is constructed. This is presented in detail in Section 7.6 of the EA and Appendix 3.5.</p> <p>Based on the findings of the aviation hazard assessment and advice from CASA that it has no comments on the proposal, it is considered that there are no significant concerns relating to the location of turbines in relation to the Crookwell airstrip.</p> <p>In particular, the claim from a nearby resident that CASA will close the airstrip because of safety concerns should the project proceed, is without basis and is factually incorrect.</p>
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4.2 A2 – DECC (Aboriginal heritage and noise)

Issue	Response
<p>Biodiversity issues related to further survey work and offsets.</p>	<p>A site visit was conducted in mid-October 2008 with the Proponent, ngenvironmental and DECC to discuss the issues raised by DECC. DECC committed to drafting a letter outlining any remaining issues following the site visit. This letter was provided as the report was being finalised and has been addressed in Section 4.10.</p>
<p>Aboriginal heritage</p>	<p>Consultation between DECC and NSW Archaeology (Proponents specialist consultant) has resolved remaining issues with the assessment and recommendations contained in the archaeology report.</p>
<p>Noise Assessment - Data exclusion process is not well explained</p>	<p>Each raw background noise dataset was analysed for extraneous noise events. Extraneous noise events are defined as any measurement that is 5dB or greater above surrounding measurements. Where measurements were determined to be extraneous, the data were excluded from the analysis. Furthermore, with respect to rainfall, any measurements that coincided with recorded rainfall were also excluded.</p> <p>In addition, wind across the microphone has been considered in the data exclusion process. However, it was determined that the manufacturer-supplied wind socks provided sufficient attenuation (of 26dBA up to 20m/s). Wind speed was monitored at three measurement locations and was determined to be within limits.</p>
<p>Noise Assessment - MM82 predicted levels</p>	<p>The verified sound power level of 104.4dBA at 9m/s has been used in the assessment as the point</p>

<p>not made using rated power</p>	<p>of maximum sound power. Sound power level data up to rated power, measured in accordance with IEC61400-11 has not been made available. However, the maximum sound power values are typically exhibited at 8-10m/s which is below the rated power levels. In addition, the background noise levels at rated power wind speeds (in this case 13m/s) are significantly higher than those at wind speeds resulting in maximum sound power levels (8-10m/s) resulting in higher noise limits at rated power wind speeds.</p>
<p>Noise Assessment - Construction Noise (DECC)</p>	<p>To clarify, a detailed Noise Management Plan will be developed as part of the CEMP for the proposed development.</p> <p>It is noted that the DECC has recommended a construction noise limit of background +10dBA. The construction duration associated with the proposed development is estimated to take 12-24 months in total. However, due to the large coverage area of the wind farm and up to 84 individual turbine sites, intensive works will be located in any one location for only a short period of time.</p> <p>We therefore consider it appropriate to allow construction (L10) noise levels to exceed background (L90) noise levels for short and intermittent periods by up to 20dBA (as per Environmental Noise Control Manual recommendations).</p> <p>In addition to Environmental Noise Control Manual (ENCM) guideline, it is noted that the draft DECC Construction Noise Guideline allows for construction outside of ENCM periods with more stringent noise emission criteria. We recommend that this is adopted i.e. L90 +5dBA from 1pm to 4pm on Saturday to allow for construction activities that are considered to have less of a noise impact e.g. wind turbine assembly or cable trench digging.</p> <p>In addition, operations that are deemed to be excessively loud e.g. turbine foundation construction, should not be performed on Saturdays, when a reduced noise limit may be in place.</p> <p>Where the predicted or measured level is above the noise limit, the proponent should apply all feasible and reasonable work practices to minimise noise. In addition, the proponent should also inform potentially impacted residents of the nature, noise level and duration of works to be carried out. These will include access road construction and turbine foundation construction but will be site dependent due to the varying distances involved.</p>

4.3 A3 - DPI

Issue	Response
<p>Mineral Resources Potential for the development of the wind farm to conflict with mineral exploration activities and the possible mining of resources that may be identified in the future.</p>	<p>The primary concern of the DPI and holders of the exploration leases is that the proposed wind farm would inhibit exploration and possibly sterilize mineral resources should they be found. The EA addresses Mineral Exploration Impacts in Section 7.13 of the EA.</p> <p>While only Exploration Leases occur over the area at this time, if a mineral deposit is discovered then an application for a Mining Lease can be made. There is no certainty that a discovery would be made or a Mining Lease would be granted and accordingly the amount of potential lost mining revenue cannot be known in advance. In comparison to the lease area, the relatively small land area that would be sterilised and the level of reversibility of the proposal suggest that this impact is justifiable; the temporary loss of these areas for mining would be offset by the utilisation of a renewable resource during the project's life.</p> <p>The Proponent however does appreciate the potential impacts on exploration companies and believes the proposal will not prevent access to the site or restrict exploration except in the vicinity of infrastructure where there may be safety, structural, operational or engineering limitations. The proponent has committed to a number of mitigation measures, including ongoing consultation with the exploration lease holders to minimize impacts and potential conflicts:</p> <p>SoC 88: The Proponent would liaise with the current mineral lease holders, providing a final turbine and infrastructure layout, prior to the construction phase</p> <p>SoC 89: The Proponent would liaise with the current mineral lease holders during the construction phase, to ensure that where possible, the works program does not unnecessarily interfere with planned exploration activities</p> <p>SoC 90: The Proponent would liaise with the involved land owners and current mineral lease holders prior to rehabilitation, to ensure that any project access roads that they may wish to retain are retained. Several of these access roads are likely to be of benefit both to routine agricultural activities as well as to exploration activities onsite.</p>
<p>Fisheries Issues If access tracks cross waterways the Proponent will be required to obtain a permit for Dredge and Reclamation from DPI and must comply with Fish Friendly</p>	<p>The EA states that water crossings are unlikely to be required, however should water crossings be required, a permit will be obtained from DPI.</p>

Waterways Crossings.	
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4.4 A4 – Department of Defence

Issue	Response
The Department of Defence has assessed the proposal and has no concerns with the project at this time.	<p>The Proponent has consulted with the Department of Defence during the development of the project and it is understood there are no concerns with the proposal. Consultation will continue as the project further develops.</p> <p>It is however noted that the Proponent will provide the RAAF with final location and heights of turbines prior to construction, and final as-constructed details for entering into the appropriate RAAF databases.</p>

4.5 A5 - DWE

Issue	Response
Licenses required for ground and surface water extraction	<p>The EA states that no water would be sourced from creeks or rivers without relevant permits being sought. It is now recommended that an additional Statement of Commitment be made:</p> <p>SoC 140 New. A No ground water would be sourced without relevant permits being sought.</p>
Impact of blasting on groundwater	<p>The potential for blasting to affect groundwater has not been assessed in the EA. While it is not know if blasting will be required, it is now recommended that an additional Statement of Commitment be made:</p> <p>SoC 141 New. Undertake geotechnical investigations to ensure that the project would have no material adverse effect on groundwater/aquifers as a result of blasting activities</p>

4.6 A6 – Goulburn Mulwaree Council

Issue	Response
Construction traffic – As with other wind	Section 7.10 of the EA addresses Traffic and Transport issues in relation to the proposal and

<p>farm proposals the key traffic implications are associated with the haulage routes. Consultation with Council, RTA and police is required in the preparation and implementation of a traffic management plan for the routes and should include details of route, days and frequency, and notification to adjoining landowners of any disruptions. Mitigation of the expected impacts during construction, repair / replacement and decommissioning should also be required as part of any approval that may issue.</p>	<p>Statement of Commitments 41 – 64 provided committed mitigation measures to minimize risks and impacts.</p> <p>SoC 42 and 43 relate to the preparation and implementation of a Traffic Management Plan that addresses the Council’s comment. These involve consultation and co-ordination with local councils.</p> <p>SoC 49 relates to the rectification of damage to roads from the proposal and addresses the Council’s second comment.</p> <p>All of the concerns identified by council would be addressed in the SoC’s identified above.</p>
<p>Views – The development will be visible from a large area of the district (or partly visible). The visual impact assessment suggested that a distance greater than 17km would be visually insignificant. The Council’s Wind Farm Policy indicates that they should not be visible from towns and villages. The visual assessment indicates that the proposal may be visible from the western peri-urban areas of Goulburn but concludes that these impacts would not be significant.</p>	<p>The seen area analysis in the Landscape and Visual Impact Assessment shows that turbines (or parts of turbines) are likely to be seen from the western edge of Goulburn township. The assessment is conservative and does not consider intervening vegetation, buildings or small topographical features.</p> <p>Goulburn is approximately 20km from the nearest wind turbine and views from the western edge of Goulburn will be distant views and the turbines will be very small on the horizon. The LVIA notes that a 135m turbine will take up less than 5% of the vertical field of view at 15.5km and accordingly 17km is used as a conservative estimate of the extent of the viewshed. Therefore visual impacts from the proposal on Goulburn are not significant.</p>
<p>Community Enhancement Program – The applicant proposes to provide an annual fund of \$75,000 to be spent on the Clean Energy Programs, i.e. products including solar water heaters and photovoltaic systems would be offered at significantly reduced rates to residents within 5km of the wind farm. Due to the widespread scale of the development and expected life of a modern wind turbine (20 – 30 years) priority funds should be offered to developments within 5km of the proposal</p>	<p>The community enhancement program is to broaden the benefits of the proposal within the local community. There are two components to the program:</p> <p>The Community Enhancement Program would include two components:</p> <ol style="list-style-type: none"> 1. A Clean Energy Program, specific to supporting the installation of residential clean energy improvements 2. A Community Fund, to provide funds to undertake initiatives which provide direct benefit to the local community <p>The Proponent would fund this program through a total annual allocation of \$75,000 per annum from project revenues, from the commencement of operation of the project until final decommissioning. This annual allocation will be escalated with CPI from the date of</p>

<p>and then offered within 17km once priority areas have been exhausted if annual funds are still available. This will enable benefits to be made progressively available to residents within the locality and with views of turbines. Remaining funds could be directed to community buildings throughout the local government area.</p>	<p>commencement of the wind farm operation.</p> <p>The Clean Energy Program focuses on residents closest (within 5km) of the proposal and the intent of the Community Fund is for funds to be spent within the local area (i.e. within 10km of the wind farm).</p> <p>It is considered that there is opportunity for the community contribution to be spent closer to the wind farm and in accordance with the proposal outlined in Section 4.4.2 of the EA. However while no management structure of the fund has been defined at this time, it is proposed that the fund will be managed by a committee including local community representatives. Therefore should there be unallocated funds in future years, the decision making will be driven by community representatives and may include funding projects or programs in wider geographic areas.</p>
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4.7 A7 – Hawkesbury-Nepean Catchment Management Authority (HNCMA)

Issue	Response
<p>EA does not adequately identify the conservation values of native vegetation present in the development area. The EA does not assess the remnancy status of native vegetation. The EA does not map vegetation or identify areas requiring clearing. The EA does not provide sufficient details regarding mitigation. The EA does not consider over-cleared Mitchell Landscapes adequately</p>	<p>The CMA uses the Native Vegetation Act to assess the vegetation impacts of the proposal. This Act is not applicable to Part 3A Major Projects, however it was used as a guideline in the EA and Biodiversity Assessment.</p> <p>While the EA summarises the key findings of the Biodiversity Assessment, however it is the Biodiversity Assessment that contains the detail that the CMA are requesting. This document was provided and should have been reviewed by the CMA. Specifically, additional to identifying listed EECs and threatened species, the Biodiversity Assessment identified constraints based on the potential to provide habitat for threatened species of flora and fauna, maturity and connectivity of vegetation. The biodiversity assessment also considered connectivity of vegetation at a landscape and regional scale, it discussed the potential of the site to act as a corridor or affect the movement of fauna in the area. Viable remnants are mapped in the constraints mapping so that they can be avoided. Vegetation maps, overlaid with infrastructure layouts and tables of estimated impact area were all provided in the Biodiversity Assessment.</p> <p>The EA considered over-cleared Mitchell Landscapes in Section 7.4.2. It concluded on the basis of</p>

	<p>the Biodiversity Assessment investigations, that the discrete development footprint that is largely cleared of native vegetation would have low likelihood of impacting on to the extent and integrity of overcleared Mitchell landscapes.</p> <p>The Biodiversity Assessment provides additional discussion and detail regarding specific mitigation measures. It is envisioned that this document will become a key reference during the detailed design phase of the development and when designing the adaptive management monitoring program for birds and bats.</p>
<p>The EA does not consider the conservation value of roadside vegetation on roads requiring widening or realignment</p>	<p>The Biodiversity Assessment contains the detail that the CMA are requesting. Specifically, the biodiversity values of roadside vegetation and constraints posed were identified in Figure 6-5 of the Biodiversity Assessment.</p>
<p>The EA states that all locations of the proposed development are located within Hawkesbury-Nepean Catchment Management Authority area. This is incorrect.</p>	<p>Initial consultation with Catchment Management Authorities acknowledged that the proposal fell within two CMAs, the Hawkesbury-Nepean and Lachlan Catchment Management Authority areas. Both CMAs were invited to attend the Planning Focus Meeting and provide input into the consultation process.</p> <p>It was agreed by the CMAs that, as the majority of the proposal was within the Hawkesbury-Nepean CMA, that Hawkesbury-Nepean would represent both CMAs in relation to the proposal.</p> <p>It was an oversight of the EA to neglect stating that around 25% of the proposal is located within the Lachlan CMS however, it is considered that liaison with the CMAs has been sufficient to address the concerns of each body.</p>
<p>Six recommendations are provided – relating to the need to minimize clearing and offset any permissible clearing through a legally binding contract, in perpetuity, summarized, as follows:</p>	<p>It is considered by the authors that the EA's SoCs encompass these recommendations, with some modification, as set out below.</p>
<p>1 All works and structures should be located to prevent or minimize clearing (ie installing powerlines underground in preference to overhead).</p>	<p>SoC. 11 Infrastructure (including turbines, powerlines, access roads, construction works areas and crane pads) would be located to avoid dense woodland/forest, impacts to woodland/forest in all other cases would be minimised through rigid site controls established in the CEMP to minimise clearing. Any loss of native vegetation would be offset in accordance with SoC16.</p> <p>SoC. 14 The final infrastructure layout would avoid areas identified as constraints (refer to constraints maps, Figures 7-6 – 7-9 this EA, and Attachment 3.3)</p>
<p>2 All clearing of native vegetation should be offset.</p>	<p>The existing SoC reads:</p>

	<p>SoC. 16 The Proponent would commit to offsets determined by suitably qualified experts on the basis of the quantum of vegetation to be removed, pending development of the final infrastructure layout</p> <p>A modification is proposed to fully capture the CMA comments 3-6, as follows:</p> <p>SoC. 16 (mod) The Proponent would commit to offsets determined by suitably qualified experts on the basis of the quantum of vegetation to be removed, pending development of the final infrastructure layout. The offset plan would be established in perpetuity.</p>
3 Offsets should be determined using the Environmental Outcomes Assessment Methodology or the BioBanking Assessment Methodology	The proposed methodology to determine offsets would conform with biodiversity offset principles established in consultation with the DECC.
4 Offsets should be identified, assessed and secured by legally binding contract in perpetuity, registered on the title	The offsets would be secured in a legally binding contract in perpetuity as identified in the SoC 16 (mod) under point 2 above.
5 Red light or red flag clearing cannot occur	The proposed methodology to determine offsets would conform with biodiversity offset principles in consultation with the DECC. High conservation areas would be considered in this approach.
6 Assessment of offset areas should be done by persons accredited in the use of the methodology.	Proponent would commit to offsets determined by a suitably qualified expert(s), as identified in SoC. 16 (mod).

