

Director General's Requirements

The Director General of the Department of Planning and Environment issued requirements for the Proponent to consider and address in this EA on 31 March 2011, with supplementary requirements on 16 August 2011. These requirements incorporate input from the various government agencies that will provide input to the DP&E in the assessment of this project.

The following table contains the Director General's Requirements (DGRs) and indicates where they are addressed in this EA. The full DGRs are also presented in Attachment 6.

Table 6-1 Director-General's Requirements

Director-General Requirement's	Addressed in:
General Requirements	
<p>The Environmental Assessment (EA) must include:</p> <ul style="list-style-type: none"> • an executive summary; • a detailed description of the project (both the wind farm and associated infrastructure) including: <ul style="list-style-type: none"> → construction, operation and decommissioning details; → the location and dimensions of all project components including the wind turbines (including map coordinates and AHD heights), underground / overhead cabling between turbines, electrical substation and transmission line linking the wind farm to the grid, temporary concrete batching plant(s), construction compounds, access roads/road upgrades (including internal access tracks) and obstacle lighting; → a timeline identifying the proposed construction and operation of the project components including staging, their envisaged lifespan and arrangements for decommissioning; → supporting maps/plans clearly identifying existing environmental features (e.g. watercourses, vegetation), infrastructure and landuse (including nearby residences and approved residential developments or subdivisions, if any) and the location / siting of the project including associated infrastructure in the context of this existing environment; and → resourcing requirements (including, but not limited to, water supply and gravel). • consideration of any relevant statutory provisions including the consistency of the project with the objects of the <i>Environmental Planning and Assessment Act 1979</i> (i.e. Section 5 of the Act) and any relevant development control plans; • an assessment of the key issues outlined below, during construction, operation and decommissioning (as relevant). The Environmental Assessment must assess the worst case as well as representative impact for all key issues; • consideration of any cumulative impacts as relevant, taking note of proposed wind farms in the locality; • demonstration that the wind farm will be capable of meeting relevant Building Code of Australia (BCA) standards and other relevant codes / manufacturers' specifications for the construction of wind farms; • a draft Statement of Commitments detailing measures for environmental mitigation, management and monitoring for the project; • a conclusion justifying the project taking into consideration the environmental, social and economic impacts of the project; the suitability of the site; and the public interest; and • certification by the author of the EA that the information contained in the Assessment is neither false nor misleading. <p>The EA should present, with respect to each relevant transmission line impact, a considered overview of potential impacts along the length of the line, to identify areas of potentially significant impact for further, more detailed assessment. In addition to detailed assessment of areas of potentially significant impact, other areas along the length of the line should be assessed in a more general manner, with a particular focus on the development of frameworks for the mitigation, management and monitoring of more minor and generic environmental issues.</p>	<p>Section 1 Section 3</p> <p>Section 3 Section 3</p> <p>Section 3.10</p> <p>Section 3 and Attachment 1</p> <p>Section 15</p> <p>Section 6</p> <p>Section 9 to 16</p> <p>Section 9 Section 6.1.10</p> <p>Section 17</p> <p>Section 18</p> <p>Section 20</p>
Key Assessment Requirements	
<p>The EA must include assessment Of the following key issues for both the wind farm and transmission line:</p> <ul style="list-style-type: none"> • Strategic Justification -the EA must: <ul style="list-style-type: none"> → include a strategic assessment of the need, scale, scope and location for the project in relation to predicted electricity demand, predicted transmission constraints and the 	

Director-General Requirement's	Addressed in:
<p>strategic direction of the region and the State in relation to electricity supply, demand and electricity generation technologies, and its role within the Commonwealth's Renewable Energy Target Scheme. The EA must clearly demonstrate that the existing transmission infrastructure has sufficient capacity to accommodate the project;</p> <p>→ include a clear demonstration of quantified and substantiated greenhouse gas benefits, taking into consideration sources of electricity that could realistically be replaced and the extent of their replacement, with reference to the Department of Environment, Climate Change and Water NSW wind farm greenhouse gas savings tool (http://www.environment.nsw.gov.au/climatechange/greenhousegassavingtool.htm);</p> <p>→ include an analysis of the suitability of the project with respect to potential land use conflicts with existing and future surrounding land uses (including rural residential development, building entitlements and subdivision potential, land of significant scenic or visual value, land of high agricultural value, mineral reserves (particularly Petroleum Exploration Licence 433 held by Eastern Star, Petroleum Exploration Licence 456 held by Santos/Apollo/Gas/Dart, mining lease A286 held by Industry and Investment and Exploration Licence 7597 held by Australian Bauxite), forestry, Crown land and conservation areas including Coolah Tops and Goulburn River National Parks), taking into account local and strategic landuse objectives and the potential for social and economic impacts on the local community. In particular justification should be provided regarding the suitability of the transmission line route through Durrigere State Conservation Area. Consideration should be given to any potential conflicts with the proposed Coolah to Newcastle gas pipeline and any operating or proposed extractive industries. The analysis of site suitability shall consider any Environmentally Sensitive Area Mapping held by Liverpool Plains Shire Council, Warrumbungle Shire Council, Upper Hunter Shire Council and Mid-Western Regional Council; and</p> <p>→ describe the alternatives considered (location and/or design) for all project components, and provide justification for the preferred project demonstrating its benefits on a local and strategic scale and how it achieves stated objectives and any measures to offset residual impacts (for example community enhancement programmes).</p>	<p>Section 4.1 and 4.7</p> <p>Section 4.2</p> <p>Section 4.6 and 4.7</p> <p>Section 5</p>
<ul style="list-style-type: none"> • Visual Impacts -the EA must: <ul style="list-style-type: none"> → provide a comprehensive assessment of the landscape character and values and any scenic or significant vistas of the area potentially affected by the project, including an assessment of the significance of landscape values and character in a local and regional context. This should describe community and stakeholder values of the local and regional visual amenity and quality, and perceptions of the project based on surveys and consultation; → assess the impact of shadow "flicker", blade "glint" and night lighting from the wind farm; → identify the zone of visual influence of the wind farm including consideration to night lighting (no less than 10 kilometres) and assess the visual impact of all project components on this landscape; → include an assessment of any cumulative visual impacts from transmission line infrastructure; → include photomontages of the project taken from potentially affected residences (including approved but not yet developed dwellings or subdivisions with residential rights), settlements and significant public view points, and provide a clear description of proposed visual amenity mitigation and management measures for both the wind farm and the transmission line. The photomontages must include representative views of turbine night lighting if proposed; and → provide an assessment of the feasibility, effectiveness and reliability of proposed mitigation measures and any residual impacts after these measures have been implemented. 	<p>Section 9 and Appendix A</p>
<ul style="list-style-type: none"> • Noise Impacts -the EA must: <ul style="list-style-type: none"> → include a comprehensive noise assessment of all phases and components of the project including: turbine operation, the operation of the electrical substation, corona and / or aeolian noise from the transmission line, construction noise (focusing on high noise-generating construction scenarios and works outside of standard construction hours), traffic noise during construction and operation, and vibration generating activities (including blasting) during construction and / or operation. The assessment must identify noise / vibration sensitive locations (including approved but not yet developed dwellings), baseline conditions based on monitoring results, the levels and 	<p>Section 10 and Appendix B</p>

Director-General Requirement's	Addressed in:
<p>character of noise (e.g. tonality, impulsiveness, low frequency etc) generated by noise sources, noise / vibration criteria, modelling assumptions and worst case and representative noise / vibration impacts;</p> <ul style="list-style-type: none"> → in relation to wind turbine operation, determine the noise impacts under operating meteorological conditions (i.e. wind speeds from cut in to rated power), including impacts under meteorological conditions that exacerbate impacts (including varying atmospheric stability classes and the van den Berg' effect for wind turbines). The probability of such occurrences must be quantified; → include monitoring to ensure that there is adequate wind speed/profile data and ambient background noise data that is representative for all sensitive receptors; → provide justification for the nominated average background noise level used in the assessment process, considering any significant difference between daytime and night time background noise levels at background noise levels higher than 30 dB(A); → identify any risks with respect to tonal, low frequency or infra-noise; → clearly outline the noise mitigation, monitoring and management measures that would be applied to the project. This must include an assessment of the feasibility, effectiveness and reliability of proposed measures and any residual impacts after these measures have been incorporated; → if any noise agreements with residents are proposed for areas where noise criteria cannot be met, provide sufficient information to enable a clear understanding of what has been agreed and what criteria have been used to frame any such agreements; and → include a contingency strategy that provides for additional noise attenuation should higher noise levels than those predicted result following commissioning and/or noise agreements with landowners not eventuate. <p>The assessment must be undertaken consistent with the following guidelines:</p> <ul style="list-style-type: none"> → Wind Turbines -the South Australian Environment Protection Authority's Wind Farms - Environmental Noise Guidelines (2003); → Substation -NSW Industrial Noise Policy (EPA, 2000); → Site Establishment and Construction -Interim Construction Noise Guidelines (DECC, 2009); → Traffic Noise -Environmental Criteria for Road Traffic Noise (NSW EPA, 1999); and → Vibration -Assessing Vibration: A Technical Guideline (DECC, 2006). 	
<ul style="list-style-type: none"> • Ecological Impacts -the EA must include an ecological assessment considering terrestrial and aquatic ecosystems (as relevant), including groundwater dependent ecosystems, consistent with Guidelines for Threatened Species Assessment (DEC, 2005); The EA must: <ul style="list-style-type: none"> → identify threatened species, populations and communities listed under both State and Commonwealth legislation that have the potential to occur on site; → map existing vegetation by vegetation / community type and include details on existing site conditions, including whether the vegetation comprises a highly modified or over-cleared landscape and the types and quality of habitat resources available. Vegetation mapping should consider any Environmentally Sensitive Area Mapping held by Liverpool Plains Shire Council, Warrumbungle Shire Council, Upper Hunter Shire Council and Mid-Western Regional Council. → provide details of the survey methodology employed including survey effort and representativeness for each species targeted and clear justification for species that were discounted from requiring field surveys or further assessment; → demonstrate a design philosophy of impact avoidance on ecological values, and in particular, ecological values of high significance; → provide a worst case estimate of vegetation to be cleared (in hectares), including quantifying impacts (in hectares) by vegetation type and threatened species habitat (as relevant); → assess the significance of impacts to native vegetation, listed' threatened species, populations and communities and their habitats with consideration to local and region-based ecological implications, including habitat connectivity and distribution of species. The assessment must consider impacts to in-stream and riparian ecology from works close to waterways and / or waterway crossings. In addition, impact of the project on birds and bats from blade strikes, low air pressure zones at the blade tips (barotrauma), and alteration to movement patterns resulting from the turbines must be assessed, including demonstration of how the project has been sited to avoid and/or minimise such impacts; 	<p>Section 11 and Appendix C</p>

Director-General Requirement's	Addressed in:
<ul style="list-style-type: none"> → include details of how flora and fauna impacts would be managed during construction and operation including adaptive management, rehabilitation! regeneration measures and maintenance protocols; → demonstrate how the project (with the incorporation of all proposed measures to avoid, mitigate and / or offset impacts) achieves a biodiversity outcome consistent with "maintain or improve" principles. Sufficient details must be provided to demonstrate the availability of viable and achievable options to offset the impacts of the project and to secure these measures in perpetuity; and → address the risk of weed spread and identify mitigation measures. 	
<ul style="list-style-type: none"> • Heritage Impacts -the EA must include an assessment of impacts on Aboriginal and historic heritage. The EA must: <ul style="list-style-type: none"> → include sufficient information to demonstrate the likely impacts of the project on Aboriginal heritage values / items (archaeological and cultural) and outline proposed mitigation measures (including consideration of the effectiveness and reliability of the measures) in accordance with the Draft Guidelines for Aboriginal Cultural Heritage Impact Assessment and Community Consultation (DEC, 2005). The assessment must be undertaken by suitably qualified heritage consultants and demonstrate effective consultation with Aboriginal communities in determining and assessing impacts, developing options and selecting options and mitigation measures (including the final proposed measures); and → provide sufficient information to demonstrate the likely impacts of the project on historic heritage values (including heritage vistas) and, where impacts to State or local historic heritage items are proposed, outline proposed mitigation and management measures (including consideration of the effectiveness and reliability of the measures) generally consistent with the guidelines in the NSW Heritage Manual. Where impacts to State or local historic heritage items are proposed, a statement of heritage significance must be included. 	Section 12 and Appendix D
<ul style="list-style-type: none"> • Traffic and Transport -the EA must assess the construction and operational traffic impacts of the project including: <ul style="list-style-type: none"> → details of traffic volumes (both light and heavy vehicles) and transport routes during construction and operation; → assess the potential traffic impacts of the project on road network function (including intersection level of service) and safety; → assess the capacity of the existing road network to accommodate the type and volume of traffic generated by the project (including over-dimensional traffic) during construction and operation, including full details of any required upgrades to roads, bridges, site access provisions (for safe access to the public road network) or other road features; → details of measures to mitigate and/or manage potential impacts, including construction traffic control, road dilapidation surveys and measures to control soil erosion and dust generated by traffic volumes; → details of access roads within the site including how these would connect to the existing public road network (i.e. site access) and ongoing operational maintenance requirements for on-site roads; and → consideration of relevant Council traffic / road policies. 	Section 13 and Appendix E
<ul style="list-style-type: none"> • Hazard/Risks - the EA must include an assessment of the potential impacts on aviation safety, including the need for aviation hazard lighting, considering nearby aerodromes and aircraft landing areas, defined air traffic routes, aircraft operating heights, approach/departure procedures, radar interference, communication systems, and navigation aids. Aerodromes within 30km of the turbines should be identified and impacts on obstacle limitation surfaces addressed. In addition, the EA must assess the impact of the turbines on the safe and efficient aerial application of agricultural fertilisers and pesticides in the vicinity of the turbines and transmission line. Possible effects on telecommunications systems must be identified. Potential hazards and risks associated with electric and magnetic fields and bushfires/use of bushfire prone land must also be assessed. 	Section 14
<ul style="list-style-type: none"> • Water Supply, Water Quality and Hydrology -The EA must: <ul style="list-style-type: none"> → identify water demands, and determine whether an adequate and secure water supply is available for the project; → identify water sources (surface and groundwater), water disposal methods and water storage structures in the form of a water balance; 	Section 15

Director-General Requirement's	Addressed in:
<ul style="list-style-type: none"> → include the statutory (licensing) context of the water supply sources; → assess potential environmental impacts associated with the use of the identified water sources including impacts on groundwater and implications for existing licensed users/basic landholder rights; → assess the potential to intercept groundwater, including predicted dewatering volumes, zone of drawdown and associated impact, water quality and disposal methods; → where the project involves crossing or works close to waterways, identify likely impacts to the waterways, how the waterways are proposed to be crossed and be designed in accordance with the NSW Office of Water Guidelines for Controlled Activities (August 2010); → describe the measures to minimise hydrological, water quality, aquatic and riparian impacts; → identify how works within steep gradient land or highly erosive soil types will be managed during construction and operation; and → consideration is to be given to water sharing plans and ground water and surface water access embargoes, as relevant. 	
<ul style="list-style-type: none"> • Waste -The EA must identify, quantify and classify the likely waste streams to be generated during construction and operation, and describe the measures to be implemented to manage, reuse, recycle and safely dispose of this waste. 	Section 16.6
<ul style="list-style-type: none"> • General Environmental Risk Analysis - notwithstanding the above key assessment requirements, the EA must include an environmental risk analysis to identify potential environmental impacts associated with the project, proposed mitigation measures and potentially significant residual environmental impacts after the application of proposed mitigation measures. Where additional key environmental impacts are identified through this environmental risk analysis, an appropriately detailed impact assessment of the additional key environmental impact(s) must be included in the EA. 	Section 16
Consultation Requirements	
<p>The Proponent must undertake a consultation programme as part of the environmental assessment process, including consultation with, but not necessarily limited to, the following parties:</p> <ul style="list-style-type: none"> • Liverpool Plains Shire Council; • Warrumbungle Shire Council; • Upper Hunter Shire Council; • Mid-Western Regional Council; • Department of Environment, Climate Change and Water; • NSW Office of Water; • Industry and Investment NSW; • NSW Roads and Traffic Authority; • NSW Rural Fire Service; • Land and Property Management Authority; • Central West Catchment Management Authority; • Hunter Central Rivers Catchment Management Authority; • Namoi Catchment Management Authority; • Commonwealth Department of Defence; • Civil Aviation Safety Authority; • Airservices Australia; • Aerial Agricultural Society of Australia; • relevant service providers; • relevant minerals stakeholders (including exploration and mining title holders); and • the local community and landowners (including "associated" and "non-associated" properties). <p>The consultation process shall include measures for disseminating information to increase awareness of the project as well as methods for actively engaging stakeholders on issues that would be of interest / concern to them. The EA must:</p> <ul style="list-style-type: none"> • demonstrate effective consultation with stakeholders, and that the level of consultation with each stakeholder is commensurate with their degree of interest / concern or likely impact; 	Section 7

Director-General Requirement's	Addressed in:
<ul style="list-style-type: none"> clearly describe the consultation process undertaken for each stakeholder/group including details of the dates of consultation and copies of any information disseminated as part of the consultation process (subject to confidentiality); and describe the issues raised during consultation and how and where these have been addressed in the EA. 	

Supplementary Director-General's Requirements

The Director-General of the Department of Planning and Environment issued supplementary DGRs on 16 August 2011. These supplementary DGRs related to the requirement:

"...that the community must be consulted during the preparation of the Environmental Assessment and relevant issues must be addressed in the document."

Table 6-2 contains the supplementary DGRs and highlights the sections in which the appropriate responses have been made. The full supplementary DGRs are presented in Attachment 6.

Table 6-2 Supplementary Director-General's Requirements

Supplementary Director-General's Requirements	Addressed In:
<ol style="list-style-type: none"> a comprehensive, detailed and genuine community consultation and engagement process must be undertaken. This process must ensure that the community is both informed of the proposal and is actively engaged in issues of concern to them, and is given ample opportunity to provide its views on the proposal. Sufficient information must be provided to the community so that it has a good understanding of what is being proposed and of the impacts. There should be a particular focus on those non wind farm associated community members who live in proximity to the site; the Environmental Assessment must clearly document and provide details and evidence of the consultation process and who was consulted with; all issues raised during the consultation process must be clearly identified and tabulated in the Environmental Assessment; and the Environmental Assessment must state how the identified issues have been addressed, and how they have informed the proposal as presented in the Environmental Assessment. In particular, the Environmental Assessment must state how the community's issues have been responded to. 	Section 7

The Director-General of the Department of Planning and Infrastructure issued further supplementary DGRs on 25 March 2014. These supplementary DGRs related to the requirement to assess the potential impacts on listed threatened species and communities under the Commonwealth Environment Protection and Biodiversity Conservation Act 1999. As detailed in Section 6.1.11 the bilateral assessment process will apply to the assessment of this project under the EPBC Act, so that the Department of Planning and Infrastructure can undertake an environmental assessment of the project to satisfy the requirements of both NSW and Commonwealth legislation.

The table attached as Appendix H contains the supplementary DGRs and highlights the sections in which the appropriate responses have been made. The full supplementary DGRs are presented in Attachment 6.

6.1.2 Draft NSW Wind Farm Planning Guidelines

The Draft NSW Wind Farms Planning Guidelines have been prepared to ensure effective consultation with local communities and to deliver improved consistency, transparency and rigour in the planning assessment process. These guidelines were exhibited from 23 December 2011 to 14 March 2012 and public comments on the draft guidelines were sought.

The Draft Guidelines provided a table of key aspects relevant to applications that can be seen in Table 6-3.

Table 6-3 Key issues of the Draft NSW Planning Guidelines for Wind Farms

Potential Issues for Consideration	Addressed In:
Consultation	
Form a Community Consultation Committee	Section 7.2
Document the consultation process undertaken, including the stakeholders consulted. Identify and tabulate the issues raised by the stakeholders during consultation. Describe how the issues raised have been addressed.	Section 7
Consult with all neighbours with dwellings within 2km of a proposed wind turbine.	Section 7.2
Consider seeking an agreement with neighbours with dwellings within 2km of a proposed turbine.	Section 7.2.2
Landscape and Visual Amenity	
Provide photomontages from all non-host dwellings within 2km of a proposed wind turbine.	Section 9 & Appendix A
Identify the zone of visual influence of the wind farm (no less than 10km) and likely impacts on community and stakeholder values. Consider cumulative impacts on landscapes and views.	Section 9
Outline mitigation measures to avoid or manage impacts.	Section 9
Noise	
Undertake assessment based on separate daytime (7am to 10pm) and night time (10pm to 7am).	Section 10
Predict noise levels at all dwellings within 2km of a proposed turbine.	Section 10
Consider special audible characteristics, including tonality, amplitude modulation, and low frequency noise (apply penalties where relevant)	Section 10
Outline measures to avoid, minimise, manage and monitor impacts.	Section 10
Health	
Consider and document health issues, focusing on neighbours with dwellings within 2km of a proposed wind turbine.	Section 8.1
Ecological Issues	
Consider the impact on birds and bats, particularly migratory species and outline the proposed monitoring and mitigation strategy.	Section 11 & Appendix C
Aviation Safety	
Outline current agricultural aerial uses on neighbouring properties.	Section 14.1
Consider the potential for the proposed wind farm to impact on aviation safety associated with agricultural aerial uses consistent with the draft guidelines.	Section 14.1
Bushfire Hazard	
Consider bushfire issues consistent with the draft guidelines, including the risks that a wind farm will cause bushfire and any potential impacts on the aerial fighting of bushfires.	Section 14.5
Blade Throw	
Assess blade throw risks consistent with the draft guidelines.	Section 14.6
Outline measures to avoid, minimise, manage and monitor impacts.	Section 14.6
Economic Issues	
Consider whether the wind farm is consistent with the relevant local or regional land use planning strategies	Section 6.1.8
Consider the potential impact upon mining/petroleum leases and exploration licenses.	Section 16.3
Consider any potential impacts upon property values consistent with the draft guidelines, including properties within 2km.	Section 8.1
Decommissioning	

Include a Decommissioning and Rehabilitation Plan in the EA, including proposed funding arrangements.	Section 3.10.4 and Appendix G
Confirm that the proponent not the landowner is responsible for decommissioning	Section 3.10.4
Monitoring and Compliance Program	
Outline program to monitor the environment performance to ensure compliance including mechanisms for reporting outcomes and procedures to rectifying non-compliance – including any provisions for independent reviews.	Section 17 - Draft Statement of Commitments
Council Planning Controls	
Outline whether the proposal is consistent with any relevant provisions of the relevant council's Development Control Plan and list any variations	Section 6.1.8

6.1.3 State Environmental Planning Policy

State Environmental Planning Policies (SEPPs) only apply 'to the extent that the provisions of such a policy expressly provide that they apply to and in respect of the particular project' (former section 75R(2)(b) EPA&A). No SEPPs expressly provide that they apply to and in respect of the Liverpool Range Wind Farm project, with the result that SEPPs do not apply to this application. However 'In deciding whether or not to approve the carrying out of a project, the Minister may (but is not required to) take into account the provisions of any environmental planning instrument that would not (because of section 75R) apply to the project if approved' (former section 75J(3)). Accordingly, the Minister may wish to take into account *State Environmental Planning Policy No 44 – Koala Habitat Protection ('Koala SEPP')*.

