CHAPTER 8

Landscape and Visual Impact Assessment

8. LANDSCAPE AND VISUAL IMPACT ASSESSMENT

The Proponent commissioned Green Bean Design Landscape Architects (GBD) to prepare a Landscape and Visual Impact Assessment (LVIA) for the Boco Rock Wind Farm. The detailed LVIA is included in **Appendix 6**. The LVIA involved a comprehensive evaluation of the visual character of the landscape in which the Project would be located, and an assessment of the potential landscape and visual impacts that may result from the construction and operation of the Project, taking into account appropriate mitigation measures.

This chapter presents a summary of the LVIA methodology as well as the key results and findings arising from the assessment. The detailed results of the LVIA are included in **Appendix 6**.

The LVIA addresses the Director-General's Requirements (DGR's) for the Project assessment, and is not aware of any planning instruments, adopted by Bombala Council or the Cooma-Monaro Shire Council, which relate specifically to the assessment of landscape or visual impacts for wind farms or wind power generation.

The LVIA is cognisant of the Australian Wind Energy Association and Australian Council of National Trust's publication *Wind Farms and Landscape Values National Assessment Framework* (June 2007), and encompasses the general assessment framework outlined in the National Assessment Framework.

8.1 Method

The LVIA methodology adopted by GBD has been applied to a number of similar LVIA Part 3A Major Projects assessed and approved by the New South Wales (NSW) Department of Planning (DoP), including wind farms in rural NSW.

The LVIA methodology included the following activities and assessments:

- Desktop study addressing visual character and identification of receptor locations surrounding the Project;
- Fieldwork and photography;
- Preparation of Zone of Visual Influence diagrams;
- Assessment and determination of landscape sensitivity;
- Assessment and determination of visual impact;
- Preparation of photomontages and illustrative figures;
- Preparation of a shadow flicker assessment; and
- Preparation of a bench mark study.

8.1.1 *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 Project. The relationship between viewshed, zone of visual influence and visibility is outlined in **Table 8.1** and detailed in **Appendix 6.**

Table 8.1 LVIA definitions

Term	Definition	Relationship
Viewshed	An area of land surrounding and beyond the Project area which may be potentially affected by the Project.	Identifies the majority of the LVIA study area that incorporates receptors that may be subject to a degree of visual impact.
Zone of Visual Influence (ZVI)	A theoretical area of landscape from which the Project structures may be visible.	Determines areas within a viewshed from which the wind turbines may be visible.
Visibility	A relative determination at which a wind turbine or group of turbines can be clearly discerned and described.	Describes the likely number and relative scale of wind turbines visible from a receptor location.

Viewshed: For the purpose of the LVIA viewshed was defined as the area of land surrounding and beyond the Project area which may be potentially affected by the Project.

The viewshed assumptions for the Boco Rock Wind Farm are outlined in **Table 8.2**.

Table 8.2 Viewshed descriptors

Distance from turbine	Potential Viewshed Descriptors
>15 km	Wind turbines less distinct and tending to become indistinct with increasing distance. Some blade movement visible but less discernable with increasing distance. Partially discernable but generally indistinct within viewshed resulting in Low level visibility.
10 – 15 km	Wind turbines visible but tending to become less distinct depending on the overall extent of view available from the potential receptor location. Movement of blades may be discernable where visible against the skyline. Potentially noticeable resulting in Low level visibility.
5 – 10 km	Wind turbines clearly visible in the landscape but tending to become less dominant with increasing distance. Movement of blades discernable. Noticeable but less dominant potentially resulting in Low to Moderate level visibility.
1 – 5 km	Wind turbines would generally dominate the landscape in which the wind turbine is situated. Potential for high visibility depending on the category of receptor, their location, sensitivity and subject to other visibility factors. Potentially dominant within viewshed 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. Dominant and significant within viewshed potentially resulting in High level visibility.

Zone of Visual Influence (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 Boco Rock Wind Farm may be visible from surrounding areas.

Five ZVI diagrams have been prepared including:

- '125' (Layout Option 1) ZVI from tip of blade;
- '125' (Layout Option 1) ZVI from full face of rotor;
- '107' (Layout Option 2) ZVI from tip of blade;
- '107' (Layout Option 2) ZVI from full face of rotor; and
- '127' and '125' ZVI from tip of blade (comparative analysis of a previous design layout with a hub height of 80 m with Layout Option 1 at 100 m).