4.8 A8 – Sydney Catchment Authority

Issue	Response
EA has not demonstrated neutral or beneficial effects on water quality	<p>The EA states that the goal for the project is to provide neutral or beneficial effects in relation to water quality. The manageability of water supply and water quality impacts has been demonstrated in the EA. It is considered that the implementation of SoCs 74-87 (which include SoC 83 Water Management Strategy) provide the required framework to be able to achieve this goal.</p> <p>Onsite performance with respect to water supply and quality will be dependent on the detail and effective implementation of these actions. It has been considered that the detail required to undertake these plans will not be available prior to detailed construction planning of the project.</p>

4.9 A9 - Upper Lachlan Shire Council

Issue	Response
<p>The proposed wind farm development does not fully comply with Councils Wind farm DCP</p>	<p>The Upper Lachlan Shire Council Wind Power Generation Development Control Plan (DCP) was adopted on 22nd September 2005 and amended in July 2007. Although the scale of the development (in excess of \$30 million capital investment) has determined that the proposal would be assessed by the NSW Minister for Planning, during the consultation process Upper Lachlan Shire Council expressed interest in the Proponents referencing the Shire's DCP.</p> <p>The Upper Lachlan Shire DCP is intended to give the community and developers guidelines in relation to planning wind farms in the local government area. It is not an environmental planning instrument but a guide to the Council's expectations and accordingly has been considered by the Proponent.</p> <p>A summary of the DCP criteria and the means by which the development would address these are provided in Section 5.3.2 of the EA.</p> <p>The proposal is generally compliant with the Councils DCP however a number of items are not fully compliant. However the proposal is considered to achieve the desired objectives of the DCP and the other planning requirements and considerations imposed on the project.</p> <p>The proposal does not strictly comply with setback distances (from dwellings, lots created for dwellings or non-related property boundaries) prescribed in the DCP however the proposal achieves compliance with the SA noise criteria and the layout has been assessed for visual impacts. Furthermore, the layout has been assessed for visual impact. The noise and visual studies are based on an assessment of amenity and consider site specific factors relating to the project design and minimisation of overall impacts. Accordingly and considering that there is no sound basis for the setback distances described in the DCP (as discussed in relation to noise and visual impacts in the EA and elsewhere in the submissions report), the proposal achieves the desired objectives of the DCP and complies with the other requirements, particularly the noise criteria. Noise monitoring and landscape screening will ensure that adverse impacts are addressed into the operational phase of the wind farm.</p> <p>In relation to the setback of turbines from formed public roads, only two turbines do not fully comply in the vicinity of Range Road. However visual impacts and safety considerations have been assessed in the Traffic Impact Assessment and are considered acceptable.</p> <p>The issue of the community enhancement fund is discussed below, but it is noted that there is no legislative basis under Section 96 or other sections of the Act that provides for compulsory</p>

	<p>community enhancement funding.</p> <p>While the proposal provides general compliance with the Councils DCP and achieves the desired objectives of the DCP, the local community supports the development of wind farms in the ULSC with Councils own survey showing 70% support.</p>
<p>The Proponent must pay a contribution of \$236,300 to the Upper Lachlan Council each year commencing upon commissioning of the project to the end of its life towards the Upper Lachlan Community Enhancement Program CEP). The contribution must be adjusted to take account of any increase in the Consumer Price Index over time, commencing at the September, 2006 quarter.</p>	<p>The community enhancement program is a voluntary commitment from the proponent to broaden the benefits of the wind farm within the local community.</p> <p>The program will provide an annual allocation of \$75,000 per annum from the commencement of operations until decommissioning, indexed with CPI from the commencement of the wind farm operation. The structure of the program has yet to be determined, however there is merit in a structure that has Council involvement but is driven by local community representatives. Local input would be sought as to the structure. Section 4.4.2 of the EA discusses the community enhancement program in greater detail.</p> <p>This contribution is the largest recurring voluntary contribution from a wind farm in Australia and is significantly larger than contributions from much larger wind farms elsewhere in Australia.</p>
<p>TV and radio reception</p>	<p>The Proponent proposed, in accordance with SoC's 35 and 36, to offer mitigation to residents should interference to TV or Radio be experienced.</p> <p>It is not possible to mitigate potential impacts of TV / radio signal interference prior to wind farm construction because of the complex nature of radiofrequency propagation, complex interaction between signal propagation and physical characteristics of the area and the largely unknown impact that the wind farm will have.</p> <p>It is, however, considered appropriate given the nature of the submissions to conduct a representative sample of nearby existing residences to establish TV/radio reception quality prior to the commencement of construction.</p> <p>SoC 36 has been updated accordingly and now reflects the request from the ULSC.</p>
<p>Transport and traffic management.</p>	<p>The Proponent has made commitments (SoC's 41 – 64 refer) in the EA in relation to the management of the traffic and transport associated with the project. These commitments are considered adequate and comprehensive in relation to the ULSC's comments in relation to the traffic and transport elements of the project.</p> <p>The comments from Upper Lachlan Shire council are also intended to be suggestions for</p>

	<p>conditions of consent to the Department of Planning, should the project be approved. While the existing SoC's are considered to adequately address the majority of the Council's concerns, some of the requests cannot be supported by the Proponent (such as the reconstruction and sealing of a section of Range Road) on the basis that they outside the reasonable responsibility of the Proponent and potential impacts are already covered via the road dilapidation repair.</p>
<p>In addition to the above specific conditions Council requests the following issues to be appropriately addressed by conditions of consent;</p> <ul style="list-style-type: none"> • Decommissioning requiring the lodgment of a security bond • landscaping • turbine colour • lighting • shadow flicker • blasting and vibration • noise • aboriginal archaeology • ground stability • flora and fauna • birds and bats • fire • waste • monitoring compliance with consent conditions • community consultation • complaints management • management plans • incident reporting • aviation, to ensure there is no impact on the current and future use of the Crookwell airport. 	<p>The issues are covered in the Statement of Commitments as presented in the EA.</p> <p>No decommissioning bond is proposed because commitments related to decommissioning is covered directly in landowners agreements in relation to removing plant at the end of the lease period, conditions of consent and the cost of steel and other commodities is expected to ultimately result in a nil financial burden from decommissioning. This is consistent with the Taralga judgement (<i>Taralga Landscape Guardians Inc v Minister for Planning and RES Southern Cross Pty Ltd</i>). It is likely however that the turbines will be refurbished, replaced or overhauled at the end of their design life.</p>
<p>Considerable discussion occurred at a</p>	<p>The Council has primarily been informed by personal representation and correspondence from Mr.</p>

<p>meeting of Upper Lachlan Shire Council held on the 25 September 2008 in relation to any impact on the Crookwell air strip and Council wants to be assured that there will be no impact on the current and future use of this important local facility by any turbines.</p> <p>The air strip is not only used by recreational fliers but used in emergency situations and provides an important facility during any bushfire fighting operations in the area.</p> <p>The Council attached for information an email received and considered as submission 59, a letter received from Galland Elder Lulham (on behalf of a resident) considered as submission 16 and a copy of Council's Wind Farm DCP.</p>	<p>Hutson and Mr. Holland, in particular regarding the threatened closure of the aerodrome. It has been identified in earlier sections of this submissions report that the threatened closure of Crookwell Aerodrome is factually incorrect and without basis.</p> <p>Upper Lachlan Shire Council has provided no indication of plans to develop or otherwise alter the use of the aerodrome from the type of operations currently conducted. The terrain surrounding the aerodrome provides a natural barrier to extension and therefore the ability to increase the capacity of the aerodrome to support larger aircraft operations. Section 3.4.1 of the Aviation Hazard Report discusses this issue.</p> <p>It is reasonable to conclude that the type of operations currently conducted at the aerodrome can continue safely, and that the Proposal will not impact on its future uses due to the influence of other existing restrictions and constraints in relation to its potential development.</p>
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4.10 A10 - RTA

Issue	Response
<p>The RTA does not object to the proposal but provides comments in relation to possible conditions of consent related to:</p> <ul style="list-style-type: none"> • a Traffic Management Plan being prepared; • attaining Section 138 Approval from the RTA for works in road reserves; and • applying for Road Occupancy Licence for works in the road 	<p>The Proponent confirms that a Traffic Management Plan will be prepared (SoC 42 and 43) in consultation with the RTA and local Councils. The Proponent further notes the RTA requirements and confirms that it will consult with the RTA and comply with requirements.</p>

reserve or within 100m of traffic signals.	
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4.11 A2 – DECC (Biodiversity)

Issue	Response
Quantification of impact not sufficient	An estimated impact area table was provided in the Biodiversity Assessment. Additionally a table has been prepared to present a 'worst case scenario' quantification of impact, specific to vegetation type (Table 1 refers). This Table assumes all native vegetation to be in good condition, and therefore over-represents quality of native vegetation. This table presents the worst case impact and therefore the worst case offset requirements. In reality, the intention to the extent practicable is to locate infrastructure in cleared areas and therefore readers should be aware that this table overstates the likely impacts. The offset plan would be finalised and implemented following the finalisation of the layout and would offset actual areas impacted by the final infrastructure placement in accordance with the Biodiversity Offset Principles, provided by DECC.
Statement of Commitments not tight enough to ensure biodiversity values will be protected (ie. use of 'where practical' and buffers not specified).	Statement of commitments including SoC 11, SoC 12, SoC 13, SoC 19, SoC 20, SoC 21 and SoC 26 have been modified.
Demonstrate offsets can be achieved	<p>Part of the Pomeroy site will be purchased by the Proponent and there will be a requirement to subdivide lots of the property known as Pomeroy West. In this regard, we would like to consider this subdivision under the existing Application.</p> <p>This area would be available for offsets in accordance with the offset plan. Refer to Map 1 that presents the land available for use in offsetting the impacts of vegetation removal. An estimated impact area table that presents a 'worst case scenario' for the quantification of impact on native vegetation has been developed. This is included as Table 1. This quantifies the worst case scenario in terms of clearing of native vegetation, and defines the quantum of vegetation that would need to be secured in the offset plan (as a worst case). It is therefore demonstrated that based on</p>

	<p>the worst case impacts (58.2ha) can be offset by the woodland to be purchased by the proponent.</p>
<p>Practical achievement of SoCs not possible onsite (ie. Turbines shown within buffer or exclusion zones)</p>	<p>The resolution of the maps provided overlaying constraints and proposed infrastructure infers that avoiding woodland and the achievement of buffer zones is not possible. However higher resolution mapping demonstrates that avoiding constraints is a reality. For example a more detailed map (Map 2) showing the turbine footing to scale in the location to the north of the identified potential Grassland Earless Dragon habitat demonstrates this. It is however recognised that in some areas full achievement of buffers will not be feasible.</p> <p>A modification of SoC 11 and an additional SoC is proposed:</p> <p>SoC. 11(Mod) <i>Infrastructure (including turbines, powerlines, access roads, construction works areas and crane pads) would be located to avoid dense woodland/forest, impacts to woodland/forest in all other cases would be minimised through rigid site controls established in the CEMP to minimise clearing. Any loss of native vegetation would be offset in accordance with SoC16.</i></p> <p>SoC. 142(New) <i>During the detailed design phase, a copy of the survey plans of the final infrastructure layout (including all turbines, hard stand areas, buildings, tracks, power lines and associated infrastructure) would be provided to DoP to demonstrate the achievement of biodiversity SoCs in the EA.</i></p>
<p>Offset plan should be provided in accordance with the Biodiversity Offset Principles provided.</p>	<p>A worst case scenario calculation of offset requirements has been provided, Table 1. Approximately 120 hectares of woodland / forest at the Pomeroy site is being acquired by the Proponent and would be available to source offsetting requirements.</p> <p>A preliminary offset plan is being developed in accordance with the Biodiversity Offset Principles, provided by DECC to the Proponent. It is proposed that, pending the final layout, the offset plan would be finalised and established in perpetuity.</p> <p>A modification to SoC 16 is proposed:</p> <p>SoC 16(Mod) <i>The Proponent would commit to offsets determined by suitably qualified experts on the basis of the quantum of vegetation to be removed, pending development of the final infrastructure layout. The offset plan would be established in perpetuity.</i></p>
<p>Powerful Owl surveying required</p>	<p>This species is known to occur on Pomeroy. The mature vegetation found in the gully systems here and the size of the remnant suggest breeding, foraging, and roosting in the woodland are all likely. This resulted in this species being rated 4 out of 5 in the Biodiversity Assessment's evaluation of</p>

	<p>risk.</p> <p>Woodlands greater than 200ha are required for this species. Expert advice indicates that while the species flies low within the canopy while hunting, that movements from point A to point B are made above the canopy and that saddles between ridges should be avoided in terms of turbine placement (pers. comm.. R. Kavanagh 12 Nov. 2008).</p> <p>During the pre-breeding period, the male in particular often flies to the highest points of his territory, which are usually at its extremities, to advertise his occupancy of the territory (pers. comm.. R. Kavanagh 12 Nov. 2008) which may bring them into close proximity with turbines.</p> <p>While cleared areas are not considered habitat for this species, dispersing juveniles can disperse across partly open country. "Dispersal ability is unknown, but expected to be at least 10-20 km..... There are no barriers to dispersal or gene flow other than extensive treeless country."(Newton <i>et al.</i> 2002).</p> <p>It is likely dispersal would be around mid-December to mid-March. Based on the location of other remnants in the region, dispersing individuals are likely to move to the east and north east, as well as to the south west, from the site. The latter may require individuals to cross open country containing wind turbines. Questions such as dispersal timing and direction could be monitored onsite before and after construction of turbines and used to develop appropriate mitigation strategies to prevent collision impacts.</p> <p>A modification to SoC23 is proposed</p> <p>Bird and Bat Monitoring Program</p> <ul style="list-style-type: none"> • Pre-construction surveying would be undertaken to assist in managing bird and bat impacts (Powerful Owl would be a key species in this Pre-construction surveying). Results would be incorporated into the ongoing monitoring program • A monitoring program would be designed to document mortalities, remove carcasses and assess the effectiveness of controls in accordance with Section 9.3.1 • If mortalities exceed a pre-determined threshold (set out in the monitoring program), additional mitigation measures would be considered, such as diversion structures, turning off turbines at critical times, further habitat modification and enhancement of off-site habitats.
<p>Grassland Earless Dragon, DECC do not support location of a turbine and</p>	<p>Figure 7-11 shows two turbines as occurring in the potential Grassland Earless Dragon habitat at Gurrundah. However the northern turbine was located to avoid the Grassland Earless Dragon</p>