The *Koala SEPP* applies to the Coolah and Merriwa local government areas (Schedule 1, *Koala SEPP*). While Liverpool Plains and Mid-Western Regional local government areas are not listed in Schedule 1 as areas to which the *Koala SEPP* applies, the former local government areas of Quirindi and Rylstone, now part of Liverpool Plains and Mid-Western Regional local government areas respectively, are listed in Schedule 1. Accordingly, the Minister may wish to take into account the provisions of the *Koala SEPP* in considering the Liverpool Range Wind Farm application.

The Minister may also wish to take into account *SEPP (Infrastructure) 2007*. Electricity generating works, such as the Liverpool Range Wind Farm, may be carried out with consent in certain prescribed zones (clause 34). These zones, defined in clause 33, are consistent with the rural zonings in the Liverpool Range Wind Farm local government areas, as further discussed in 'Local Environmental Plans' in this EA.

6.1.4 Protection of the Environment Operations Act 1997

The proposed development of the Liverpool Range Wind Farm does not currently require an environment protection licence under the Protection of the Environment Operations Act 1997 (POEO Act) because wind power generation is excluded from the definition 'general electricity works' that must be licensed (POEO Act, section 48 and Schedule 1, clause 17(1)). However a draft regulation is currently on exhibition which may result in the requirement for a licence under revisions to the POEO Act. On the basis that a licence will be required under the POEO Act by the time this EA is determined, a licence in line with the intention of the exhibited amendment is sought.

6.1.5 Ecologically Sustainable Development

Ecologically sustainable development (ESD) involves the effective integration of social, economic and environmental considerations in decision-making processes. In 1992, the Commonwealth and all state and territory governments endorsed the *National Strategy for Ecologically Sustainable Development*. In NSW, the concept has been incorporated in legislation such as the *EP&A Act* and Regulation.

Sustainable development in the context of a proposed wind farm, climate change, renewable energy, wind assets and threatened flora and grasslands was considered by Preston CJ in *Taralga Landscape Guardians Inc v Minister for Planning and RES Southern Cross Pty Ltd* [2007] NSWLEC 59.

For the purposes of the *EP&A Act* and other NSW legislation, the Intergovernmental Agreement on the Environment (1992) and the *Protection of the Environment Administration Act 1991* outline the following principles which can be used to achieve ESD:

- ▶ The precautionary principle: that if there are threats of serious or irreversible environmental damage, lack of full scientific certainty should not be used as a reason for postponing measures to prevent environmental degradation
- ▶ In the application of the precautionary principle, public and private decisions should be guided by:
 - Careful evaluation to avoid, wherever practicable, serious or irreversible damage to the environment; and
 - An assessment of the risk-weighted consequences of various options.
- ▶ Inter-generational equity: that the present generation should ensure that the health, diversity and productivity of the environment are maintained or enhanced for the benefit of future generations;
- ▶ Conservation of biological diversity and ecological integrity: that conservation of biological diversity and ecological integrity should be a fundamental consideration;
- ▶ Improved valuation, pricing and incentive mechanisms: that environmental factors should be included in the valuation of assets and services, such as:
 - Polluter pays: that is, those who generate pollution and waste should bear the cost of containment, avoidance or abatement;
 - The users of goods and services should pay prices based on the full life cycle of costs of providing goods and services, including the use of natural resources and assets and the ultimate disposal of any waste; and
 - Environmental goals, having been established, should be pursued in the most cost effective way, by establishing incentive structures, including market mechanisms, which enable those best placed to maximise benefits or minimise costs to develop their own solutions and responses to environmental problems.

The precautionary principle has been adopted in the assessment of impacts. All potential impacts have been considered and mitigated where a risk is present. Where uncertainty exists, measures have been suggested to address the uncertainty.

The impacts of the project on ecology, including EPBC listed species, have been assessed in detail in the attached Ecology Assessment (summarised in Section 11).

The aims, structure and content of this EA have incorporated these ESD principles. The Draft *Statement of Commitments* in Section 17 provides an auditable environmental management commitment to these parameters. Based on the social and environmental benefits accruing from the project at a local and broader level, and the assessed impacts on the environment and their ability to be managed, it is considered that the development would be ecologically sustainable within the context of the above ESD principles.

6.1.6 Catchment Action Plans

Catchment Action Plans (CAPs) are strategic, statutory plans under the *Catchment Management Authorities Act 2003* that provide a framework for natural resource management in a catchment. CAPs include general principles for biodiversity, land and water management.

Each catchment management authority is required to prepare a catchment action plan in partnership with regional community and government agencies. Catchment action plans guide natural resource management investment in the 13 catchment regions across NSW. They bring together government priorities, best available science and the values of catchment communities into a strategic plan for making improvements in NSW's natural resources (ABS, 2010).

The majority of the proposed Liverpool Range Wind Farm falls in the Central West catchment region, with the northern and southern sections falling in the Namoi and Hunter/Central Rivers catchment regions respectively.

Overall, the Liverpool Range Wind Farm will only have a small effect on the key principles of:

- ▶ water management;
- ▶ regional vegetation management;
- ▶ floodplain management;
- ▶ regional action plans;

- ▶ property management;
- ▶ local environment plans.

While vegetation clearing would be required on site, the amount required would be relatively small in size. The impact of this native vegetation clearing has been assessed as part of the proposal and was concluded to be manageable with effective implementation of the Construction Environmental Management Plan.

Of these other principles which the development may affect, prevention and mitigation measures have been identified to reduce their potential impact. These measures have been developed using best practice and will be implemented into both the Construction and Operational Environmental Management Plans.

6.1.7 Renewable Energy Action Plan

In September 2013 the NSW government published the final version of its Renewable Energy Action Plan to guide NSW's renewable energy development and to support the national target of 20% renewable energy by 2020. The Plan positions NSW to increase energy from renewable sources at least cost to the energy customer and with maximum benefits to NSW.

The Plan details three goals and 24 actions to most efficiently grow renewable energy generation in NSW. The strategy is to work closely with NSW communities and the renewable energy industry to increase renewable energy generation in NSW.

The Plan replaces the government's previous Renewable Energy Precincts program established in February 2009.

6.1.8 Local Government Instruments and Policies

Local Environment Plans

As stated above (in relation to SEPPs) 'In deciding whether or not to approve the carrying out of a project, the Minister may (but is not required to) take into account the provisions of any environmental planning instrument that would not (because of section 75R) apply to the project if approved' (EP&A Act, former section 75J(3)). Local Environmental Plans are environmental planning instruments (EPA&A section 4). Accordingly the Minister may (but is not required to) take into account the applicable Local Environmental Plans (LEPs), namely:

- ▶ Coolah LEP 2000. The wind farm is 'generating works' and 'public utility undertaking', as defined in the Model Provisions and adopted in Coolah LEP 2000, being the LEP within the Warrumbungle Shire local government area applicable to part of the proposed Liverpool Range Wind Farm site. The land is zoned 1(a) (General Rural) under Coolah LEP 2000. The proposed wind farm is permissible with development consent in that zone.
- ▶ Merriwa LEP 2000. The wind farm is 'generating works' and 'public utility undertaking', as defined in the Model Provisions and adopted in Merriwa LEP 1992, being the applicable LEP within the Upper Hunter local government area applicable to part of the proposed Liverpool Range Wind Farm site. The land is zoned 1(a) (General Rural) under Merriwa LEP 1992. The proposed wind farm is permissible with development consent in that zone.
- ▶ Liverpool Plains LEP 2011. The wind farm is 'electricity generating works', as defined in the Dictionary to Liverpool Plains LEP 2011, being the applicable LEP within the Liverpool Plains local government area applicable to part of the proposed Liverpool Range Wind Farm site. The land is zoned RU1 Primary Production, in which the proposed wind farm is prohibited. However Liverpool Plains LEP 2011 is subject to the provisions of any State environmental planning policy (clause 1.9). State Environmental Planning Policy (Infrastructure) 2007 ('SEPP Infrastructure') is applicable, and prevails to the extent of any inconsistency with any other environmental planning instrument (SEPP Infrastructure, clause 8). The RU1 Primary Production land under Liverpool Plains LEP 2011 is 'prescribed rural zone' under clause 33 of SEPP Infrastructure, in which electricity generating works are permissible with consent (clause 34(1)).
- ▶ Mid-Western Regional LEP 2012. The transmission lines for the wind farm are 'public utility undertaking' as defined in the Dictionary to the Mid-Western Regional LEP 2012. The potential transmission line corridor land includes land zoned RU1 Primary Production, RU3 Forestry, E1 National Parks and Nature Reserves and E3 Environmental Management. Transmission lines are permissible with consent in Zone RU1. In Zone RU3 transmission lines would be permissible without consent if the use was authorised under the Forestry Act 1916 (for example, in accordance with a special purpose permit under section 32F), but would otherwise be prohibited. Similarly in Zone E1 National Parks and Nature Reserves the transmission lines would be

permissible without consent if the use was authorised under the National Parks and Wildlife Act 1974 (for example through an easement for the transmission of electricity under section 153), but would otherwise be prohibited. In Zone E3 Environmental Management, transmission lines are prohibited.

Development Control Plans and local council policies

In the same way that the Minister may wish to (but is not required to) take into account the provisions of LEPs (EPAA former section 75J(3)), the Minister may wish to take into account the current Development Control Plans (DCPs) and other local council policies which specifically addresses the development of wind farms.

Upper Hunter Shire Council Development Control Plan 2008

Section 1.4 (Notification and Advertisement), Section 1.5 (Documentation), Section 1.6 (Environmental Considerations), Section 1.7 (Contributions), Section 1.8 (Tourism), Section 1.9 (Consultation with other authorities), and Section 1.10 (Reference material) of Upper Hunter Development Control Plan 2008 (including section on wind power generation adopted 25 July 2011) (Upper Hunter DCP) provide a guide to the Council's expectations in relation to wind farms, and accordingly have been considered by the Proponent.

While the project does comply with most of the controls proposed by the Upper Hunter DCP (see Table 6-4), it should be noted that there are some exceptions.

The project does not comply with set-back distances suggested in this DCP; however, it achieves compliance with the SA EPA Guidelines. 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. In *Gullen Range Wind Farm Pty Limited v Minister for Planning [2010] NSWLEC 1102* (at [167]) the Court described the 2 km setback proposed in the DCP as arbitrary, and rejected it. The project achieves the desired objectives of the DCP and complies with the other requirements, particularly the noise criteria.

This assessment also considers the criteria set out in the Draft NSW Wind Farm Guidelines.

Table 6-4 Criteria from the Upper Hunter Shire Council DCP 2008 (section on wind power generation adopted 25 July 2011)

Wind Power Generation - DCP Issues	Relevant section in this EA
Section 1.4 (Notification and Advertisement):	
Notification radius of at least 10 km	Section 7
(Not applicable). (iii) The applicant must hold at least one public information session to which the public will have access to both during the day and evening per town covered within the proposal and notification radius. In the event no towns are covered by the proposal and notification radius one information session must be held in the nearest town centre. Public notice of an information sessions must be given at least 21 days in advance and advertised in the local newspapers and on Upper Hunter Shire Council's website.	Section 7.2.2
Applicants are encouraged at the earliest opportunity, to actively engage in public consultation with non-hosting adjoining owners prior to lodgement of an application	Section 7
Section 1.5 (Documentation)	
Site plan(s) showing all wind farm infrastructure including wind turbine envelopes, site and property boundaries, land contours, native and existing vegetation, land uses within the proposal area, the location and uses of all buildings on the site, power and transmission lines, sub-stations(s), fences on site, temporary structures including accommodation and extent of ground disturbance.	Section 3
Specifications of the proposed wind turbines	Section 3.3
Proposed route of any transmission lines	Sections 3.4 & 3.5
Comprehensive noise impact survey and modelling of the proposed development (worst case scenario) in relation to the existing environmental surroundings. Noise modelling shall as a minimum include all residential dwellings and other likely noise receptors within a 3km radius of a proposed wind turbine.	Section 10
Traffic and road management impact assessment including proposed haulage routes, new roads required, proposed upgrading of local roads whether private or	Section 13

Wind Power Generation - DCP Issues	Relevant section in this EA
Council owned, existing road and bridge weight limits and strategies to overcome deficiencies in the network.	
Where wind turbines are proposed to be placed on ridgelines or part of the wind turbine structures will be visible above a ridgeline a visual impact assessment must be undertaken including computer assisted modelling to a minimum distance of 10km from the affected ridgelines. The assessment shall include photomontages which should also depict night lighting in accordance with any requirements of the Civil Aviation Safety Authority (CASA).	Section 9
The heritage significance of the subject site, nearby sites and surrounds including but not limited to indigenous and non-indigenous cultural, archaeological and built environment issues/items.	Section 12
A detailed assessment of flora and fauna impacts with specific mention of migratory and threatened species potentially impacted by the development	Section 11
Copies of all agreed and proposed noise agreements that have been entered into or are intended to be entered into.	Not applicable
Section 1.6 (Environmental Considerations)	
a) The proposed development must take into account the surrounding environment. All elements of the project shall be sited and carried out to minimise impacts on the locality and not conflict with current land uses on and surrounding the proposal.	Section 6
b) The applicant must take into consideration and assess the cumulative impact of the proposed development in connection to existing or approved undeveloped wind farms. Ridgelines dominated with wind turbines will not be favoured.	Section 1.8 and Section 9
c) Where wind turbines are proposed to be significantly higher than nearby properties or where the wind turbines will dominate the immediate view from the dwelling or an approved dwelling lot, consideration to be given to increasing the separation distances to reduce the visual impact	Section 9
d) The development as a minimum shall not be located within a distance 1.25 times the height of the turbine (including the tip of the blade) from the boundary of a formed public road or a non-related property boundary.	Not applicable
e) Distances between proposed wind turbine locations in relation to any dwellings shall be on merit supported fully by aesthetic, acoustic and amenity assessments which shall give due consideration to issues of excessive noise, shadow flicker, infrasound and visual amenity.	Sections 10 & 14.4
f) Where a non-related property has wind turbines adjacent to more than one boundary of the property, setback distances should be increased above the minimum requirements to the development in order to minimise the visual and noise impacts of that property.	Not applicable
g) An assessment of the likely impacts on the local, regional and state communications networks (television, radio, mobile phones & two way radios) in operation within the locality shall be undertaken including the establishment of benchmarks on quality and service. Any reduction in either must be suitably addressed to overcome the loss.	Section 14.2
h) The Upper Hunter Shire Council operates a regional airport in Scone. In addition it is likely that there are other airstrips, helipads and aviation facilities within the Shire. An assessment of the likely impacts on such facilities in operation within the locality shall be undertaken.	Section 14.1
i) A bushfire risk assessment is to be provided with the any application prepared by a suitably qualified bushfire consultant and include (but not limited to): (i) the potential for the wind farm to trigger/influence a bushfire; and, (ii) the potential for damage should a bushfire enter the subject site; and, (iii) bushfire management strategies; and (iv) provision of fire retardant devices within the nacelle.	Section 14.5

Wind Power Generation - DCP Issues	Relevant section in this EA
j) Any development consent will be subject to the inclusion of a condition seeking the dismantling and removal of all structures associated with the development within a period of six (6) months and site rehabilitation of the wind farm or any wind turbines becoming redundant (not used for generation of electricity for a continuous period of 12 months or more).	Section 3.10.4
k) Any development consent will require the development of an environmental management plan (EMP) to comprise in detail the construction, commissioning, operation and post monitoring of the development. Applications will be assessed on merit and the requirements of the monitoring program identified as a result of the development assessment process.	Section 17
Section 1.7 (Contributions)	
Council will require the developer to make contributions in accordance with the Upper Hunter Shire Council S94A Development Contributions Plan 2008 (as amended). Council may also consider an offer from a developer to enter into a Voluntary Planning Agreement (VPA), in accordance with S93F of the Act. Under a VPA the developer may offer to pay money, dedicate land, carry out works or provide other material public benefits for public purposes.	Section 4.5.4
Section 1.8 (Tourism)	
Where a wind farm includes 25 or more wind turbines an area where vehicles and pedestrians (the public) can manoeuvre safely should be provided in a position which allows for the safe viewing of the wind farm and provides information on the development. Consultation with Council's and the RTA (where applicable) should be undertaken to identify a suitable location.	Not applicable
Section 1.9 (Consultation with other authorities)	
Applicants are advised to consult first with public authorities that may have a role in the assessment of a development application to ensure the application appropriately addresses all relevant and necessary considerations. Council may consult the following Agencies in connection with the development application: <ul style="list-style-type: none"> ▶ NSW Department of Planning & Environment ▶ NSW Department of Primary Industries ▶ NSW Office of Environment and Heritage ▶ NSW Department of Trade and Investment, Regional Infrastructure and Services ▶ NSW Roads and Traffic Authority ▶ The relevant Catchment Management Authority ▶ Civil Aviation Safety Authority (CASA) ▶ Australian Rail Track Corporation ▶ NSW Rural Fire Service ▶ Department of Defence ▶ Airservices Australia 	Section 7

Draft Mid-Western Regional Comprehensive Land Use Strategy

The Mid-Western Regional Comprehensive Land Use Strategy – Part C (Draft Strategy) (Mid-Western Regional Council, October 2009) lists a set of principles to address rural planning considerations. One of the principles is 'Support the consideration (merit based) for the development of wind farms and solar farms in rural areas' (page 11).

6.1.9 Subdivision

This EA seeks the approval for any subdivision of land as may be required by the relevant electricity transmission authority for substations and related purposes, and the eventual issuing of a subdivision certificate (if a survey plan of subdivision in registrable form is submitted to the Minister to enable the subdivision to be registered on land titles).

6.1.10 Building Code of Australia and manufacturer's specifications

The terms of engagement for the proponent's engineering, procurement and construction contractor will require compliance with Building Code of Australia requirements, and installation of wind turbines and other wind farm infrastructure in accordance with manufacturer's specifications. At completion of construction the proponent's engineer can certify such compliance. Commonwealth Legislation

6.1.1.1 Environment Protection and Biodiversity Conservation Act 1999

This *Environment Protection and Biodiversity Conservation Act 1999* (EPBC Act) provides for a Commonwealth assessment and approvals system for:

- ▶ actions that have a significant impact on ‘matters of national environmental significance’;
- ▶ actions that (indirectly or directly) have a significant environmental impact on Commonwealth land; and
- ▶ actions carried out by the Commonwealth Government.

A Proposal requires the approval of the Environment Minister if an action is likely to have a significant impact on a matter of national environmental significance or listed as a matter of national significance which includes:

- ▶ World Heritage properties;
- ▶ wetlands of international importance (Ramsar wetlands);
- ▶ Commonwealth listed threatened species and ecological communities;
- ▶ Commonwealth listed migratory species;
- ▶ nuclear action;
- ▶ the Great Barrier Reef Marine Park;
- ▶ Commonwealth marine areas; and
- ▶ a water resource, in relation to coal seam gas and large mining development.

Threatened Species and Ecological Communities

The EPBC Act aims to ensure the conservation and recovery of flora and fauna species and communities at a state and national level. The requirements of the EPBC Act under Part 13 - Species and communities, are that the Minister must establish a list of threatened species, threatened communities and key threatening processes. The list must contain threatened species and communities as contained in Schedules 1 and 2 of the *Endangered Species Protection Act 1992*. Listed species are divided into the following categories: Extinct, extinct in the wild, critically endangered, vulnerable and conservation dependent. Threatened communities are divided into the following categories: Critically endangered and endangered. Key threatening processes are contained in Schedule 3 of the *Endangered Species Protection Act 1992*.

A search for Matters of National Environmental Significance based on the study area and a 10 kilometre buffer was undertaken using the Commonwealth Government’s Protected Matters Search Tool. This tool covers World Heritage properties, National Heritage places, significant wetlands, migratory species, nationally listed threatened species and communities and other matters protected by the EPBC Act. The report generated by the Matters of National Environmental Significance Commonwealth Government’s Protected Matters Search Tool is provided in full and discussed within the Ecology Assessment, provided in Appendix C. A summary of the results of the Protected Matters Search Tool is provided in Table 6-5 below.

Table 6-5 Summary of the results of the Protected Matters search tool

<i>Liverpool Range Wind Farm</i>	
Threatened Species	25
Migratory Species	14
World Heritage Properties	-
Australian Heritage Sites	-
Ramsar Wetlands	1
Commonwealth Marine Areas	-
Commonwealth land	-
Threatened Ecological Communities	5

EPBC Referral

While ecological investigations consider it unlikely the project will have a significant impact on EPBC listed species, as defined by the *EPBC Act 1999*, an EPBC referral for the project was submitted in February 2014 as a precautionary measure.

On 17 March 2014 the Commonwealth Department of the Environment advised Referral 2014/7136 for the proposed action is considered a controlled action and, as such, requires assessment and a decision on approval under the EPBC Act before it can proceed.

Bilateral agreement

In accordance with subsection 45(4) of the *EPBC Act* and Division 16.1 of the EPBC Regulations 2000, the Commonwealth of Australia entered into a bilateral agreement with New South Wales in December 2013. One of the aims of the agreement is to minimise duplication of environmental impact assessment processes, ensuring a co-ordinated approach for actions requiring approval from both the Commonwealth and the State. As the project has been considered a 'controlled action' under the *EPBC Act* the referral will be assessed by the NSW Department of Planning and Environment.

On 25 March 2014 the NSW Department of Planning and Environment issued a Supplement to the Director General's Requirements setting out the Commonwealth's assessment requirements (Matters of National Environmental Significance Terms of Reference) under the EPBC Act.

The proponents response to EPBC matters raised in the Supplementary Director General's Requirements issued by the NSW Department of Planning and Environment on 25 March are addressed in Appendix H attached to this EA.

6.1.12 DEH Supplementary Significant Impact Guidelines 2.1.1: Wind Farm Industry Sector 2005

The purpose of these guidelines is to assist operators in the wind farm industry to decide whether or not actions which they propose to take require assessment and approval under the *Environment Protection and Biodiversity Conservation Act 1999 (EPBC Act)*.

These guidelines have been considered in the preparation of this EA, particularly with reference to Section 11, Ecology Assessment.

7 Public Consultation

7.1 Community Attitudes

NSW Government Report 'Community Attitudes to Wind Farms in NSW', DECCW, 2010

In 2010 the NSW Government commissioned the report *'Community Attitudes to Wind Farms in NSW'* to assess residents attitudes towards targets set to achieve 20% renewable energy consumption by 2020 (DECCW, 2010c). The survey was conducted by telephone of 2022 resident's aged 18 years and older and 300 businesses across the 6 Renewable Energy Precincts, including the Southern Tablelands and a control area in regional NSW.