The ZVI diagrams are illustrated in **Figures 8.1, 8.2** and **8.3** in **Volume 2**, and **Appendix 6**. The ZVI methodology is assumed to be conservative as the screening effects of any structures and vegetation above ground level are not considered in any way. Therefore the Project 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 in included in **Appendix 6**.

Visibility: The level of wind turbine visibility within the viewshed can result from a number of factors including the distance between a receptor and the Project, 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.

8.2 Existing Situation

For the purpose of this LVIA, landscape character was defined as *'the distinct and recognisable pattern of elements that occur consistently in a particular type of landscape'* (The Countryside Agency and Scottish Natural Heritage 2002).

The LVIA identified seven Landscape Character Areas (LCA's), which generally occur within the Project viewshed and include:

- LCA 1 – Undulating grassland;
- LCA 2 – River valley and drainage lines;
- LCA 3 – Broad river valley;
- LCA 4 – Simple slope and ridgeline areas;
- LCA 5 – Upland wetland and plateau;
- LCA 6 – Timbered areas (cultural and remnant native); and
- LCA 7 – Settlements.

The British Landscape Institute (2002) 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*'. The determination of landscape sensitivity primarily results from the nature and degree of perceptual factors that can influence interpretation and appreciation of the landscape, including landform, scale, land cover and human influence or modifications. A full list of the criteria against which landscape sensitivity was assessed is included in **Appendix 6**.

In terms of overall landscape sensitivity, the LVIA determined that each of the seven LCA's within the Project viewshed had a Medium sensitivity to accommodate change, and represented a landscape that is reasonably typical of other landscape types found in surrounding areas of the Monaro, as well as landscapes within the wider regional context of the NSW Southern Tablelands.

With a Medium sensitivity to accommodate change, some characteristics of the landscape are likely to be altered by the Project 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 and open landscape character areas across portions of the Study area, together with the relatively low density and dispersed nature of human settlement patterns and potential receptors located within the Project viewshed.

The LVIA determined that the Project is likely to be an acceptable development within the viewshed, which in a broader context also contains built elements such as roads, agricultural industry, aircraft landing strips, communication and transmitter towers and power lines.

8.2.1 *Perception 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.

It is unlikely that wind farm projects will ever conform, or be acceptable to all points of view, with some receptors accepting and supporting wind farms in response to global or local environmental issues, others supporting the environmental ideals of wind farm development as part of a broader renewable energy strategy, but not considering them appropriate for their regional or local area and others who find the whole concept of wind farms unacceptable. A summary of the changes made to the Project throughout the site design and public consultation period is included in **Chapter 6** Stakeholder Consultation.

The Proponent conducted a Public Opinion Survey and a Landscape Values Questionnaire during the course of 2008/2009 and received responses from the community. From a total of 20 Public Opinion Surveys received by the Proponent:

- 15 respondents supported the Boco Rock wind farm development;
- 3 respondents did not support the Boco Rock wind farm development; and
- 2 respondents were undecided.

From a total of 22 Landscape Values Questionnaire received by the Proponent:

- 13 respondents considered that the Boco Rock wind farm development would have a negative impact on the landscape; and
- 9 respondents considered that the Boco Rock wind farm development would have a neutral or positive impact on the landscape.

As discussed in **Chapter 6** Stakeholder Consultation, these returned surveys and questionnaires are statistically too small to determine an overall trend.

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 survey to establish community perception toward wind farms was undertaken by Epuron for the Gullen Range Wind Farm Environmental Assessment in August 2008. The results of the survey, which targeted a number of local populations within the Southern Tablelands, suggested that around 89 % of respondents were in favour of wind farms being developed in the Southern Tablelands, with around 71 % of respondents accepting the development of a wind farm within one kilometre from their residential dwelling. This result is closely reflected in the responses gathered by the Boco Rock Wind Farm Proponent from a Public Opinion Survey and online survey which recorded 72 % of respondents approving of wind being used to generate renewable energy.

In addition, an informal straw poll carried out by the on-line version of the Cooma-Monaro Express indicated that 75 % of respondents agreed that the Monaro should have wind farms, 23 % of respondents disagreed and 2 % were undecided. The poll was not scientific and only expressed the views of on-line viewers who chose to participate in the poll.