<p>infrastructure within this habitat patch.</p>	<p>habitat and is actually on a crest of a ridge approximately 25 metres from the boundary of the identified potential habitat. This separation is illustrated on the more detailed map (Map 2) below.</p> <p>It is acknowledged that the southern most turbine is located on the periphery of this habitat patch. The biodiversity assessment identified that this was an area of potential quality habitat for the Grassland Earless Dragon. Two separate field surveys were undertaken (Autumn and Spring 2007) but failed to identify the presence of the Grassland Earless Dragon. A conservative approach was taken in delineating the area and this turbine was proposed on the edge to avoid the core of the habitat. Following from discussions with Dr Sandra Jones of DECC, it is recognised that this species is subject to recent significant reductions in abundance. In order to address concerns raised by DECC, intensive surveying using ‘spider hole’ pit fall traps over a 6 day survey period is proposed within this habitat in the vicinity of the proposed infrastructure related to turbine GUR-08.</p> <p>An additional SoC is proposed</p> <p>SoC. 143(New) <i>Additional targeted surveying (utilising ‘Spider hole’ pitfall traps) would be carried to establish if the Grassland Earless Dragon utilises the identified habitat at Gurrundah. If it is identified as occurring, turbine infrastructure would avoid this habitat, and a buffer of at least 25 metres maintained.</i></p>
<p>Overhead cabling justification in EEC, south of Pomeroy.</p>	<p>Two easement options were considered in this location, one running through the EEC vegetation, to minimise the length of the line and visual impacts (Option 1), and the other circumnavigating the core of the woodland (Option 2). While Option 2 would require a greater amount of clearing (along the edge of woodland), the conservation significance and potential to fragment EEC has persuaded the Proponent to remove Option 1 from the proposal. A revised SoC has been developed:</p> <p>SoC 12(Mod). The Proponent would locate the electricity corridor required at the Gurrundah property using Option 2 (as shown in figure 7-10 of the EA). The width of the corridor would be minimised and impacts to native vegetation offset in accordance with SoC16</p>

References

Ecology and Conservation of Owls: Proceedings of the Owls 2000, Canberra, Australia
 By Ian Newton, Rodney Kavanagh, Jerry Olsen, Iain Taylor
 Published by CSIRO Publishing, 2002
 363 pages

ASSUMPTIONS OF THIS ESTIMATION

Turbine footings

Cleared land is defined as vegetation lacking overstorey and midstorey and where understorey cover is less than 50%.

Bannister and Pomeroy are on basalt soils where the understorey is defined in the BA as ...'Converted to exotic pasture more frequently than other soils with a greater tendency to weed infestation.' Hence all turbines on these sites are presumed to occur in cleared land.

Kialla and Gurrundah are located on less fertile, skeletal soils. As a precautionary measure, all turbines sites are assumed to occur in vegetation where the understorey remains predominantly native. These areas are attributed to the vegetation type that the area would have been cleared from. At Gurrundah, this is the upperslope Scribbly gum dry forest. At Kialla, it is the Mountain gum- peppermint forest.

Crane hardstand

Calculated as per 'turbine footings'.

Onsite access and spur roads

As per 'turbine footings'. As the 4 sites are similar in size, the total length of roads has been divided by 4 to arrive at an area by site and then the attribution to vegetation types assigned as per 'turbine footings'.

External site access

Broad-leaf peppermint-brittle gum dry forest is noted as common on the verges of approach roads. The Blakely's red gum- yellow box grassy woodland is noted as occurring in one or two patches on Range and Pomeroy Roads. On this basis, 90% of the external access works have been attributed to the former and 10% to the latter.

Underground powerlines

While there is potential to locate trenches within roads, this has not been assumed for this worst case scenario. As per 'turbine footing' discussion above, the pasture at Kialla and Gurrundah has been attributed to derived forest types while Bannister and Pomeroy are assumed to be cleared land. As the 4 sites are similar in size, the total length of roads has been divided by 4 to arrive at an area by site.

Overhead powerlines

As per 'underground powerlines' .

Concrete batch plant and compounds

As per 'turbine footings', one plant is assumed in cleared land at Pomeroy and one in Scribbly gum dry forest at Gurrundah. Each site has a compound located in cleared or native pasture, as per 'turbine footing' discussion.

Crane operation area

The crane operation area takes in the turbine footing, hard stand area and additional area required for manoeuvring the turbine blades during assembly. Where these areas abut forest or woodland fragments, the entire area has been attributed to the abutting vegetation rather than the clearing, to achieve a worst case scenario in terms of clearing. Note, the turbine footings and hardstand areas are included within this area.

Powerline Gurrundah to Pomeroy

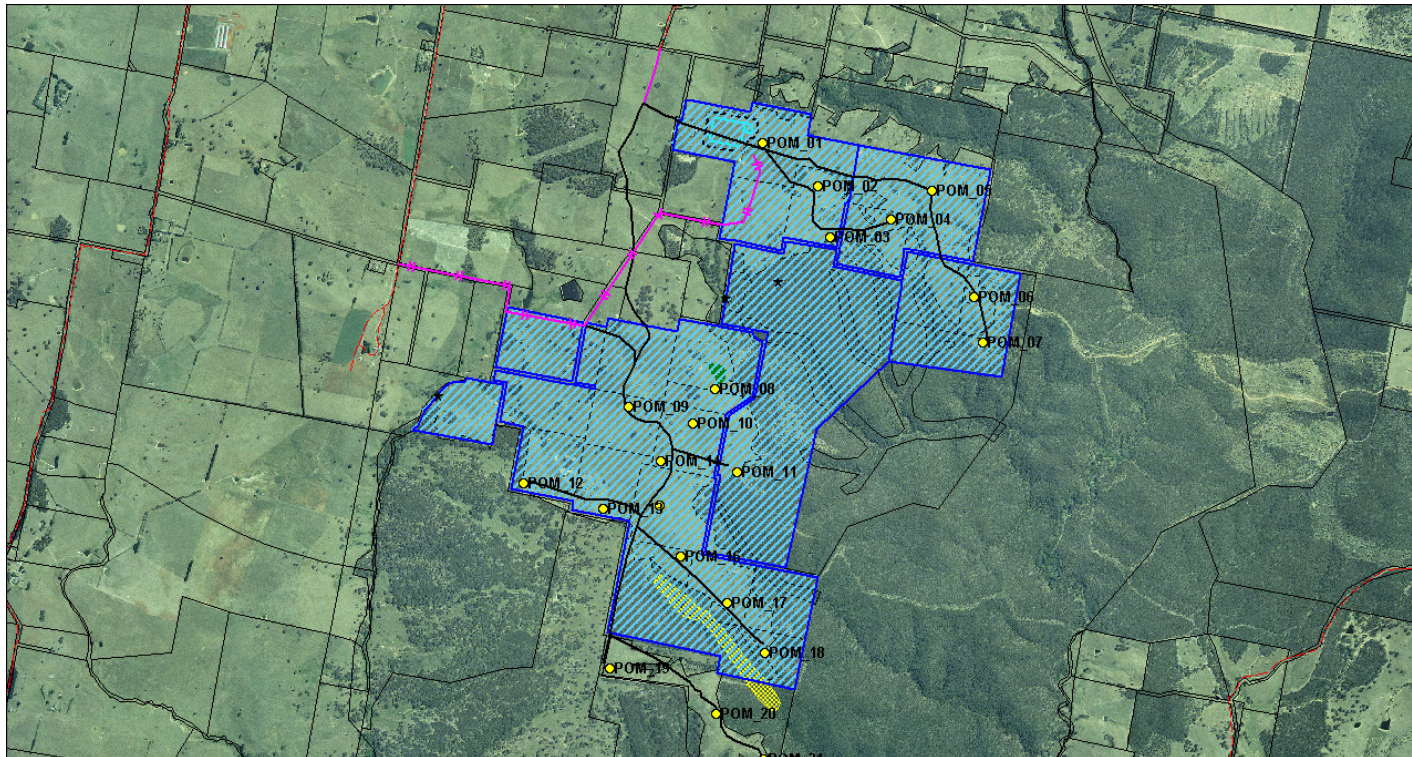
Although a clearing runs along the ridge, this is assumed to occur entirely within Broad-leaf peppermint forest, as a worst case scenario.

Map 1.

The blue hatching indicates land being purchased by the Proponent. This holding contains a large and continuous woodland / forest remnant (approximately 120 hectares) able to be used to source offsets required by the project. This area contains:

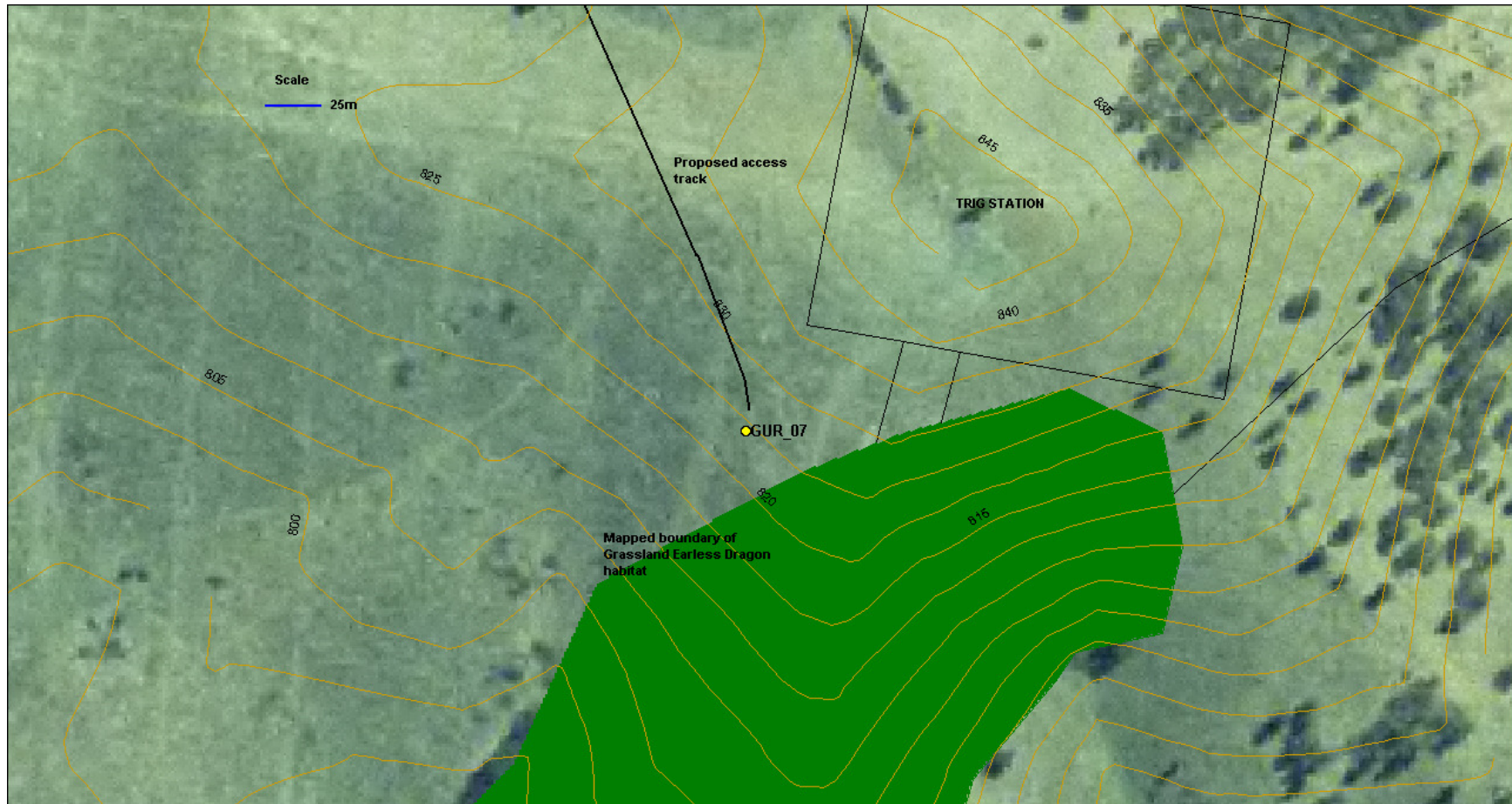
- 2. Broad-leaf peppermint-brittle gum dry forest
- 3. Apple box- yellow box grassy woodland
- 5. Mountain gum – broad-leaf peppermint moist forest
- 6. Snow gum or ribbon gum moist forest

Of particular interest in terms of offsetting are the Snow gum or ribbon gum moist forest gully systems, which represent quality habitat for the Powerful Owl, recorded onsite in one of these areas.



Map 2.

Scaled map of proposed location for turbine in relation to the area of identified potential Grassland Earless Dragon habitat at Gurrundah.