The outcomes of the study are as follows:

- ▶ Of the total surveyed 81% believed wind power was acceptable for power generation.
- ▶ General awareness of wind turbines was very high, with 97% of people having heard about wind farms or wind turbines generating electricity and 81% of the population had seen a wind farm or wind turbine in person or via media.
- ▶ The majority (68%) of the population living in these precincts knew about wind farms currently operating in NSW. However, the average of the New England Tablelands Precinct was well below the state average at only 38%.
- ▶ Eighty five per cent (85%) of the population across the precincts support wind farms in NSW, with 80% supporting them within their local precinct, and 79% support for a wind farm being built 10 km from their residence.
- ▶ A similar trend occurs with business opinion with 88% support for wind farms within NSW, 83% support for a wind farm in the precinct, 82% support for a wind farm 10 km from the residence and 60% support for a wind farm within 1-2 km of the residence.

The NSW Government study concludes that the general adult residents of the survey area are well aware of the potential of wind farms or wind turbines to generate renewable energy. Additionally, the respondents were generally aware of wind turbines and how wind turbines appear within the landscape and are generally supportive. The results further indicated that the respondents were generally not adverse to the development of wind farms in the immediate locality.

CSIRO Report 'Exploring community acceptance of rural wind farms in Australia: a snapshot', CSIRO, 2012

The CSIRO released a report in 2012 exploring community acceptance of wind farms in rural Australia. This research explores community acceptance levels regarding Australian wind farms. The research employed a range of methods, including a literature and information review, a media analysis of newspaper articles, case studies, and semi-structured qualitative interviews with a range of stakeholders associated with wind farms (CSIRO, 2012).

A summary of the outcomes of the study are as follows:

- ▶ There is strong community support for the development of wind farms, including support from rural residents who do not seek media attention or political engagement to express their views.
- ▶ The actual and perceived local costs and benefits of wind farms are strongly influenced by the design, implementation, and community engagement processes. Many of the benefits can be shared or communicated in ways that would enhance community support for the development of wind farms in a region. Many of the potential costs can be reduced by appropriate design, siting, and project implementation.

Based on the above independent surveys, it is reasonable to assume that the communities within the ACT/NSW Border Areas Precinct are generally supportive of wind farms. However, the surveys showed that a majority of the population did not feel like they had adequate information about wind farms, even in areas where general wind farm awareness was much greater.

7.2 Community Consultation

Wind farm developments and their approvals in Australia have, at times, elicited polarised responses from the community, highlighting the need to appropriately identify and commence consultation with community stakeholders early in the development process.

Prospective wind energy projects in NSW are generally limited to sites with large elevated land parcels, good wind speeds, usually in rural areas, and with good electricity transmission line access. Such sites are relatively rare, and often, these sites are located in the vicinity of rural dwellings and in some cases in the vicinity of small to medium sized regional communities. This can cause conflict where some local community members feel impacted by the development and yet do not see any direct benefits from the development.

While unfortunate, the limited number of appropriate wind farm sites means that this conflict is often unavoidable and cannot be eliminated by simply moving the wind farm to a different location.

Accordingly, community consultation is focussed on understanding and mitigating the impacts of the wind farm, and on showing and maximising its benefits to the local community.

7.2.1 Project Consultation Plan

A Project Consultation Plan (PCP) was prepared by Epuron for the proposal (Attachment 7).

The PCP was prepared to guide stakeholder engagement and consultation activity during the development phase (up to project approval). The plan reflects the corporate requirements set out in Epuron's Community Consultation Framework and the Director General's Requirements issued for the project by the NSW Department of Planning and Environment.

The PCP is dynamic and can be periodically updated, as required, during the course of the development phase and community engagement activity.

The PCP highlights the key objectives of consultation for the proposal, which are:

- ▶ to minimise undue community concern in relation to the proposal, particularly at an early stage where little information on the project is known;
- ▶ to ensure the community and other stakeholders are fully informed and aware of the proposal, its likely impacts, and its likely benefits;
- ▶ to ensure that Epuron fully understands the local context for the proposal, including any local impacts that the proposal may have or opportunities that it could provide;
- ▶ to incorporate the communities suggestions and feedback into the design of the wind farm where possible;
- ▶ to explain where and how this feedback can be, and has been, incorporated; and,
- ▶ in that context, to provide multiple opportunities for dialogue in various forms to allow the community to receive information and provide feedback about the proposal.

The approach taken to the project consultation plan was to use a variety of communication channels to achieve the desired objectives. These included:

- ▶ access to website containing corporate and project details;
- ▶ periodical newsletters;
- ▶ media opportunities where available;
- ▶ public open house / information day in the local area;
- ▶ establishment of a Community Consultation Committee;
- ▶ letters to identified residents at a minimum within 2km of a proposed turbine; and
- ▶ phone calls and/or individual meetings with landowners at a minimum within 2km of a proposed turbine.

The plan was used to guide consultation during the development of the project. The plan was reviewed and adapted where necessary as community feedback was received so that consultation activities were a pragmatic response to the issues raised by the community.

Key consultation activities included an open house day attended by specialists working on the project, follow-up phone calls, emails and other correspondence, including face-to-face meetings with neighbouring and concerned landowners. A Community Consultation Committee is being established for the project and is expected to meet prior to exhibition of the EA.

7.2.2 Implementation of the Project Consultation Plan

While the majority of the consultation process focussed on informing the community about issues relating to the project, activities to engage the community in two-way dialogue were also undertaken for the purpose of receiving feedback for incorporating community concerns, local knowledge and thereby maximising the suitability of the project to the site and the community's acceptance of the project. A schedule of the key consultation activity undertaken for the project prior to lodgement of the EA is outlined below.

Table 7-1 Schedule of consultation activities throughout the project

Activity	Timing	Objectives	Stakeholders	Status
Website	Ongoing	<ul style="list-style-type: none"> ▶ Provide information about Epuron and the project to public over the internet ▶ Updated maps, layouts of the wind farm and powerline ▶ Seek feedback and enquiries 	<ul style="list-style-type: none"> ▶ All stakeholders ▶ General public 	Completed (but ongoing)
Community information presentation	June 2009	<ul style="list-style-type: none"> ▶ Introduce Epuron and the proposed wind farm project ▶ Provide accurate information about wind farms ▶ Seek feedback as to key issues from the community ▶ Build trust with the local community 	<ul style="list-style-type: none"> ▶ Involved Landowners ▶ Invited community stakeholders ▶ Coolah District Development Group 	Completed
Project Newsletter 1	November 2009	<ul style="list-style-type: none"> ▶ Introduce Epuron and proposed project to the local community and key stakeholders ▶ Provide feedback on recent activity. 	<ul style="list-style-type: none"> ▶ Involved landowners ▶ Uninvolved stakeholders ▶ General public and interested stakeholders 	Completed
Project Newsletter 2	December 2009	<ul style="list-style-type: none"> ▶ Supplementary project update following the newsletter released in November ▶ Wishing community merry Christmas 	<ul style="list-style-type: none"> ▶ Involved landowners ▶ Uninvolved stakeholders ▶ General public and interested stakeholders 	Completed
Project Newsletter 3	May 2010	<ul style="list-style-type: none"> ▶ Update development activities and progress. ▶ Provide feedback on recent activity. 	<ul style="list-style-type: none"> ▶ Involved landowners ▶ Uninvolved stakeholders on mailing list ▶ General public and interested stakeholders 	Completed
Project Newsletter 4	November 2010	<ul style="list-style-type: none"> ▶ Update development activities and progress. ▶ Provide feedback on recent 	<ul style="list-style-type: none"> ▶ Involved landowners ▶ Uninvolved stakeholders on mailing list 	Completed

Activity	Timing	Objectives	Stakeholders	Status
		activity.	▶ General public and interested stakeholders	
Project Newsletter 5	February 2011	<ul style="list-style-type: none"> ▶ Update development activities and progress. ▶ Provide feedback on recent activity. 	<ul style="list-style-type: none"> ▶ Involved landowners ▶ Uninvolved stakeholders on mailing list ▶ General public and interested stakeholders 	Completed
Consult with neighbours of proposed wind turbines (via telephone, email and face-to-face meetings)	Mid 2011	<ul style="list-style-type: none"> ▶ Communications with near neighbours to the proposed development (dwellings within 2km of proposed wind turbine) ▶ Explain potential impacts and benefits of the proposed wind farm ▶ Discuss and arrange further assessment (if required) ▶ Provide accurate information and seek feedback 	<ul style="list-style-type: none"> ▶ Uninvolved neighbours 	Completed (but ongoing)
Project Newsletter 6	December 2011	<ul style="list-style-type: none"> ▶ Update development activities and progress. ▶ Provide feedback on recent activity. 	<ul style="list-style-type: none"> ▶ Involved landowners ▶ Uninvolved stakeholders on mailing list ▶ General public and interested stakeholders 	Completed
Establish Community Consultation Committee	May 2012	<ul style="list-style-type: none"> ▶ Commitment to establish CCC ▶ Call for member nominations ▶ Identify independent chair ▶ Prepare to hold meeting 	<ul style="list-style-type: none"> ▶ Independent chairperson ▶ Local Councils ▶ Involved landowners ▶ Uninvolved landowners ▶ Community groups ▶ Proponent 	Completed (but ongoing)
Project Newsletter 7	May 2012	<ul style="list-style-type: none"> ▶ Announced and displayed revised wind farm and powerline layouts ▶ Update development activities and progress. ▶ Provide feedback on recent activity. 	<ul style="list-style-type: none"> ▶ Involved landowners ▶ Uninvolved stakeholders on mailing list ▶ General public and interested stakeholders 	Completed
Project Newsletter 8	October 2012	<ul style="list-style-type: none"> ▶ Outlined changes to Part 3a projects ▶ Update development activities and progress. ▶ Provide feedback on recent activity. 	<ul style="list-style-type: none"> ▶ Involved landowners ▶ Uninvolved stakeholders on mailing list ▶ General public and interested stakeholders 	Completed

Activity		Timing	Objectives	Stakeholders	Status
Community House	Open	November 2012	<ul style="list-style-type: none"> ▶ Update on development status ▶ Release of current layouts ▶ Outline preliminary results from expert studies where completed ▶ Display preliminary photomontages ▶ Provide accurate information and seek feedback 	<ul style="list-style-type: none"> ▶ Involved landowners ▶ Uninvolved neighbours ▶ Community stakeholders ▶ General invitation to interested parties 	Completed
Pre DA submission follow up		November 2012	<ul style="list-style-type: none"> ▶ To consider any project feedback and incorporate any final amendments prior to lodging EA for assessment 	<ul style="list-style-type: none"> ▶ Involved landowners ▶ Uninvolved neighbours ▶ Community stakeholders 	Completed
CCC meeting 1		February 2013	<ul style="list-style-type: none"> ▶ First community consultation committee meeting ▶ Introducing members and role of the CCC ▶ Providing details about project 	<ul style="list-style-type: none"> ▶ Invited CCC members ▶ Community observers 	Complete
Project Newsletter 9		May 2013	<ul style="list-style-type: none"> ▶ Project update including layout optimised to 288 turbines ▶ Details of first CCC meeting and request for feedback ▶ General industry information including sound and health 	<ul style="list-style-type: none"> ▶ Involved landowners ▶ Uninvolved stakeholders on mailing list ▶ General public and interested stakeholders 	Complete
CCC meeting 2		June 2013	<ul style="list-style-type: none"> ▶ Update project details ▶ Maps of wind farm layout and powerline ▶ Outline project benefits 	<ul style="list-style-type: none"> ▶ Invited CCC members ▶ Community observers 	Complete
Proponent and landowner consultation meetings		July 2013	<ul style="list-style-type: none"> ▶ To discuss wind farm and powerline layout with involved landowners ▶ Inform and consult with uninvolved neighbours ▶ OEH Information Kiosks 	<ul style="list-style-type: none"> ▶ Involved and uninvolved landowners proximate to the project ▶ General stakeholders 	Complete
CCC meeting 3		August 2013	<ul style="list-style-type: none"> ▶ Update project details ▶ Photomontages of wind farm layout and powerline ▶ Discussion of benefits, opportunities to community and proposed community enhancement fund 	<ul style="list-style-type: none"> ▶ Invited CCC members ▶ Community observers 	Complete

Activity	Timing	Objectives	Stakeholders	Status
Coolah and Cassilis Business Meeting	November 2013	<ul style="list-style-type: none"> ▶ Update community about project ▶ Advise employment and investment opportunities ▶ Seek capability information from businesses and employees 	<ul style="list-style-type: none"> ▶ Invited Coolah and Cassilis business representatives ▶ Invited CCC members ▶ Community observers 	Complete
CCC meeting 4	November 2013	<ul style="list-style-type: none"> ▶ Update project details ▶ Updated photomontages of wind farm layout and powerline ▶ Discussion of benefits, opportunities to community and proposed community enhancement fund 	<ul style="list-style-type: none"> ▶ Invited CCC members ▶ Community observers 	Complete
CCC Meeting 5	April 2014	<ul style="list-style-type: none"> ▶ Update project details ▶ Further Discussion of community enhancement fund ▶ Discussion of next stages once project on exhibition 	<ul style="list-style-type: none"> ▶ Invited CCC members ▶ Community observers 	Complete

Community Open House

The community open house forum allows the opportunity for members of the community to speak individually or in small groups to the Proponent representatives and to persons undertaking parts of the EA. The open house format is helpful in avoiding potential conflict in a public meeting for contentious issues, allowing a flow of stakeholder dialogue throughout the event rather than a more constrained discussion that can be hijacked by the most vocal individuals. It allows for a larger proportion of stakeholders to voice their individual concerns with the relevant representatives in a less confrontational situation. It also allows the presentation of issues and information to be tailored to individual queries.

The community open house session for the project was held on 1 November 2012 at the Cassilis Bowling Club. A community newsletter, distributed to residents, preceded the event that was also advertised in the local newspapers beforehand.

The event ran from 2:00pm to 7:00pm and representatives from the Proponent, including the specialist visual consultant, were present to discuss the project specifics (including general questions about wind farms and wind farm development) and the environmental planning process.

The objective of the open house day was to display current project information and to seek feedback that would ultimately contribute towards preparation of the final design and wind farm layout.

On the day 73 people attended the event, primarily local residents within the vicinity of the wind farm, as well as community stakeholders. Outcomes and statistics observed from the event included;

- ▶ of the 73 people in attendance, the majority (approximately 54) were supportive of the project;
- ▶ approximately 19 people were opposed or expressed negative views to the project or wind farms in general;
- ▶ more than 20 people asked for follow up information to be sent to them or arranged for a follow up meeting; and
- ▶ 6 people/companies registered their interest in future construction jobs and tender contracts.

Details of the proposed wind farm project that were on display included:

- ▶ latest wind farm and powerline layouts showing the planned locations of wind turbines and other associated infrastructure including construction compounds, substations, overhead powerlines, underground cables and access tracks;
- ▶ photomontages showing the likely view of the completed wind farm from 4 public road locations around the site;
- ▶ general wind farm, industry and corporate information; and
- ▶ copies of recent project newsletters.

Notable observations or comments made on the day included:

- ▶ a number of attendees expressed interested in the various environmental studies underway and the proposed management plan necessary during construction phase.
- ▶ Most people were interested in viewing the photomontages to gain an understanding of the visibility of the project from public road routes such as Coolah to Cassilis.
- ▶ A few people were concerned about the potential noise, health and property value impacts that may result from the operation of the wind farm. Copies of the following reports were on hand during the open day as reference for people to view on these two matters and to alleviate any concerns in this regard
 - NSW Valuer General – Impact of Wind farms on Property Values – August 2009
 - NHMRC (National Health & Medical Research Council) Review of Wind Turbines & Health – July 2010
- ▶ Some people located away from the wind farm site were interested to view details about the new overhead powerline heading south to the Ulan connection point.
- ▶ A number of people expressed their support for the project and the potential benefits available to the local area (such as jobs and investment), including general support for renewable energy and wind farms. In particular benefits that would flow to the local towns of Cassilis and Coolah were seen as a positive boost for the area.

Epuron was pleased with the overall positive response and feedback received during the open house day. The opportunity to engage with the local community was greatly appreciated.



Figure 7-1 Liverpool Range Wind Farm Community Open Day at Cassilis Bowling Club

Community Business Meeting

On 20 November 2013 a meeting of local businesses from the Coolah and Cassilis communities was held at the Coolah Sports Club. The meeting was an initiative arranged by local business, supported by Epuron and OEH, and there were 46 people in attendance. The purpose of the meeting was to discuss the potential benefits available from construction of the project and how local businesses could participate and capture benefit. The meeting was facilitated by the CCC chairperson and speakers on the evening included local businesses, OEH representative and the proponent (Epuron). The meeting was received enthusiastically and local businesses were keen to ready themselves to capture a share of the local investment and employment opportunities available when the project proceeded to construction.

Face-to-face consultation

A common criticism of major project developers is a lack of consultation with surrounding neighbours. While newsletters, websites and open houses forums are effective at engaging with the wider community, there is no guarantee that this information will be received or interpreted correctly by everyone.

Epuron has taken this on board in designing the project consultation plan and has placed an importance on consultation with the immediate neighbours of the project. During the feasibility phase of the project representatives from Epuron identified all landowners that reside within a few kilometres of the project, particularly those residents within 2 km of a proposed turbine, and proceeded to make contact for consultation purposes. In most cases this involved an initial phone conversation, visit to the property or a letter box drop to introduce the proponent and the project. Usually a face-to-face meeting or discussion followed to provide additional detail about the project and to answer any questions. Landowner contact details were entered on the Epuron database to enable follow up dialogue and for future information about the project to be sent to landowners when required.

Uninvolved landowners with a dwelling within 2 km

Consistent with corporate requirements set out in Epuron's Community Consultation Framework and in consideration of the draft NSW Wind Farm Planning Guidelines, Epuron specifically focussed consultation efforts on those uninvolved landowners identified to have a dwelling within 2 km of a proposed wind turbine.

As set out in the DGR's and the DPI correspondence, consultation obligations and scope with this uninvolved landowner group included, but was not limited to, potential impacts around landscape and visual amenity issues, noise, health, property values, blade glint and shadow flicker. These landowners were also offered a photomontage from their dwelling to show what the wind farm would look like, and if accepted, a photomontage was prepared and forwarded to the landowner at the EA lodgement stage.

Under the project consultation plan this group of uninvolved landowners were identified early on and actively contacted for an initial discussion. Wherever possible further engagement followed which included a meeting and or written correspondence to ensure information and feedback about the project was communicated in both directions with landowners or those occupants renting/living in the dwelling.

There are 2 uninvolved landowner dwellings that have been identified as being located within 2 km of a proposed wind turbine.

The following table lists the identified uninvolved landowner dwellings and the consultation activity undertaken. These landowners are also shown in Figure 7-2.

Table 7-2 Consultation activity with uninvolved landowners with a dwelling within 2 km

<i>Residence ID</i>	<i>Newsletter List</i>	<i>Telephone Contact</i>	<i>Face to Face Meeting</i>	<i>Written Correspondence</i>	<i>Photomontage Offered & Accepted</i>
G6-2	yes	yes	yes	yes	yes & yes
H7-1	yes	yes	yes	yes	yes & yes

Involved landowners with a dwelling within 2 km

There are 21 involved landowners, some of which have been identified to have a dwelling located within 2 km of a proposed wind turbine. This group was actively consulted in accordance with the project consultation requirements and have wind farm agreements in place for participating in the project.

Residents outside 2 km

Landowners and residents outside the 2 km dwelling consultation zone were engaged and consulted with as necessary and any feedback received was incorporated where possible. Landowner details were entered on the mail-out data base to receive correspondence such as newsletters and meetings/discussions were held with them as required.



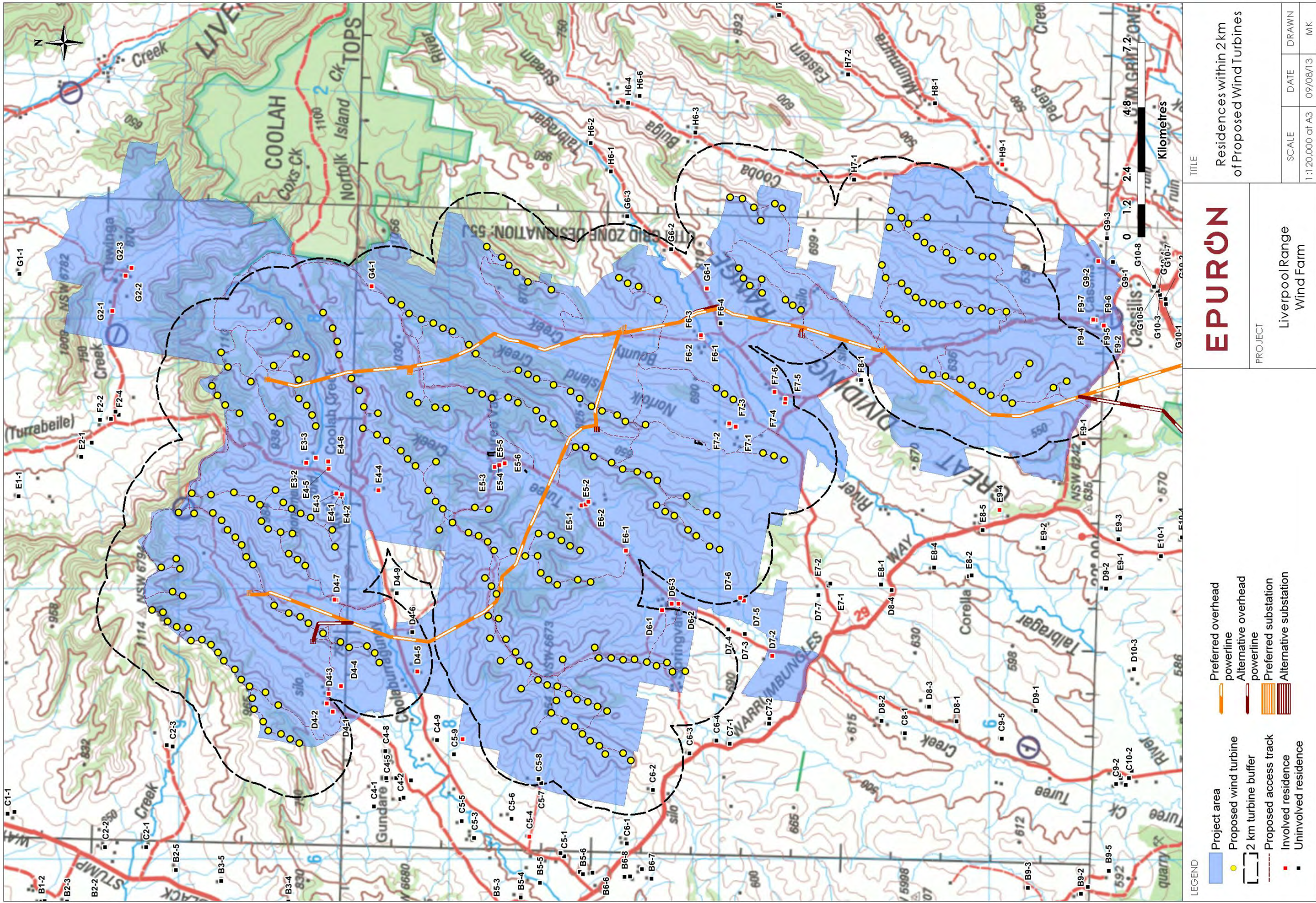


Figure 7-2 Involved and uninvolved residences within 2 km

Newsletters

Newsletters have been used throughout the development process as a means of informing the local community about the project, announcing upcoming activity and progress of development phases, as well as any status updates that may be relevant when milestones are achieved. Newsletters were also used to advertise events such as the open house, where people were invited to come and ask questions and provide feedback on the project, and to seek feedback on the proposal.