Whilst individual perception and local community attitudes toward wind farm development are an important issue, and need to be considered in terms of potential landscape and visual impacts, there is also the issue of the greater potential societal benefit provided by renewable energy projects, as discussed in **Chapter 4** Project Justification.

8.3 Potential Impacts

The potential significance of visual impact resulting from the construction and operation of the Boco Rock Wind Farm would result primarily from a combination of the following factors:

- The visibility or extent to which the Project structures would be visible from surrounding areas;
- The degree of visual contrast between the Project and surrounding landscape, and the ability of the landscape to visually accommodate the Project;
- The category and type of situation from which receptors may view the Project;
- The distance between receptor and wind farm;
- The duration of time a receptor may view the Project from any static or dynamic view location, and
- The visual sensitivity of receptors.

The criteria used to establish visibility and the significance of visual impact are detailed in **Appendix 6**. Residential and public receptor locations are presented in **Figure 8.4**, located in **Volume 2** and **Appendix 6**.

The LVIA identified a total of 94 residential receptors within 10 km of the Project. An assessment of each residential receptor location indicated that for the '125' and '107' design layouts:

- 12 of the 94 residential receptor locations were determined to have a High visual impact.
- 11 of the 94 residential receptor locations were determined to have a Moderate visual impact;
- 27 of the 94 residential receptor locations were determined to have a Low visual impact; and
- 44 of the 94 residential receptor locations were determined to have a Nil visual impact.

The 12 residential receptors determined to have a High visual impact were all associated landowners hosting wind turbines.

The LVIA also identified a total of 25 selected public receptors with seven of the selected public receptor locations determined to have a Moderate visual impact. These public receptor locations included sections of the Snowy River Way, Bungarby Road, Avon Lake Road and Springfield Road. None of the public receptor locations were determined to have a High visual impact.

Overall the LVIA determined that residential receptors beyond 10 km of the Project would be unlikely to experience a visual impact greater than Low and would more likely be screened by a combination of undulating landform and tree cover.

It should be noted that the term 'visual impact' may not necessarily always imply or represent an individual's negative response toward the wind turbines, and that an individual's perception of wind farms can be positive, negative or neutral.

8.3.1 *Shadow Flicker*

Residential: Wind turbines can cast shadows on surrounding areas at a distance from the base of the tower due to their height. When viewed from a stationary position, the moving shadows can appear as a flicker giving rise to the phenomenon of 'shadow flicker'.

A shadow flicker assessment was prepared for both the '125' and '107' design layouts to determine and illustrate the potential impact of shadow flicker on surrounding receptor locations. As there are no guidelines published in NSW by which to assess the impact of shadow flicker, the assessment adopted the Victorian Planning Guidelines that state:

"The shadow flicker experienced at any dwelling in the surrounding area must not exceed 30 hours per year as a result of the operation of the wind energy facility".

The results of the shadow flicker assessment for the '107' design layout determined that five residential receptors surrounding the Project may be subject to varying levels of shadow flicker, included in **Appendix 6**. The five residential receptors include 'Yandra', 'Rockybah', 'Benbullen', 'Avonlake' (ruin) and 'Coopers Hill', each an associated landowner. Only one of the receptors, 'Benbullen', was identified as having potential exposure to a maximum theoretical duration of shadow flicker greater than 30 hours per year. However, this residence is located to the east of a tall vegetated wind break with additional tree planting around the residence effectively blocking all views from the residence toward any of the wind turbines. As there are unlikely to be any views toward wind turbines from the residence, or building curtilage, it is anticipated that 'Benbullen' will not experience the level of shadow flicker determined in the assessment.

None of the surrounding residential receptors, including 'Benbullen', were identified as having the potential to exceed a maximum theoretical duration of shadow flicker greater than 30 hours per year for the '125' design layout.

Motorists: The shadow flicker diagram (**Appendix 6**) illustrated that motorists may experience shadow flicker sensations along portions of the Avon Lake Road and the Snowy River Way.

There are no specific guidelines to address the potential impact of wind turbine shadow flicker across roads, although there are lighting standards that address the need to minimise the adverse effects of shadow flicker caused by some roadside or overhead objects. The standards suggest that the flicker effect will be noticeable and possibly cause annoyance for motorists between 2.5 and 15 Hz (2.5 to 15 flickers per second), and that a flicker effect between 4 and 11 Hz should be avoided for longer than 20 seconds. As the potential flicker frequency for the Project is likely to be around 1 Hz, it is unlikely that the flicker effect will cause annoyance or impact on a driver's ability to operate a motor vehicle safely whilst travelling along local roads surrounding the Project.