5 Modifications to the Proposal

As a result of the submission from Government agencies and the community, a number of changes have been made to the Statement of commitments. Additional (add) or modified (mod) commitments are summarised below:

New and Modified SoC's following Review of Submissions

	Impact	Objective	Mitigation tasks	By	Timing	Auditing	Criteria
11 Mod	Loss of biodiversity value	Avoid direct and indirect impact	Infrastructure (including turbines, powerlines, access roads, construction works areas and crane pads) would be located to avoid dense woodland/forest, impacts to woodland/forest in all other cases would be minimised through rigid site controls established in the CEMP to minimise clearing. Any loss of native vegetation would be offset in accordance with SoC16.	The Proponent	Development of site layout	DoP DECC	Minimise clearing
12 Mod	Loss of biodiversity value	Minimise impact	The Proponent would locate the electricity corridor required at the Gurrundah property using Option 2 (as shown in figure 7-10 of the EA). The width of the corridor would be minimised and impacts to native vegetation offset in accordance with SoC16.	The Proponent	During construction	DoP DECC	Minimise clearing of mature vegetation
13 Mod	Loss of biodiversity value	Avoid direct and indirect impact	Impacts to isolated mature trees (>60cm diameter at breast height) in cleared areas would be minimised through rigid site controls established in the CEMP to minimise clearing. Where trees cannot be avoided these would be offset in accordance with SoC16.	The Proponent	Development of site layout	DoP DECC	Minimise clearing of mature vegetation
16 Mod	Loss of biodiversity value	Compensate for biodiversity impact	The Proponent would commit to offsets determined by suitably qualified experts on the basis of the quantum of vegetation to be removed, pending development of the final infrastructure layout. The offset plan would be established in perpetuity.	The Proponent	During construction	DoP DECC	Biodiversity Assessment used as guidance to determine appropriate offsets
19 Mod	Loss of biodiversity value	Minimise impact	Where the initial monitoring program demonstrates a need, the Proponent will liaise with landowners to negotiate to fill in dams within 100m of a turbine on involved properties to reduce the potential to attract birds and bats which might collide with turbines.	The Proponent	During construction	DoP DECC	Minimise bird and bat collisions

Impact	Objective	Mitigation tasks	By	Timing	Auditing	Criteria	
		Dams removed due to site development would be reinstated in more appropriate locations to retain this habitat resource onsite.					
20 Mod	Loss of biodiversity value	Avoid or minimise impact	Final site inspections would be undertaken for the electricity corridor between Pomeroy and Gurrundah to allow micro-siting of the corridor in areas of least vegetation. If the alternative access off Prices Lane to Pomeroy becomes the preferred option and also if the western access option (a paper road) to Gurrundah becomes the preferred option final inspections would also be undertaken in these areas.	Ecological consultant	Prior to construction	DoP DECC	Minimise direct biodiversity impact
21 Mod	Loss of biodiversity value	Minimise impact	Implementation of design measures: <ul style="list-style-type: none"> Aviation lighting would be minimised in number and fitted to reduce their ability to attract migrating birds and insects. Red lights are preferred, with the least number of flashes per minute. Cowls may also shield the light when viewed from the ground and reduce potential to attract wetland birds taking off at dusk Guy lines would not be fitted to wind turbine towers. Guy lines will be avoided on other associated structures, where practical. The turbine towers would not provide perching opportunities Electrical connection lines would be installed underground where practical Power poles and overhead powerlines would be designed to be bird-safe using measures such as flags or marker balls, large wire size, wire insulation, wire and conductor spacing 	The Proponent	During infrastructure and materials selection	DoP DECC	Minimise bird and bat collisions
23 Mod	Loss of biodiversity value	Minimise impact	Bird and Bat Monitoring Program <ul style="list-style-type: none"> Pre-construction surveying would be undertaken to assist in managing bird and bat impacts (Powerful Owl would be a key species in this Pre-construction surveying). Results would be incorporated into the ongoing monitoring program A monitoring program would be designed to document mortalities, remove carcasses and assess the effectiveness of controls in accordance with Section 9.3.1 If mortalities exceed a pre-determined threshold (set out in the monitoring program), additional mitigation measures would be considered, such as diversion structures, turning off turbines at critical times, further habitat modification and enhancement of 	Ecological consultant	Designed prior to operation Implemented during operation	DoP DECC	Minimise bird and bat collisions

Impact	Objective	Mitigation tasks	By	Timing	Auditing	Criteria	
		off-site habitats					
26 Mod	Loss of biodiversity value	Avoid or minimise impact	Disturbed ground would be stabilised and rehabilitated following works	The Proponent	After decommissioning	DoP DECC	Rapid rehabilitation of disturbed areas
31 (mod)	Creation of hazard	Minimise risk	The Proponent would notify known users of the Crookwell and Ashwell Airstrips of the location of the wind turbines. The Proponent, with assistance from its specialist aviation consultant would assist the aerodrome operator and/or local aircraft operators to develop or amend procedures for safe operations on or within the vicinity of the aerodrome, taking into account the location of the turbine.	The Proponent	Prior to construction	DoP	Direct notification of users
36 (mod)	Deterioration of signal strength	No deterioration of signal strength	<p><u>Television and radio broadcast services</u></p> <ul style="list-style-type: none"> Prior to the erection of any wind turbine generators on the site, the Proponent will undertake an assessment of the existing quality of the television/radio transmission available at a representative sample of residential dwellings located within five kilometres of a wind turbine. The Proponent will undertake further assessment of television/radio reception following commencement of operation to determine any loss in television signal. In the event that television interference (TVI) is experienced by existing receivers in the vicinity of the wind farm, the source and nature of the interference would be investigated by the Proponent. Should investigations determine that the cause of the interference can be reasonably attributable to the wind farm, the Proponent would put in place mitigation measures at each of the affected receivers in consultation and agreement with the landowners. <p>Specific mitigation measures may include:</p> <ul style="list-style-type: none"> Modification to, or replacement of receiving antenna Provision of a land line between the effected receiver and an 	The Proponent	At the commencement of operation	DoP	No detected deterioration in signal strength, post mitigation

Impact	Objective	Mitigation tasks	By	Timing	Auditing	Criteria
		<p>antenna located in an area of favourable reception</p> <ul style="list-style-type: none"> Improvement of the existing antenna system Installation of a digital set top box <u>or</u> In the event that interference cannot be overcome by other means, negotiating an arrangement for the installation and maintenance of a satellite receiving antenna at the Proponents cost 				
139	Impact on future rural subdivisions	<p>Minimise risks</p> <p><u>Future Rural Subdivisions</u> The Proponent will provide reasonable and feasible noise mitigation measures to achieve a noise criterion ($LA_{eq(10\text{-minute})}$) of 30dB(A) inside bedrooms (as outlined in the Guidelines for Community Noise (WHO, 1999) for no more than one dwelling on each parcel of land that:</p> <ul style="list-style-type: none"> Is not associated with the project; Was lawfully in existence at the date of the approval; Was lawfully permitted to be developed for the purpose of a residential dwelling at the date of the approval; Is or was the subject of a valid construction certificate for a residential dwelling, lodged with the consent or a certifying authority within three years of the date of approval; and Would, but for the requirements of this condition, experience noise contributions from the project at the approved location of the residential dwelling in excess of the noise limits recommended in the SA EPA guidelines. 	The Proponent	Operation	DoP	Minimise impacts
140	Impact on local water supplies	<p>Comply with water authority</p> <ul style="list-style-type: none"> No ground water would be sourced without relevant permits being sought. 	The Proponent	Prior to construction	CEMP	Relevant approvals obtained
141	Impact on groundwater	<p>Minimise risks</p> <ul style="list-style-type: none"> Undertake geotechnical investigations to ensure that the project would have no material adverse effect on groundwater/aquifers as a result of blasting activities. 	The Proponent	Detailed design phase	CEMP	No detectable impact on groundwater

	Impact	Objective	Mitigation tasks	By	Timing	Auditing	Criteria
142	Loss of biodiversity value	Avoid or minimise impact	<ul style="list-style-type: none"> During the detailed design phase, a copy of the plans of the final infrastructure layout (including all turbines, hard stand areas, buildings, tracks, power lines and associated infrastructure) would be provided to DoP to demonstrate the achievement of biodiversity SoCs in the EA. 	Ecological consultant	Prior to construction	DoP	Minimise direct biodiversity impact
143	Loss of biodiversity value	Avoid or minimise impact	<ul style="list-style-type: none"> Additional targeted surveying (utilising 'Spider hole' pitfall traps) would be carried in works area likely to be impacted by GUR-08 infrastructure to establish if the Grassland Earless Dragon utilises this habitat at Gurrundah. If it is identified as occurring, turbine infrastructure would be relocated to avoid this habitat, and a buffer of at least 25 metres maintained 	Ecological consultant	Prior to construction	DoP DECC	Minimise direct biodiversity impact
144	Safety and asset protection	Minimise risks	<ul style="list-style-type: none"> <i>If haulage is proposed on routes that have not been assessed as part of the EA, assessment would be undertaken, in consultation with the Department of Planning, the roads authority and Council, prior to its inclusion in the haulage route. This would be completed as part of the Construction Environmental Management Plan.</i> 	The Proponent	During construction	CEMP	Minimise impacts on road users

6 Conclusion

This Submissions Report responds to the comments and issues raised in submissions from the community and Government agencies following the public exhibition of the Gullen Range wind farm EA. Specialist advice has been sought from the consultants involved in the original assessment in preparing these responses. The Submissions Report fulfils the requirements of Section 75H of the Environmental Planning and Assessment Act 1979.

In response to the submissions, 6 additional Statements of Commitments and 11 modifications to existing Statements of Commitment have been included as part of the proposal. In consideration of the assessment of the impacts from the project contained in the EA and the proposed mitigation measures committed to in the revised Statement of Commitments, it is believed that all relevant issues and concerns have been addressed and that the project should now proceed for approval by the Minister.

7 Appendices

7.1 Appendix 1: Revised Statement of Commitments in full

7.1.1 Visual

	Impact	Objective	Mitigation tasks	By	Timing	Auditing	Criteria
1.	Visual impact to nearby properties	Minimise the view of infrastructure	<ul style="list-style-type: none"> The Proponent would determine the extent of planting with residents of properties within 3km of a wind turbine. This would include a site visit. Any such offer would remain in place for a period of 1 year after project construction. Screening options are detailed in Attachment 3.1 	The Proponent	During Construction and Operation	CEMP and OEMP	Minimise complaints by residents within 3km

7.1.2 Noise

	Impact	Objective	Mitigation tasks	By	Timing	Auditing	Criteria
2.	Construction noise exceedance	Minimisation	<ul style="list-style-type: none"> Limit hours of high noise generating activities 	The Proponent	Construction	CEMP	Minimise noise complaints
3.	Construction noise exceedance	Minimisation	<ul style="list-style-type: none"> Establish communication with relevant authorities and local residents 	The Proponent	Construction	CEMP	Minimise noise complaints
4.	Construction noise exceedance	Minimisation	<ul style="list-style-type: none"> Adoption of a site representative responsible for noise and vibration issues 	The Proponent	Construction	CEMP	Fast response to all complaints

Impact	Objective	Mitigation tasks	By	Timing	Auditing	Criteria
5. Construction noise exceedance	Minimisation	<ul style="list-style-type: none"> The contractor would select appropriate machinery for the proposed works. This machinery would have low inherent potential for noise generation where practicable 	The Proponent	Construction	CEMP	Compliance with DECC Environmental Noise Control Manual
6. Construction noise exceedance	Minimisation	<ul style="list-style-type: none"> Where necessary, barriers would be erected around potentially high noise generating areas including generator and high duty compressors 	The Proponent	Construction	CEMP	Minimise noise complaints
7. Construction noise exceedance	Minimisation	<ul style="list-style-type: none"> Appropriate siting of noisy machinery. This siting would be as far away from the nearest receiver as possible 	The Proponent	Construction	CEMP	Minimise noise complaints
8. Operational noise exceedance	Compliance	<ul style="list-style-type: none"> Further noise assessment would be required to be carried out on the turbine ultimately selected for construction and on the final layout proposed taking into account any minor changes in turbine location to ensure compliance with SA EPA noise guidelines 	Noise consultant	Post final site layout and turbine selection	DoP DECC	Compliance with SA EPA noise guidelines
9. Noise exceedance	Compliance	<ul style="list-style-type: none"> Develop and implement an operational noise compliance testing program. 	Noise consultant	Once all turbines are operational	DoP DECC	Compliance with SA EPA noise guidelines
10. Noise exceedance	Compliance	<ul style="list-style-type: none"> If operational monitoring identifies exceedances, the Proponent would give consideration to providing mechanical ventilation (to remove requirement for open windows), building acoustic treatments (improved glazing) or using turbine control features to manage excessive noise under particular conditions. 	The Proponent	Once all turbines are operational	DoP DECC	Compliance with SA EPA noise guidelines

7.1.3 Biodiversity

Impact	Objective	Mitigation tasks	By	Timing	Auditing	Criteria
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	Impact	Objective	Mitigation tasks	By	Timing	Auditing	Criteria
11. Mod	Loss of biodiversity value	Avoid direct and indirect impact	<ul style="list-style-type: none"> Infrastructure (including turbines, powerlines, access roads, construction works areas and crane pads) would be located to avoid dense woodland/forest, impacts to woodland/forest in all other cases would be minimised through rigid site controls established in the CEMP to minimise clearing. Any loss of native vegetation would be offset in accordance with SoC16. 	The Proponent	Development of site layout	DoP DECC	Minimise clearing
12. Mod	Loss of biodiversity value	Minimise impact	<ul style="list-style-type: none"> The Proponent would locate the electricity corridor required at the Gurrundah property using Option 2 (as shown in figure 7-10 of the EA). The width of the corridor would be minimised and impacts to native vegetation offset in accordance with SoC16. 	The Proponent	During construction	DoP DECC	Minimise clearing of mature vegetation
13. Mod	Loss of biodiversity value	Avoid direct and indirect impact	<ul style="list-style-type: none"> Impacts to isolated mature trees (>60cm diameter at breast height) in cleared areas would be minimised through rigid site controls established in the CEMP to minimise clearing. Where trees cannot be avoided these would be offset in accordance with SoC16. 	The Proponent	Development of site layout	DoP DECC	Minimise clearing of mature vegetation
14.	Loss of biodiversity value	Avoid direct and indirect impact	<ul style="list-style-type: none"> The final infrastructure layout would avoid areas identified as constraints (refer to constraints maps, Figures 7-6 – 7-9 this EA, and Attachment 3.3) 	The Proponent	Development of site layout	DoP DECC	Adherence to biodiversity constraints maps
15.	Loss of biodiversity value	Avoid direct and indirect impact	<ul style="list-style-type: none"> A flora assessment would be conducted as part of the construction environmental management plan, to microsite infrastructure such as tracks away from better quality patches of understorey. 	The Proponent	During construction	ER	Adherence to flora assessment recommendations
16. Mod	Loss of biodiversity value	Compensate for biodiversity impact	<ul style="list-style-type: none"> The Proponent would commit to offsets determined by suitably qualified experts on the basis of the quantum of vegetation to be removed, pending development of the final infrastructure layout. The offset plan would be established in perpetuity. 	The Proponent	During construction	DoP DECC	Biodiversity Assessment used as guidance to determine appropriate offsets

	Impact	Objective	Mitigation tasks	By	Timing	Auditing	Criteria
17.	Loss of biodiversity value	Minimise impact	<ul style="list-style-type: none"> Weed and sediment erosion controls would be implemented to prevent onsite habitat degradation during and following the proposed works. A Construction Environmental Plan would be the appropriate vehicle for these controls. Weeds such as serrated tussock would be treated before the commencement of works to avoid spreading the infestation 	The Proponent	During construction	DoP DECC	Minimise indirect biodiversity impacts
18.	Loss of biodiversity value	Minimise impact	<ul style="list-style-type: none"> All areas of disturbed soil would be rehabilitated progressively as soon as practicable after disturbance, in order to resist erosion and colonisation by weeds. This may require restricting stock access and implementing revegetation activities 	The Proponent	During construction	DoP DECC	Rapid rehabilitation of disturbed areas
19. Mod	Loss of biodiversity value	Minimise impact	<ul style="list-style-type: none"> Where the initial monitoring program demonstrates a need, the Proponent will liaise with landowners to negotiate to fill in dams within 100m of a turbine on involved properties to reduce the potential to attract birds and bats which might collide with turbines. Dams removed due to site development would be reinstated in more appropriate locations to retain this habitat resource onsite. 	The Proponent	During construction	DoP DECC	Minimise bird and bat collisions
20. Mod	Loss of biodiversity value	Avoid or minimise impact	<ul style="list-style-type: none"> Final site inspections would be undertaken for the electricity corridor between Pomeroy and Gurrundah to allow micro-siting of the corridor in areas of least vegetation. If the alternative access off Prices Lane to Pomeroy becomes the preferred option and also if the western access option (a paper road) to Gurrundah becomes the preferred option final inspections would also be undertaken in these areas. 	Ecological consultant	Prior to construction	DoP DECC	Minimise direct biodiversity impact