Newsletters are distributed by mail and / or email to all residents on the project database and generally cover those properties within a few kilometres of the project. Newsletters are also distributed to identified absentee landowners and broader community stakeholders such as councils and local groups. Newsletters are also available on the project website, are delivered to letter boxes in the general area and handed to stakeholders during consultation meetings.

Newsletter 1 - The first newsletter introduced the project in November 2009, introducing Epuron and the Liverpool Range Wind Farm project area and advising residents of opportunities for community input, including recent sponsorship of the "Tour de Coolah" event.

Newsletter 2 – As a follow-on supplement to the first newsletter, a second newsletter was released just prior to Christmas in December 2009. The newsletter provided some updated project information and wished the community a merry Christmas.

Newsletter 3 - The third newsletter in May 2010 provided a summary of the development activities underway including an update on the sites wind resource analysis and a preliminary ecological assessment. The newsletter also announced the preferred grid connection point at the existing 330 kV Wollar to Wellington transmission line to the south of the wind farm site.

Newsletter 4 - In November 2010 a project newsletter was released providing updated project information including lodgement of the project application requesting DGRs. Epuron outlined early consultation requirements and activity and requested feedback for the community and other stakeholders.

Newsletter 5 – The newsletter in February 2011 primarily announced the lodgement of the Part 3a planning application with the department of planning and provided an overview of the planning process. The newsletter also outlined the project scope and current activity including an update on grid connection.

Newsletter 6 - In December 2011 Epuron was pleased to announce receipt of the DGRs for the project and the launch of its new website. An overview of the project consultation plan was provided and indicated where the community could be involved in the development and provide its feedback.

Newsletter 7 – A seventh newsletter was released in May 2012 and announced Epuron's commitment to establish a Community Consultation Committee. A CCC nomination form was also enclosed with the newsletter calling for community members to participate. An update on grid connection was also provided.

Newsletter 8 – In October 2012 an eight newsletter was released to update the community on the government's legislative change to fast track Part 3a projects requiring lodgement by 30 November. The newsletter announced a public open day to display project information and called for feedback in finalising the design. Updated maps of the wind farm and powerline development areas were provided including the study program necessary to meet the government's targets.

Newsletter 9 – The ninth newsletter released in May 2013 informed the community about the submission of the EA and provided a copy of an updated wind farm and powerline layout (turbines optimised from 417 to 288). An update on CCC activity was provided including some general wind industry news around sound, health and a wind farm fire related matter in SA.

Further newsletters will continue to be provided to the community, including a newsletter to advise the Community of the submission and exhibition of the EA, and to indicate where the reports can be viewed by the public and to thank the community for their participation to date.

Copies of all relevant community consultation material including the project consultation plan, surveys, community newsletters, media releases, presentations and letters received from key stakeholders are included within Attachments 7 & 8.

Community Consultation Committee

Consistent with corporate requirements set out in Epuron's Community Consultation Framework and in consideration of the draft NSW Wind Farm Planning Guidelines, Epuron has committed to the establishment of a Community

Consultation Committee (CCC) for the project. In May 2012 a CCC member nomination form was distributed seeking expressions of interest from willing community participants wanting to sit on the committee. Epuron received a number of nominations from the community and the required committee membership were appointed including representatives from local councils. Four CCC meetings have been held at local venues up to the EA lodgement stage and have been chaired by an independent chairperson.

The purpose and objectives of the CCC are:

- ▶ to enable Epuron to formally provide the local community with information about the proposal;
- ▶ to enable the community to express and for Epuron to understand any concerns regarding the potential impacts of the proposal;
- ▶ to enable Epuron to consider whether and how to incorporate any suggestions and feedback into the design of the proposal;
- ▶ to demonstrate how and where feedback has been incorporated and resulted in amendments to the proposal;
- ▶ to formally advise potential community benefits that can be integrated into the proposal; and,
- ▶ to establish and strengthen good working relationships between the proponent and the local community.

While individual membership of the CCC is likely to change from time to time, the committee membership generally comprises representation from the following groups within the community, where available;

- ▶ an independent chairperson;
- ▶ two involved landowners;
- ▶ two uninvolved landowners;
- ▶ a representative local community group;
- ▶ a representative from each of the four local councils (Liverpool Plains, Mid-Western Regional, Upper Hunter & Warrumbungle Shire);
- ▶ observer participation by OEH; and
- ▶ the proponent (Epuron).

Around 8-10 members attended each CCC meeting and generally represent one of the above groups.

During the development phase the CCC met on four occasions at local venues in Cassilis and Coolah. Copies of the meeting presentation material, minutes of the meetings and CCC members in attendance are made available to the public on the project website and are included within Attachment 7. A summary of proceedings and key outcomes from meetings are also outlined in project Newsletters and media releases locally.

- ▶ meeting 1 – 28 February 2013 in Cassilis;
- ▶ meeting 2 – 3 June 2013 in Cassilis;
- ▶ meeting 3 – 13 August 2013 in Cassilis; and
- ▶ meeting 4 – 21 November 2013 in Coolah

Epuron would like to sincerely thank those people who participated in the CCC meetings and contributed feedback about the project on behalf of the community. This exchange of information fed into the wind farm layout and design process wherever possible.

The CCC reviewed and discussed a wide range of matters and material relating to the project. The key feedback points provided by the CCC based on these matters, and how that feedback was considered or incorporated into the project, is set out in the following table (in no particular order of importance).

Table 7-3 Key issues raised during the Community Consultation Committee meetings

<i>Issue</i>	<i>CCC Feedback Provided</i>	<i>How Considered or Incorporated into Project</i>
Increases community awareness and access to project information.	Members require the community be provided with CCC consultation information regarding the project on a regular basis to increase awareness and provide further avenues for	After each CCC meeting the following local media outlets are provided with a summary of the meeting outcomes and discussion information so that interested community

Issue	CCC Feedback Provided	How Considered or Incorporated into Project
	feedback.	<p>stakeholders can keep abreast of project progress and or provide feedback if desired.</p> <p>Merriwa Ringer Coolah Diary</p>
<p>Consider impacts on local roads used for access during construction including repair and maintenance requirements.</p>	<p>Members asked that local councils review and have input to the Traffic and Transport Plan. It is important that the selected access roads/routes are appropriate and any impacts on local roads are considered.</p>	<p>The Traffic and Transport Plan (TTP) was made available to councils and was also appended to the submitted EA which was reviewed by local councils. The following key feedback points received from council have been incorporated/addressed in the EA and or TTP.</p> <p>Upper Hunter – Concern for impact to their local council roads and require preconstruction negotiation with proponent to ensure they are not adversely affected. This has been clarified in the TTP/EA. Council will make a formal submission during exhibition of the EA.</p> <p>▶ Mid-Western Regional – Require the submission of a road dilapidation report prior to the commencement of construction including implementation of a monitoring and repair program. This has been clarified in the TTP/EA. Council will make a formal submission during exhibition of the EA.</p> <p>Liverpool Plains – Councils concern for impacts to their “local road assets” have been noted. This has been clarified in the TTP/EA. It should also be noted that with the revisions to the layout that no council roads are used/impacted. Only one proposed turbine remains on private land in the LGA.</p> <p>Warrumbungle – Council has concerns the impact on local roads may be understated. The TTP has been updated to provide council with more detailed information.</p>
<p>Roadwork construction contracts.</p>	<p>Members from council, particular Warrumbungle, expressed an interest to tender for any roadwork contracts associated with construction of the project.</p>	<p>Epuron has entered council details on the construction contractor’s database for the project to be notified when any roadwork tenders are available for quotation.</p>
<p>Community Enhancement Funding.....”During consultation and discussions the CCC <i>has been seeking community feedback on;</i></p> <ol style="list-style-type: none"> 1. <i>How best to establish a community enhancement fund; and to</i> 2. <i>Identifying what type of local support is required from the project.</i> 	<ol style="list-style-type: none"> 1. How best to establish a community enhancement fund. <ul style="list-style-type: none"> ▶ Councils generally prefer that if a community enhancement fund is established it is more effective to be managed by them (local councils). ▶ Community wants to have a say in where and how any community funds are managed and spent. It is preferred a local group or trust (or part of CCCs ongoing role) be established to manage allocation of funds. ▶ Draft Wind Guidelines say community contributions may be required under the EP&A Act 1979 or through a voluntary planning agreement. 	<p>Following consultation feedback Epuron outlined its position, generally as follows, to the CCC regarding the establishment of a community fund for the project and the type of support required from the project;</p> <ul style="list-style-type: none"> ▶ Epuron designs its wind farms to minimise impacts to the environment and local community. ▶ Each project should be assessed by the consent authority specifically on its merits and not by funding influences to the community. ▶ Epuron strongly believes in the value of community contributions and believes that the final investor who will commit funds to the construction and operation of the

Issue	CCC Feedback Provided	How Considered or Incorporated into Project
	<ul style="list-style-type: none"> ▶ Existing community funds where implemented for other wind farm projects have been considered and established through combinations of the above mechanisms. 2. Identifying what type of local community enhancement funding support is required from the project. ▶ Improve tourism attraction and information facilities in the local towns. ▶ Opportunity to revitalise Cassilis. ▶ Improvements to the townships of Coolah and Cassilis and better local amenities. ▶ Chance to reopen some businesses or support existing businesses. ▶ Provide attraction to keep younger people and families in the local area through long term benefits and job creation. ▶ Support for improving local educational and training capabilities locally, such as apprenticeships and TAFE teaching. ▶ Increase local accommodation and aged care facilities. 	<p>project should engage with the community in a meaningful way.</p> <ul style="list-style-type: none"> ▶ Epuron believes that such community contributions should be: <ul style="list-style-type: none"> ○ applied towards local environmental, social and community initiatives led by local residents and community stakeholders; ○ directed to initiatives raised by residents and stakeholders proximate to the development or likely to be impacted; ○ established at the commencement of operations and continued for the life of the development; and, ○ regularly reviewed to ensure they are providing ongoing benefits to the community. ▶ Epuron considers that the CCC working with the developer and ultimate project owner is ideally placed to help develop a community fund and its administration process. ▶ Epuron, like most wind farm proponents, is not the ultimate project owner and accordingly it is not appropriate for Epuron to determine the final details of any community fund. ▶ Accordingly, at this stage Epuron has not proposed any specific amount payable to any community fund in its development application. However, it will commit to an ongoing consultation process to determine an appropriate basis for the establishment of a community fund. ▶ The EA’s Statement of Commitments will set out the community fund details.
<p>Public display of photomontages and wind farm layouts.</p>	<p>Members requested selected public road photomontages and the wind farm layouts be made available locally in large scale format for the public to view and provide their feedback.</p> <p>The CCC clarified that as set out in the draft wind guidelines that the proponent will offer to prepare a photomontage for all uninvolved landowners with a dwelling within 2km of a proposed turbine.</p>	<p>The proponent provided 2 sets of selected public road photomontages and the wind farm layouts (mounted on board) for public display at venues in Cassilis and Coolah.</p> <p>All uninvolved landowners who have a dwelling within 2km of a wind turbine have been offered, and where accepted by the landowner, provided with a photomontage at the EA lodgement stage.</p>
<p>Information displayed on maps and layouts.</p>	<p>Mudgee District Environment Group (MDEG) asked that local roads be better displayed on maps and layouts including a local landmark called “The Drip”.</p>	<p>The proponent updated all maps and layouts to display the local information more clearly in the future.</p>

Media

Various forms of media have been utilised for communicating details about the project. Information articles have appeared in the local newspapers from time to time including advertisements for events such as the community open house.

After each CCC meeting the following local media outlets are provided with a summary of the meeting outcomes and discussion information so that community stakeholders can keep abreast of project progress.

- ▶ Merriwa Ringer
- ▶ Coolah Diary

The CCC plans to extend this media notification to the Mudgee Guardian following future meetings.

Epuron's corporate website is also available for viewing company and project details at www.epuron.com.au.

7.3 Government Consultation

7.3.1 Initial meetings

The proponent began consultation with the consent authority, the NSW Department of Planning and Environment (previously Department of Planning and Infrastructure), from around mid-2010, introducing the project and seeking advice on the assessment process.

During the development process the proponent and their consultants liaised with governmental stakeholders including:

- ▶ Neville Osborne and Diane Sarkies, NSW Department of Planning and Environment;
- ▶ Pauline Dunn, Regional Coordinator NSW Renewable Energy Precincts, Office of Environment and Heritage, Department of Premier and Cabinet.
- ▶ Robert Taylor, David Geering and Mark Irvine from the Dubbo office of NSW Office of Environment and Heritage regarding biodiversity and cultural heritage matters.
- ▶ Four involved Local Councils, Liverpool Plains Shire, Mid-Western Regional, Upper Hunter Shire and Warrumbungle Shire, including their participation in the Community Consultation Committee.
- ▶ National Party Policy Committee, Chaired by Mike Blake, including a presentation and a wind farm site visit.

7.3.2 Key Stakeholders

Planning for the development of the Liverpool Range Wind Farm has included specific consultation with the stakeholders listed in Table 7-4.

Consultation with stakeholders has occurred through a variety of means including phone conversations, face-to-face meetings, email and letter correspondence and in some cases attendance at local information days.

Through the feasibility and design stages of the project, consultation has involved the proponent informing the relevant stakeholders of the project details and seeking advice to enable the design of the wind farm and to reduce potential impacts to the existing environment. Specific issues raised by these stakeholders have been discussed within the relevant Sections of this EA. The consultation process will continue through the development and operation of the wind farm.

Table 7-4 Key stakeholders

Sector	Organisation or Group	Contact Person	Telephone Contact	Face to Face Meeting	Written Correspondence	Newsletter List	Summary of Key Feedback Provided	How Considered or Incorporated into Project	Where addressed in the EA
Local Community	Local community including involved and uninvolved landowners	Stakeholder database	Yes	Yes	Yes	Yes	<p>A wide range of matters have been discussed with the local community including the involved and uninvolved landowners.</p> <p>The key themes from these discussions generally centred on provision of current project information, layouts, maps, industry issues and explanation of potential impacts including noise, health, visual and property values.</p>	<p>The community including involved and uninvolved landowners have been consulted in line with the Draft NSW Wind Guidelines and the Supplementary DGRs.</p> <p>Newsletters are released regularly to provide the local community and landowners with up to date project information, including maps and layouts. Follow up meetings are held with stakeholders as required and any feedback received has been considered and or incorporated where possible.</p>	Section 7
	Community Consultation Committee (CCC)	Danielle Annells, Independent Chairperson	Yes	Yes	Yes	Yes	<p>The CCC raised a number of community and stakeholder issues for consideration by the project including establishment of a community enhancement fund and provision of consultation information.</p>	<p>The project has addressed a number of issues raised by the CCC and distributed a wide range of information by methods including discussion, website, newsletter and media.</p>	Section 7
Local Government	Warrumbungle Shire Council	Michael Marks, Manager Regulatory Services	Yes	Yes	Yes	Yes	<p>Correspondence from council and follow up consultation has identified the following key areas of concern regarding the project;</p> <ol style="list-style-type: none"> 1. Potential effect on Three Rivers Community Radio transmission service located near Coolah. 2. Effect the projects construction will have on local roads. 3. Establishment of a VPA preferred over a community fund. 4. Concern the noise assessment is not being calculated using the actual 	<p>Matters raised by council have been considered and incorporated where possible.</p> <ol style="list-style-type: none"> 1. Consultation has occurred with Three Rivers Community Radio and requirements considered in layout. 2. The Traffic and Transport Plan has been updated to provide more detail. 3. The project has committed to establish a community fund instead of VPA. 4. Noise assessment has been updated regarding predicted noise from 	<p>Section 14.2</p> <p>Section 13</p> <p>Section 7</p> <p>Section 10</p>

Sector	Organisation or Group	Contact Person	Telephone Contact	Face to Face Meeting	Written Correspondence	Newsletter List	Summary of Key Feedback Provided	How Considered or Incorporated into Project	Where addressed in the EA
							turbines to the used.	selected turbines.	
	Mid-Western Regional Council	Catherine Van Laeren, Group Manager Planning and Development	Yes	Yes	Yes	Yes	<p>Correspondence from council and follow up consultation indicates they are committed to critiquing the EA in more detail during exhibition but have provided the following comments to date;</p> <ol style="list-style-type: none"> 1. Clarification as to whether temporary workers accommodation will be established during construction. 2. Preference for Section 94 Developer Contributions to manage road funding. 3. More detail regarding selection of offset land. 4. Provision of minutes from Community Consultation Committee meetings. 	<p>Matters raised by council have been considered and incorporated where possible.</p> <ol style="list-style-type: none"> 1. Temporary workers accommodation is not proposed during construction as workforce will be hosted across accommodation available in local communities. 2. The project commits councils (roads) will not be worse off by the project and is discussing scope and funding requirements for road works. 3. The Biodiversity Assessment discusses offset requirements in detail. 4. Minutes from CCC meetings are placed on proponent's website and provided to all members. 	<p>Section 13</p> <p>Section 11</p> <p>Section 7</p>
	Upper Hunter Shire Council	Sean Constable, Manager Economic Development and Tourism	Yes	Yes	Yes	Yes	<p>Correspondence from council and follow up consultation indicates they will make a more detailed submission during exhibition of the EA but have provided the following initial comments;</p>	<p>Matters raised by council have been considered and incorporated where possible.</p> <ol style="list-style-type: none"> 1. The Traffic and Transport Plan has been updated to provide more detail. 	Section 13

Sector	Organisation or Group	Contact Person	Telephone Contact	Face to Face Meeting	Written Correspondence	Newsletter List	Summary of Key Feedback Provided	How Considered or Incorporated into Project	Where addressed in the EA
							<ol style="list-style-type: none"> 1. Impact of wind farm on local roads. 2. Establishment of VPAs for management of road funding requirements. 	<ol style="list-style-type: none"> 2. The project commits councils (roads) will not be worse off by the project and is discussing scope and funding requirements for road works. 	Section 13
	Liverpool Plains Shire Council	Donna Ausling, Manager Planning and Development	Yes	Yes	Yes	Yes	<p>Correspondence from council and follow up consultation indicates a need for more information regarding the following points of concern;</p> <ol style="list-style-type: none"> 1. To facilitate community engagement during the public exhibition process. 2. Improved presentation of maps. 3. More useable information regarding the schedule of affected lands. 4. More detail regarding the traffic and transport assessment. 	<p>Matters raised by council have been considered and incorporated where possible.</p> <ol style="list-style-type: none"> 1. A number of communication channels have been established for the project to facilitate community engagement including website, newsletters, meetings, CCC, email and community open days. 2. All maps and figures have been reviewed and updated to make information clear where possible. 3. A detailed set of maps has been added to the schedule of affected lands. 4. The Traffic and Transport Plan has been updated to provide more detail. 	EA Attachment 1 Section 13
NSW	Office of Environment	Robert Taylor, Manager	Yes	Yes	Yes	Yes	OEH have been consulted regarding biodiversity and heritage requirements	The Biodiversity Assessment and Heritage assessments have been updated to reflect	Sections 11 and 12

Sector	Organisation or Group	Contact Person	Telephone Contact	Face to Face Meeting	Written Correspondence	Newsletter List	Summary of Key Feedback Provided	How Considered or Incorporated into Project	Where addressed in the EA
Government Agencies	and Heritage (OEH)	Regional Operations and David Geering, Senior Officer Dubbo					including site survey program.	OEH comments to DGR's and EA feedback consultation.	
	Roads and Maritime Service (RMS)	Andrew McIntyre, Manager Western Region	Yes	No	Yes	Yes	Correspondence from RMS and follow up consultation highlighted areas where RMS requires more information in the Traffic and Transport Plan. These matters include costs road upgrades, details around alternate routes, assessment of operational traffic and cumulative traffic impacts.	The Traffic and Transport Plan has been updated and considered and or incorporate matters raised by RMS.	Section 13 and Appendix E
	NSW Rural Fire Service (RFS)	Stuart Midgley, Director Operational Services	Yes	No	Yes	Yes	RFS was consulted regarding operational fire matters relating to wind farms.	The design and layout of the wind farm has considered fire related matters and feedback from RMS.	Section 14.5
	Department of Primary Industries	Greg Paine, Manager Planning, Policy and Business Services	Yes	No	Yes	Yes	Office of Water – EA is adequate Fisheries NSW – EA is adequate Forests NSW – EA is adequate Agriculture NSW – EA is adequate	The design and layout of the wind farm has considered feedback from Department of Primary Industries.	Section 3
	Department of Primary Industries	Elizabeth Burke, Group Manager Central Region	Yes	No	Yes	Yes	Crown Lands. Crown Lands were consulted regarding access and use of Crown Lands relating to the wind farm. Preapproval required prior to any use or occupation Requirement to licence use or occupation	The design and layout of the wind farm has considered feedback from Crown Lands.	Section 3.11
	Trade and	Gary Burton,	Yes	No	Yes	Yes	Correspondence from the Resource and	Consultation has occurred with identified	Section

Sector	Organisation or Group	Contact Person	Telephone Contact	Face to Face Meeting	Written Correspondence	Newsletter List	Summary of Key Feedback Provided	How Considered or Incorporated into Project	Where addressed in the EA
	Investment	Senior Geologist Orange					Energy division raises no concerns with the EA but requests consultation details with mineral and petroleum exploration companies be included in the EA.	mineral and petroleum exploration companies. The design and layout of the wind farm has considered feedback from these companies.	16.3
	Catchment Management Authorities	Various	Yes	No	No	Yes	Relevant catchment management authorities are Central West, Namoi and Hunter Central Rivers. Discussion held with environmental consultant prior to undertaking survey work to establish overall biodiversity issues and identify land attributes relevant to development of the project.	Consultation has occurred with identified CMAs and the design and layout of the wind farm has considered following feedback. Key consultation issues considered during development of the wind farm include impacts on nearby IBRA Subregions, grazing management practises, salinity, vegetative clearance, pests and weeds.	
Federal Government Agencies	Department of Defence	Gary Lee	Yes	No	Yes	Yes	Correspondence from the Department of Defence and follow up consultation advised no objection to the proposal subject to the implementation of certain safety precautions and CASA review of the aviation assessment.	The design and layout of the wind farm has considered feedback from the Department of Defence.	Section 14
	Department of Sustainability, Environment, Water, Population and Communities	Frances Daniels, Assessment Officer	Yes	No	Yes	Yes	Consultation has occurred with the Referrals Branch at the Department SEWPaC regarding matters relating to the EPBC Act and the project.	A separate referral will be lodged under the EPBC Act prior to the commencement of construction.	Section 6.2
Other organisation or group	TransGrid	Sean Buggy, Customer Access and Relationship Manager	Yes	Yes	Yes	Yes	Consultation has occurred with Transgrid to assess grid connection. A connection enquiry has been lodged.	Grid technical requirements have been incorporated into the substation / electrical design. Technical assessments and the connection enquiry continues to be progressed with Transgrid.	Sections 3.4, 3.5 and 4.6
	Civil Aviation Safety Authority	Slavica Despotovic,	Yes	No	Yes	Yes	CASA feedback requested contact with Warrumbungle Shire Council to obtain OLS	Contact has been made with council and OLS data has been provided for Coolah	

<i>Sector</i>	<i>Organisation or Group</i>	<i>Contact Person</i>	<i>Telephone Contact</i>	<i>Face to Face Meeting</i>	<i>Written Correspondence</i>	<i>Newsletter List</i>	<i>Summary of Key Feedback Provided</i>	<i>How Considered or Incorporated into Project</i>	<i>Where addressed in the EA</i>
		Aerodrome Inspector					data as council is operator of the Coolah Aerodrome.	Aerodrome and considered in design and layout.	
	Airservices Australia	Jessica Neidert, Airport Development Assistant	Yes	No	Yes	Yes	ASA feedback advised guidelines for wind farm are in development and will require an aviation assessment to be sent to ASA.	<ul style="list-style-type: none"> Subject to the outcome of the ASA guidelines an aviation assessment will be prepared and issued to ASA prior to construction works. 	
	Aerial Agricultural Society of Australia	Phil Hurst CEO –	No	No	Yes	Yes	Feedback is that AAAAs formal policy position on all wind farm developments and wind monitoring towers is to automatically oppose such developments.	Epuron will continue to keep AAAA informed about project details.	Section 14

8 Approach to Environmental Assessment

The approach to this Environmental Assessment was developed and submitted for the Preliminary Environmental Assessment (PEA), which accompanied the project application sent to the Department of Planning and Environment on the 11 February 2011. During the assessment the approach was expanded to include a wider range of issues as they were identified, however it has largely remained as described in the PEA.