8.3.2 *Photosensitive Epilepsy*

The Canadian Epilepsy Alliance (2008) defines photosensitivity as '*a sensitivity to flashing or flickering lights, usually of high intensity, which are pulsating in a regular pattern – and people with photosensitive epilepsy can be triggered into seizures by them*'. Both the Canadian Epilepsy Alliance (2008) and Epilepsy Action Australia (2008) estimate that less than 5 % of people with epilepsy are photosensitive.

Epilepsy Action Australia (2008) suggest that the frequency of flashing or flickering light most likely to trigger seizures occurs between 8 to 30 Hz (or flashes/flickers per second), although this may vary between individuals. It also suggests that 96 % of people with photosensitive epilepsy are sensitive to flicker between 15 to 20 Hz.

Given the low flicker frequency associated with the Project (around 1 Hz), which falls below the range suggested by Epilepsy Action Australia as a potential trigger for photosensitive epileptic seizures, it is unlikely that the Project would present a risk to people with photosensitive epilepsy.

8.3.3 *Blade Glint*

Blade glint refers to the reflection of sun from one or more rotating turbine blades. The occurrence of blade glint depends on a number of conditions, including the orientation of the nacelle, angle of the blade and angle of the sun. The reflectivity of the blades surface is influenced to some extent by the colour and age of the blade.

Blade glint can be mitigated through the use of matt coatings which, if applied correctly, will generally mitigate potential visual impacts.

8.3.4 *Electrical works*

The Project would include electrical infrastructure to collect and distribute electricity generated by the wind turbines. Electrical works within the Project site (and subject to LVIA under the Part 3A assessment) would include 33 kV overhead electrical lines and the collector substation facility.

The majority of electrical connections between the wind turbines and on-site substation would be via underground cabling, including areas along a number of the prominent ridgelines within the Project boundary. Some overhead 33 kV electrical lines would be required to connect the Yandra, Boco and Springfield Clusters to the collector substation.

The 33 kV electrical lines are a relatively small infrastructure element, and where mounted on single spun concrete poles would appear similar in scale to domestic distribution lines and other small

scale electrical infrastructure located in surrounding areas. Overall the 33 kV electrical lines would tend to be visually contained within the Project site and not result in a significant visual impact for any of the surrounding residential receptors.

8.3.5 *Night Lighting*

The Boco Rock Wind Farm may require night time lighting and during day time periods of reduced visibility. The requirement for lighting would be subject to the advice and endorsement of the Civil Aviation Safety Authority (CASA). CASA is currently undertaking a study into the risk to aviation posed by wind farms and may develop a new set of guidelines to replace the Advisory Circular with regard to lighting for wind turbines withdrawn by CASA in mid 2008.

However, with respect to a duty of care, the Proponent commissioned the Ambidji Group, an independent aviation safety expert, to conduct an Aeronautical Impact Assessment and Obstacle Lighting Review to determine the risks posed to aviation activities by the Project. The Ambidji Group report, as discussed in **Chapter 13** Aviation, recommended that the Project will have no operational significance and will not require lighting. The outcomes of the report (**Appendix 14**) will be submitted to CASA for their comment. Further discussion on the assessment process and requirement for wind turbine lighting is included within **Chapter 13** Aviation.

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

- Control and auxiliary buildings;
- Collector substation;
- Wind turbines and wind monitoring masts; and
- Scheduled or emergency maintenance.

There has been no extensive research in NSW on potential visual impacts from safety lighting. Although, recently Hart Aviation (2009) undertook a review for Sustainability Victoria on wind farms in Australia and the potential impacts and mitigation strategies associated with aviation interests. Hart Aviation (2009) determined that a formal aeronautical/risk assessment should be undertaken by the developer for all wind farm developments, however it should not be assumed that all developments will require obstacle lighting, as some wind farm developments will be in low risk areas from an aviation-operation perspective. In areas where there is a risk, but not as high to warrant extensive obstacle lighting, other forms of mitigation measures should be reviewed, such as the use of medium intensity lights instead of full high intensity flashing lights (Hart Aviation 2009).