	Impact	Objective	Mitigation tasks	By	Timing	Auditing	Criteria
21. Mod	Loss of biodiversity value	Minimise impact	<p>Implementation of design measures:</p> <ul style="list-style-type: none"> • Aviation lighting would be minimised in number and fitted to reduce their ability to attract migrating birds and insects. Red lights are preferred, with the least number of flashes per minute. Cowls may also shield the light when viewed from the ground and reduce potential to attract wetland birds taking off at dusk • Guy lines would not be fitted to wind turbine towers. Guy lines will be avoided on other associated structures, where practical. • The turbine towers would not provide perching opportunities • Electrical connection lines would be installed underground where practical • Power poles and overhead powerlines would be designed to be bird-safe using measures such as flags or marker balls, large wire size, wire insulation, wire and conductor spacing 	The Proponent	During infrastructure and materials selection	DoP DECC	Minimise bird and bat collisions
22.	Loss of biodiversity value	Minimise impact	<p>Pest Animal Control Program</p> <ul style="list-style-type: none"> • To reduce the attractiveness of the site to foraging raptors, rabbits would be controlled on the turbine ridges, carrion would be removed from the site as quickly as possible 	The Proponent	During operation	DoP DECC	Minimise bird and bat collisions
23. Mod	Loss of biodiversity value	Minimise impact	<p>Bird and Bat Monitoring Program</p> <ul style="list-style-type: none"> • Pre-construction surveying would be undertaken to assist in managing bird and bat impacts (Powerful Owl would be a key species in this Pre-construction surveying). Results would be incorporated into the ongoing monitoring program • A monitoring program would be designed to document mortalities, remove carcasses and assess the effectiveness of controls in accordance with Section 9.3.1 • If mortalities exceed a pre-determined threshold (set out in the monitoring program), additional mitigation measures would be considered, such as diversion structures, turning off turbines at critical times, further habitat modification and enhancement of off-site habitats 	Ecological consultant	Designed prior to operation Implemented during operation	DoP DECC	Minimise bird and bat collisions

	Impact	Objective	Mitigation tasks	By	Timing	Auditing	Criteria
24.	Loss of biodiversity value	Avoid or minimise impact	<ul style="list-style-type: none"> A flora and fauna assessment would be undertaken prior to decommissioning to identify biodiversity constraints 	Ecological consultant	Prior to decommissioning	DoP DECC	Minimise biodiversity impact
25.	Loss of biodiversity value	Avoid or minimise impact	<ul style="list-style-type: none"> Weed and sediment erosion control principles would be developed and implemented 	Ecological consultant and the Proponent	Prior to decommissioning	DoP DECC	Minimise indirect biodiversity impacts
26. Mod	Loss of biodiversity value	Avoid or minimise impact	<ul style="list-style-type: none"> Disturbed ground would be stabilised and rehabilitated following works 	The Proponent	After decommissioning	DoP DECC	Rapid rehabilitation of disturbed areas

7.1.4 Aboriginal archaeology

	Impact	Objective	Mitigation tasks	By	Timing	Auditing	Criteria
27.	Loss of Aboriginal heritage items	Minimise impact	<ul style="list-style-type: none"> The Pejar LALC propose to collect artefacts located within proposed impact areas as a form of mitigation prior to the commencement of construction 	Pejar LALC in consultation with the Proponent	Prior to construction	DoP	Liaison with Pejar LALC
28.	Loss of Aboriginal heritage items	Minimise impact	<ul style="list-style-type: none"> An Aboriginal Heritage Management Plan would be prepared, pending Project Approval and prior to any impact, which outlines the strategy of artefact collection, s85A NPW Act (transfer of Aboriginal objects) procedures, and contingencies for unexpected finds such as skeletal remains. 	The Proponent	Prior to construction	DoP	Liaison with Archaeologists

7.1.5 Aircraft hazards

	Impact	Objective	Mitigation tasks	By	Timing	Auditing	Criteria
29.	Creation of hazard	Minimise risk	<ul style="list-style-type: none"> The Proponent would install obstacle marking as required by CASA. 	The Proponent	During construction	DoP in consultation with CASA	CASA signoff
30.	Creation of hazard	Minimise risk	<ul style="list-style-type: none"> The Proponent would provide to the RAAF Aeronautical Information Service (AIS), CASA and Air Services Australia the location and height details once the final position of the wind turbines have been determined and before construction commences. After construction is complete, "as constructed" details would also be provided to AIS 	The Proponent	Prior to construction	DoP in consultation with RAAF	Signoff by AIS and Air Services Australia
31. Mod	Creation of hazard	Minimise risk	<ul style="list-style-type: none"> The Proponent would notify known users of the Crookwell and Ashwell Airstrips of the location of the wind turbines and any changes to operational procedures. The Proponent, with assistance from its specialist aviation consultant would assist the aerodrome operator and/or local aircraft operators to develop or amend procedures for safe operations on or within the vicinity of the aerodrome, taking into account the location of the turbine. 	The Proponent	Prior to construction	DoP	Direct notification of users
32.	Creation of hazard	Minimise risk	<ul style="list-style-type: none"> The Proponent would notify other operational information providers such as the Aircraft Owners and Operators Association and Flight Ace of the location of wind turbines in close proximity to Crookwell and Ashwell Airstrips 	The Proponent	Prior to construction	DoP	Direct notification of operational information providers
33.	Creation of hazard	Minimise risk	<ul style="list-style-type: none"> A briefing sheet including a description and an aerial view of the proposed development, expected construction times, extent of the development, lighting, likely operational impacts and contact details of the developer would be distributed widely. 	The Proponent	Prior to construction	DoP	Advertised through local channels

	Impact	Objective	Mitigation tasks	By	Timing	Auditing	Criteria
34.	Creation of hazard	Minimise risk	<p>The Proponent would provide the following advice to the relevant stakeholders, prompting them to undertake the specified actions:</p> <ul style="list-style-type: none"> • That Crookwell Airstrip consider formalising guidance to airstrip users regarding takeoff and landing procedures giving due consideration to the location of wind turbines and other obstacles, surrounding terrain, aircraft performance, prevailing conditions, runway physical characteristics, regulatory requirements and any other operational limitations • That Upper Lachlan Shire Council's Information Sheet for Crookwell Airstrip be updated to include reference to the location of wind turbines in close proximity to the airstrip 	The Proponent	Prior to construction	DoP	Direct communication

7.1.6 Communications

	Impact	Objective	Mitigation tasks	By	Timing	Auditing	Criteria
35.	Deterioration of signal strength	No deterioration of signal strength	<p><u>Television and radio broadcast services</u></p> <ul style="list-style-type: none"> • Use of primarily non-metallic turbine blades • Use, wherever practical, of equipment complying with the Electromagnetic Emission Standard, AS/NZS 4251.2:1999 	The Proponent	Prior to construction	DoP	Adherence to standard

Impact	Objective	Mitigation tasks	By	Timing	Auditing	Criteria
36. Mod	Deterioration of signal strength	No deterioration of signal strength				
		<p><u>Television and radio broadcast services</u></p> <ul style="list-style-type: none"> • Prior to the erection of any wind turbine generators on the site, the Proponent will undertake an assessment of the existing quality of the television/radio transmission available at a representative sample of residential dwellings located within five kilometres of a wind turbine. • The Proponent will undertake further assessment of television/radio reception following commencement of operation to determine any loss in television signal. • In the event that television interference (TVI) is experienced by existing receivers in the vicinity of the wind farm, the source and nature of the interference would be investigated by the Proponent. • Should investigations determine that the cause of the interference can be reasonably attributable to the wind farm, the Proponent would put in place mitigation measures at each of the affected receivers in consultation and agreement with the landowners. <p>Specific mitigation measures may include:</p> <ul style="list-style-type: none"> • Modification to, or replacement of receiving antenna • Provision of a land line between the effected receiver and an antenna located in an area of favourable reception • Improvement of the existing antenna system • Installation of a digital set top box <u>or</u> • In the event that interference cannot be overcome by other means, negotiating an arrangement for the installation and maintenance of a satellite receiving antenna at the Proponents cost 	The Proponent	Prior to construction and commencement of operation	DoP	No detected deterioration in signal strength, post mitigation
37.	Deterioration of signal strength	No deterioration of signal strength				
		<p><u>Mobile phone (and wireless broadband) services</u></p> <ul style="list-style-type: none"> • The Proponent will consult with Wirefree to avoid impacts to wireless broadband service 	The Proponent	At the commencement of construction	DoP	Direct consultation

Impact	Objective	Mitigation tasks	By	Timing	Auditing	Criteria
38. Deterioration of signal strength	No deterioration of signal strength	<p><u>Radio communications services</u></p> <ul style="list-style-type: none"> The Proponent has made provisions for a 100m corridor for the RFS links from Mt Martin to Mt Gray. <p>In the event that any issues with license links are identified as a result of the wind farm, whether prior to or post construction, the proponent would consult with the operator and undertake appropriate remedial measures, which may include:</p> <ul style="list-style-type: none"> Modifications to or relocation of the existing antennae Installation of a directional antennae <u>and/or</u> Installation of an amplifier to boost the signal 	The Proponent	At the commencement of operation	DoP	No detected deterioration in signal strength, post mitigation

7.1.7 Electromagnetic fields (EMFs)

Impact	Objective	Mitigation tasks	By	Timing	Auditing	Criteria
39. Exposure from EMFs	Minimise exposure	<ul style="list-style-type: none"> The substation would be designed in accordance with all applicable codes and industry best practice standards in Australia 	The Proponent	Pre construction design phase	DoP	Adherence to standard
40. Exposure from EMFs	Minimise exposure	<ul style="list-style-type: none"> The turbines, control building, substation and transmission lines would be located at appropriate distances from residences, farm shed and yards in order to reduce the potential for both chronic and acute exposure 	The Proponent	Pre construction design phase	DoP	Adherence to ARPANSA guidelines

7.1.8 Traffic and transport

Impact	Objective	Mitigation tasks	By	Timing	Auditing	Criteria	
		General measures:					
41.	Safety and asset protection	Minimise risks	<ul style="list-style-type: none"> Use of a licensed haulage contractor with experience in transporting similar loads, to be responsible for obtaining all required approvals and permits from the RTA and Councils and for complying with conditions specified in the approvals 	The Proponent	Prior to construction	CEMP	Written confirmation of license and experience, including referees
42.	Safety and asset protection	Minimise risks	<ul style="list-style-type: none"> Development of a Traffic Management Plan to include scheduling of deliveries, managing timing of transport through Goulburn and Crookwell to avoid peak hours (beginning/end of the school day), limiting the number of trips per day, undertaking community consultation before and during all haulage activities (including with neighbouring landowners and landowners adjoining access roads), designing and implementing temporary modifications to intersections and street furniture, restoring all changes to their original condition and managing the haulage process 	The Proponent	Prior to construction	CEMP	Develop TMP in accordance with Traffic Impact Study, Attachment 3.7
43.	Safety and asset protection	Minimise risks	<ul style="list-style-type: none"> Implementation of all aspects of the Traffic Management Plan in coordination with the Councils and RTA 	The Proponent	During construction	CEMP	Adherence to TMP
44.	Safety and asset protection	Minimise risks	<ul style="list-style-type: none"> Providing a dedicated telephone contacts list to enable any issues or concerns to be rapidly identified and addressed 	The Proponent	Prior to construction	CEMP	Rapid response to queries
45.	Safety and asset protection	Minimise risks	<ul style="list-style-type: none"> Installing required signage to direct traffic flows appropriately during haulage through Goulburn and Crookwell 	The Proponent	During construction	CEMP	Timely provision of signage

	Impact	Objective	Mitigation tasks	By	Timing	Auditing	Criteria
46.	Safety and asset protection	Minimise risks	<ul style="list-style-type: none"> Reinstating pre-existing conditions after temporary modifications to the roads and pavement along the route. 	The Proponent	During construction	CEMP	Dilapidation report adhered to
47.	Safety and asset protection	Minimise risks	<ul style="list-style-type: none"> Undertaking forward planning to ensure equipment transportation complies with requirements of the management plan, RTA and Council 	The Proponent	Prior to construction	CEMP	Minimise complaints from road users and risks associated with transport
48.	Safety and asset protection	Minimise risks	<ul style="list-style-type: none"> The extent of road upgrades, including realignments and paving upgrades, would be determined by a qualified traffic consultant, in consultation with the RTA and Council 	The Proponent	During construction	CEMP	Minimise complaints from road users and risks associated with transport
49.	Safety and asset protection	Minimise risks	<ul style="list-style-type: none"> The Proponent would prepare road dilapidation reports covering pavement and drainage structures in consultation with Council, for the construction (and decommissioning) route prior to the commencement of construction (and decommissioning) and after construction (and decommissioning) is complete. Any damage resulting from the construction (or decommissioning) traffic, except that resulting from normal wear and tear, would be repaired at the Proponent's cost. Alternatively, the Proponent may negotiate an alternative for road damage with the relevant roads authority. The decision to provide a seal needs to be balanced against the cost of maintenance on the gravel surface. Road condition would be inspected throughout construction to ensure that impacts are addressed as they occur. This would be undertaken at regular intervals by the site manager and council roads engineer 	The Proponent in consultation with Council	Prior to construction	CEMP	Dilapidation report adhered to Ongoing contact with roads authorities

Impact	Objective	Mitigation tasks	By	Timing	Auditing	Criteria
50. Safety and asset protection	Minimise risks	<ul style="list-style-type: none"> A speed limit would be placed on some of the roads near dwellings or sub standard junctions. The speed restriction would be included in the Traffic Management Plan to be submitted to Council 	The Proponent in consultation with Council and RTA	Prior to construction	CEMP	Adherence to TMP
51. Safety and asset protection	Minimise risks	<ul style="list-style-type: none"> A procedure would be established to monitor the traffic impacts during construction, such as noise, dust nuisance and travel times and work methods modified to reduce the impacts 	The Proponent	Prior to construction	CEMP	Minimise complaints from road users and risks associated with transport
52. Safety and asset protection	Minimise risks	<ul style="list-style-type: none"> A procedure would be established to inform vehicle operators on the precise timing of school buses 	The Proponent	Prior to construction	CEMP	Protocols set out in CEMP
53. Safety and asset protection	Minimise risks	<ul style="list-style-type: none"> Regular monitoring and scheduled maintenance of gravel pavements such as grading, dust suppression and drainage control would take place during the construction period 	The Proponent	Construction	CEMP	Protocols set out in CEMP
54. Safety and asset protection	Minimise risks	<ul style="list-style-type: none"> Signposting to warn horse riders of construction traffic and slashing of vegetation from verges on the Bi-Centennial Route to allow horses to move off the road when vehicles approach 	The Proponent in consultation with Council	Prior to construction	CEMP	Timely provision of signage
Additional location specific measures						
55. Safety and asset protection	Minimise risks	<p><i>Hume Highway Junction at Breadalbane</i></p> <ul style="list-style-type: none"> Speed controls. The Roads and Traffic Authority are generally not in favour of speed restrictions on the Hume Highway because of the loss in efficiency of the route. However, the use of speed controls for specific short-term activities may be included in a traffic control plan or other temporary traffic control measures 	The Proponent in consultation with RTA	Prior to construction	CEMP	Adherence to TMP