8.1 Initial General Risk Analysis

The following section outlines the key issues in relation to the Liverpool Range Wind Farm, and summarises Epuron's approach to addressing each issue. As a general rule, in undertaking this assessment:

- ▶ Issues identified as "Key Issues" will be addressed through use of an independent expert assessment together with specific on-site assessment and field work.
- ▶ "Additional issues" will be addressed, where necessary, via desktop assessment, precedent and consultation.

The focus on this delineation is to ensure that every issue is adequately addressed considering the potential risks and impacts associated with the issue, and without burdening the EA with details which are unlikely to affect the ultimate assessment of the project.

Epuron has carried out a risk analysis based on the requirements of the DGRs and information collected to date on site, at nearby sites, generally within the region and based on similar proposals in other regions.

In relation to each risk, Epuron has established a priority which takes into consideration:

- ▶ the level of information already available about that issue;
- ▶ the extent to which site specific assessment is required to define that issue;
- ▶ the likelihood of that issue occurring, and potential impacts of that issue if it did occur; and
- ▶ the extent to which standard industry practice, statutory requirements, and standard consent conditions adequately address the issue.

The results of this general risk analysis can be seen in Table 8-1. The model considers the key assessment requirements from the DGRs and the nature of the potential impact on them (i.e. is it temporary, reversible, likelihood of secondary impacts), the receiving environment and the likelihood of the impact occurring. The assessment strategy was then determined based on the overall risk rating for each issue.

Where the overall risk rating was very low and where the issues have previously been assessed in relation to wind farms in general and have been demonstrated to not affect the assessment or the consent conditions, no further assessment was carried out.

Where the risk rating was moderate or high this risk has then been reassessed following the application of available avoid, manage, mitigate and offset measures.

Table 8-1 Risk analysis of issues

Aspect	Potential Impacts	Likelihood	Consequence	Unmitigated Risk	Proposed Management	Mitigated Risk
Visual						
Visual impacts of turbines	Visual impact of turbines on the local community and significant vistas	Almost Certain	Minor	High	Removal of 32 turbines due to potential visual impacts The visual impact of the project has been assessed in Section 9 and vegetative screening can be implemented at landowner residences that are in areas of high visual sensitivity.	Low – moderate
Visual impacts of infrastructure	Visual impact of supporting infrastructure on the local community and significant vistas	Possible	Minor	Moderate	Permanent supporting infrastructure will generally be located away from the community. Temporary infrastructure will be as unobtrusive as possible and will be removed after construction. Overhead powerline will be located away from houses where possible but visible from some sections of public roads	Low
Shadow flicker	4 dwellings have been assessed to experiences shadow flicker, of which none are predicted to exceed the limitations.	Likely	Minor	High	4 turbines were removed due to the potential of shadow flicker Appropriate mitigation measures will be negotiated and implemented, where necessary, including potential limiting hours of operation on selected turbines. The impact of shadow flicker has been assessed in Section 14.4	Low
Blade glint	Sun reflecting off blades at certain times causing annoyance to local community and distraction to road users	Possible	Moderate	High	Modern turbine blades have been designed to limit reflections with the use of non-reflective finishes. The impact of shadow flicker has been assessed in Section 14.4	Low
Cumulative impact within the area	Other wind farm developments in the vicinity compounding the above stated impacts to local community	Possible	Minor	Moderate	Consider other projects proposed in the area to understand adjacent issues regarding cumulative effects.	Low
Noise Impacts						
Operational noise including low frequency noise	Potential of exceedance of operation noise guidelines and limits at receptor locations nearby.	Unlikely	Moderate	Moderate	The wind farm has been designed and modelled with background noise monitoring to comply with the relevant standards.	Low

<i>Aspect</i>	<i>Potential Impacts</i>	<i>Likelihood</i>	<i>Consequence</i>	<i>Unmitigated Risk</i>	<i>Proposed Management</i>	<i>Mitigated Risk</i>
or infrasound					In the event that noise from a turbine is exceeding the operational standards, mitigation measures would be investigated and implemented to ensure compliance, including potentially operating the turbine in a reduce noise mode.	
Construction noise including traffic and vibration generating activities	Potential for exceedance of construction noise limits through activities such as increased traffic, heavy machinery, blasting and vibration.	Unlikely	Minor	Low	Construction activities would be located away from residential areas where possible and during permissible times. A construction noise management plan will be developed as part of the CEMP.	Low
Substation operation and transmission line noise	Potential for noise associated with the operation of electrical and substation equipment	Unlikely	Minor	Low	Substations and electrical infrastructure will be located away from residents	Low
Ecological Impacts						
Avifauna strikes	Potential of avifauna deaths due to blade strike.	Likely	Minor	High	Wind farm design has implemented the recommendations from the BA and sited infrastructure away from sensitive areas i.e. identified nests and supportive habitat.	Low
Removal of EEC / CEEC and other native vegetation or habitats	Local vegetation / habitat being removed or altered from the site to accommodate turbines and associated infrastructure including powerline	Almost Certain	Moderate	Extreme	Turbines and infrastructure (including overhead powerlines) will be micrositied where possible to avoid or minimise the loss of vegetation. The loss of vegetation will be offset where required	Low-Moderate
Threatened species	The development of wind farm infrastructure adversely effects identified species population	Possible	Moderate	High	Wind farm infrastructure has been micrositied away from known threaten species populations where ever possible to minimise impacts	Low-Moderate
Heritage Impacts						
Impact on Indigenous heritage values	Potential for disturbance to Indigenous heritage sites or objects.	Possible	Minor	Moderate	Studies have shown that the site is of low Indigenous cultural significance. The impact on Indigenous heritage values has been assessed in Section 12.	Low
Impact on European	Potential for disturbance to European heritage sites or objects.	Unlikely	Minor	Low	Studies have shown that the site is of low European cultural significance.	Low

<i>Aspect</i>	<i>Potential Impacts</i>	<i>Likelihood</i>	<i>Consequence</i>	<i>Unmitigated Risk</i>	<i>Proposed Management</i>	<i>Mitigated Risk</i>
heritage values					The impact on Indigenous heritage values has been assessed in Section 12.	
Traffic & Transport						
Overweight loads causing damage to local roads Impact of increased traffic loads	Impacts caused to the roads and users by over mass and oversized vehicles used during construction, operation and decommissioning periods.	Likely	Moderate	High	Careful selection of access routes and roads to be used during construction. Local improvements and upgrades will be applied where necessary. A Traffic Management Plan (TMP) will be developed in consultation with local councils and RMS. The impact on traffic and transport routes has been assessed in Section 13.	Low-Moderate
Off-road driving causing erosion and disturbing natural habitats	Impacts caused to natural habitats when driving to off-road locations on site.	Possible	Moderate	High	The roads constructed on site will be well designed, all weather access tracks. A TMP will be prepared to guide the use, restriction, speed limits and maintenance requirements to ensure safe and proper use of off access tracks.	Low
Hazards & Risks						
Impact of wind turbines on commercial and agricultural aircraft safety	Turbines may impact upon the safe operation of aircraft in the region for recreational and agricultural purposes.	Likely	Moderate	High	A 500 m no-fly zone has been implemented around the operation turbines and local air operators will be notified. Aircraft landing areas have been identified around the site and turbine placements comply with CASA take-off and landing clearance restrictions. The impact on aviation has been assessed in Section 14.1.	Low-Moderate
Interference of television, radio, mobile phone coverage or electromagnetic fields	Potential signal interferences to services as a result of operational wind turbines.	Unlikely	Minor	Low	A study was undertaken using ACMA data or registered transmitters and receivers and this has been taken into account for the design of the wind farm. It is unlikely that that wind farm will affect signals from existing mobile phones towers, microwaves or digital television signals. The impact on aviation has been assessed in Section 14.2.	Low
Fire or bushfire near the turbines	Ignition of a bushfire as a result of	Possible	Moderate	High	A bush fire management plan will be created in consultation	Low-moderate

<i>Aspect</i>	<i>Potential Impacts</i>	<i>Likelihood</i>	<i>Consequence</i>	<i>Unmitigated Risk</i>	<i>Proposed Management</i>	<i>Mitigated Risk</i>
or local community	construction or operational activities. Any compounding risk caused by the wind farm to an existing bush fire in the region.				with the RFS While the use of aerial fire fighting may be limited in some situation, the wind farm access tracks will provide a small fire break and improved access for fire fighting. In the event of a bush fire on or in close proximity to the wind farm it would be operated in accordance with the Bushfire Management Plan. The impact on aviation has been assessed in Section 14.5.	
Water Supply, Water Quality and Hydrology						
Impact of erosion and sediment run-off Use of local water and its effects on the waterways	Increase sediment run off and erosion. Excessive use of local water supply.	Possible	Moderate	High	The majority of water required will be transported from outside the area and stored on site, in addition to small amounts of captured rain water from buildings. A CEMP will be developed to manage soil erosion, drainage and sediment control. Hydrological impacts have been assessed.	Low
General Environmental Assessment						
Impacts on soils & landforms	Soil erosion due to inadequate construction techniques. Poor management controls for excavated materials and stockpiles.	Possible	Minor	Moderate	Vegetation removal will be minimised to prevent soil erosion and controls will be in place to minimise erosion and runoff due to high rainfall and wind events. The CEMP will address the impacts on soils and landforms	Low
Impacts on climate & air emissions	Dust and vehicle emissions may affect the local area during the construction and decommissioning periods	Possible	Minor	Moderate	During construction and high wind events, water trucks will be used to minimise dust. The exposed area of the construction footprint will only be a very small percentage of the overall site.	Low
Impacts on mineral exploration	Future prospecting may be limited due to wind farm infrastructure	Possible	Minor	Moderate	Consultation has occurred with the current mineral license holders about their future plans. The infrastructure footprint of the wind farm and powerline is a very small percentage of the total site and located away from known mining areas	Low
Social and economic impacts	The flow on effects of investments and jobs in the local community are less than anticipated	Rare	Unlikely	Low	It is not anticipated that the wind farm will cause any negative social or economic impacts as they are generally considered to be positive.	Low

<i>Aspect</i>	<i>Potential Impacts</i>	<i>Likelihood</i>	<i>Consequence</i>	<i>Unmitigated Risk</i>	<i>Proposed Management</i>	<i>Mitigated Risk</i>
					The benefits anticipated have been modelled against other constructed and operational projects in Australia.	
Property values	Potential of the wind farm to affect local land and property values	Unlikely	Minor	Low	A review of published studies in New South Wales confirms that wind farms do not negatively impact on property values.	Low
Impacts on health (electromagnetic fields & epilepsy)	Potential to impact human health as a result of wind farms and electrical infrastructure	Unlikely	Minor	Low	There is currently no published scientific evidence to positively link wind turbines with adverse health effects.	Low
Waste						
Generation of construction related wastes	Poor waste management practices leading to an environmental impact	Possible	Moderate	High	Proper waste management strategies will be implemented across the site to reduce or remove wastes create A waste management plan will be developed as part of the CEMP	Low

8.2 Assessment Approach

8.2.1 Director General's Requirements

The Director General's Requirements (DGRs) are compiled by the DP&E, with consultation from various government departments in order to identify the issues that the proponent must address in their Environmental Assessment.

Epuron has used these DGRs to structure this EA and has ensured that all issues raised have been individually addressed and consultation requirements have been met. A copy is found in Attachment 6.

8.2.2 Best Practice Guidelines

Epuron's assessment has in general followed the advice provided in a number of industry guidelines, including:

- ▶ the Draft NSW Planning Guidelines: Wind Farms; and
- ▶ Auswind's Best Practice Guidelines for the Implementation of Wind Energy Projects in Australia (ABS, 2008).

While much of the assessment pre-dated the draft NSW Wind Farm Planning Guidelines (2012), these draft guidelines have also been taken into account to the fullest extent possible.

The above guidelines were developed to establish the process for identifying, developing and implementing wind energy projects, recognising that each project would require assessment on its individual merits. They are focused primarily on technical and planning issues.

These guidelines have been considered in the preparation of this EA, particularly with respect to the chronological flow of the project phases.

8.2.3 Consultation

Epuron's assessment is designed to satisfy the supplementary DGRs for community consultation (see Attachment 6), in addition to making use of all information provided by the relevant parties in relation to environmental issues which were identified through the consultation processes outlined in Section 7. This includes consultation with stakeholders whose input was used to refine the design of the project.

8.2.4 Specialist Studies

Independent consultants were engaged to complete specialist reports on the following key issues:

- ▶ Landscape and Visual – summarised in Section 9 and in full in Appendix A;
- ▶ Environmental Noise – summarised in Section 10 and in full in Appendix B;
- ▶ Ecology – summarised in Section 11 and in full in Appendix C; and
- ▶ Aboriginal and European Heritage – summarised in Section 12 and in full in Appendix D.

8.2.5 Wind Turbine Selection for Assessments

Some impact assessments require an understanding of specific wind turbine characteristics which are not known until the final wind turbine model has been selected. An approach is therefore required to carry out an assessment based on reasonable assumptions, and ultimately confirming that these assumptions are valid.

The majority of issues identified with respect to this proposed development are not impacted by specific turbine model selection. For example, the assessment of ecology and archaeology constraints is based on a development envelope, that is, the entire geographic area where infrastructure may be located. This approach allows ecological and archaeological constraints to be defined within the development envelope and as a consequence allows for minor relocation of infrastructure within the development envelope without further assessment.

However, the final turbine selection could have a material impact on some issues and in these cases the decision as to whether to present a representative or worst case turbine must be considered.

The approach taken is to present the representative impact assessment for specialist studies where physical dimensions and technical characteristics of turbines are related to the extent of the potential impact. Examples of this are visual impacts and noise propagation. However as discussed in Section 3.1, the most likely turbine model to be ultimately selected for the project is not the largest but one that sits in the middle of the turbine size range (physical size and generation capacity). Therefore in this context, the EA also considers and presents the indicative or likely impacts.

Wind Farm Layout

The wind turbine layout design is based on a Vestas V112 turbine.

Wind farm layout and design is impacted by the minimum required spacing between turbines, which is a function of their rotor diameter. Therefore an assumption of the likely rotor diameter must be made at the time of the assessment.

The Vestas V112 is a mid to upper range turbine, known to be suitable for the site and has been installed in Australia. If a larger physical turbine is selected, fewer turbines may be installed, a consequence of the requirement for larger separation distances between turbines. In this scenario, some associated impacts may be reduced (such as visual impacts). Conversely, a layout using the smallest turbine option would represent the worst-case scenario in terms of the number of turbines able to be developed but may overstate other impacts. Use of the Vestas V112 is therefore considered a likely and representative turbine for the purposes of assessment.

Energy and Greenhouse Gas Calculations

The energy production and greenhouse calculations are based on an indicative 3.0 MW turbine.

Energy production calculations are most important for determining the options for connecting the wind farm into the transmission network. A wind farm output may be restricted by the size of the transmission line running through the site, or if other generators are already attached to the line. Energy production is also used to calculate the potential greenhouse gas emissions that would be reduced by the project.

A turbine with a name plate rating of 3.0 MW sits in the middle to upper range of turbines under consideration and is a likely turbine size to be ultimately selected. It is therefore considered representative of the energy production and greenhouse abatement benefits from the project.

Visual Impacts

The photomontages, Zone of Visual Influence, and Shadow Flicker analysis are prepared using the Vestas V112, which is a turbine with a 112m rotor diameter on a 101 m hub height.

Photomontages, Zone of Influence and Shadow Flicker maps are created to assess the potential impact to visual amenity. Using a turbine with a large rotor diameter (blades) and a large overall tip height allows for the worst case scenario to be assessed. While the visual assessment has been conducted using a turbine with a tip height of 157 m, the maximum tip height for the project is expected to be up to 165 m.

In some cases, the worst case presents an unrealistic portrayal of impacts when compared to the most likely turbines to be selected for the project. Therefore, in some areas, the EA also considers and presents the indicative or likely impacts for comparison. Noting that the layout would require review and likely removal of a number of turbines to accommodate the physically largest turbine, this assessment would overstate the visual impacts. The photomontages were prepared using the likely turbine sizing of a 101 m hub height with a 112 m rotor diameter (tip height of 157 m) to present the likely and representative scenario. The maximum expected tip height is up to 165 m.

Noise Impacts

The noise assessment was conducted using the Vestas V112 3.0 MW

Each turbine has a slightly different noise curve, and must be individually assessed prior to construction taking place to ensure that compliance will be achievable. Rather than testing every turbine model available, a

conservative approach has been adapted to demonstrate that compliance is achievable. Thus other turbines considered would theoretically comply with the same criteria.

The noise assessment presents the modelling of the Vestas V112 3.0 MW turbine on 80 m towers as a conservative estimate for the project. The V112 presents the representative impacts as it has noise characteristics typical of modern wind turbines and therefore offers a good approximation of the likely noise impacts of the project. The physical and noise characteristics of these turbines are considered to be indicative of the wind turbines available. The analysis demonstrates that it is possible to achieve the noise limits set by the SA EPA guidelines and WHO guidelines using the Vestas V112.

The current layout, as presented in this EA, has been prepared to demonstrate that compliance can be achieved across a wide range of turbine models. Accordingly by contemplating that turbines can be relocated within a reasonable distance of their proposed location or removed to achieve the SA EPA Guidelines, a single flexible indicative layout can be presented and assessed. Additional analysis of the sensitivity of the physical dimensions (hub height and maximum tip height) on noise propagation and a worst case scenario, requiring mitigation, is presented in the noise assessment.

The approach undertaken simplifies the noise assessment process by avoiding a different layout for each proposed turbine model. The Statement of Commitments affirms that modelling of the final turbine on the final layout would be undertaken to ensure compliance with the SA EPA guidelines.

8.3 Environmental Management Plans

A Construction Environmental Management Plan (CEMP) and Operational Environmental Management Plan (OEMP) will be prepared to manage and mitigate environmental impacts on the wind farm site. The CEMP will incorporate all relevant processes and mitigation measures for the development/construction phase while the OEMP will incorporate measure for operations phase. The CEMP will be prepared prior to the commencement of construction and the OEMP will be prepared prior to the commencement of operations. The plans will generally address:

- ▶ Soil & Water Management;
- ▶ Fuel and Chemical Storage - to avoid the pollution of surface and ground waters;
- ▶ Erosion & Sediment Control Plan;
- ▶ Landscape Management Plan;
- ▶ Traffic and Transport;
- ▶ Fire Management;
- ▶ Waste Generation and Disposal;
- ▶ Rail Safety Management Plan; and
- ▶ Additional measures mentioned in the Statement of Commitments

The CEMP and the OEMP will follow the philosophy of adaptive management. The philosophy of adaptive management is followed when policies and practices are continually improved by learning from the outcomes of previous work. As part of the adaptive management process the management measures provided by the EMP will also include a review and assessment program where works and monitoring are regularly reviewed and reassessed to ensure the environmental outcomes are achieved. This process is illustrated in Figure 8-1.

During construction, the site will be protected from erosion and sedimentation by the installation and maintenance of standard erosion and sediment control measures, such as sedimentation fences and swales in accordance with *Managing Urban Stormwater: Soils and Construction 4th Edition – Vol 1* (the “Blue Book”) (CSIRO, 2012) and *Managing Urban Stormwater: Soils and Construction* (DEWHA, 2009).

Surface water management procedures will be maintained in accordance with an Erosion and Sediment Control Plan. This plan will detail the use of sedimentation fences, and drainage controls to direct surface water into appropriate sediment basins and through a filter before being discharged into the site drainage system.

Specific environmental management measures will be used around the batching plant area and other temporary facilities. The temporary concrete batching plants will have a bunded storage area and a temporary concrete slab beneath the loading area. To capture surface water, sediment runoff (including any imported materials which may influence the pH and water quality) a swale drain is anticipated around the perimeter of the batching plant. This will be channelled into an enclosed retention pond, where water will be evaporated off and any solid waste disposed of at landfill. To ensure water pH levels remain at a reasonable level as a result of the potential of mixing with imported materials, checks will be set up and if deemed appropriate acid dosing (anticipated to be hydrochloric) will be added to ensure pH is controlled or alternatively the contaminated water would be transported by tanker off site. This type of approach is common in the construction industry.

Controls to avoid spillage of oil or erosion and sediment loss from the site will be supported by emergency response procedures where required.

These management procedures will remain in place until the site is rehabilitated suitable for the intended land use. This will effectively protect the site and its surrounding areas from any significant impacts on topography, surface water and water quality.