The cumulative impact of night lighting, if required (see **Chapter 13** Aviation), will be minimal as there are very few existing structures in the area that have similar hazard lighting. The only night time illumination in the area would originate from residential properties. The impact of night lighting on motorists would also be minimal, with the impact similar to that of other lighting that a motorist would encounter on the roads (e.g. rear tail lights, headlights, street lighting, illuminated signs and lights from nearby houses/farms).

8.3.6 *Cumulative Impacts*

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 winds farms have been constructed within the same locality, and may be viewed from the same receptor location either simultaneously, or within the same overall viewshed. 'Indirect' 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 no additional wind farms that have been constructed, or that are currently being assessed for planning approval, which occur within the nominated viewshed of the Project, and therefore there are unlikely to be any 'direct' cumulative visual impacts that result from views toward multiple wind farms from the receptor locations identified in the LVIA.

The Capital Hill wind farm is the closest existing wind farm (currently under construction) in NSW. Located north of Bungendore, the Capital Hill wind farm is approximately 165 km north east of the Project site and will host up to 63 turbines.

The Snowy Plains wind farm is the closest approved wind farm to the Boco Rock Wind Farm. This wind farm will be located approximately 30 km north west of Berridale, and around 65 km north west of the Project. The Snowy Plains wind farm will host up to 16 turbines. Approved in 2005, construction of the Snowy Plains wind farm is yet to commence.

The closest proposed wind farm is at Shannon's Flat located to the north of Cooma. This proposal, currently subject to feasibility studies, would be for up to 20 wind turbines and approximately 70 km north, and beyond the viewshed, of the Project.

The majority of wind farms within NSW, currently constructed, approved or under consideration by the NSW DoP, are located within the general regional area of the NSW Southern Tablelands, including sites in the locality of Crookwell, Goulburn, and Yass.

An online ABC News report dated 26th August 2009, suggested that the NSW Government planned to fast-track renewable energy projects (including wind farms) in the state's south-east, including the far South Coast and Monaro. It is therefore likely that additional wind farm projects will be proposed within the region and potentially contribute to future potential cumulative visual impact.

The LVIA determined that the Project is unlikely to result in either a direct, or indirect, cumulative visual impact (including potential cumulative impact associated with night time obstacle lighting), in association with any known existing or proposed wind farm in NSW.

8.4 Photomontages

Photomontages have been prepared to illustrate the general appearance of the Project following construction. Seven locations were selected for the '125' design layout (Locations A to G) and two for the '107' design layout (Locations B and C).

Each photomontage location was selected following a desktop review of preliminary ZVI diagrams, together with a site inspection to identify potential representative viewpoints. As none of the non associated residential dwellings surrounding the Project were likely to have a high visual impact, the photomontages were selected from surrounding public areas and road corridors.

The majority of the photomontages represent the '125' design layout as it comprises the greater number of wind turbines and could present a worst case visual impact. Two of the '125' design layout photomontage locations were also selected to illustrate the '107' design layout in order to provide a direct comparison of the alternative design layout.

The photomontages locations included:

- Springfield Road
- Snowy River Way (east of the Sherwin Range)
- Snowy River Way (west of the Sherwin Range)
- Ironmungy Road (west of the Sherwin Range)
- Bungarby Road (west of the Sherwin Range)
- Old Bombala Road (east of the Project site)
- Richardson's Road (east of the Sherwin Range)

The process used to generate the photomontages is detailed in **Appendix 6**. The photomontages are illustrated in **Figures 8.5** to **8.13** located in **Volume 2** and in **Appendix 6**.

A bench mark study was carried out to verify the photomontages for both technical and perceptual accuracy. The bench mark study confirmed that the procedures used to construct the photomontages resulted in a technical and perceptual accurate representation of the wind turbines. The bench mark study is included in **Appendix 6**.

Whilst a professional photomontage provides an image that illustrates a reasonably accurate 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.

The bench mark study is described and illustrated in **Appendix 6**, with **Figures 8.14** and **8.15** located in **Volume 2**.