	Impact	Objective	Mitigation tasks	By	Timing	Auditing	Criteria
56.	Safety and asset protection	Minimise risks	<p><i>Crookwell Road</i></p> <ul style="list-style-type: none"> The business owners, retailers etc in the main street of Crookwell would be made aware of the timing for heavy, over-mass and over-dimensional vehicles 	The Proponent	Prior to construction	CEMP	Timely notification
57.	Safety and asset protection	Minimise risks	<p><i>Grabben Gullen Road</i></p> <ul style="list-style-type: none"> The junction is to be designed and constructed in consultation with Upper Lachlan Shire Council and the Roads and Traffic Authority 	The Proponent	Prior to construction	CEMP	Adherence to TMP
58.	Safety and asset protection	Minimise risks	<p><i>Range Road</i></p> <ul style="list-style-type: none"> The new junction required to be constructed on Range Road would be designed and constructed in consultation with Upper Lachlan Shire Council 	The Proponent in consultation with RTA	Prior to construction	CEMP	Adherence to TMP
59.	Safety and asset protection	Minimise risks	<p><i>Gurrundah Road</i></p> <p>The new junction required to be constructed on Range Road would be designed and constructed in consultation with Upper Lachlan Shire Council</p>	The Proponent in consultation with RTA	Prior to construction	CEMP	Adherence to TMP
60.	Safety and asset protection	Minimise risks	<p><i>Range Road</i></p> <ul style="list-style-type: none"> Consideration would be given to the reconstruction and sealing of the 1.8km length of unsealed pavement which would include the proposed junctions 	The Proponent in consultation with RTA	Prior to construction	CEMP	Adherence to TMP
61.	Safety and asset protection	Minimise risks	<p><i>Range Road</i></p> <ul style="list-style-type: none"> The shadow flicker effects would be monitored following commissioning and any remedial measures to address concerns would be developed in consultation with the RTA and the Department of Planning 	The Proponent	Operation	CEMP	Shadow flicker controlled (via roadside planting if required)
62.	Safety and asset protection	Minimise risks	<p><i>Bannister Lane, Storriers Lane, Prices Lane</i></p> <ul style="list-style-type: none"> A program would be established to consult with all of the road users and residents in the area particularly those living in the residences close to the roads 	The Proponent in consultation with RTA and Council	Prior to construction	CEMP	Timely notification and consultation

	Impact	Objective	Mitigation tasks	By	Timing	Auditing	Criteria
63.	Safety and asset protection	Minimise risks	<p><i>Gurrundah Road</i></p> <ul style="list-style-type: none"> The junction is to be designed and constructed in consultation with Upper Lachlan Shire Council 	The Proponent in consultation with Council	Prior to construction	CEMP	Adherence to TMP
64.	Safety and asset protection	Minimise risks	<p><i>Breadalbane to Gurrundah Road</i></p> <ul style="list-style-type: none"> A procedure would be established for all over-dimensional vehicles associated with the Gullen Range wind farm project to make contact with a railway service to establish approximate timing of trains so that crossings could be made during the safer periods. The need to always visually check for the approach of trains would be stressed to vehicle operators 	The Proponent	Prior to construction	CEMP	Adherence to TMP

7.1.9 Fire and bushfire impacts

	Impact	Objective	Mitigation tasks	By	Timing	Auditing	Criteria
65.	Increase risk of fire ignition or spread	Minimise risks	<ul style="list-style-type: none"> The Rural Fire Service and NSW Fire Brigade would be consulted in regard to the adequacy of bushfire prevention measures to be implemented on site during construction, operation and decommissioning. These measures would in particular cover hot-work procedures, asset protection zones, safety, communication, site access and response protocols in the event of a fire originating in the wind farm infrastructure, or in the event of an external wildfire threatening the wind farm or nearby properties 	The Proponent	Prior to construction	DoP	Timely notification and consultation
66.	Increase risk of fire ignition or spread	Minimise risks	<ul style="list-style-type: none"> Flammable materials and ignition sources brought onto the site, such as hydrocarbons, would be handled and stored as per manufacturer's instructions 	The Proponent	During construction	CEMP	Adherence to safety protocols set out in CEMP

Impact	Objective	Mitigation tasks	By	Timing	Auditing	Criteria
67. Increase risk of fire ignition or spread	Minimise risks	<ul style="list-style-type: none"> During the construction phase, appropriate fire fighting equipment would be held onsite when the fire danger is very high to extreme, and a minimum of one person on site would be trained in its use. The equipment and level of training would be determined in consultation with the local RFS 	The Proponent	During construction	CEMP	Adherence to safety protocols set out in CEMP
68. Increase risk of fire ignition or spread	Minimise risks	<ul style="list-style-type: none"> The substation facility would be bunded with a capacity exceeding the volume of the transformer oil to contain the oil in the event of a major leak or fire. The facility would be regularly inspected and maintained to ensure leaks do not present a fire hazard, and to ensure the bunded area is clear (including removing any rainwater) 	The Proponent	During construction	CEMP	Adherence to safety protocols set out in CEMP
69. Increase risk of fire ignition or spread	Minimise risks	<ul style="list-style-type: none"> The substation would be surrounded by a gravel and concrete area free of vegetation to prevent the spread of fire from the substation and reduce the impact of bushfire on the structure. The substation area would also be surrounded by a security fence as a safety precaution to prevent trespassers and stock ingress 	The Proponent	During construction	CEMP	Adherence to safety protocols set out in CEMP
70. Increase risk of fire ignition or spread	Minimise risks	<ul style="list-style-type: none"> Asset protection zones, based on the RFS <i>Planning for Bushfire Protection</i>, would be maintained around the control room, sub-station and in electricity transmission easements. Workplace health and safety protocols would be developed to minimise the risk of fire for workers during construction and during maintenance in the control room and amenities 	The Proponent	During construction	CEMP	Adherence to RFS <i>Planning For Bushfire Protection</i>
71. Increase risk of fire ignition or spread	Minimise risks	<ul style="list-style-type: none"> Fire extinguishers would be stored onsite in the control building and within the substation building 	The Proponent	During construction	CEMP	Adherence to safety protocols set out in CEMP
72. Increase risk of fire ignition or spread	Minimise risks	<ul style="list-style-type: none"> Shut down of turbines would commence if components reach critical temperatures or if directed by the RFS in the case of a nearby wildfire being declared (an all hours contact point would be available to the RFS during the bushfire period). Remote alarming and maintenance procedures would also be used to minimise risks 	The Proponent	Operation	OEMP	All hours contact point provided to RFS. Remote alarming installed

Impact	Objective	Mitigation tasks	By	Timing	Auditing	Criteria
73. Increase risk of fire ignition or spread	Minimise risks	<ul style="list-style-type: none"> Overhead transmission easements would be periodically inspected to monitor regrowth of encroaching vegetation 	The Proponent	Operation	OEMP	Compliance with Transgrid easement maintenance protocols.

7.1.10 Hydrology

Impact	Objective	Mitigation tasks	By	Timing	Auditing	Criteria
74. Water extraction	Not deplete local supplies	<ul style="list-style-type: none"> Water would be sourced from an onsite bore (Pomeroy) as well as other local sources including onsite dams. It would be reused where possible to reduce the total amount required. No water would be sourced from creeks or rivers without relevant permits being sought. No water would be or discharged into creeks, rivers or drainage lines without relevant permits 	The Proponent	Construction	CEMP	Minimise water use, maximise reuse onsite,
75. Deterioration of water quality	Minimise risk	<ul style="list-style-type: none"> All vehicles onsite would follow established trails and minimise onsite movements 	The Proponent	Construction and operation	CEMP and OEMP	Protocols set out in CEMP and OEMP
76. Deterioration of water quality	Minimise risk	<ul style="list-style-type: none"> Machinery would be operated and maintained in a manner that minimises risk of hydrocarbon spills 	The Proponent	Construction and operation	CEMP and OEMP	Protocols set out in CEMP and OEMP
77. Deterioration of water quality	Minimise risk	<ul style="list-style-type: none"> Maintenance or re-fuelling of machinery would be carried out on hard-stand areas (i.e. existing or proposed road surface or hard-stand areas beneath turbines). Where possible, maintenance and re-fuelling would not occur on areas that either contain native vegetation, or would be revegetated 	The Proponent	Construction and operation	CEMP and OEMP	Protocols set out in CEMP and OEMP
78. Deterioration of water quality	Minimise risk	<ul style="list-style-type: none"> The concrete batching plants would contain settling ponds sufficient to capture all concrete wash. Wash water would be recycled onsite (in cement mix, road base and dust control) and would not be released 	The Proponent	Construction	CEMP	Protocols set out in CEMP

	Impact	Objective	Mitigation tasks	By	Timing	Auditing	Criteria
79.	Deterioration of water quality	Minimise risk	<ul style="list-style-type: none"> Waste sludge would be recovered from the settling pond and used in the production of road base manufactured onsite. The waste material would be taken from the batching plant to be blended in the road base elsewhere onsite 	The Proponent	Construction	CEMP	Minimise waste, maximise reuse
80.	Deterioration of water quality	Minimise risk	<ul style="list-style-type: none"> The concrete batching plant areas would be fully remediated at the completion of the construction phase 	The Proponent	Completion of construction	CEMP	Stable and revegetated
81.	Deterioration of water quality	Minimise risk	<ul style="list-style-type: none"> Dust suppression would be carried out where required. Central to controlling dust are means to determine when dust suppression is required and having adequate access to water or chemical dust suppression alternatives to control dust. These specifications would be included in the Construction Environmental Management Plan prepared for the project prior to construction 	The Proponent	Construction	CEMP	Minimise dust complaints
82.	Deterioration of water quality	Minimise risk	<p>Sediment and erosion would be controlled as part of a formal Sediment / Erosion Control Plan (SECP), as a sub plan of the Construction Environmental Management Plan. This plan would include the following provisions:</p> <ul style="list-style-type: none"> Sediment traps would be installed wherever there is potential for sediment to collect and enter waterways Stockpiles generated as a result of construction activities would be bunded with silt fencing, (hay bales or similar) to reduce the potential for runoff from these areas Soil and water management practices would be guided by the Best Practice guidelines contained within <i>Soils and Construction Vol. 1</i> (Landcom 2004) 	The Proponent	Construction	CEMP	Adherence to SECP
83.	Deterioration of water quality	Minimise risk	<ul style="list-style-type: none"> A Water Management Strategy would be developed for the site as part of the Construction and Operational Environmental Management Plans. This would aim to integrate the total water cycle of the site in terms of water supply, stormwater and wastewater, and maximise the use of best management practice techniques for stormwater and wastewater management. Devices such as swales to disperse rather than concentrate runoff would be implemented. Water use would be minimised by maximising reuse. Detailed measures would be devised in conjunction with the development of the construction drawings. 	The Proponent	Construction and Operation	CEMP and OEMP	Best practice water management devices

Impact	Objective	Mitigation tasks	By	Timing	Auditing	Criteria
84. Deterioration of water quality	Minimise risk	<p>A Site Restoration Plan (SRP) would be prepared as part of the Construction Environmental Management Plan. This would set out protocols for restoration works including:</p> <ul style="list-style-type: none"> • Site preparation • Stabilisation • Revegetation • Monitoring 	The Proponent	Construction	CEMP	Adherence to SRP
85. Deterioration of water quality	Minimise risk	<p>The contractor would prepare and implement a Spill Control Plan, as a sub-plan of the Construction Environmental Management Plan. It would:</p> <ul style="list-style-type: none"> • Identify persons responsible for implementing the plan if a spill of a dangerous or hazardous chemical/waste would occur • Material Safety Data Sheets (MSDS) for all chemical inventories would be located on site and readily available • Where chemicals are used, their application and disposal would comply with manufacturers recommendations • Any spill that occurs, regardless of size or type of spill, would be reported to the Construction Manager • The event and clean up processes would be recorded. Information that would be recorded in the event of spill would include time and date of spill, type of chemical or waste spilt, approximate volume spilt, general area in which the spill occurred, corrective actions applied, and disposal of spilt material • Spill protocols in this plan would dictate when the EPA would be notified • Chemical / fuel storage areas would be identified, and be bunded to prevent loss of any pollutants • Hydrocarbon spill kits would be stored at the site. A number of site staff are to be trained in the use of the spill kits 	The Proponent	Construction	CEMP	<p>Adherence to Spill Control Plan.</p> <p>Minimise spills.</p> <p>Rapid response to spill, involving the EPA as required.</p>
86. Deterioration of water quality	Minimise risk	<ul style="list-style-type: none"> • Infrastructure would be bunded to ensure that the amounts of oil could be fully contained in the event of a leak. Bunding provisions would be regularly inspected 	The Proponent	Operation	OEMP	Bunding adequate to contain fluids

	Impact	Objective	Mitigation tasks	By	Timing	Auditing	Criteria
87.	Deterioration of water quality	Minimise risk	<ul style="list-style-type: none">Septic systems, if installed, would meet Upper Lachlan Council standards	The Proponent	Operation	OEMP	Adherence to Council standards

7.1.11 Mineral exploration

	Impact	Objective	Mitigation tasks	By	Timing	Auditing	Criteria
88.	Conflict with mineral exploration	Minimise conflict	<ul style="list-style-type: none"> The Proponent would liaise with the current mineral lease holders, providing a final turbine and infrastructure layout, prior to the construction phase 	The Proponent	Prior to construction	DoP	Timely notification and liaison
89.	Conflict with mineral exploration	Minimise conflict	<ul style="list-style-type: none"> The Proponent would liaise with the current mineral lease holders during the construction phase, to ensure that where possible, the works program does not unnecessarily interfere with planned exploration activities 	The Proponent	Construction	DoP	Timely notification and liaison
90.	Conflict with mineral exploration	Facilitate access	<ul style="list-style-type: none"> The Proponent would liaise with the involved land owners and current mineral lease holders prior to rehabilitation, to ensure that any project access roads that they may wish to retain are retained. Several of these access roads are likely to be of benefit both to routine agricultural activities as well as to exploration activities onsite 	The Proponent	Construction	DoP	Timely notification and liaison

7.1.12 Economic

	Impact	Objective	Mitigation tasks	By	Timing	Auditing	Criteria
91.	Affect on local economy	Maximise positive effect of proposal	<ul style="list-style-type: none"> The Proponent would liaise with local industry representatives to maximise the use of local contractors and manufacturing facilities in the construction and decommissioning phases of the project 	The Proponent	Prior to construction	DoP	Timely notification and liaison
92.	Affect on local activities	Minimise disruption	<ul style="list-style-type: none"> Co-ordinate construction activities with local events. Gullen Range Wind Farm Pty Ltd would liaise with the local visitor information centres to ensure that construction and decommissioning timing and haulage routes are known well in advance of works 	The Proponent	Prior to construction	DoP	Timely notification and liaison