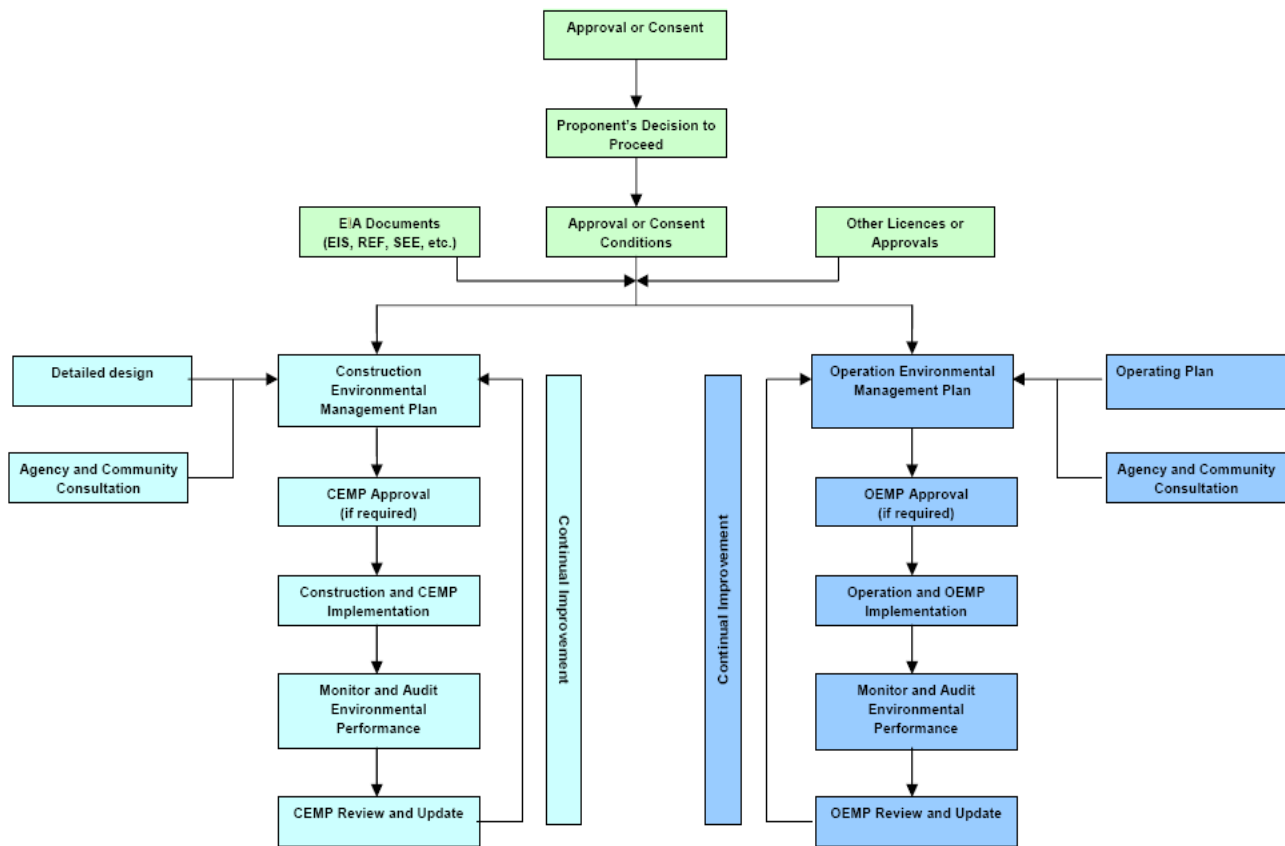


Figure 8-1 Post approval Environmental Management Plan process

9 Visual Assessment

9.1 Visual Amenity

The Liverpool Range Wind Farm Landscape and Visual Impact Assessment (LVIA) has been prepared by the landscape architectural consultancy and visual assessment specialist Green Bean Design (GBD). The LVIA involved a comprehensive evaluation of the visual character of the landscape in which the wind farm would be located, and an assessment of the potential significance of landscape and visual impacts that may result from the construction and operation of the wind farm, taking into account appropriate mitigation measures.

This Section presents a summary of the LVIA methodology as well as the key results and findings arising from the assessment. The detailed LVIA is included in Appendix A.

9.1.1 Methodology

The LVIA was undertaken in accordance with the DGRs and, although not directly applicable to the assessment process, is cognisant with the Upper Lachlan Shire Council's Development Control Plans (DCP) for Wind Power Generation.

The LVIA addresses key issues outlined in the Australian Wind Energy Association and Australian Council of National Trust's publication *Wind Farms and Landscape Values National Assessment Framework* (AusWEA, 2007), and encompasses the general assessment framework outlined in the National Assessment Framework. The LVIA has also given regard to the Draft NSW Planning Guidelines for Wind Farms (December 2011).

As well as consideration of existing guidelines, the LVIA methodology has been applied to a number of similar Part 3A Major Project wind farms prepared by GBD, for assessment by the NSW Department of Planning and Environment (DP&E).

The LVIA methodology included the following key activities:

- ▶ desktop study addressing visual character and identification of view locations within the surrounding area;
- ▶ fieldwork and photography;
- ▶ preparation of ZVI diagrams;
- ▶ assessment and determination of landscape sensitivity;
- ▶ assessment of significance of visual impact;
- ▶ describing the potential impact of night time lighting;
- ▶ determining the potential for cumulative impacts; and
- ▶ preparation of photomontages and illustrative figures.

9.1.2 Assessment

Visual components of the wind farm

The key visual components of the wind farm that are likely to be visible from surrounding areas include, but are not limited to:

- ▶ up to 288 wind turbines;
- ▶ up to 288 individual 33kV external kiosk transformers and switchgear with associated control systems to be located in the vicinity of the wind turbine towers (in some turbine models transformer equipment will be integrated within the tower or nacelle);
- ▶ underground and overhead electrical and communication cable network linking turbines to each other within the project boundary;

- ▶ up to eight new 22 or 33/330 kV collection substations located across the wind farm;
- ▶ a new overhead powerline rated at up to 330 kV (nominal) capacity. The new powerline would be mounted on a single pole type structure and may be single-circuit or double-circuit as required;
- ▶ up to 10 permanent wind monitoring masts. The permanent monitoring masts may be either static guyed or un-guyed structures and will be to a minimum height of the wind turbine hubs;
- ▶ on site access tracks for construction, operation and ongoing maintenance; and
- ▶ wind farm signage and maintenance facilities.

Temporary works associated with the construction of the wind farm that may be visible during construction and operational phases include a mobile concrete batching plant and rock crushing facilities.

The wind turbines would be the most visible element of the wind farm from the majority of surrounding view locations. The final selection for the turbine model will be made closer to construction; however, a turbine representative of the larger options was selected for the visual assessment.

Table 9-1 Wind Turbine Parameters

<i>Element</i>	<i>Description</i>
Tower height	100 m
Rotor Diameter	130 m
Overall height from ground level to tip of blade	165 m
Proposed number of wind turbines	288

Community Perceptions and Public Consultation

Individual perception is an important issue to consider in any visual impact assessment, as the attitude or opinion of an individual receptor adds significant weight to the level of potential visual impact. These attitudes or opinions of individual receptors toward wind farms can be shaped and formed through a multitude of complex social and cultural values.

Whilst published research into the potential landscape and visual impacts of wind farms is limited in Australia, there are general corresponding results between the limited number that have been carried out when compared to those carried out overseas.

A recent survey was conducted by ARM Interactive on behalf of the NSW Department of Environment, Climate Change and Water (September 2010). The survey polled 2,022 residents across the 6 Renewable Energy Precincts established by the NSW Government; including the Upper Hunter Renewable Energy Precinct. Key findings of the survey indicated that:

- ▶ 97% of people across the Precincts had heard about wind farms or turbines, and 81% had seen a wind farm or turbine (in person or the media);
- ▶ 85% of people supported the construction of wind farms in New South Wales, and 80% within their local region; and
- ▶ 76% supported wind farms being built within 10km of residences and 47% of people surveyed supported the construction of wind turbines within 1 to 2km from their residences.

Whilst individual perception and local community attitudes toward wind farm development are an important issue, these need to be considered in terms of potential landscape and visual impacts from a broad community perspective.

Proximity to Urban Areas

Small towns and localities surrounding and beyond the proposed Liverpool Range wind farm include:

- ▶ Coolah (approximately 4.6 km to the south west). Population 798;
- ▶ Cassilis (approximately 4.5 km to the south east). Population 350;

- ▶ Dunedoo - (approximately 42 km to the south west). Population 836;
- ▶ Gulgong (approximately 56 km to the south west). Population 1,866; and
- ▶ Merriwa (approximately 40 km to the south east). Population 973.

Population figures from the Australian Bureau of Statistics 2011 Census.

Existing Landscape

The landscape surrounding the wind farm is predominantly rural in character and occupied by medium sized landholdings as well as larger commercial pastoral operations. Areas of cultivated farmland and livestock pasture are interspersed with occasional rural homesteads surrounded by cultural planting and windbreaks. Human modifications within the broader landscape are consistent with common adaptations to rural life and include roads (sealed and unsealed), drainage structures, agricultural buildings, electrical transmission infrastructure, and communication structures. A series of hills are joined by ridgelines extending north to south across the wind farm site with areas of timber located on hillside slopes. The undulating topography within and surrounding the wind farm also creates a series of valleys from which views are largely contained and restricted.

Viewshed, Zone of Visual Influence and Visibility

A core component of the LVIA is defined by the description, assessment and determination of the viewshed, zone of visual influence and visibility associated with the wind farm. The relationship between viewshed, zone of visual influence and visibility is outlined in the following table. Extended descriptions are found in the full report in the LVIA Appendix A.

Table 9-2 Definitions used in Landscape and Visual Impact Analysis

	<i>Definition</i>	<i>Relationship</i>
Viewshed	An area of land surrounding and beyond the Project area which may be potentially affected by the wind farm.	Identifies the majority of the LVIA study area that incorporates view locations that may be subject to a degree of visual impact.
Zone of Visual Influence (ZVI)	A theoretical area of landscape from which the wind farm structures may be visible.	Determines areas within a viewshed from which the wind turbines may be visible.
Landscape Character	Defined as 'the distinct and recognisable pattern of elements that occur consistently in a particular type of landscape' (SNH, 2009).	Determines the ability of the landscape to accommodate change.
Landscape Sensitivity	The British Landscape Institute describes Landscape Sensitivity as 'the degree to which a particular LCA can accommodate change arising from a particular development, without detrimental effects on its character'.	Quantifies the level of impact that a development would have on the landscape.
Visibility	A relative determination at which a wind turbine or cluster of wind turbines can be clearly discerned and described.	Describes the likely number and relative scale of wind turbines visible from a view location.

The distance effect within the 10 km viewshed is outlined in the following table. Distance effect is not site specific and can be applied consistently to any wind farm based on the size and distance of turbines to the viewer. Note, in all cases visibility is nil where influenced or screened by surrounding topography and vegetation.

Table 9-3 Visual effect based on distance from wind turbines

Distance from turbine	Distance effect
>20 km	Wind turbines become indistinct with increasing distance. Rotor movement may be visible but rotor structures are usually not discernible. Turbines may be discernible but generally indistinct within viewshed resulting in Low level visibility and Nil where influenced or screened by surrounding topography and vegetation.
10 km – 20 km	Wind turbines noticeable but tending to become less distinct with increasing distance. Blade movement may be visible but becomes less discernible with increasing distance. Turbines discernible but generally less distinct within viewshed (potentially resulting in Low level visibility).
5 km – 10 km	Wind turbines visible but tending to become less distinct depending on the overall extent of view available from the potential view location. Movement of blades discernible where visible against the skyline. Turbines potentially noticeable within viewshed (potentially resulting in Low to Moderate level visibility).
3 – 5 km	Wind turbines clearly visible in the landscape but tending to become less dominant with increasing distance. Movement of blades discernible. Turbines noticeable but less dominant within viewshed (potentially resulting in Moderate level visibility).
1 – 3 km	Wind turbines would generally dominate the landscape in which the wind turbine is situated. Potential for high visibility depending on the category of view location, their location, sensitivity and subject to other visibility factors. Turbines potentially dominant within viewshed (potentially resulting in Moderate to High level visibility).
<1 km	Wind turbines would dominate the landscape in which they are situated due to large scale, movement and proximity. Turbines dominant and significant within viewshed (potentially resulting in High level visibility).

Landscape Character Areas and Landscape Sensitivity

Landscape character is defined as ‘the distinct and recognisable pattern of elements that occur consistently in a particular type of landscape’ (SNH, 2009).

The LVIA identified six Landscape Character Areas (LCAs), which generally occur within the viewshed of the project and include:

- ▶ LCA 1 – Upper plateau;
- ▶ LCA 2 – Plateau spur;
- ▶ LCA 3 – Slope and hill;
- ▶ LCA 4 – Cultivated agricultural land;
- ▶ LCA 5 – Woodland (State Forest)
- ▶ LCA 6 – Settlement.

The British Landscape Institute describes landscape sensitivity as ‘the degree to which a particular LCA can accommodate change arising from a particular development, without detrimental effects on its character’.

In terms of overall landscape sensitivity, the LVIA determined that in aggregate each of the six LCAs within the 10km wind farm viewshed had a medium to high sensitivity to accommodate change, and represent a landscape that is reasonably typical of other landscape types found in surrounding areas of the Upper Hunter regional landscape.

With a medium to high sensitivity to accommodate change, some characteristics of the landscape are likely to be altered by the wind farm development; however, the landscape is likely to have some capability to accommodate change. This capability is largely derived from the presence of predominantly large scale features within the landscape character areas and portions of the wind farm area, together with the relatively low density and dispersed nature of human settlement patterns and potential receptors located within the wind farm viewshed.

Table 9-4 Landscape Character Areas and Landscape Sensitivity

Landscape Character Area	Description	Landscape Sensitivity
LCA 1	Upper plateau	Medium to High
LCA 2	Plateau spur	Medium to High
LCA 3	Slope and hill	Medium to High
LCA 4	Cultivated agricultural land	Medium
LCA 5	Woodland (State Forest)	Medium to High
LCA 6	Settlement	Medium

The six LCA are located in Figure 9-1 and illustrated in Figure 9-2 Example of Landscape Character AreasFigure 9-2.

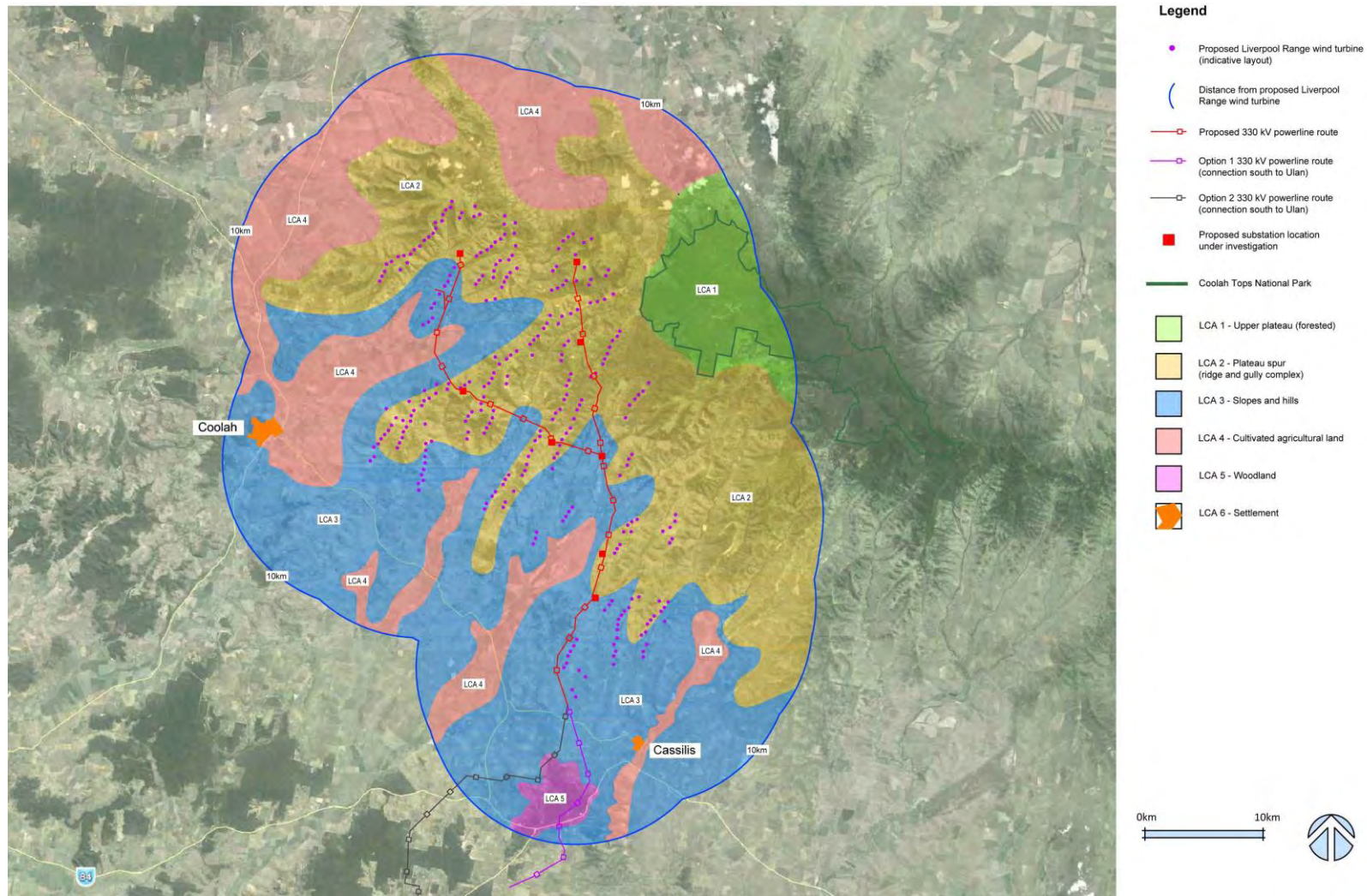


Figure 9-1 Landscape Character Areas



Typical view toward upper plateau (LCA 1)



Typical view toward plateau spur (LCA 2)



Typical view toward slope and hill (LCA 3)



Typical views across cultivated agricultural land (LCA 4)



Typical views toward woodland (LCA 5)



Typical views toward settlement (LCA 6)

Figure 9-2 Example of Landscape Character Areas

Zone of Visual Influence Diagrams (ZVI)

The ZVI diagrams are used to identify theoretical areas of the landscape from which a defined number of wind turbines, or portions of turbines, may be visible within the viewshed. They are useful for providing an overview as to the extent to which the Liverpool Range Wind Farm may be visible from surrounding areas.

Three ZVI diagrams have been prepared to demonstrate the extent to which the wind turbines would be visible at a distance up to 10 km from the site. Three different ZVI diagrams have been prepared to show the zone of visual influence from:

- ▶ any part of the wind turbines (i.e. tip of blade).
- ▶ half the swept path of rotor (i.e. hub height to tip of blade); and
- ▶ the entire turbine structure (i.e. ground to tip of blade).

The ZVI methodology is conservative as the screening effects of any structures and vegetation above ground level are not considered in any way. Therefore the wind farm may not be visible at many of the locations indicated on the ZVI diagrams due to the presence of trees or other screening elements. A summary of the ZVI analysis is included in the LVIA Appendix A.

The level of wind turbine visibility within the viewshed can result from a number of factors including the distance between a receptor and the wind farm, static or dynamic receptor locations (e.g. residents or motorists) or the relative position of the receptor to the wind turbines. Whilst the distance between a receptor and the wind turbines is a primary factor to consider when determining potential visibility, there are other issues, for example the level of tree cover, which may also affect the degree of visibility.

The ZVI diagrams are illustrated in Figures 9-3 to 9-5, which show from each location the number of turbines visible in each category.

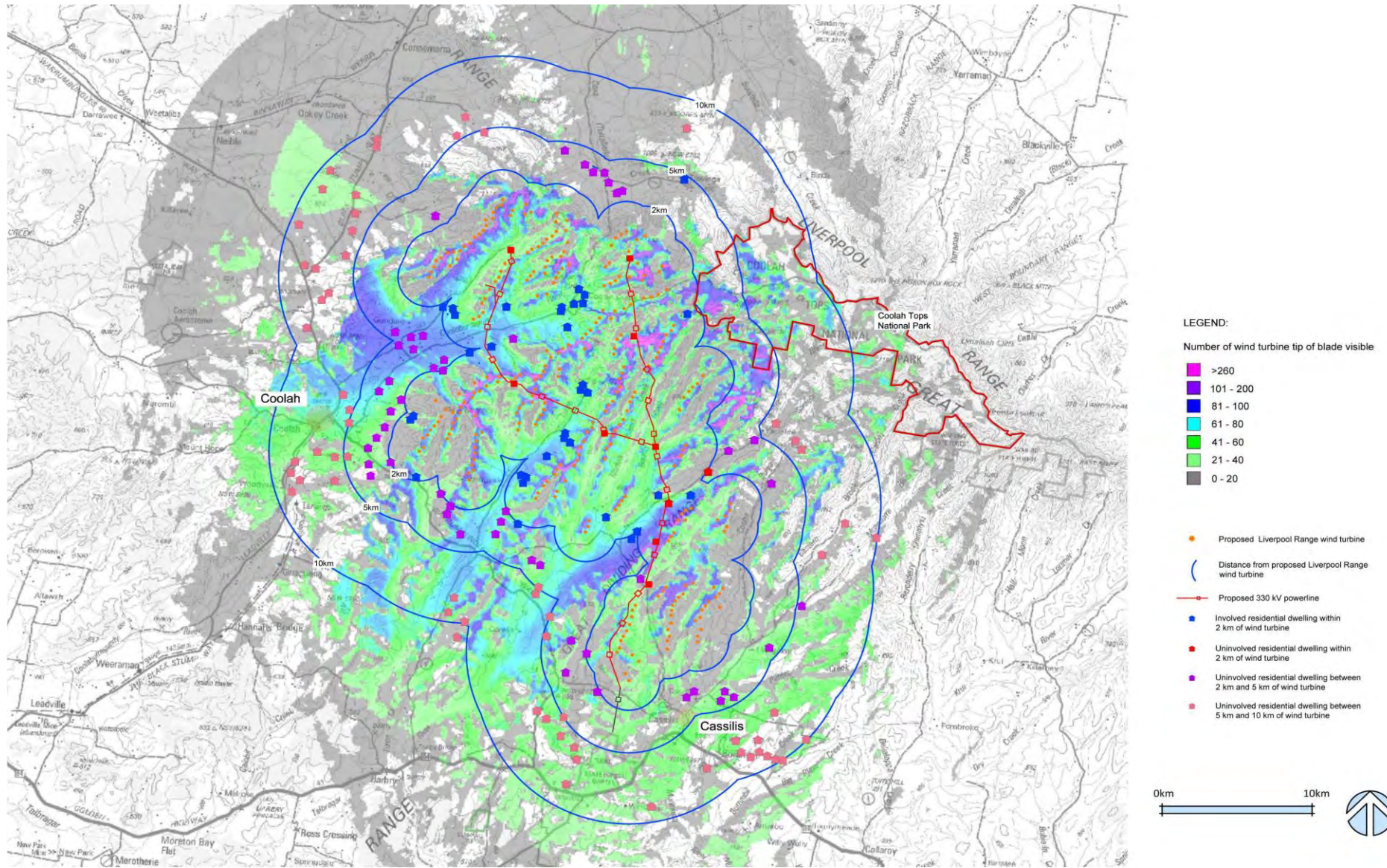


Figure 9-3 Zone of Visual Influence (turbine tips visible)