8.5 Management and Mitigation

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

- Use of a matt and/or off-white finish on the structures to reduce visual contrast between wind turbine generator (WTG) structures and the viewing background (this is subject to final turbine selection);
- Undertake landscape planting where screening is deemed appropriate and in accordance with the outcomes of the assessment process;

- Re-instate disturbed soil areas immediately after completion of construction and decommissioning which would include re-contouring and re-seeding with appropriate plant species and local materials where feasible;
- Enforce safeguards to control and minimise dust emissions during construction and decommissioning;
- Minimise activities that may require night time lighting and, if necessary, use low lux (intensity) lighting designed to be mounted with the light projecting inwards to the Project site to minimise glare;
- Location of the collector substation and other ancillary infrastructure sited sympathetically with the nature of the locality and away from major roads and residences where possible to mitigate visual impact;
- Tracks have been designed to follow contour lines and existing roads will be used as much as possible, which will minimise cut-and-fill and the potential landscape scarring; and
- The majority of electrical connections within the Project site (i.e. cables between the WTG's) have been designed to be located underground (where possible), in order to further reduce potential visual impacts.

8.6 Summary

The LVIA established the current landscape values, predicted visual influence of the Project and other potential visual effects. A variety of methods were used in the visual assessment of the Project, such as public consultation, on-ground surveys, Zone of Visual Influence (ZVI) assessments, photomontage production and assessment of shadow flicker effects.

In terms of overall landscape sensitivity, the LVIA determined that each of the seven LCA's within the Project viewshed had a Medium sensitivity to accommodate change, and represented a landscape that is reasonably typical of other landscape types found in surrounding areas of the Monaro, as well as landscapes within the wider regional context of the NSW Southern Tablelands.

With a Medium sensitivity to accommodate change, some characteristics of the landscape are likely to be altered by the Project 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 and open landscape character areas across portions of the Study area, together with the relatively low density and dispersed nature of human settlement patterns and potential receptors located within the Project viewshed.

The LVIA determined that the Project is likely to be an acceptable development within the viewshed, which in a broader context also contains built elements such as roads, agricultural industry, aircraft landing strips, communication and transmitter towers and power lines.

There are a number of potential visual effects associated with the wind farm. The likely incidence of glinting is impossible to predict, but experience suggests that this occurs relatively rarely. Whilst shadow flicker effects are likely to be experienced at some residences, the effects are not likely to be a significant issue for any of the local dwellings due to careful planning of the turbine layout. The Project will have some degree of visual influence, however it is unlikely that wind farm projects will ever conform, or be acceptable to all points of view.

Surveys which targeted a number of local populations within the Southern Tablelands, suggested that around 89 % of respondents were in favour of wind farms being developed in the Southern Tablelands, with around 71 % of respondents accepting the development of a wind farm within one kilometre from their residential dwelling. This result is closely reflected in the responses gathered by the Boco Rock Wind Farm Proponent from a Public Opinion Survey and online survey which recorded 72 % of respondents approving of wind being used to generate renewable energy.

Overall, the cumulative visual effect of the Project in combination is considered to be low and it is considered that the Project is well-suited to the scale of the landscape and is unlikely to give rise to an unacceptable cumulative visual influence.

8.7 Proposed Transmission Line

The proposed 132 kV transmission line will be assessed separately to this Environmental Assessment under Part 5 of the *EP&A Act*. Possible mitigation strategies to minimise potential visual impacts associated with the 132 kV transmission line include:

- A careful and considered route selection process to avoid sensitive receptors and loss of existing vegetation where possible;
- Wherever possible select angle positions in strategic locations to minimise potential visual impact (e.g. avoiding, where possible, skyline views) and to provide a maximum setback from residences, road corridors;
- Selection of suitable component materials for poles, insulators and conductors with low reflective properties;
- Appropriate control and removal of spoil from construction areas;
- Selection of suitable storage areas for materials or plant with minimum visibility from residences and roads with screening where necessary; and
- Strategic tree or shrub planting between the receptor and the transmission line.

The proposed transmission line development will occur in parallel with the planned upgrade to the existing 66 kV network as described in **Chapter 3** Project Description and the Boco Rock Wind Farm. Other transmission and distribution lines that traverse the locality are displayed in **Figure 3.3**, and those proposed internal overhead power lines are presented in **Figures 3.1** and **3.2**. With respect to the management and mitigation measures outlined above for construction works, and in-situ operational aspects of the proposed transmission line, cumulative impacts are not considered a significant impact. However, if necessary, an assessment will be included in the Review of Environmental Factors for the Project.

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