7.1.13 Community wellbeing

	Impact	Objective	Mitigation tasks	By	Timing	Auditing	Criteria
93.	Community division	Provide accurate information	<ul style="list-style-type: none"> Dissemination of accessible and independent information on wind farm impacts 	The Proponent	Prior to construction	DoP	Timely dissemination of information
94.	Community division	Provide accurate information	<ul style="list-style-type: none"> Monitoring information collected during the operation of the wind farm would be made publicly available 	The Proponent	Operation	DoP	Timely dissemination of information
95.	Community division	Equitable distribution of benefits	<ul style="list-style-type: none"> Gullen Range wind farm would address the potential for wider adverse community impacts by way of a Community Enhancement Program as presented in Section 4.4.2. 	The Proponent	Prior to construction	DoP in consultation with the Upper Lachlan SC	Agreement on amount and conditions of fund achieved, in accordance with Council policy

7.1.14 Tourism

	Impact	Objective	Mitigation tasks	By	Timing	Auditing	Criteria
96.	Affect on local activities	Minimise disruption	<ul style="list-style-type: none"> Co-ordinate construction activities with local events. Gullen Range Wind Farm Pty Ltd would liaise with the local visitor information centres to ensure that construction and decommissioning timing and haulage routes are known well in advance of works 	The Proponent	Prior to construction	DoP	Timely notification and liaison
97.	Affect on local activities	Maximise benefits	<ul style="list-style-type: none"> The Proponent would work with the involved landowners, the community and Upper Lachlan Shire Council to allow for the development of the wind farm as a tourist attraction, if this option becomes desirable to these three parties. 	The Proponent	Operation	DoP	Liaison as required

7.1.15 Agricultural impacts

	Impact	Objective	Mitigation tasks	By	Timing	Auditing	Criteria
98.	Affect on current local land use	Minimise disruption	<ul style="list-style-type: none"> A Traffic Management Plan would be developed and would include provisions for construction traffic on access roads where stock may be grazing. These may include specifications for safe speed limits and provision of a construction timetable to affected landowners 	The Proponent	Construction	CEMP	Adherence to TMP
99.	Affect on current local land use	Minimise disruption	<ul style="list-style-type: none"> Stock would be restricted from works areas where there is a risk stock injury. For example, near excavated trenches and within high traffic areas 	The Proponent	Construction	CEMP	Adherence to TMP
100.	Affect on current local land use	Maximise benefits	<ul style="list-style-type: none"> Liaison would be undertaken with involved landowners to explore the possibility of enhancing the native component of the understorey in pasture production. This could be incorporated into the site restoration plan which would dictate protocols for the rehabilitation of areas disturbed during construction 	The Proponent	Construction	CEMP	Liaison as required
101.	Affect on current local land use	Maximise benefits	<ul style="list-style-type: none"> Stock would be restricted from areas being rehabilitated, until surfaces are able to withstand resumed grazing 	The Proponent	Construction	CEMP	Protocols set out in SRP
102.	Affect on current local land use	Minimise risks	<ul style="list-style-type: none"> Liaison would be undertaken with involved landowners to restrict stock access within construction zones during the construction and decommissioning phases. This is aimed at reducing potential for collision and ensuring stock are not able to escape during construction 	The Proponent	Construction	CEMP	Timely notification and liaison
103.	Affect on current local land use	Minimise disruption	<ul style="list-style-type: none"> Liaison would be undertaken with neighbouring landowners and landowners adjoining access roads, to provide information about the timing and routes to be used during construction and decommissioning. This could be in the form of advertising and provision of a contact point for further inquiries. The aim would be to reduce the risk of interference with agricultural activities on affected roads and road verges. 	The Proponent	Construction	CEMP	Timely notification

	Impact	Objective	Mitigation tasks	By	Timing	Auditing	Criteria
104.	Affect on current local land use	Minimise risks	<ul style="list-style-type: none"> The Traffic Management Plan (TMP) would contain procedures to manage horse riders using the Bicentennial National Trail during the construction period including keeping the verge of the road clear for riders to allow riders to move off the road. This would include ongoing consultation and liaison with the BNT co-ordinator 	The Proponent	Operation	OEMP	Adherence to TMP

7.1.16 Health and safety: construction activities

	Impact	Objective	Mitigation tasks	By	Timing	Auditing	Criteria
105.	Safety of persons or stock	Minimise risks	<p>A detailed Health and Safety Plan (H&SP) would be prepared, as a sub plan of the Construction Environmental Management Plan, identifying hazards associated with construction works, the risks of the identified hazards occurring and appropriate safeguards would be prepared prior to the commencement of construction works. Additionally:</p> <ul style="list-style-type: none"> The plan would incorporate standard work place practices, such as restraints, fall arrest systems, protective clothing and procedures that enable infrastructure to remain stationary during specific activities Emergency response protocols and equipment and reminders of the requirement for workers to take responsibility for their safety would be implemented All site workers are to be inducted to the site on their first day of employment. The induction would include a detailed briefing of the health and safety plan Workplace health and safety protocols would be developed to minimise the risk as a result of the ignition of fire from and to workers during construction and during maintenance in the control room and amenities 	The Proponent	Construction	CEMP	Adherence to H&SP
106.	Safety of persons or stock	Minimise risks	<ul style="list-style-type: none"> Liaison would occur between property owners and construction staff in relation to land and stock management during construction (during construction and decommissioning, stock would be excluded from the works area - this would exclude road works) 	The Proponent	Construction	CEMP	Timely notification and liaison
107.	Safety of persons or stock	Minimise risks	<ul style="list-style-type: none"> Site fencing would be installed where there is a risk to the safety of the general public (i.e. when the trench is left open for extended periods) 	The Proponent	Construction	CEMP	Adherence to H&SP

	Impact	Objective	Mitigation tasks	By	Timing	Auditing	Criteria
108.	Safety of persons or stock	Minimise risks	<ul style="list-style-type: none"> Employee safety would be managed through the application a Health and Safety Plan 	The Proponent	Operation	OEMP	Adherence to H&SP

7.1.17 Health and safety: shadow flicker

	Impact	Objective	Mitigation tasks	By	Timing	Auditing	Criteria
109.	Safety / nuisance to persons or stock	Minimise risks	<ul style="list-style-type: none"> If shadow flicker is found to be a nuisance to residents, conditions would be pre-programmed into the control system and individual wind turbines automatically shut down whenever these conditions are present 	The Proponent	Operation	OEMP	Minimise complaints
110.	Safety of persons or stock	Minimise risks	<ul style="list-style-type: none"> Shadow flicker effects on motorists using Range Road would be monitored following commissioning and any remedial measures to address concerns would be developed in consultation with the RTA and the Department of Planning 	The Proponent	Operation	OEMP in consultation with the RTA and the Department of Planning	Minimise shadow flicker on this section of road

7.1.18 Health and safety: stability of turbines

	Impact	Objective	Mitigation tasks	By	Timing	Auditing	Criteria
111.	Safety of persons or stock	Minimise risks	<ul style="list-style-type: none"> Obtain and implement sound geotechnical advice during construction, choice of a reliable turbine and proper installation and maintenance of the turbines 	The Proponent	Construction	DoP	Adherence to geotechnical report conclusions

7.1.19 Historic heritage

Impact	Objective	Mitigation tasks	By	Timing	Auditing	Criteria
112. Deterioration of heritage items	Minimise risks	<ul style="list-style-type: none"> Inform the Upper Lachlan Shire Council, Goulburn-Mulwaree Council and the NSW Heritage Office of the proximity of final access routes 	The Proponent	Construction	DoP	Timely notification and liaison
113. Deterioration of heritage items	Minimise risks	<ul style="list-style-type: none"> Building design, materials and colour would be appropriate to the heritage values of the area 	The Proponent	Prior to construction	DoP	Signoff from Landscape Architect
114. Deterioration of heritage items	Minimise risks	<ul style="list-style-type: none"> Underground rather than overhead transmission would be used where possible and where it would not result in inappropriate risks to soils and land forms. Although extensive existing electricity transmission infrastructure is present on the site and to the south, the cumulative impact of the development would be reduced where possible 	The Proponent	Prior to construction	DoP	Minimal overhead transmission

7.1.20 Physical impacts: air quality

Impact	Objective	Mitigation tasks	By	Timing	Auditing	Criteria
115. Air quality	Minimise risks	<ul style="list-style-type: none"> Subsoil would be separated from topsoil for rehabilitation purposes. All topsoil from the excavation sites would be stockpiled and replaced to its original depth for seeding and fertilising. On steep slopes, topsoil would need to be stabilised using, for example, jute matting. Any excess subsoil would be removed from the site and disposed of at an appropriate fill storage site 	The Proponent	Construction	CEMP	Protocols set out in CEMP
116. Air quality	Minimise risks	<ul style="list-style-type: none"> Any material stockpiled as would be covered with plastic, seeded or otherwise bound to reduce dust. Dust levels at stockpile sites would be visually monitored. Dust suppression (eg. water sprays) would be implemented if required 	The Proponent	Construction	CEMP	Protocols set out in CEMP
117. Air quality	Minimise risks	<ul style="list-style-type: none"> Product stockpiles would be protected from prevailing weather conditions 	The Proponent	Construction	CEMP	Protocols set out in CEMP

	Impact	Objective	Mitigation tasks	By	Timing	Auditing	Criteria
118.	Air quality	Minimise risks	<ul style="list-style-type: none"> During dry, windy periods a water cart or alternative chemical dust suppression would be available and applied to works areas generating dust. Means to determine when action is required would be detailed in the Construction Management Plan 	The Proponent	Construction	CEMP	Protocols set out in CEMP
119.	Air quality	Minimise risks	<ul style="list-style-type: none"> Should blasting be required, it would be carried out in accordance with all relevant statutory requirements 	The Proponent	Construction	CEMP	Adherence to ANZECC guidelines
120.	Air quality	Minimise risks	<ul style="list-style-type: none"> Residences within 1km of blasting activities would be informed prior to blasting 	The Proponent	Construction	CEMP	Timely notification
121.	Air quality	Minimise risks	<ul style="list-style-type: none"> Dust filters would be installed on silos, where required 	The Proponent	Construction	CEMP	Minimal dust complaints
122.	Air quality	Minimise risks	<p>Sediment and erosion would be controlled as part of a formal Sediment / Erosion Control Plan (SECP). This plan would include the following provisions:</p> <ul style="list-style-type: none"> Sediment traps would be installed wherever there is potential for sediment to collect and enter waterways On the steeper slopes check banks would be installed across the trenchline, as appropriate, following closure of the trench. These would discharge runoff to areas of stable vegetation Stabilisation would be undertaken as soon as practicable during construction. Furthermore, rehabilitation of disturbed ground would be carried out at the completion of construction works Stockpiles generated as a result of construction activities would be bunded with silt fencing, (hay bales or similar) to reduce the potential for runoff from these areas Soil and water management practices would be guided by the Best Practice guidelines contained within <i>Soils and Construction Vol. 1</i> (Landcom 2004) 	The Proponent	Construction	CEMP	Adherence to SECP

	Impact	Objective	Mitigation tasks	By	Timing	Auditing	Criteria
123.	Air quality	Minimise risks	<p>A Traffic Management Plan (TMP) would be developed and would include strategies to reduce the number of vehicle movements to, from and across the sites. These would include:</p> <ul style="list-style-type: none"> • Only machinery compliant with emission standards would be used • Vehicles and motorised equipment would be maintained so that emissions are minimised • Machinery and vehicles would not be left running or idling when not in use 	The Proponent	Construction	CEMP	Adherence to TMP

7.1.21 Physical impacts: soils and landforms

	Impact	Objective	Mitigation tasks	By	Timing	Auditing	Criteria
124.	Soil loss or stability of landform loss	Minimise risks	<ul style="list-style-type: none"> • Concrete wash would be deposited in an excavated area, below the level of the topsoil, or in an approved landfill site. Where possible, waste water and solids would be reused onsite 	The Proponent	Construction	CEMP	No effect on waterways or top soil
125.	Soil loss or stability of landform loss	Minimise risks	<ul style="list-style-type: none"> • Tracks would be graded to enhance their stability 	The Proponent	Construction	CEMP	Adherence to SECP
126.	Soil loss or stability of landform loss	Minimise risks	<ul style="list-style-type: none"> • Access routes and tracks would be confined to already disturbed areas, where possible 	The Proponent	Construction	CEMP	Minimise disturbance area
127.	Soil loss or stability of landform loss	Minimise risks	<ul style="list-style-type: none"> • ANZECC guidelines for control of blasting impact at residences would be adhered to if blasting is required 	The Proponent	Construction	CEMP	Adherence to ANZECC guidelines

7.1.22 Resource impacts

Impact	Objective	Mitigation tasks	By	Timing	Auditing	Criteria
128. Waste generation	Minimise waste and maximise recycling of materials	<ul style="list-style-type: none"> Waste would be reused or recycled whenever possible. Separate recyclable materials receptacles would be provided (eg. For glass, plastics and aluminium) 	The Proponent	Construction and operation	CEMP and OEMP	Waste streams identified, Waste Hierarchy implemented
129. Waste generation	Appropriate disposal of waste	<ul style="list-style-type: none"> Packaging materials and general construction wastes would be disposed of, with Council's approval, at Council operated waste disposal centres 	The Proponent	Construction and operation	CEMP and OEMP	Waste streams identified, Waste Hierarchy implemented
130. Waste generation	Appropriate disposal of waste	<ul style="list-style-type: none"> Toilet facilities would be provided for onsite workers and sullage from contractor's pump out toilet facilities would be disposed at the local sewage treatment plants or other suitable facility agreed to by Council 	The Proponent	Construction and operation	CEMP and OEMP	Council approved disposal
131. Waste generation	Minimise waste and maximise recycling of materials	<ul style="list-style-type: none"> Surplus topsoil would be stockpiled on site during construction, and following construction would be spread on the site (particularly over former hardstand areas and access roads) to assist with revegetation 	The Proponent	Construction	CEMP	SRP adhered to
132. Waste generation	Minimise waste and maximise recycling of materials	<ul style="list-style-type: none"> Excavated material would be used in road base construction and as aggregate for footings where possible. Surplus material would be disposed of in appropriate locations on site (on agreement with the landowner), finished with topsoil, and revegetated 	The Proponent	Construction	CEMP	Maximum reuse of excavated material

	Impact	Objective	Mitigation tasks	By	Timing	Auditing	Criteria
133.	Waste generation	Appropriate disposal of waste	<ul style="list-style-type: none"> Risk of chemical spills would be minimised and protocols would be in place to ensure prompt and effective clean up of any accidental spills 	The Proponent	Construction and operation	CEMP and OEMP	<p>Adherence to Spill Control Plan.</p> <p>Minimise spills.</p> <p>Rapid response to spill, involving the EPA as required.</p>
134.	Waste generation	Appropriate disposal of waste	<ul style="list-style-type: none"> No permanent waste disposal would be utilised onsite 	The Proponent	Construction and operation	CEMP and OEMP	<p>Waste disposal protocols set out in CEMP and OEMP adhered to</p>
135.	Waste generation	Appropriate disposal of waste	<ul style="list-style-type: none"> The contractor would implement a Spill Control Plan as part of its Erosion and Sediment Control Plan. Spill Control Plans would identify persons responsible for implementing the plan if a spill of a dangerous or hazardous waste should occur. Any spill that occurs, regardless of size or type of spill, would be reported to the Construction Manager. The event and clean up processes would be recorded. Spill protocols in the plan would dictate when the EPA should be notified 	The Proponent	Construction and operation	CEMP and OEMP	<p>Adherence to Spill Control Plan.</p> <p>Minimise spills.</p> <p>Rapid response to spill, involving the EPA as required.</p>