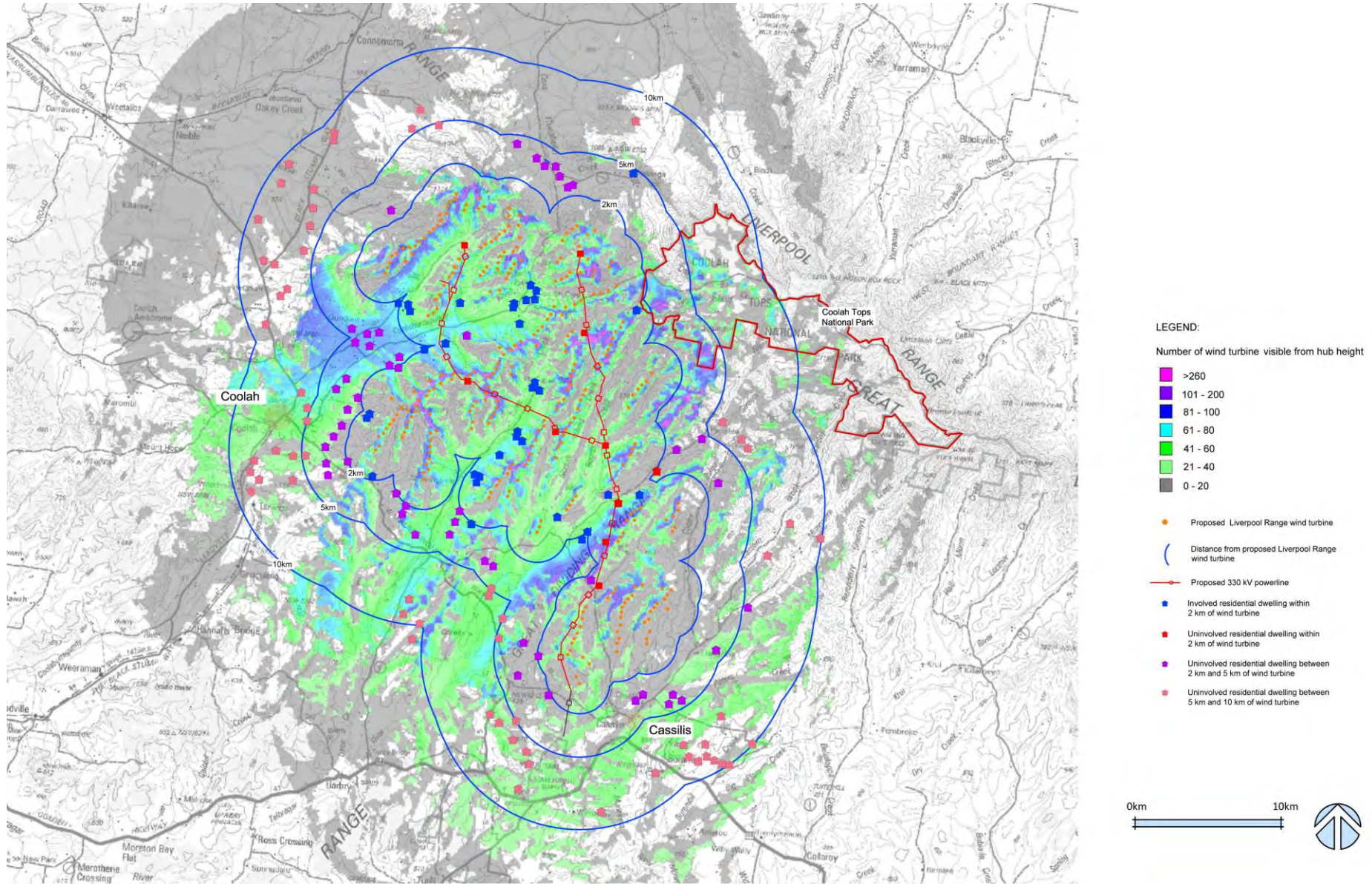


Figure 9-4 Zone of Visual Influence (turbine hubs visible)

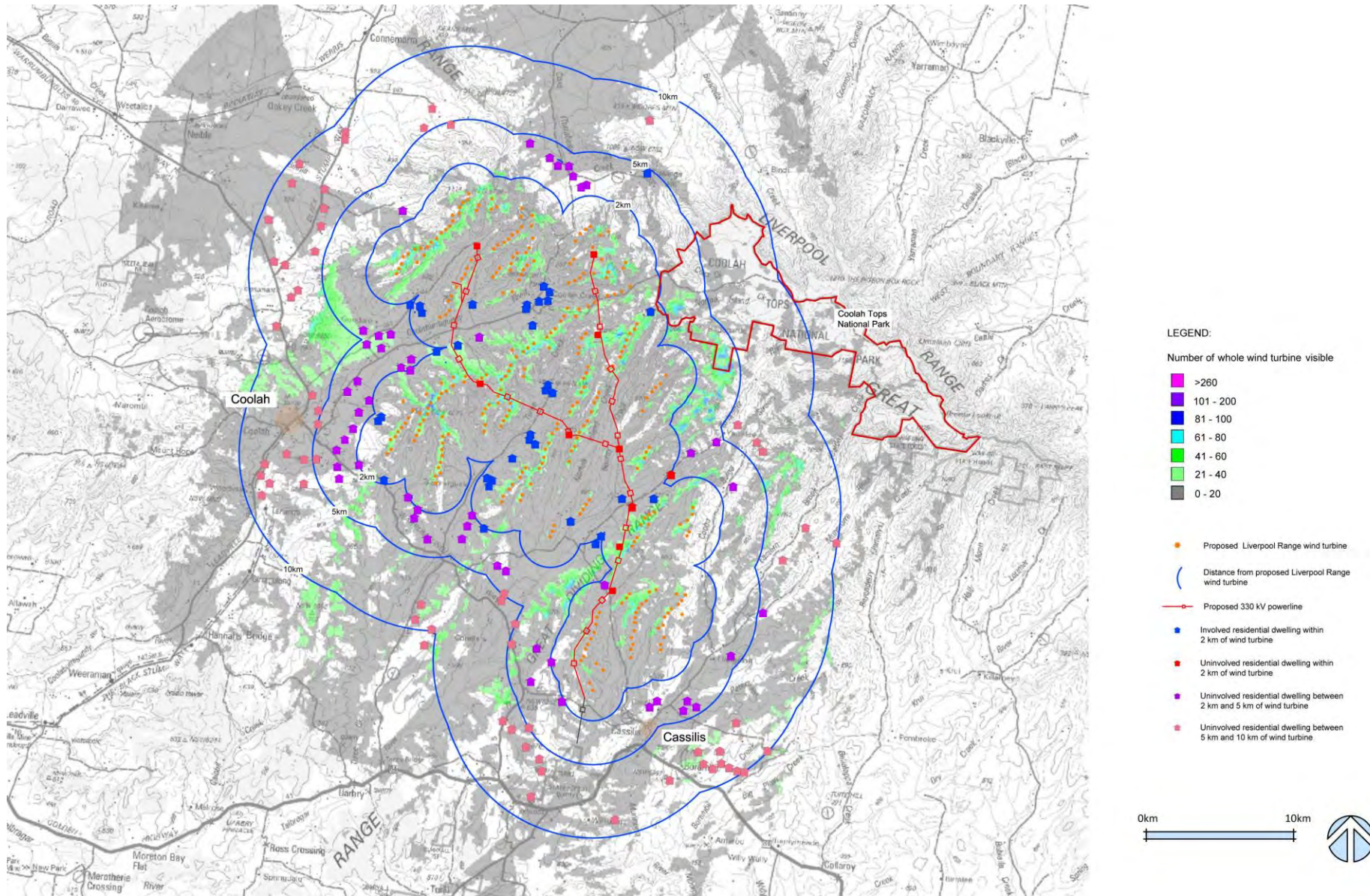


Figure 9-5 Zone of Visual Influence (whole turbines visible)

Photomontages

Photomontages have been prepared to illustrate the general appearance of the wind farm following construction. Eight locations were selected to illustrate the wind farm from public view points in the landscape surrounding the wind farm project area. These locations are shown in Figure 9-5 and listed below:

Table 9-5 Public photomontages locations

Photomontage Location	LVIA Figure ref	Status:
L2 Rotherwood Road	Figure 19 and 20	Unsealed road corridor (minor local road)
L3 Rotherwood Road	Figure 21 and 22	Sealed road corridor (minor local road)
L5 Glenwood	Figure 23 and 24	Uninvolved and unoccupied residential dwelling
L7 Bill's block	Figure 25 and 26	Uninvolved residential dwelling
L8 Turee Vale Road	Figure 27 and 28	Sealed road corridor (minor local road)
L9 Cassilis Road	Figure 29 and 30	Sealed road corridor (local road)
L10 Coolah	Figure 31 and 32	Sealed road corridor (local road)
L11 Cooks Road	Figure 33 and 34	Sealed road corridor (minor local road)
L13 Warung State Forest Road	Figure 35 and 36	Unsealed road corridor (minor local road)
L14 Pandoras Road	Figure 37 and 38	Unsealed road corridor (minor local road)
L23 St Antoine	Figure 39 and 40	Uninvolved and unoccupied residential dwelling

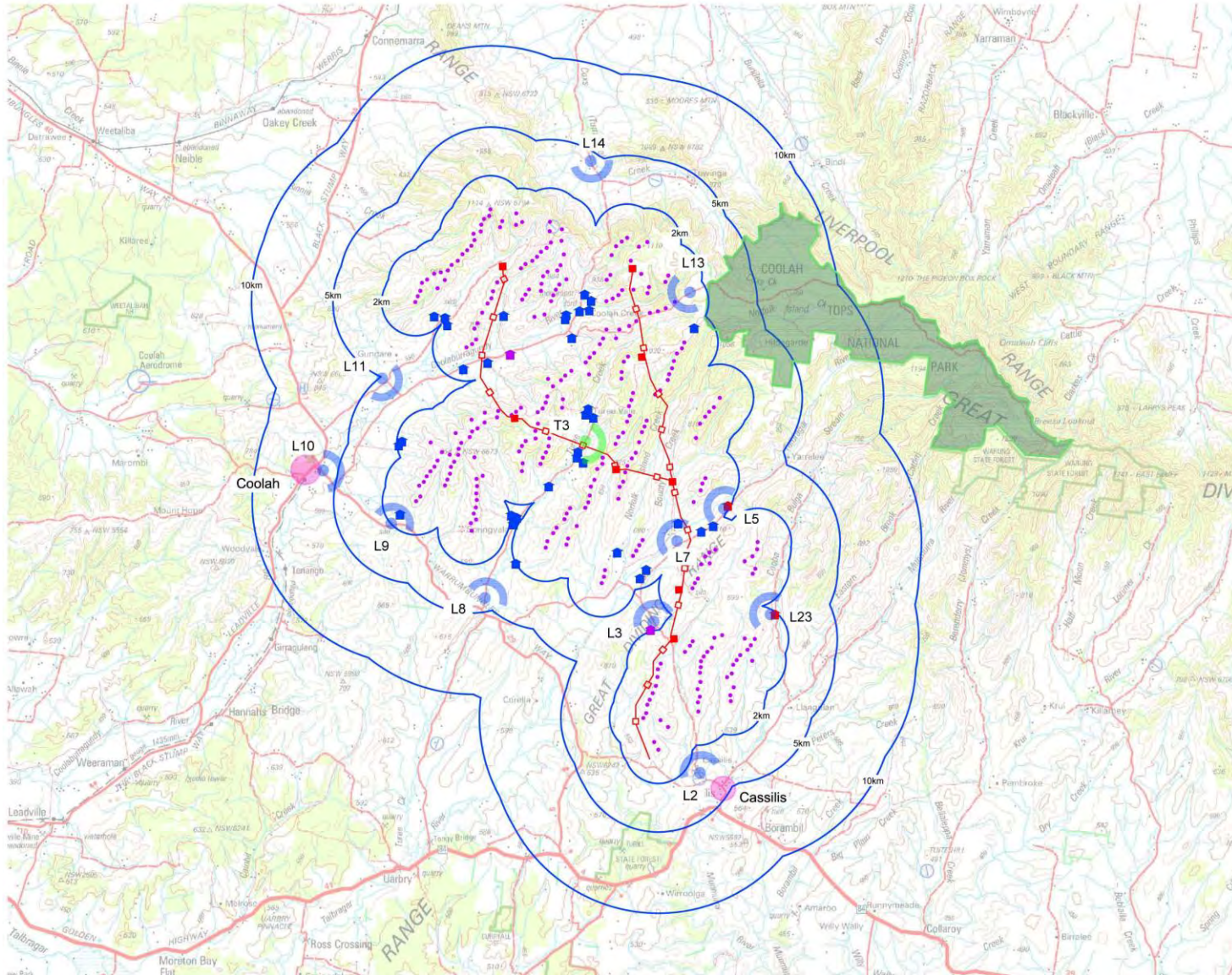
The public photomontages locations were selected following a review of preliminary ZVI maps, together with a site inspection to identify potential representative viewpoints. The public photomontage locations were selected from publically accessible sections of surrounding road corridors.

In addition to the public photomontages locations, a total of 3 photomontages were prepared from uninvolved residential dwellings within 2 km of the Liverpool Range wind farm turbine locations. These photomontage locations are illustrated in the LVIA Appendix A.

The process used to generate the photomontages is detailed in the LVIA Appendix A. An example of a public and uninvolved photomontage is illustrated in Figure 9-7 and Figure 9-8. All eleven photomontages are illustrated in the LVIA Appendix A.

GBD undertook to independently verify the scale of the Liverpool Range wind turbines within the photomontages through a photographic comparison of the photomontage methodology against constructed and operational wind turbines. The results of this verification are included in the LVIA Appendix A.

Whilst a professional photomontage provides an image that illustrates a realistic representation of a wind turbine, both in relation to its proposed location and its scale relative to the surrounding landscape, the LVIA acknowledges that large scale objects in the landscape can appear smaller in photomontage than in real life, and is partly due to the fact that a flat image does not allow the viewer to perceive any information relating to depth or distance.



- Legend**
- Involved residential dwelling within 2 km of wind turbine
 - Uninvolved residential dwelling within 2 km of wind turbine
 - Uninvolved residential dwelling beyond 2 km of wind turbine
 - ⊙ Photomontage location
 - ⊙ Photomontage location (powerline refer Figure 54)
 - Coolah Tops National Park
 - Proposed Liverpool Range wind turbine (indicative layout)
 - ⌒ Distance from proposed Liverpool Range wind turbine
 - Proposed 330 kV powerline route



Figure 9-6 Photomontage Locations



Public view location L14 Rockgedgiel-Pandoras Road - Existing view north north east to south east. Photo coordinate Easting:790415 Northing:6494831 (MGAz55)



Public view location L14 Rockgedgiel-Pandoras Road - Proposed view through 120°. Approximate distance to closest visible wind turbine 3.8 km

Notes

Composite panorama photograph taken with a Nikon D700 digital SLR camera with 50 mm prime lens.

Individual panorama photograph coordinate map datum is MGAz55 to ± 5 m.

Extent of potential wind turbine visibility and directional bearing illustrated on each photomontage is indicative only.

The Nikon D700 digital SLR camera with a 50mm lens results in a single photograph with a view angle equivalent to a 35mm digital SLR camera photograph taken with a 50mm lens.

Refer Figure 17 for photomontage locations



Indicative extent of a single frame photograph (in landscape format) taken with the Nikon D700 digital SLR camera with a 50mm lens



Extent of wind turbines visible in panorama

Figure 9-7 Public Photomontage Location L14



Public view location L7 Bill's block (uninvolved residential dwelling) - Existing view south west to north east. Photo coordinate Easting:779774 Northing:6466870 (MGAz55)



Public view location L7 Bill's block (uninvolved residential dwelling)- Proposed view through 120°. Approximate distance to closest visible wind turbine 2.1km

Notes:

Composite panorama photograph taken with a Nikon D700 digital SLR camera with 50 mm prime lens.

Individual panorama photograph coordinate map datum is MGAz55 to ± 5 m.

Extent of potential wind turbine visibility and directional bearing illustrated on each photomontage is indicative only.

The Nikon D700 digital SLR camera with a 50mm lens results in a single photograph with a view angle equivalent to a 35mm digital SLR camera photograph taken with a 50mm lens.

Refer Figure 17 for photomontage locations



Indicative extent of a single frame photograph (in landscape format) taken with the Nikon D700 digital SLR camera with a 50mm lens

— Extent of wind turbines visible in panorama

Figure 9-8 Photomontage for uninvolved residential dwelling R17

Night Lighting

Although not currently proposed, the Liverpool Range wind farm may require obstacle lighting in the future. The future requirement for lighting would be subject to the advice and endorsement of the Civil Aviation Safety Authority (CASA) (see Section 14.1). CASA is currently undertaking a safety study into the risk to aviation posed by wind farms to develop a new set of guidelines to replace the Advisory Circular with regard to lighting for wind turbines that was withdrawn by CASA in mid 2008.

Should future CASA regulations require a lighting assessment; the proponent will undertake an Aeronautical Impact Assessment, to first determine the risks posed to aviation activities by the wind farm. If required, an Obstacle Lighting Assessment would be undertaken by an Aeronautical Impact Assessment expert to stipulate the turbine lighting layout which would mitigate any risks to aviation. The outcomes of the Aeronautical Impact Assessment and the Obstacle Lighting Assessment would then be submitted to CASA for their comment.

A small number of existing night time light sources are present in the vicinity of the wind farm, including lights within and surrounding settlements, dispersed homesteads, vehicles travelling along local roads and communication towers. Potential night time light sources from the wind farm could result from:

- ▶ low intensity night lights for substations, control and auxiliary buildings; and
- ▶ night time obstacle lights mounted on some wind turbines (if required in the future).

Night time lighting has the potential to be visible from distant view locations, and well beyond the 10km viewedshed for the Liverpool Range wind farm, although the level of impact will diminish when viewed from more distant view locations, with a greater probability of night time lighting being screened by landform and/or tree cover.

Electrical works

The Liverpool Range wind farm would include a range of electrical infrastructure to collect and distribute electricity generated by the wind turbines. Electrical works would include elements such as:

- ▶ up to 8 collection substations and 1 connection substation;
- ▶ a double circuit 330 kV powerline;
- ▶ generator transformers; and
- ▶ underground and overhead electrical and control cables.

These elements of the project are fully described and illustrated in the LVIA Appendix A. The potential visual impact of electrical infrastructure works, including the proposed 330kV powerline routes, is unlikely to have a significant impact on surrounding residential view locations. The electrical works would be contained within a landscape with an overall moderate to high visual absorption capability, which would have some ability to accept modifications and alterations without the loss of landscape character or significant deterioration of existing levels of visual amenity.

Pre-Construction and Construction Activities

The key pre-construction and construction activities that may be visible from areas surrounding the proposed wind farm include:

- ▶ ongoing detailed site assessment including sub surface geotechnical investigations;
- ▶ various civil works to upgrade local roads and access point;
- ▶ construction compound buildings and facilities;
- ▶ construction facilities, including portable structures and laydown areas;
- ▶ various construction and directional signage;
- ▶ mobilisation of rock crushing equipment and concrete batching plant (if required);
- ▶ excavation and earthworks; and

- ▶ various construction activities including erection of wind turbines, monitoring masts and substation with associated electrical infrastructure works.

The majority of pre-construction and construction activities, some of which would result in physical changes to the landscape, are generally temporary in nature and for the most restricted to various discrete areas within or beyond the immediate wind farm area. The majority of pre-construction and construction activities would be unlikely to result in an unacceptable level of visual impact for their duration and temporary nature. The LVIA determined that the wind farm is likely to be an acceptable development within the viewshed, which in a broader context also contains approved wind farm developments and built elements such as roads, agricultural industry, aircraft landing strips, communication and transmitter towers and powerlines.

9.1.3 Results of Visual Impact Assessment

The significance of visual impact resulting from the construction and operation of the Liverpool Range wind farm would result primarily from a combination of:

- ▶ the overall sensitivity of visual receptors in the surrounding landscape; and
- ▶ the scale or magnitude of visual effects presented by the wind farm development.

The sensitivity of visual receptors has been determined and described in the LVIA by reference to:

- ▶ the location and context of the view point;
- ▶ the occupation or activity of the receptor; and
- ▶ the overall number of people affected.

The scale or magnitude of visual effects associated with the project have been determined and described by reference to:

- ▶ the distance between the view location and the wind farm turbines;
- ▶ the duration of effect;
- ▶ the extent of the area over which the wind farm could be theoretically visible (ZVI hub height)
- ▶ the degree of visibility subject to existing landscape elements (such as forested areas or tree cover).

The LVIA notes that although a large number of viewers in a category that would otherwise be of low or moderate sensitivity may increase the sensitivity of the receptor, it is also the case that a small number of people (such as residents) with a high sensitivity may increase the significance of visual impact. The criteria used to establish the significance of visual impact are detailed in the LVIA Appendix A. Residential dwelling locations are presented in Figure 16, located in the LVIA Appendix A.

Residential viewpoints within 2km of the proposed wind turbine locations

The LVIA identified a total of 23 potential involved and uninvolved residential view locations within the Liverpool Range wind farm 2 km viewshed. Unoccupied residential dwellings have been included and assessed as part of the LVIA where structures and buildings were considered to be habitable at the time of the field work.

An assessment of each potential residential view location indicated that for the Liverpool Range wind turbine design layout:

- ▶ 1 of the 23 residential view locations has been determined to have a low visual significance;
- ▶ 3 of the 23 residential view locations have been determined to have a low to medium visual significance;
- ▶ 9 of the 23 residential view locations have been determined to have a medium visual significance;
- ▶ 9 of the 23 residential view locations have been determined to have a medium to high visual significance; and
- ▶ 1 of the 23 residential view locations has been determined to have a high visual significance.

The residential view location with a high visual significance will be an involved residential dwelling.

Other viewpoints

The LVIA determined that the majority of residential dwellings and public viewpoints located beyond the 2 km wind turbine offset are unlikely to be significantly impacted by the wind farm development. The localised influence of topography, as illustrated in the ZVI diagrams, has a direct and marked impact on the extent and nature of views within the 2 km and wider viewshed.

Overall conclusion

Taking into account the mitigation measures outlined in the LVIA concludes that the Liverpool Range wind farm project would have an overall low to medium visual significance on the majority of uninvolved residential view locations within the 10 km viewshed as well public view locations.

9.1.4 Cumulative Visual Impact Assessment

An assessment of cumulative environmental impacts considers the potential impact of a proposal in the context of existing developments and future developments to ensure that any potential environmental impacts are not considered in isolation.

‘Direct’ cumulative visual impacts may occur where two or more wind farms have been constructed within the same locality and are simultaneously viewed from the same receptor location.

‘Indirect’ cumulative visual impacts may also arise as a result of multiple wind farms being observed from the same receptor location, but do not overlap or occur within a single field of view.

‘Sequential’ cumulative visual impacts may also arise as a result of multiple wind farms being observed at different locations during the course of a journey (e.g. from a vehicle travelling along a highway or from a network of local roads), which may form an impression of greater magnitude within the construct of short term memory.

There are a number of proposed, approved and operating wind farm developments within New South Wales which are illustrated in the LVIA Appendix A. The number and location of wind farms is likely to change as more wind farm projects are announced. The Kyoto wind farm development is currently the only approved wind farm development in the Upper Hunter Renewable Energy Precinct. With an approval for up to 34 wind turbines, the Kyoto wind farm development has yet to commence construction. The Liverpool Range wind farm development would be located approximately 70 km to the west of the Kyoto project site, therefore the opportunity for any significant ‘direct’ or ‘indirect’ visual impacts are likely to be limited. ‘Sequential’ visual impacts will be limited by the absence of additional wind farm developments within the regional context and would not be expected to be significant between the approved Kyoto wind farm development and the Liverpool Range project.

9.1.5 Mitigation Measures

It is inevitable that wind turbines of the size proposed for the Liverpool Range wind farm will have some significance of visual impact. However, a number of mitigation measures have been incorporated into the design of the wind farm, or from wind farm commitments, with the aim of minimising visual impact. These include:

- ▶ Consideration of a matt and/or off-white finish of the structures to reduce visual contrast between turbine structures and the viewing background (this is subject to final turbine selection);
- ▶ A commitment to undertake landscape planting at any residence within 2km of a wind turbine.
- ▶ A commitment to minimise activities that may require night time lighting and, if necessary, use low intensity lighting designed to be mounted with the light wind farming inwards to the site to minimise glare;
- ▶ Substation and other ancillary infrastructure have been sited sympathetically with the nature of the locality and away from major roads and residential dwellings where practical to mitigate visual impact;
- ▶ The majority of electrical connections within the site (i.e. cables between the turbines) have been designed to be located underground (where practical), in order to further reduce potential visual impacts.

These are outlined in the Statement of Commitments in Section 17.

10 Operational and Construction Noise

10.1 Background

SLR Consulting Australia Pty Ltd (SLR Consulting) was engaged as the acoustic consultant for the proposed Liverpool Range Wind Farm. A full assessment of the operational and construction noise has been completed and can be found in Appendix B. The layout assessed comprised 288 wind turbines modelled as Vestas V112 model.

10.2 Operational noise

The operational noise impact assessment predicts noise levels for receptors within 6 km of a proposed turbine and compares the predicted level to the limits set out in the South Australian Environmental Protection Authority (SA EPA) *Environment Noise Guidelines for Wind Farms (February 2003)* and World Health Organization (WHO) limits, as appropriate. The assessment procedure involved the following:

- ▶ Noise monitoring was conducted by Epuron in the period 19 September 2012 through to 4 November 2012 and 13 August 2013 through to 16 September 2013 at 12 locations to determine baseline conditions and establish indicative criteria for surrounding residential receivers.
- ▶ Noise was predicted using ISO 9613-2:1996 as implemented in the SoundPLAN computer noise model. The model predicts noise levels through spherical spreading and includes the effect of air absorption, ground attenuation and shielding. The predicted noise levels for the wind range 3 to 12 m/s are then calculated from the sound power levels determined in accordance to the recognised standard IEC-61400-11:2002. The Joule Report was considered in the assessment but it was shown that ISO 9613 produced more conservative prediction results as well as superior correlations to local conditions as found by recent studies.
- ▶ Preliminary analysis was undertaken and a simplified limit of 35 dBA for non-project involved receivers and 45 dBA for project involved receivers was adopted. For the majority of non-project involved receivers, assessment has been undertaken for a 35dBA criterion for all wind speeds. This is the minimum criteria value i.e. most conservative.—Locations which had a predicted exceedance of the simplified criteria had background regression curves derived for the nearest monitoring location.
- ▶ The captured background noise data was screened for validity, so that data monitored during periods of rain or where the average wind speed at the microphone position likely exceeded 15 m/s (10 m AGL) was discarded from the data set. In addition extraneous data, such as local fauna noise was manually removed. A regression analysis of all valid data is used to determine a line of 'best fit' from which the noise limit is established. Note that the wind speed at ground level is not usually monitored. The exception might be where the weather station (used for rain exclusion) was used. The weather station wind speed measurements show an average of 0.9 to 1.2m/s over the various background noise monitoring periods. The wind speed at microphone height (approximately 1.2m) may have an adverse effect on monitored noise levels when sufficiently high wind turbulence on the microphone or wind shield noise contaminates the monitored level. It is generally accepted that a standard 90mm open cell foam wind shield is sufficient provided the local wind speed is less than 5m/s average over the monitoring period, which holds true for this case. A wind shield of this specification was used for background noise monitoring. It is SLR's experience that for most rural properties with established gardens, windbreak trees and out-buildings, it is rare for the average wind speed to exceed an average of 5m/s at 1.2m above ground level over a 10 minute period. The properties surrounding Liverpool Range Wind Farm fit into this characteristic of rural properties.
- ▶ Turbine noise based on the Vestas V112 was then assessed against relevant criteria prescribed by the SA EPA Guideline and World Health Organisation (WHO) goals where appropriate to determine compliance.

10.2.1 Assessment

The criteria for the prioritised locations discussed above, were determined using the following approach:

- ▶ Unattended noise loggers were deployed at receptor locations around the proposed wind farm site by Epuron Pty Ltd, with a standard 90mm open cell foam wind shield.
- ▶ The loggers were set up to collect background noise data (LA90) in 10-minute intervals. Simultaneous wind speed measurements at wind masts around the site were used to correlated wind speed to background noise. Hub height wind speed is used for correlation to background noise. Hub height wind speed is derived using the calculated shear value (based on the logarithmic law) for each time stamp using data monitored at several heights above ground.
- ▶ The data set was then analysed by SLR Consulting to exclude data that is not representative due to influence of rain or other localised, non-wind induced sources of noise. This is conducted by manual scrutiny of results. Noise levels typically vary quite significantly in rural areas, especially when the dominant sources of noise are wind induced. When higher statistical indices of noise such as the L10 and the average noise level (Leq) are very close to the L90, it can be surmised that the dominant source of noise did not vary greatly during the measurement period. Where it was found that constant elevated noise levels combined with the times of day (dawn, dusk etc.) it can be determined that local fauna (insects, frogs, birds etc.) unduly influenced the results and excluded data points are based on this judgement. This approach reduces the influence of non-wind-induced extraneous noise on the background regression curves. Low correlation coefficients occur at sites where background noise levels are not determined by local wind driven sources. This may be for a multitude of reasons including: lack of nearby foliage, other dominant sources e.g. traffic, insects, frogs etc., location is sheltered from wind by topography. For the majority of locations, assessment has been undertaken for a 35dBA criterion for all wind speeds. This is the minimum criteria value i.e. most conservative. As such the background noise curves are only relevant for a small number of receivers.
- ▶ A polynomial line was then plotted through the data set to establish a background noise regression curve. This was used to determine the noise limit for that measurement site, which is either:
 - 35 dBA or Background Noise (L90) + 5 dBA, whichever is higher; for non-project involved receivers (SA EPA Criteria)
 - 45 dBA or Background Noise (L90) + 5 dBA, whichever is higher; for project involved receivers (WHO Criteria)

The noise emission of each turbine was modelling at a hub height of 80m above ground level. The reference sound power values listed, based on a hub height of 84 m above ground level, are still valid for prediction purposes. Differences from this change in hub height are unlikely to significantly change the total sound power emitted by the turbine.

The relationship between ground level wind speed and hub height wind speed is specified as part of the measurement standard IEC 61400-11 (Section 8.1 – Wind Speed) i.e. logarithmic law profile. This same equation is used to convert 10 m AGL wind speed back to hub height wind speed, using a roughness of 0.05. Considering the difference in predicted wind speed (8m/s 10m AGL) from the logarithmic profile law between 80 m and 84 m hub heights, the difference in wind speed would be 0.07 m/s. The corresponding difference in emitted sound power level would be negligible.

In addition sound power data from the manufacturer has been provided at multiple heights up to 119m with no change in maximum sound power level, as such modelling the source at 100m would make an insignificant change to the resulting predicted levels.

The assessment of noise from turbines was completed by plotting the predicted noise levels against the limit curves for all wind speeds. An example regression plot is shown in Figure 10-1; the assessment curves for the same location are shown in Figure 10-2.

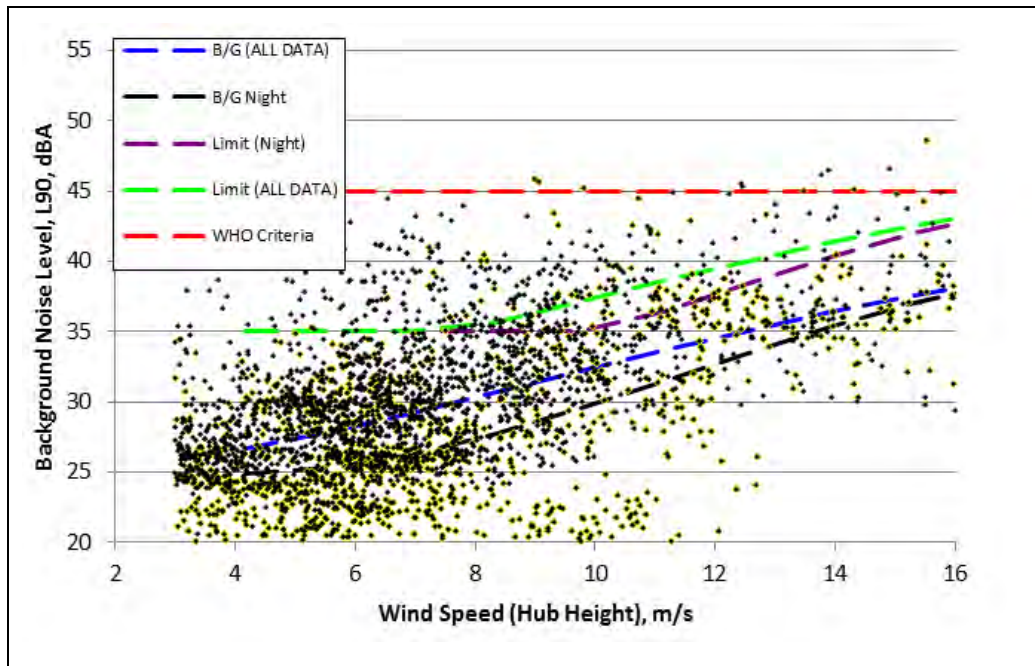


Figure 10-1 Example Background Noise Regression Curve (Location G6-2)

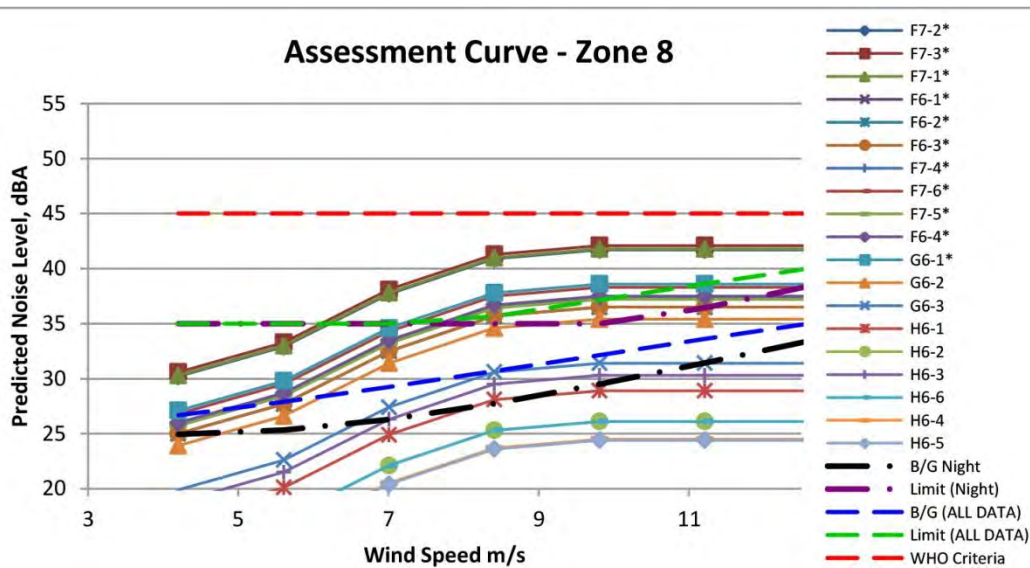


Figure 10-2 Example Assessment Curve (Location G6-2)

In addition to these assessment curves, predicted noise contours have been created for the project, these are shown in Figure 10-3. These are for a wind speed of 8m/s which is both the reference wind speed and also the wind speed at which maximum sound power level occurs.

All receiver locations are predicted to comply with their respective criteria.

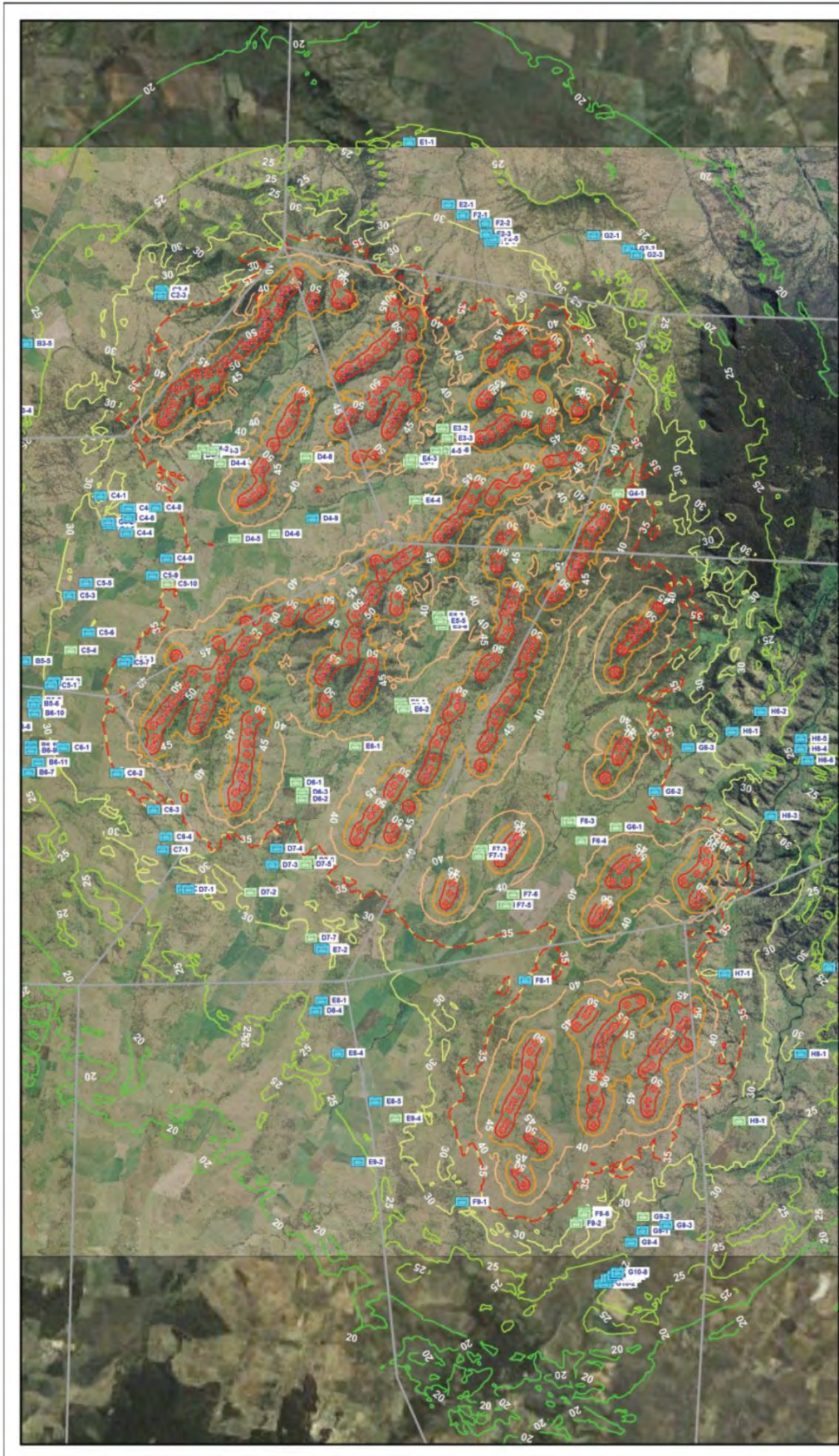
It should be noted that all predicted noise levels are considered to be conservative with the model assuming ‘hard ground’ and average downwind propagation from all turbines to each receiver or a well-developed moderate ground based temperature inversion.

Research into the accuracy of various noise prediction algorithms has been undertaken for Australian conditions, the results being published by the Australian Acoustical Society in April 2012 (‘Comparison of predicted and

measured wind farm noise levels and implications for assessments of new wind farms, Tom Evans and Jonathan Cooper, Acoustics Australia Vol.40 No.1'). The study compared predicted noise levels with measured results. The study also investigated adjustment of various modelling parameters and ground terrain cross section. For locations where the cross section of ground terrain is 'concave' (as is the case with Liverpool Range Wind Farm) the most accurate results overall were predicted using ISO9613 with ground absorption set to 0 (hard ground assumption). The Joule Project report was not listed as a required con

sideration in the Direction General Requirements and has not been used on other wind farm Noise Impact Assessments undertaken by SLR Consulting. It proposes modifications to the ISO 9613 method for the A_{barrier} and applied a +3dBA correction to terrain cross-section that are deemed 'concave' the ground absorption value is set to soft ground ($G=1$). In order to determine the noise predictions that would have been determined from the Joule Report proposed correction to ISO 9613, further analysis has been undertaken. A comparison between the predicted levels with ISO 9613 and the levels predicted with the modified method proposed by the Joule Report has been completed for each receiver. The results showed that the predicted noise levels under a 'hard ground' assumption (SLR method) were higher than the predicted noise levels with soft ground assumption and Joule Project's proposed correction (amended method) by between 1.7dBA and 5.2 dBA. Given the more conservative prediction results, as well as the more recent findings of superior correlation to local conditions by ISO 9613, SLR Consulting are of the opinion that the methodology adopted in the NIA is appropriate in this case.

The project is yet to select and finalise the WTG make and model. Upon finalising the WTG selection a revised noise prediction and assessment will be completed to confirm compliance.



CLIENT:
Epuron Pty Ltd
EPURON

PROJECT:
Liverpool Range WF
Noise Impact Assessment

TITLE:
Revised Layout 5c GNM 201

DESCRIPTION:
288 X Vestas V112 WTG's
Hub Height - 80 m

MAP NO: 1

Predicted Noise Level dBA, Leq

20 <	<=	20
25 <	<=	25
30 <	<=	30
35 <	<=	35
40 <	<=	40
45 <	<=	45
50 <	<=	50
55 <	<=	55
60 <	<=	60

PREDICTION METHOD:
ISO 9613-2:1996

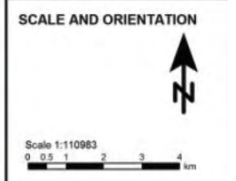
PROJECT NO.: 640.10487

REPORT NO.: 640.10487-R1

DATE: 27/09/2013

PREPARED: PS

- LEGEND**
- Project Involved Receiver
 - ★ Wind Turbine
 - Non Project Involved Receiver
 - Limit line



SLR
SLR Consulting Australia Pty Ltd
ABN 29 001 584 612
Suite 6, 131 Bulleen Rd
Balwyn North VIC 3104

Figure 10-3 Predicted Noise Levels Contour Map, LAeq, vref=8m/s

As requested by the NSW Department of Planning and Environment, additional assessments have been undertaken under the recently released NSW Draft Wind Farm Noise Guidelines. Assessments into low frequency noise and tonality have been undertaken and the results do not indicate any further investigation into these Special Audible Characteristics is required under the draft guidelines.

10.2.2 Mitigation Measures, Monitoring and Adaptive Management

Mitigation measures are required when the turbine layout does not comply with the criteria and as such need to be carried out to ensure compliance. Mitigation measures will be used if necessary once the final turbine is selected and documented in the updated Noise Impact Assessment at pre-construction to ensure compliance. Mitigation would be undertaken on a case by case basis and the appropriateness of any mitigation would depend on a number of factors including:

- ▶ the predicted level of exceedance;
- ▶ the number of turbines contributing to that noise level;
- ▶ any prevalence of noise from a particular direction (turbine or background noise); and
- ▶ available background monitoring data for that location

Mitigation measures that may be used include: operating turbines in a reduced 'noise optimised' mode during identified times and conditions (sector management) or removing turbines from the layout.

Monitoring will form part of the compliance monitoring program. The compliance program will commence 3 months before construction commencement and continue on a permanent basis for 2 years post commissioning. Permanent noise loggers will be installed at selected receivers for the duration of the compliance program, with noise data regularly downloaded and any potential exceedances noted for detailed analysis. The selected house locations will comprise of all houses within 2km of a turbine and selected representative houses within 2-5km. A complaint hotline or other means will receive and document noise impacts. This will lead to further investigation and aid in identifying exactly what conditions or times lead to these impacts.

If noise impact complaints arise and upon assessment the wind farm exceeds the relevant criteria then an 'adaptive management' approach could be implemented to mitigate or remove the impact. This process could include;

- ▶ Receiving and documenting noise impact complaint through 'hotline' or other means.
- ▶ Investigating the nature of the reported impact.
- ▶ Identifying exactly what conditions or times lead to the impacts.
- ▶ Operating turbines in a reduced 'noise optimised' mode during identified times and conditions (sector management).
- ▶ Turning off turbines that are identified as causing the undue impact.
- ▶ Providing acoustic upgrades (glazing, façade, masking noise etc.) to affected dwellings.

The type of mitigation required would depend on the conditions which occur when the noise is shown to have an impact as well as site-specific details at the location where the impact is demonstrated. Any noise impact would need to be appropriately investigated by a qualified acoustics consultant to understand which mitigation strategy is most appropriate. Nominating an appropriate management technique is dependent on the nature and times of the impact. The measures outlined above are feasible and can be implemented with the current technology and control systems available in the turbines. Acoustical upgrades can be retrofitted as required using standard building and construction applications. In terms of effectiveness and reliability there are multiple measures for both mitigation and management measures. Having multiple measures provides both redundancy and options to ensure an effective result is achieved. At worst case turbine removal/turbine shutdown will be the final mitigation and management measure that would be carried out if other measures fail. In addition once mitigation or management measurements are carried out the compliance and monitoring program will ensure that these measures are both effective and reliable and that any residual impacts if any would be detected and provide a basis for further management as required. Specific details of the steps involved to mitigate, monitor and manage potential adverse noise impacts would form a part of a Construction Environmental Management Plan for the project which would be completed following approval of the wind farm.