7.1.23 Cumulative impact

Impact	Objective	Mitigation tasks	By	Timing	Auditing	Criteria
136. Cumulative noise	Minimise risk of construction noise criteria exceedence	<p>Construction noise</p> <ul style="list-style-type: none"> If an additional project proposes concurrent construction timing as the proposed Gullen Range wind farm, the Proponent would enter into liaison to ensure that additional construction noise issues were addressed 	The Proponent	Construction and operation	CEMP and OEMP	Rapid response to complaints, adherence to SA EPA guidelines
137. Cumulative traffic and infrastructure	Minimise disruption	<p>Traffic and infrastructure</p> <ul style="list-style-type: none"> If an additional project proposed concurrent construction timing on access routes nominated by the Gullen Range wind farm, the Proponent would enter into liaison to ensure that additional traffic and transport issues were addressed 	The Proponent	Construction and operation	CEMP and OEMP	Timely notification and liaison with road authorities and second proponent
138. Cumulative economic	Maximise local skill use	<p>Economic</p> <ul style="list-style-type: none"> Liaison would continue with local economic development bodies to ensure the potential for local skill use and manufacturing is maximised 	The Proponent	Construction and operation	DoP	Timely notification and liaison

7.1.24 New and Modified SoC's following Review of Submissions

Impact	Objective	Mitigation tasks	By	Timing	Auditing	Criteria
11 Mod Loss of biodiversity value	Avoid direct and indirect impact	Infrastructure (including turbines, powerlines, access roads, construction works areas and crane pads) would be located to avoid dense woodland/forest, impacts to woodland/forest in all other cases would be minimised through rigid site controls established in the CEMP to minimise clearing. Any loss of native vegetation would be offset in accordance with SoC16.	The Proponent	Development of site layout	DoP DECC	Minimise clearing
12 Mod Loss of biodiversity	Minimise impact	The Proponent would locate the electricity corridor required at the Gurrundah property using Option 2 (as shown in figure 7-10 of the EA). The width of the corridor would be minimised and impacts to native	The Proponent	During construction	DoP DECC	Minimise clearing of mature

	Impact	Objective	Mitigation tasks	By	Timing	Auditing	Criteria
	value		vegetation offset in accordance with SoC16.				vegetation
13 Mod	Loss of biodiversity value	Avoid direct and indirect impact	Impacts to isolated mature trees (>60cm diameter at breast height) in cleared areas would be minimised through rigid site controls established in the CEMP to minimise clearing. Where trees cannot be avoided these would be offset in accordance with SoC16.	The Proponent	Development of site layout	DoP DECC	Minimise clearing of mature vegetation
16 Mod	Loss of biodiversity value	Compensate for biodiversity impact	The Proponent would commit to offsets determined by suitably qualified experts on the basis of the quantum of vegetation to be removed, pending development of the final infrastructure layout. The offset plan would be established in perpetuity.	The Proponent	During construction	DoP DECC	Biodiversity Assessment used as guidance to determine appropriate offsets
19 Mod	Loss of biodiversity value	Minimise impact	Where the initial monitoring program demonstrates a need, the Proponent will liaise with landowners to negotiate to fill in dams within 100m of a turbine on involved properties to reduce the potential to attract birds and bats which might collide with turbines. Dams removed due to site development would be reinstated in more appropriate locations to retain this habitat resource onsite.	The Proponent	During construction	DoP DECC	Minimise bird and bat collisions
20 Mod	Loss of biodiversity value	Avoid or minimise impact	Final site inspections would be undertaken for the electricity corridor between Pomeroy and Gurrundah to allow micro-siting of the corridor in areas of least vegetation. If the alternative access off Prices Lane to Pomeroy becomes the preferred option and also if the western access option (a paper road) to Gurrundah becomes the preferred option final inspections would also be undertaken in these areas.	Ecological consultant	Prior to construction	DoP DECC	Minimise direct biodiversity impact
21 Mod	Loss of biodiversity value	Minimise impact	Implementation of design measures: <ul style="list-style-type: none"> • Aviation lighting would be minimised in number and fitted to reduce their ability to attract migrating birds and insects. Red lights are preferred, with the least number of flashes per minute. Cowls may also shield the light when viewed from the ground and reduce potential to attract wetland birds taking off at dusk • Guy lines would not be fitted to wind turbine towers. Guy lines will be avoided on other associated structures, where practical. • The turbine towers would not provide perching opportunities • Electrical connection lines would be installed underground where practical 	The Proponent	During infrastructure and materials selection	DoP DECC	Minimise bird and bat collisions

Impact	Objective	Mitigation tasks	By	Timing	Auditing	Criteria	
		Power poles and overhead powerlines would be designed to be bird-safe using measures such as flags or marker balls, large wire size, wire insulation, wire and conductor spacing					
23 Mod	Loss of biodiversity value	Minimise impact	Bird and Bat Monitoring Program <ul style="list-style-type: none"> Pre-construction surveying would be undertaken to assist in managing bird and bat impacts (Powerful Owl would be a key species in this Pre-construction surveying). Results would be incorporated into the ongoing monitoring program A monitoring program would be designed to document mortalities, remove carcasses and assess the effectiveness of controls in accordance with Section 9.3.1 <p>If mortalities exceed a pre-determined threshold (set out in the monitoring program), additional mitigation measures would be considered, such as diversion structures, turning off turbines at critical times, further habitat modification and enhancement of off-site habitats</p>	Ecological consultant	Designed prior to operation Implemented during operation	DoP DECC	Minimise bird and bat collisions
26 Mod	Loss of biodiversity value	Avoid or minimise impact	Disturbed ground would be stabilised and rehabilitated following works	The Proponent	After decommissioning	DoP DECC	Rapid rehabilitation of disturbed areas
31 (mod)	Creation of hazard	Minimise risk	The Proponent would notify known users of the Crookwell and Ashwell Airstrips of the location of the wind turbines. The Proponent, with assistance from its specialist aviation consultant would assist the aerodrome operator and/or local aircraft operators to develop or amend procedures for safe operations on or within the vicinity of the aerodrome, taking into account the location of the turbine.	The Proponent	Prior to construction	DoP	Direct notification of users
36 (mod)	Deterioration of signal strength	No deterioration of signal strength	<u>Television and radio broadcast services</u> <ul style="list-style-type: none"> Prior to the erection of any wind turbine generators on the site, the Proponent will undertake an assessment of the existing quality of the television/radio transmission available at a representative sample of residential dwellings located within five kilometres of a wind turbine. The Proponent will undertake further assessment of television/radio reception following commencement of operation to determine any loss in television signal. In the event that television interference (TVI) is experienced by 	The Proponent	At the commencement of operation	DoP	No detected deterioration in signal strength, post mitigation

Impact	Objective	Mitigation tasks	By	Timing	Auditing	Criteria	
		<p>existing receivers in the vicinity of the wind farm, the source and nature of the interference would be investigated by the Proponent.</p> <ul style="list-style-type: none"> Should investigations determine that the cause of the interference can be reasonably attributable to the wind farm, the Proponent would put in place mitigation measures at each of the affected receivers in consultation and agreement with the landowners. <p>Specific mitigation measures may include:</p> <ul style="list-style-type: none"> Modification to, or replacement of receiving antenna Provision of a land line between the effected receiver and an antenna located in an area of favourable reception Improvement of the existing antenna system Installation of a digital set top box <u>or</u> In the event that interference cannot be overcome by other means, negotiating an arrangement for the installation and maintenance of a satellite receiving antenna at the Proponents cost 					
139.	Impact on future rural subdivisions	Minimise risks	Future Rural Subdivisions	The Proponent	Operation	DoP	Minimise impacts
		<p>The Proponent will provide reasonable and feasible noise mitigation measures to achieve a noise criterion ($LA_{eq(10-minute)}$) of 30dB(A) inside bedrooms (as outlined in the Guidelines for Community Noise (WHO, 1999) for no more than one dwelling on each parcel of land that:</p> <ul style="list-style-type: none"> Is not associated with the project; Was lawfully in existence at the date of the approval; Was lawfully permitted to be developed for the purpose of a residential dwelling at the date of the approval; Is or was the subject of a valid construction certificate for a residential dwelling, lodged with the consent or a certifying authority within three years of the date of approval; and Would, but for the requirements of this condition, experience noise contributions from the project at the approved location of the residential dwelling in excess of the noise limits recommended in the SA EPA guidelines. 					

Impact	Objective	Mitigation tasks	By	Timing	Auditing	Criteria	
140.	Impact on local water supplies	Comply with water authority	<ul style="list-style-type: none"> No ground water would be sourced without relevant permits being sought. 	The Proponent	Prior to construction	CEMP	Relevant approvals obtained
141.	Impact on groundwater	Minimise risks	<ul style="list-style-type: none"> Undertake geotechnical investigations to ensure that the project would have no material adverse effect on groundwater/aquifers as a result of blasting activities. 	The Proponent	Detailed design phase	CEMP	No detectable impact on groundwater
142.	Loss of biodiversity value	Avoid or minimise impact	<ul style="list-style-type: none"> <i>During the detailed design phase, a copy of the plans of the final infrastructure layout (including all turbines, hard stand areas, buildings, tracks, power lines and associated infrastructure) would be provided to DoP to demonstrate the achievement of biodiversity SoCs in the EA.</i> 	Ecological consultant	Prior to construction	DoP	Minimise direct biodiversity impact
143.	Loss of biodiversity value	Avoid or minimise impact	<ul style="list-style-type: none"> Additional targeted surveying (utilising 'Spider hole' pitfall traps) would be carried in works area likely to be impacted by GUR-08 infrastructure to establish if the Grassland Earless Dragon utilises this habitat at Gurrundah. If it is identified as occurring, turbine infrastructure would be relocated to avoid this habitat, and a buffer of at least 25 metres maintained 	Ecological consultant	Prior to construction	DoP DECC	Minimise direct biodiversity impact
144.	Safety and asset protection	Minimise risks	<ul style="list-style-type: none"> If haulage is proposed on routes that have not been assessed as part of the EA, assessment would be undertaken, in consultation with the Department of Planning, the roads authority and Council, prior to its inclusion in the haulage route. This would be completed as part of the Construction Environmental Management Plan. 	The Proponent	During construction	CEMP	Minimise impacts on road users

7.2 Appendix 2: Matrix of Community Comments

Submission	Visual Impacts	Operational Noise Impacts	Community Impacts and Consultation	Land Value Impacts	-Biodiversity	Wind variability and efficiency	Traffic and Transport	Health Impacts	EA lacks specific details / not adequate	Construction Noise Impacts	Fire Risks	Hydrology Impacts (Water)	Turbine Layout Unclear	Size and Extent of Project	Turbine Size / Capacity Unclear	Decommissioning	Comms & Telecoms	Aircraft Hazards / Aviation
1	X	X		X			X			X							X	
2																		
3	X					X								X	X			
4																		
5																		
6	X	X		X	X	X			X			X			X			
7	X		X			X			X						X			
8	X	X	X	X	X			X									X	X
9	X	X	X			X	X	X	X	X		X	X		X			
10	X	X	X		X	X					X							
11	X	X		X	X								X				X	
12	X		X	X														
13	X	X		X		X					X							

Submission	Visual Impacts	Operational Noise Impacts	Community Impacts and Consultation	Land Value Impacts	Biodiversity	Wind variability and efficiency	Traffic and Transport	Health Impacts	EA insufficient	Construction Noise Impacts	Fire Risks	Hydrology Impacts (Water)	Turbine Location /Layout Unclear	Size and Extent of Project	Turbine Size / Capacity Unclear	Decommissioning	Comms & Telecoms	Aircraft Hazards / Aviation
14	X		X	X								X	X					
15	X	X	X	X	X	X	X	X	X	X				X				
16																		X
17		X	X		X	X					X	X				X		
18	X	X	X		X		X	X		X	X						X	
19			X									X						
20	X	X	X		X	X	X	X							X			
21	X	X	X	X	X	X	X			X						X		
22		X						X										
23	X			X			X				X							
24								X										X
25		X		X				X										
26	X	X		X	X						X		X					

Submission	Visual Impacts	Operational Noise Impacts	Community Impacts and Consultation	Land Value Impacts	Biodiversity	Wind variability and efficiency	Traffic and Transport	Health Impacts	EA insufficient	Construction Noise Impacts	Fire Risks	Hydrology Impacts (Water)	Turbine Location /Layout Unclear	Size and Extent of Project	Turbine Size / Capacity Unclear	Decommissioning	Comms & Telecoms	Aircraft Hazards / Aviation
27	X	X		X													X	
28			X	X								X					X	
29	X	X																
30	X	X	X	X	X	X		X	X	X		X	X	X	X	X		
31		X				X			X									
32																		
33	X	X																
34	X	X		X	X													X
35																		
36	X		X	X			X	X		X		X						
37	X	X	X	X								X	X			X		
38	X	X		X				X	X		X					X		
39	X	X	X	X	X	X						X	X	X	X			X

Submission	Visual Impacts	Operational Noise Impacts	Community Impacts and Consultation	Land Value Impacts	Biodiversity	Wind variability and efficiency	Traffic and Transport	Health Impacts	EA insufficient	Construction Noise Impacts	Fire Risks	Hydrology Impacts (Water)	Turbine Location /Layout Unclear	Size and Extent of Project	Turbine Size / Capacity Unclear	Decommissioning	Comms & Telecoms	Aircraft Hazards / Aviation
40	X		X	X			X								X	X		
41	X	X		X	X	X			X			X			X			
42	X	X	X		X						X					X	X	
43																		
44												X						
45	X	X	X		X	X	X			X	X							
46	X	X		X			X	X		X			X					
47																		
48	X	X		X			X											
49	X	X	X	X														
50	X		X	X								X						
51	X	X	X			X	X				X				X			
52	X		X		X													

Submission	Visual Impacts	Operational Noise Impacts	Community Impacts and Consultation	Land Value Impacts	Biodiversity	Wind variability and efficiency	Traffic and Transport	Health Impacts	EA insufficient	Construction Noise Impacts	Fire Risks	Hydrology Impacts (Water)	Turbine Location /Layout Unclear	Size and Extent of Project	Turbine Size / Capacity Unclear	Decommissioning	Comms & Telecoms	Aircraft Hazards / Aviation
53							X											
54			X		X		X		X									
55	X		X						X									X
56	X	X	X	X		X					X					X		
57	X		X											X				
58	X	X	X				X			X								
59									X									X
	40	33	29	27	18	17	16	12	11	10	10	9	9	9	8	9	8	7